The Competitive Environment in the Dairy Industry and its Impact on the Food Industry

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Anotace

Cílem článku je vyhodnotit konkurenční prostředí zpracovatelů mléka v ČR. K analýze ekonomické situace podniků v letech 2007 – 2011 je použita finanční analýza. Výběrový soubor 38 zpracovatelů mléka reprezentuje klíčové podniky v odvětví. Základní metodou pro vyhodnocení konkurenčního prostředí je Porterův model pěti sil. V článku je rovněž vyhodnocena technická efektivnost zpracovatelů mléka. Ekonomická krize postihla mlékárenský průmysl již v roce 2008. Zhoršení finanční situace bylo způsobeno nepříznivými cenovými relacemi vstupů a produkce. Současně začali zákazníci více spotřebovávat levnější výrobky privátních značek. Konkurenční prostředí zpracovatelů mléka v ČR se vyznačuje poměrně vyostřenými konkurenčními vztahy. Analýza odhalila, že slabou stránkou českého mlékárenského průmyslu jsou tržně nevyrovnané vztahy na straně vstupů, tak i odbytu produkce.

Klíčová slova

Mlékárenský průmysl, konkurenční prostředí, finanční výkonnost, dodavatelský řetězec.

Abstract

The aim of the paper is to present in-depth view on the competitive environment of the Czech dairy industry. The financial statement analysis evaluates the financial performance of the dairy industry in the period 2007 - 2011. The sample of 38 dairy processors represents leading market players. The basic method for industry analysis is Porter five forces analysis. The paper also comprises brief analysis of technical efficiency of the dairy industry. The economic recession affected the financial performance of the Czech dairy industry in 2008. It was showed by unfavourable input-output price relations. Simultaneously, the economic downturn made consumers to switch from branded dairy products to cheaper private labels, as the analysis proved. The competitive environment within the Czech dairy industry is slightly concentrated with greatly heightened competitive relations. The vertical business relationships within dairy supply chain can be considered as the weakness of the Czech dairy industry.

Key words

Dairy industry, competitive environment, financial performance, supply chain.

Introduction

The dairy industry together with the dairy farms produces essential products to meet nutritional needs of the whole population. This paper defines the dairy industry as the branch of the food industry that includes enterprises processing milk and producing various dairy products from milk (CZ-NACE 10.5). In the Czech Republic, the dairy industry accounts for 17 % of the sales and for 10 % of the number of employees of the total food industry (MoA, 2012).

The competitive strategy of the enterprises within the dairy industry affects economic efficiency of both milk processors and dairy farms. Competitiveness of the dairy industry and the dairy products can be improved in different ways. Látečková, Kučera and Brédová (2009) suggest enhancing the competitiveness of the dairy products by implementation of ICT systems. Gray et al. (2011) identify three main ways to increase the productivity in the dairy industry – the technical change, changes in the technical efficiency and structural adjustment. Generally, one of the key tools for improving competitiveness is the innovation strategy (Krause, 2012).

Another important part of the competitive strategy is the corporate social responsibility. Lušňáková et al. (2012) focus on the implementation of the concept of corporate social responsibility (CSR) in the major dairy enterprises in Slovakia. They conclude that the concept of CSR significantly affects the business activities of some dairy farms in Slovakia. Even though, some of them have large reserves in implementation of the CSR concept.

Mejstříková, Mezera and Plášil (2011) briefly evaluate the financial performance of the Czech dairy market. They point out very low profitability and high debt-to-equity ratio relative to the whole sector Manufacture of Food Products (CZ-NACE 10). It is desirable to further support adding value to dairy products as well as promotion of the national quality brand KLASA and regional food brands. (Mezera, Mejstříková, 2011) They also suggest more intensive vertical integration in the dairy industry, especially between farmers and dairy processors.

The dairy market in the EU is distorted by quota system. However, the EU milk quotas expire in 2015 and the whole market will liberalize. Schönhart et al. (2012) expect that a drop in the number of the dairy farms and an increase of total milk volumes will be important consequences of the phasing out of the EU milk quota regime. Abolition of market regulation will change market conditions and the competitive environment within the dairy industry. Lelyon, Chatellier, and Daniel (2012) confirm the large potential of farmers to increase milk production, but they do not expect significant structural changes. It is important to emphasize that the potential to increase milk production will be limited by the demand for dairy products.

Because of lack of published information about the structure and recent economic development of the dairy industry in the Czech Republic, the aim of the paper is to present in-depth view on the competitive environment of the Czech dairy industry. The market overview of milk processors and their suppliers and retailers can facilitate subsequent predictions of possible impacts of abolition of milk quotas on the dairy industry. The paper targets to obtain answers to following important questions:

1. In what way the economic recession affects the financial performance of the dairy industry in the Czech Republic?

2. What type of competitive environment is in the Czech dairy industry?

3. What brands dominate the main market segments and how important are the private labels?

4. What structure has the supply chain in the Czech dairy industry?

Materials and methods

The database Albertina provides data on the financial statements of the Czech milk processing companies as well as on overview of the corporate headquarters and total turnover. As accounting data are available with a lag of t-2, it is possible to use data only for the period 2007 - 2011. A total of 38 out of more than 200 firms in the branch CZ-NACE 10.5 have full accounting data available during the whole period. The number of firms in the Czech dairy industry varies every year with an increasing trend. As shown in table 1, the sample represents leading players in the Czech dairy market. It includes more than 60 % of branch' sales of production, cost of sales, value added and staff costs. On the other hand, small enterprises are not covered due to the lack of accounting data.

