

ASSESSMENT OF ECONOMIC EFFICIENCY OF CONVENTIONAL AND ORGANIC AGRICULTURAL ENTERPRISES IN A CHOSEN REGION

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Abstract

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The present paper is aimed at assessing the economic efficiency of organically farming agricultural enterprises in a chosen region of the Czech Republic. The results recorded in the organic farming sector were confronted both with conventional agriculture and FADN (Farm Accountancy Data Network) enterprises in the respective region. Economic efficiency has been evaluated firstly by means of a production base (equity, assets, and liabilities). Secondly, profit indicators (operating profit, accounting profit) have been employed while monitoring the share of profitable and loss-making farms. Different profitability ratios were calculated per one hectare of farmland in order to provide a thorough comparison with conventional farming. Last but not least, the research strived to assess the overall economic and financial situation of agricultural enterprises by means of the following ratios: profitability, liquidity, indebtedness, interest coverage and total assets turnover. Following the research findings, several suggestions related to the database improvement and subsequent profitability assessment in the sector were formulated.

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economic efficiency, organic farming, conventional farming, legal entities, profit, ratios

In all business undertakings, the need for economic efficiency and sustainability has been increasing in today's highly competitive environment and globalized markets. All kinds of enterprises in all sectors strive for success, development and innovation, seeking a better market position or leadership.

However, the position of agriculture among other national economy sectors is really exclusive due to its importance for food safety, nutrition, environment care and protection. It can be stated that reaching economic efficiency in this sector is more complicated due to production process and market process specificities.

As a matter of fact, the above also applies to organic farming where even more factors (e.g. higher production costs, stricter production process

regulations, regulations related to selling organic products etc.) are involved and can thus hinder economic efficiency. Nevertheless, support and subsidies for the organic farming sector seem to be desirable as people's interest and demand for quality and safe foodstuff, animal welfare and natural resources sustainability have been increasing recently.

Nowadays, the era of cheap natural resources is nearing its end and almost all enterprises try to use the existing available resources in the most effective and efficient way. It is vital to use these resources in a sustainable manner in order to minimize environmental impact. Therefore, the room for organic farming development and its support remains very much in situ.

Economic efficiency belongs to key topics that are dealt with by many authors. Farrel (1957) was the first to tackle the productive efficiency issue: *A company is technically efficient in case it can continue producing the same volume of goods using a lower amount of one production factor without increasing at the same time the amount of the second production factor*. Mankiw (2000) said about efficiency in general: *Efficiency stands for a maximum use of scarce resources in the society*. For Samuelson and Nordhaus (2001), efficiency is: *The use of economic resources bringing a maximum level of satisfaction attainable with given inputs and technologies*. Hindls *et al.* (2003) define economic efficiency on the company level in the following way: *Economic efficiency generally means company's ability to appreciate the resources used in business undertaking*. Petráčková (1995) says on efficiency: *... efficiency of the resources used in production evaluated from the viewpoint of the results*.

Foreign research related to economic efficiency of organic farms and its comparison with the conventionally farming enterprises deals with many diverse areas. It is therefore very hard to summarize the outcomes with a view to confirming or disproving the economic success or failure. Each study uses its own monitoring (choice of farms in different climate and production conditions, choice of methods and approaches used for evaluation etc.), which makes a comparison more complicated.

The issue of efficiency is raised especially in relation to farmers' changeover from conventional farming to the organic one.

Several surveys carried out with conventional farmers (e.g. in Belgium) recorded significant ignorance and underestimation of the organic farming sector's economic potential. There persists a view that restrictions related to organic farming necessarily lead to lower income. De Cock (2005) considers this negative expectation as a key factor of Belgian farmers' unwillingness to switch from the conventional to organic farming system. Kerselaers' model (2007) also draws from Belgian agriculture. By means of concrete accounting data of both organic and conventional farms, Kerselaers points out potential changes in income structure stemming from the transition to organic farming. According to his model, economic efficiency is not definitely positive in all enterprises and depends mostly on the type and nature of farms.

In their studies, Madau (2005, 2007) and Kumbhakar *et al.* (2009) confirm a lower economic efficiency of organic farms in comparison with the conventional ones. Those studies also adopt a rather reserved stance on transitions to organic farming and do not see economic profit as very real.

On the other hand, several studies (e.g. Nieberg (1997), Diafe (1999), Offermann and Nieberg (2000)) deal with the farms where transition to organic farming was driven mostly by higher profit expectations and where these expectations were fulfilled. However, the above statements have to be accepted carefully as the samples analyzed always

entailed also enterprises that recorded a lower profitability rate than conventional farms.