The relevant indicators are selected for the financial statement analysis. The financial statement analysis allows for companywide point of view, not owners expectations. Moreover, enterprises have various shares of remunerated liabilities and different attitudes to paying taxes (deferred taxes, payable taxes). So, the indicators of profitability use EBIT (Earnings before Interest and Taxes), instead of Net Income. Similarly, the total company turnover instead of sales of goods and production is used. The financial statement analysis consists of following indicators:

A) Indicators of profitability:
   - Return on Assets (ROA) = EBIT/Total Assets
   - Return on Sales (ROS, Profit Margin) = EBIT/Total Turnover

B) Value Added per Staff Costs: Value added = (Sales of goods – Cost on goods sold) + (Sales of production – Cost of sales)

C) Net Working Capital per Total Assets: Net Working Capital = Current Assets – Current Liabilities

D) Indicator of cost efficiency: Cost of sales/ Sales of production

E) Indicators of liquidity:
   - Current Ratio = Current Assets/Current Liabilities

- Acid Test Ratio = (Current Assets – Inventory)/ Current Liabilities
- Cash Ratio = Short-term Financial Assets/ Current Liabilities
- Accounts Payable Turnover Ratio in Days = Short-term Accounts Payable/ (Total Turnover/360)

F) Turnover indicators

- Assets Turnover = Total Turnover/Total Assets
- Long-term Assets Turnover = Total Turnover/ Fixed Assets
- Inventory Turnover = Total Turnover/ Inventories
- Accounts Receivable Turnover in Days

= Short-term Accounts Receivable/ (Total Turnover/360)

G) Indicators of capital structure

- Debt Ratio = Liabilities/Total Assets
- Credit Debt Ratio = Bank Loans & Overdrafts/Total Assets
- Short-term Debt Ratio = Short-term Liabilities/Total Assets
- Long-term Debt Ratio = Long-term Liabilities/Total Assets

In order to make benchmarking of financial indicators within the branch, results of the financial analysis present weighted average, median, 25th and 75th percentile.

A) Sales of production (´000 CZK)

	2007	2008	2009	2010	2011*
Branch 10.5	44,046,209	41,212,726	36,276,046	37,040,407	38,080,173
Sample	28,228,023	27,733,798	24,041,346	24,359,869	25,916,082
%	64.1	67.3	66.3	65.8	68.1

B) Cost of sales (´000 CZK)

	2007	2008	2009	2010	2011*
Branch 10.5	39,488,156	37,508,394	30,809,674	33,032,507	34,262,394
Sample	25,590,561	25,791,220	20,856,098	22,236,008	23,607,677
%	64.8	68.8	67.7	67.3	68.9

C) Value added (´000 CZK)

	2007	2008	2009	2010	2011*
Branch 10.5	5,899,776	5,063,694	5,899,324	5,322,627	5,187,280
Sample	3,696,004	2,997,978	3,404,410	3,191,144	3,301,854
%	62.6	59.2	57.7	60.0	63.7

D) Staff costs (´000 CZK)

	2007	2008	2009	2010	2011*
Branch 10.5	3,118,834	3,161,603	3,340,424	3,352,249	3,228,236
Sample	1,784,098	1,834,184	1,920,475	1,990,112	1,955,710
%	57.2	58.0	57.5	59.4	60.6

E) Number of enterprises

	2007	2008	2009	2010	2011*
Branch 10.5	188	178	186	229	225
Sample	38	38	38	38	38
%	20.2	21.3	20.4	16.6	16.9

Notes: * Branch 10.5 in 2011 - estimate of the Ministry of Industry and Trade

Source: Own calculation based on Albertina database and Panorama of the food industry 2011 (Ministry of Agriculture, 2012)

Table 1: The absolute and relative size of the sample in the branch CZ-NACE 10.5.

The main data sources for competitive environment analysis are Albertina Gold Edition, MarketLine and Euromonitor International. The University of Economics in Prague uses the databases and reports. The basic method for industry analysis is Porter five forces analysis (Porter, 1998) - intensity of competitive rivalry, bargaining power of suppliers, bargaining power of customers, threat of substitute products or services, and threat of new competition.

The paper also comprises brief analysis of the economic efficiency of the dairy industry. Analysis of economic efficiency of milk processors respects the view of efficiency in utilization of production factors (Coelli et al, 1998; Fried, Lovell, Schmidt, 2008). To determine the level of the technical efficiency of farms, the Data Envelopment Analysis method (DEA) is applied. Production unit is efficient when there isn't any other unit maintaining the same level of outputs with lower level of inputs, respectively, when there isn't any other unit achieving the higher level of outputs with the same level of inputs. Units with the highest efficiency are located on the efficient frontier. The purpose of the DEA method is to construct a non-parametric envelopment frontier over the data points such that all observed points lie on or below the production frontier. The technical efficiency (TE) estimates vary between 0 (0%) and 1 (100 %). The model assumes variable returns to scale. The issue of returns to scale concerns

what happens to units' outputs when they change the amount of inputs that they are using to produce their outputs. Under the assumption of variable returns to scale a unit found to be inefficient has its efficiency measured relative to other units in the data-set of a similar scale size only. Whereas under the assumption of constant returns to scale a units efficiency is measured relative to units of all different scale sizes. Material and energy, costs on services and wages are inputs, sales of production represents output.

The DEA method is suitable when production units are relatively homogeneous regarding inputs and technologies. The dairy industry largely fulfils this condition. The data source for DEA consists of 44 milk processors excluding companies specializing in the production of ice cream (CZ-NACE 10.52) in the period 2007 - 2010. The analysis of TE determinants will be subject of subsequent research.

Results and discussion

Financial performance of the dairy industry

Table 2 illustrates the results of profitability indicators and labour productivity.

The Czech dairy industry experienced the deepest crisis in 2008 when the global economic recession became evident. The weighted average ROA dropped from 9.81 % in 2007 to 2.36 % in 2008 because of sharp slump in prices of dairy products

Indicator	Boundary	2007	2008	2009	2010	2011
ROA (%)	Weighted Average	9.81	2.36	6.90	4.08	5.85
	75th percentile	12.61	8.63	10.31	6.79	7.41
	Median	7.31	2.93	4.74	3.67	3.67
	25th percentile	3.85	-1.76	1.86	-2.50	-0.37
ROS (%)	Weighted Average	3.18	0.79	2.45	1.41	2.02
	75th percentile	4.66	3.40	4.28	3.01	2.65
	Median	2.83	1.05	1.69	0.97	0.97
	25th percentile	1.29	-1.04	0.72	-0.96	-0.32
Value Added / Staff Costs	Weighted Average	2.07	1.63	1.77	1.60	1.69
	75th percentile	2.26	2.12	1.86	2.16	1.96
	Median	1.87	1.59	1.69	1.55	1.46
	25th percentile	1.38	1.19	1.32	1.11	1.21
Cost of sales / sales of production	Weighted Average	0.90	0.92	0.88	0.90	0.90
	75th percentile	0.93	0.95	0.93	0.93	0.96
	Median	0.88	0.89	0.88	0.88	0.89
	25th percentile	0.83	0.82	0.81	0.83	0.82

Source: own calculation

Table 2: Indicators of profitability, labour productivity and cost efficiency.

in the fourth quarter of 2008 and during the whole year 2009, as shown in figure 1. In the crisis period, industrial producer price index and agricultural producer price index were moving in a similar direction. On the one hand, the dairy processors suffered from low price level of milk products. On the other hand, they used cheaper input from dairy farmers. Relatively favourable input-output price relations induced higher profitability in the dairy processing industry in 2009. It is also obvious when looking at the indicator "cost of sales / sales of production" The more dynamic increase in input prices than output prices caused the poor profitability in the previous year 2008, just as later in 2010.

The dairy industry as the whole did not reduce the total amount of staff costs during 2007 – 2010 (table 2). The first year with lower inter-annual amount of staff costs was 2011. The labour productivity, measured by value added per staff costs, reflects impacts of adverse input-output price relations in 2008 and 2010 and increasing staff costs.

Table 3 provides information about firms' short-term liquidity. The liquidity indicators express the degree of coverage of current liabilities by current assets, which can be relatively easily converted into cash.

The liquidity ratios did not significantly change during the crisis. Generally, companies in the dairy industry have lower liquidity than recommended values, as indicate 25th and 75th percentile of all three liquidity ratios. Generally recommended values of the liquidity ratios for average strategy are 1.6 – 2.5 for current liquidity and 0.2 for cash ratio (Kislingerová et al., 2007).

Net working capital is mostly negative. It is possible for companies with low level of inventory, high inventory turnover and the accounts receivable. The difference between current ratio and acid test ratio indicates relatively low level of inventory, compared to short-term receivables as the most significant part of current assets. The dairy industry operates with perishable products that need to be quickly processed. The storage costs are high. So, firms operating in the dairy industry cannot have large stocks of materials. However, this financing approach can be very risky. Such firms are more sensitive to cash flow volatility and they can face serious financial problems because there is not much cushion between the value of liquid assets and the amount of short-term debt.

Accounts payable turnover exceeds 70 days on average. The most volatile accounts payable turnover have 75th percentile. Their accounts payable turnover is higher than 90 days. Such firms face the risk of struggling for existence.

Table 4 summarizes the turnover indicators which express the amount of sales generated by assets.

The turnover indicators show a sharp drop of sales in 2008 and 2009. The assets turnover and the long-term assets turnover move in the same direction,
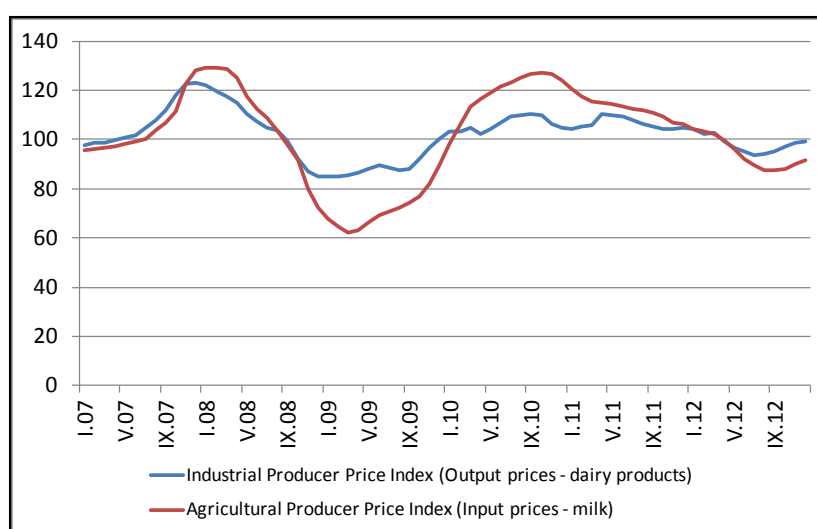
Source: Czech Statistical Office, own processing

Figure 1: Development of price level in the dairy industry in the period 2007 – 2012 (corresponding period of the previous year = 100).

Indicator	Boundary	2007	2008	2009	2010	2011
Current Ratio	Weighted Average	0.88	0.84	0.92	0.92	0.97
	75th percentile	1.24	1.39	1.42	1.38	1.35
	Median	0.95	0.94	1.05	1.06	1.06
	25th percentile	0.77	0.72	0.75	0.76	0.79
Acid Test Ratio	Weighted Average	0.64	0.59	0.69	0.69	0.74
	75th percentile	0.92	0.90	0.97	1.02	1.07
	Median	0.70	0.67	0.79	0.75	0.81
	25th percentile	0.54	0.51	0.58	0.51	0.53
Cash Ratio	Weighted Average	0.05	0.07	0.10	0.08	0.08
	75th percentile	0.13	0.11	0.17	0.16	0.15
	Median	0.06	0.04	0.07	0.07	0.07
	25th percentile	0.01	0.02	0.01	0.02	0.01
Accounts Payable Turnover in Days	Weighted Average	73.45	77.45	71.97	73.04	75.41
	75th percentile	89.96	95.61	88.33	108.58	97.78
	Median	76.36	66.96	71.30	65.38	69.55
	25th percentile	59.53	57.73	57.48	54.61	51.79
Net Working Capital per Total Assets	Weighted Average	-0.076	-0.104	-0.043	-0.050	-0.019
	75th percentile	0.119	0.148	0.146	0.124	0.184
	Median	-0.031	-0.036	0.020	0.025	0.031
	25th percentile	-0.147	-0.166	-0.151	-0.164	-0.142

Source: own calculation

Table 3: Indicators of liquidity and net working capital.

Indicator	Boundary	2007	2008	2009	2010	2011
Assets Turnover	Weighted Average	3.08	2.98	2.82	2.90	2.89
	75th percentile	3.40	3.17	2.77	3.35	3.07
	Median	2.90	2.70	2.50	2.53	2.47
	25th percentile	2.10	2.19	2.11	2.09	1.89
Long-term Assets Turnover	Weighted Average	7.26	6.67	6.08	6.55	7.19
	75th percentile	10.10	8.42	7.42	8.25	9.09
	Median	6.77	6.16	5.72	5.83	5.90
	25th percentile	4.78	4.64	4.50	4.35	3.86
Inventory Turnover	Weighted Average	20.77	18.72	21.36	21.58	21.36
	75th percentile	29.98	31.89	30.06	38.39	27.22
	Median	20.61	19.45	20.12	20.69	19.73
	25th percentile	15.57	14.42	12.69	12.06	13.72
Accounts Receivable Turnover in Days	Weighted Average	43.42	40.17	42.54	44.17	50.44
	75th percentile	56.90	54.63	53.44	55.91	54.61
	Median	51.48	42.47	45.65	43.47	46.01
	25th percentile	36.61	35.18	33.38	34.30	33.39

Source: own calculation

Table 4: Turnover indicators.

unlike the inventory turnover. The inventory turnover increased in 2009 due to the low value of inventory as a consequence of low input prices of raw milk. The accounts receivable turnover is lower than accounts payable. So, companies in the dairy industry use supplier credits and short-term credits to a large extent.

Table 5 completes the picture of the financial situation by indicators of the capital structure.

The debt ratio is relatively high compared to recommended level of 50 %. The average debt ratio in the dairy industry is about 70 % and ranges mostly from 50 % (25th percentile) to 80 % (75th percentile). Such high values emerge from a high use of short-term liabilities including credits as shown by negative net working capital (table 3). During economic downturn, companies in the dairy industry tried to cut down their dependency on bank loans and overdrafts. Thus, the credit debt ratio has been significantly lower since 2009. Comparing long-term and short-term debt ratios, it can be revealed that the companies are able to quickly reduce short-term indebtedness, not long-term debts. The long-term debts substantially dropped in 2011.
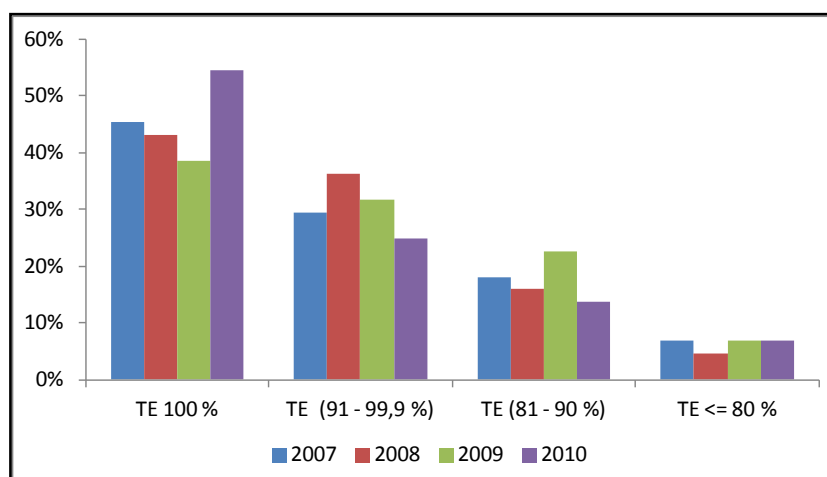
The technical efficiency in the Czech dairy industry is relatively high (figure 2).

About 75 % of dairy processors on average are fully effective or highly effective with TE above 90 %. There is one quarter of enterprises doing less well, and could improve the input-output efficiency.

Indicator	Boundary	2007	2008	2009	2010	2011
Debt Ratio (%)	Weighted Average	74.81	76.18	70.41	71.92	69.72
	75th percentile	87.59	86.45	80.05	86.38	80.04
	Median	71.25	69.59	64.79	68.37	69.23
	25th percentile	60.39	52.47	53.79	52.90	51.14
Short-term Debt Ratio (%)	Weighted Average	62.91	64.01	56.38	58.88	60.53
	75th percentile	74.39	71.04	64.96	70.26	71.25
	Median	59.87	56.69	50.36	55.10	52.06
	25th percentile	44.25	42.15	36.14	37.71	32.71
Long-term Debt Ratio (%)	Weighted Average	12.55	12.62	14.53	13.55	9.76
	75th percentile	17.22	17.73	16.03	20.17	17.11
	Median	7.78	6.92	6.47	5.52	7.92
	25th percentile	2.42	2.21	1.02	0.82	1.56
Credit Debt Ratio (%)	Weighted Average	26.24	26.33	21.76	21.44	21.96
	75th percentile	29.44	31.86	29.08	24.11	26.57
	Median	15.99	19.81	13.81	12.72	13.63
	25th percentile	3.79	6.46	0.00	0.00	0.00

Source: own calculation

Table 5: Indicators of capital structure.

Source: own calculation

Figure 2: Distribution of technical efficiency in the Czech dairy industry (2007 – 2010).

The structure of the dairy industry – the degree of rivalry

The Czech dairy industry covers relatively important segment in the European dairy market. MarketLine data (2012) inform that the Czech Republic accounts for 1.7 % of the European dairy market value. Since the Czech EU accession there have been some important mergers and acquisitions. For example, AGROFERT HOLDING acquired Olma Olomouc and Mlékárna Hlinsko. French group Lactalis owns the majority share in the Czech dairy Mlékárna Kunín.

Table 6 shows the concentration ratio CR_4 for the 4 largest market players in the Czech dairy industry. The values express the shares of production values in the total branch CZ-NACE 10.5 (in current prices).

The level of concentration in the Czech dairy industry in the period covered by the assessment shows a slightly decreasing trend. The concentration ratio in the Czech dairy industry varies around 35 %. MarketLine database presents higher market shares of the key market players – the three leading players (Madeta a.s., OLMA, a.s., Groupe Danone) generate more than 40 % of the market value. Such market structure comes near loose oligopoly. The oligopoly means a market form in which a market or industry is dominated by a small number of sellers. The leading players operate on the whole market, so the competition among them is fierce. Furthermore, there is a considerable downward pressure on prices by grocery retailers because the leading distribution channels in the Czech dairy market are supermarkets and hypermarkets with more than 50 % share of the total market's value. Independent retailers account more than 20 % of the market (MarketLine, 2012). Barring the leading market players, there is also a large number of small and medium enterprises so called "oligopoly hem" operating either on the whole market or are regionally based.

Figure 3 depicts the shares of yogurt and sour milk products brands. Figures 4 and 5 focus on the drinking milk products and cheese brand shares in the period 2009 – 2012.

|	Major shareholder	2007	2008	2009	2010	2011
Madeta a. s.	Faltha Investment, S.A. (95 %)	13.8%	14.1%	12.9%	11.7%	12.1%
Mlékárna Pragolaktos, a.s.	Müller Sachsen GmbH (100 %)	3.7%	4.8%	5.4%	7.6%	7.9%
Olma, a.s.	AGROFERT Holding, a.s. (100 %)	10.4%	10.0%	8.6%	7.5%	7.4%
Danone, a.s.	PRODUITS LAITIERS FRAIS EST EUROPE - GROUPE DANONE, S.A. (100 %)	7.8%	8.2%	9.7%	7.9%	7.4%
Mlékárna Hlinsko, a.s.	AGROFERT Holding, a.s. (100 %)	5.8%	5.7%	5.7%	5.8%	6.0%
CR₄		**37.8%**	**38.1%**	**36.9%**	**34.7%**	**34.9%**

Source: own calculation

Table 6. Concentration ratio CR_4 in the Czech dairy industry by sales of production.
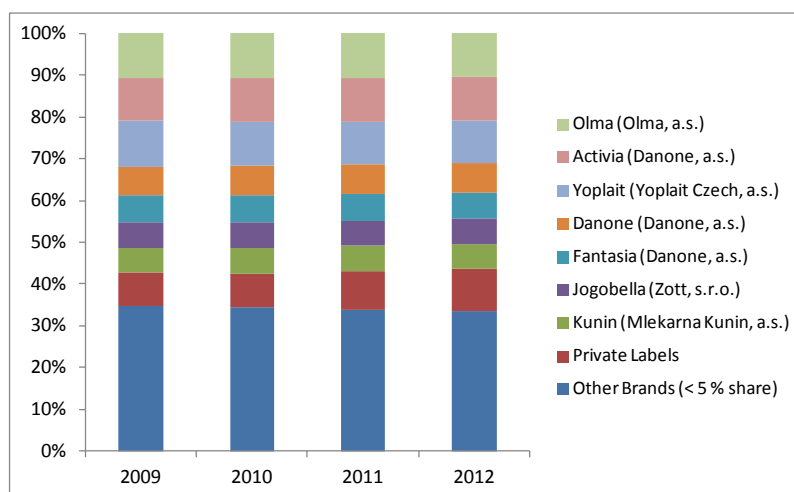
Source: Estimations by Euromonitor International database, own processing
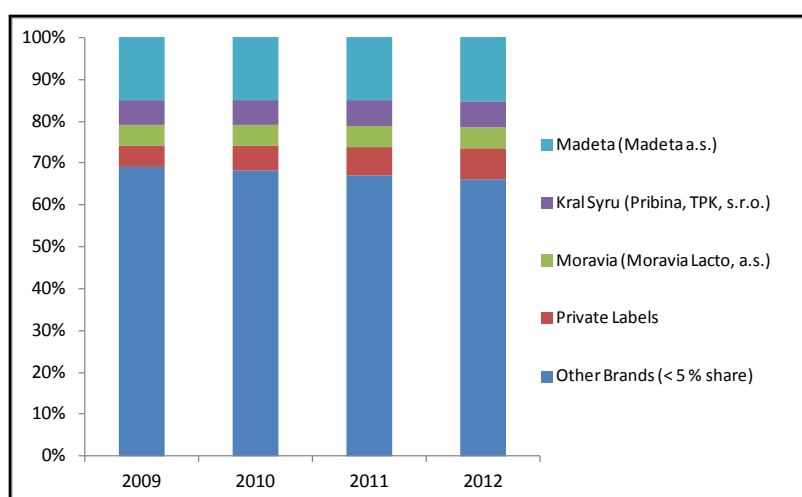
Figure 3: Yoghurt and sour milk products company shares in 2009 – 2012 (% of retail value).
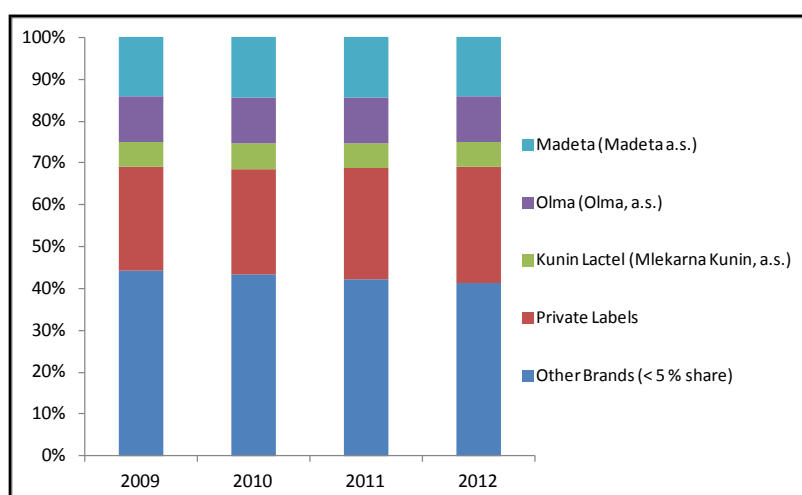
Source: Estimations by Euromonitor International database, own processing
Figure 4: Drinking milk products brand shares in 2009 – 2012 (% of retail value).

Source: Estimations by Euromonitor International database, own processing
Figure 5: Cheese brand shares in 2009 – 2012 (% of retail value).

The dairy market is not dynamic, as shown by the relative stable market shares of main brands in the Czech dairy industry. Nevertheless, increasing market share of private labels in the main product segments of the dairy industry indicates that price becomes important decision factors for Czech consumers. The private labels are strongly developed within drinking milk products, both in long-life/UHT milk and fresh/pasteurised milk, with more than 25% market share (Euromonitor International, 2012b). The market share of private labels in butter exceeds 10 % (Euromonitor International, 2011). Because of the ongoing economic recession, high price sensitivity of milk products and strong power of hypermarkets/ supermarkets, private labels seem to further increase its market share.

Even though Madeta is the leading company in the Czech dairy industry by value of sales, Danone leads yoghurt and sour milk drinks with approximately 25 % share (figure 3). It is top seller of both drinking and spoonable yoghurt and benefits from wide range of product portfolio with well-established brands. Danone takes advantage of consumer trust and loyalty because of long-standing presence on the Czech market since early 90th of the 20th century. Olma takes the second rank in yoghurt and sour milk products with approximately 12 % market share. In this segment, the most popular is plain spoonable yoghurt. Besides this, Olma's product

portfolio includes fresh milk, long life milk, milk desserts and flavoured milk drinks including organic products. It benefits from traditional Czech brand, like Madeta.

Madeta is a leading company in the segment of drinking milk products, followed by Olma and Mlékárna Kunín (figure 4). Madeta has the highest success in flavoured milk drinks and long-life/UHT milk, the second rank takes Olma. Madeta also produces fresh/pasteurised milk, where it ranks second place behind Olma. Mlékárna Kunín has success with long-life/UHT milk. No other brands reach more than 5% value share. Olma and Madeta also have strong position in butter, where they accounted for an aggregate retail value sales share of 37 % in 2010 (Euromonitor International, 2011).

The dominant company within cheese market is Madeta (figure 5) with relative stable cheese market share about 17 % (all cheese brands of Madeta). Madeta is the leading producer of unprocessed cheese in the Czech Republic. The second positions within the Czech cheese market ranks the company Bel Sýry Česko with approximately 14% value share. Because any of its brands does not exceed the 5% value share, company's name does not appear in the figure 5. Bel Sýry Česko is a leading producer of processed cheese and important producer of packaged hard cheese in the Czech Republic. TPK ranks third position. It is particularly famous for soft cheese and takes second position in processed cheese.

There are also specific market segments in the dairy market. Market research by Euromonitor international (2012b) presents, that "Nestlé Česko leads flavoured powder milk drinks and is expected to hold a 47% value share in 2012 with its brands Orion Granko and Nesquick, followed by Emco with an 11% market share. Lactel (by Lactalis) and Bettine brand are is the leading brands in goat milk. Powder milk is dominated by PML Protein Mleko Laktoza and Bohemilk. Within soy milk, brand Alpro Soya (distributed by Emco), followed by Provamel (distributed by Country Life)."

Considering product innovations in the recent years, producers have launched new flavours, new milk products for children, light milk products, spreadable processed cheese with lower salt content, yoghurts with cereals and organic milk products. Producers also focus on new packaging like new package design, family packaging or improving packaging materials to extend the high quality of production.

Bargaining power of customers (buyers)

Buyer power depends on the structure of market channels as well as on the character of the product. In the Czech Republic, as mentioned above, the main distribution channels for dairy products are hypermarkets and supermarkets with more than 50 % of the total market value. The competitive environment of the hypermarkets and supermarkets is highly concentrated. The CR_4 ratio of the grocery retailers company shares in the Czech Republic is 46.3 % in 2011. The CR_4 ratio was 40.1 % in 2007, so the concentration has been gradually increasing. It means that the market share of the four leading grocery retailers – Ahold Czech Republic, a. s., Tesco Stores CR, a. s., Kaufland Česká republika, v.o.s., Penny Market, s. r. o. - indicate oligopoly. The biggest grocery retailers are multinational companies with strong bargaining power. There is not vertical integration between leading grocery retailers and dairy processors. Thus, the consumer price setting is highly independent on suppliers (dairy processors) and considers the purchasing power and preferences of final consumers of food products. Moreover, all main hypermarkets and supermarkets started to increasingly promote their cheaper private labels brands. It also affects the brand competition environment within the dairy industry. The increasing market share of private labels brands indicates that the price sensitivity of milk products becomes higher.

Bargaining power of suppliers (dairy farms)

The dairy processors are dependent on one major raw material – milk. There are no basic substitute inputs for the dairy processors. It means that the dairy industry must face bargaining position of dairy farms. Although there is no significant vertical integration between dairy farms and processors in the Czech Republic, the supply chain is based on the long-term contracts. AGROFERT Holding attempts to integrate dairy farms and processors, but it is not typical vertical integration like in Germany or Denmark. Some small dairy farms also process own milk and produce milk products with higher value added, or even organic products, for distribution at local farmers' market, via Internet or via automatic milk vending machines. Large dairy processors often use hedging against price fluctuation as well as against exchange rate changes, when they export milk.

The number of suppliers in the Czech Republic can be set by the number of registered milk quota holders (table 7). There can be both direct sales

quotas, for producers who sell dairy products direct to consumers, or wholesale quota, for producers who sell milk to approved milk purchasers.

The number of wholesale quota holders has been decreasing. It goes hand in hand with gradual decline of the number of dairy cows. Alternatively, the number of quota holders for direct selling has not dropped against 2004/2005.

Producers' organisations increase the weak bargaining power of more than 2 000 milk suppliers. Bošková (2013) finds that 66.7 % of milk production was sold via 39 registered producers' organisations in 2011. The market share of each of the three largest producers' organisations exceeds 5 % of total amount milk sold. The market share of other seven producers' organisations ranges from 2 % to 5 %. It means that supplier power in the dairy industry can be considered as relatively weak.

Threat of substitute products

Milk and milk products are important components of peoples' diet. Milk products are used directly or indirectly as ingredients for home-made food. Nevertheless, it is possible for consumers to replace conventional milk products with vegetable alternatives, such as soya milk, almond milk, rice milk, oat milk, coconut milk. The vegetable alternatives are often available as powdered milk drinks. Cow's milk can be also replaced by goat milk, sheep milk or buffalo milk. The special alternatives of cow's milk and milk products represent only a marginal market share. Moreover, milk alternatives are relatively expensive. The milk substitutes have marginal market share. The average annual consumption of goat milk is stable at 0.1 kg per capita (Czech Statistical Office).

Butter can be substituted either by other animal fats or by vegetable edible fats and oils. The butter substitutes have more appreciable market position. Nevertheless, the average annual consumption of hardened cooking fats dropped from 3.5 kg (2003) to 3.1 kg (2011) per capita (Czech Statistical Office). Margarine and cooking fats saw an ongoing decline in retail volume and value sales over the recent period due to the decreasing popularity of baking and cooking at home. Overall, the threat of substitute milk products can be assessed as weak (milk substitutes) or moderate (butter substitutes).

Threat of new competition

Generally, enterprises entering into the food industry benefits from higher assets turnover than other branches, especially in primary sectors (agriculture, mining) and real estate activities (figure 6).

Overall, branches that have high assets turnover and relatively low profit margin have lower barriers to entry than branches with high profit margin and low assets turnover (Holečková, 2008). Nevertheless, there are some high barriers to entry in the dairy industry, among them the most important are laws on food safety, customer loyalty to established brands of leading market players and contracting with grocery retailers and milk suppliers. Moreover, dairy products are mostly perishable, which requires high turnover, reliable supply chain and distribution channels. Alternatively, there are relatively weak barriers to entry for small dairy processors looking to sell products at the local market. They must obey laws on food safety and have to build up consumer confidence in the region.

Concerning capital requirements, the dairy industry does require relatively large amounts of capital,

Quota year	Quota holders for		Approved purchasers
	wholesale	direct selling	
2004/2005	2,950	252	82
2005/2006	2,871	264	86
2006/2007	2,699	197	82
2007/2008	2,581	176	82
2008/2009	2,479	162	83
2009/2010	2,344	249	83
2010/2011	2,182	268	84
2011/2012	2,072	276	81

Source: Yearbook of the livestock production in the CR 2011

Table 7: The number of milk quota holders and approved milk purchasers.
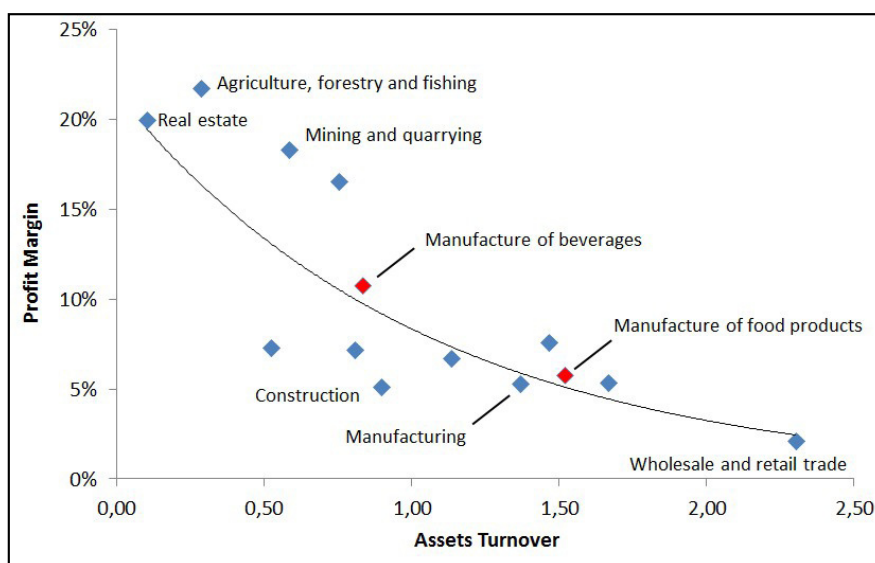
Source: Own calculation based on data provided by the Ministry of Industry and Trade

Figure 6: Profit Margin and Assets Turnover in selected branches in the CR (2011).

Processing of	Number of completed projects	Investment expenditures per project ('000 CZK)
Oils and fats	5	20,079
Milling products	27	17,973
Milk products	39	15,899
Tea blends/herbs/spices	14	10,724
Fruit and vegetables	43	9,387
Meat products	115	8,768
Feeds	23	8,518
Wine grapes	46	7,524
Honey products	7	5,750
Other products	17	8,736
Total	336	10,412

Source: Own calculation based on data provided by the Ministry of Agriculture

Table 8: Number and average investment expenditures of completed projects in RDP measure I.1.3.1 by branch (2007 - 2011).

compared to other branches of the food industry, because of strict regulations for hygienic milk processing and packaging. Table 8 shows average investment expenditures of completed (settled) applications within measure I.1.3.1 "Adding value to agricultural and food products" of the Rural Development Programme in the period 2007 – 2011.

It can be concluded that investments in modernisation of small and medium milk processors belong to the most capital-demanding projects among other food-processing branches. It relates to the need for investments in advanced technological equipment for processing dairy raw materials and production of dairy products. Average investment expenditure per project was 15.9 million CZK.

Conclusion

The aim of the paper is to present in-depth view on the competitive environment of the Czech dairy industry. The sharp drop of profitability reveals that the economic recession affected the financial performance of the Czech dairy industry early in 2008. It was caused by unfavourable input-

output price relations. The gulf between agriculture producer price index and processors producer price index gave rise to farmers' clamour against low milk prices in 2009. The dairy processors had higher profitability in 2009 than in 2008. The crisis in the dairy sector accelerated the ongoing decline of the milk cow population. The brief analysis of the technical efficiency of the dairy industry shows that one quarter of enterprises could improve the input-output efficiency. In this respect, it is desirable to further promote investments in technology upgrades. The more comprehensive analysis of determinants of the technical efficiency will be subject of subsequent research.

The competitive environment within the Czech dairy industry is slightly concentrated and comes near loose oligopoly. The leading players operate on the whole market, so the competition among them is fierce. Alternatively, there are relatively weak barriers to entry for small dairy processors looking to sell products at the local market. This is particularly noticeable in the increase of number of the small dairies engaged in direct selling of milk and milk products to consumers.

The relationships within dairy supply chain can be considered as the weakness of the Czech dairy industry. At the bottom of the vertical, there are more than 2 000 dairy farmers and 39 registered producers' organisations with rather weak bargaining power, partly because of missing forward integration between dairy farmers and dairy processors. At the upper level of the vertical, there is strong bargaining power of large multinational chain of the hypermarkets and supermarkets. Moreover, the consumer price setting is highly independent on suppliers (dairy processors) and considers the purchasing power and preferences of final consumers of food products. The economic downturn made consumers to switch from branded dairy products to cheaper private labels, as the analysis proved.

The incentives to the dairy industry should more focus on contracting. The bargaining power of dairy farmers should be bolstered up by concentration of dairy farmers to less number and more powerful producers' organisations. It is also necessary to strengthen the position of dairy processors towards retailers, to prevent abuses of dominant market power of big grocery retail chains. Last but not least, it is desirable to continue supporting of consumers education about quality of the Czech dairy products.

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References

[1] Bošková, I. Vývoj trhu s mlékem. Náš chov. 2013, no. 1, p. 20-23, ISSN 0027-8068.

[2] Coelli, T., Prasada, R. D. S., Battese, G. E. An Introduction to Efficiency and Productivity Analysis. Boston: Kluwer Academic Publishers. 1998, 296 p., ISBN 978-0-79-238060-3.

[3] Fried, H. O., Lovell, C. A. Knox, Schmidt, Shelton S. The Measurement of Productive Efficiency and Productivity Growth. Oxford: Oxford University Press, 2008. ISBN 978-0-19-518352-8.

[4] Gray, E., Sheng, Y., Nossal, K., Oss-Emer, M., Davidson, A. Improving productivity - The incentives for change. Australian Commodities. 2011, vol. 18, issue 1, p. 218-234, ISSN 1321-7844.

[5] Holečková, J. Finanční analýza firmy. Praha: ASPI Wolters Kluwer. 2008, 208 p., ISBN 978-80-7357-392-8.

[6]   Kislingerová, E. et al. Manažerské finance. Praha: C.H.Beck. 2007, ISBN 978-80-7179-903-0.

[7]   Krause, J. The Basic Characteristics of Corporate Strategy and Firm Value. Business Systems and Economics [online]. 2012, vol. 2, no. 1, p. 20-32, ISSN 2029-8234.

[8]   Látečková, A., Kučera, M., Brédová, K. Increasing of competitiveness of dairy products in Slovakia through the application of information systems. Agricultural Economics – Czech. 2009, vol. 55, issue 8, p. 384-391, ISSN 0139-570X.

[9]   Lelyon, B., Chatellier, V., Daniel, K. Production strategies after the end of milk quotas: An analysis based on bio-economic modeling. Productions Animales. 2012, vol. 25, issue 1, p. 67-76, ISSN 1152-5428.

[10]   Lušňáková, Z., Kleinová, K., Šajbidorová, M., Šajbidorová, V. Implementation of the CSR concept in the enterprises of Slovak dairy industry. Economics of Agriculture. 2012, vol. XII, no. 2, pp. 78 – 94, ISSN 1338-6336.

[11]   MarketLine. MarketLine Industry Profile – Dairy in the Czech Republic. An Informa Business. March 2012. Reference Code: 0144-0711.

[12]   Mejstříková, L., Mezera, J., Plášil, M. Positive and negative aspects of financial economic development in selected branches of the food industry of the CR in 2007, 2009 as revealed by spider analysis. Agris On-line Papers in Economics and Informatics. 2011, vol. 3, issue 2, p. 39-54, ISSN 1804-1930.

[13]   Mezera, J., Mejtříková, L. Structural and economic aspects of the dairy industry in the Czech Republic (in Czech). Bulletin of the Institute of Agricultural Economics and Information. No. 12/2011. URL: http://www.uzei.cz/left-menu/publikacni-cinnost/bulletin-uzei/2011/bu1112.pdf (cited: 09.03.2013).

[14]   Ministry of Agriculture (MoA). Panorama of the food industry of the Czech Republic (in Czech). Prague: Ministry of Agriculture, 2012.

[15]   Porter, M. E. Competitive strategy: techniques for analyzing industries and competitors: with a new introduction. New York: Free Press. 1998, 396 p., ISBN 0-684-84148-7.

[16]   Schönhart, M., Larcher, M., Schmid, E., Stiglbauer, C. Perspectives and intentions of Austrian milk producers towards the phasing out of the EU milk quota regime. Journal of the Austrian Society of Agricultural Economics. 2012, vol. 21, issue 1, p. 85-94, ISSN 1815-1027.

Electronic licensed sources:

[17]   Euromonitor International (2012a) – Yoghurt and sour milk products in the Czech Republic. December 2012.

[18]   Euromonitor International (2012b) – Drinking milk products in the Czech Republic. December 2012.

[19]   Euromonitor International (2012c) – Cheese in the Czech Republic. December 2012.

[20]   Euromonitor International (2011) – Oils and fats in the Czech Republic. October 2011.