While Lund *et al.* (2002) or Nowak (1987) consider financial performance as a decisive factor limiting the existence of organic agriculture (i.e. they do not mention other factors), other authors (e.g. Schulze Pals, 1994; Köhne and Köhn, 1998; Lampkin and Padel, 1994) mention more factors to be taken into account before transiting to organic farming. In their view, economic motivation is even less important than non-economic factors such as e.g. environment protection, animal welfare, psychosocial characteristics etc. Those aspects should be also taken into consideration while interpreting economic data related to organic farms even if the economic performance is very important.

Economic efficiency research outputs within agricultural enterprises (both organic and conventional) in the Czech Republic are also quite varied.

Some authors deal with efficiency in general – e.g. Šarapatka and Urban (2006), Kopta and Kouřilová (2008) or Kouřilová (2010). On the other hand, Živělová *et al.* (2003), Jánský *et al.* (2006) or Hrabalová and Zander (2006) are concerned with economic efficiency measurement within chosen agricultural enterprises (organic versus conventional). The above authors monitor efficiency of chosen crop and animal products (organic farms are usually focused on dairy cows and suckler-cows in animal production and wheat, potato and oat growing in crop production).

Economic performance of agricultural enterprises is monitored and recorded also by state authorities and bodies. The Institute of Agricultural Economics and Information Prague (IAEI) is concerned with detailed economic characteristics in its FADN CZ (*Farm Accountancy Data Network*) database. These economic categories include costs/yields for legal entities and incomes/expenses for natural persons. Nevertheless, this aggregate database comprises data for both conventional and organic enterprises. Moreover, it includes only about 8% of all organically farming agricultural enterprises. As a result, these data cannot be generalized or considered representative for the whole sector.

The Institute of Agricultural Economics and Information (IAEI) – division Brno – annually gathers information related to the organic farming sector development for the Ministry of Agriculture (Hrabalová *et al.*, 2012). Apart from common statistical data concerning the production base, economic performance of organic farms is monitored and since 2007 the share of profitable organic farms (in relation to the production focus) has been recorded too. However, we can state that there is a significant lack of more detailed economic indicators.

Thus, the present research strives to reflect this reality. By means of economic analysis, the research is concerned with efficiency and subsequent viability and sustainability of organic farming

in our conditions. The results were confronted with conventional agriculture. Following the outcomes of the analysis, the authors endeavour to suggest measures contributing to a better flow of information on the profitability of the whole organic farming sector. The findings should also serve as a useful feedback for state authorities that subsidize the development of the organic farming sector. In other words, the survey results clearly show whether the financial means have been employed effectively.

Even if the author is dedicated to the topic in the long-term (Brožová, 2009; Brožová, 2011a, 2011b), there is still a room for further economic evaluation of the organic farming sector. Recently, the authors strive to pursue previous researches within the framework of which a map portal of farms in the South Bohemian region has been developed. These researches were carried out in close cooperation with other co-workers (Vaněk *et al.*, 2010 and 2011). The authors would like to carry on developing economic aspects of the issue. In the pilot stage, the South Bohemian region was chosen mainly because of its predominance in organic farming (number of organic farms, area of farmland). Moreover, the data related to organic farming in the latter region were verified and specified thanks to the above-mentioned research activities. Organic farming is mostly concentrated to less favourable montane and submontane areas of the Czech Republic and the South Bohemian region offers suitable conditions for organic agriculture. The South Bohemian region has the biggest area of organically farmed land (14.4% of the total organically farmed land in the Czech Republic – as at 31st December 2011) and at the same time the highest number of farms (13.4% of all organic farms in the Czech Republic – as at 31st December 2011 – Hrabalová *et al.*, 2012). Taking into account the above-mentioned factors, the authors consider the South Bohemian region suitable for presenting the data on economic performance of the whole organic farming sector.

Previous research activities dealt with data validation over organic farms databases. The outputs of the Ministry of Agriculture and those of the Institute of Agricultural Economics and Information were verified over other resources and then complemented by own survey (telephone, on spot). Subsequently, an accurate organic farm location and its subsequent map positioning were realized.

In order to realize the above-mentioned map portal, an original software solution MPRR 1.0 (Map Portal MPRR 1.0) has been created. MPRR 1.0 enables users not only to localize the farm in the map but also to display further information according to various criteria. The users can access data on two levels: basic farm identification (company trade name, farm name, address and legal form) and detailed information (land area of the individual cultures both in transition period and in organic agriculture, control bodies etc.). The results can be filtered for all farms, organic farms

or farms combining both organic and conventional systems. The map output includes as well a detailed methodology.

The SW solution is built on the WWW platform and runs within the Apache Web Server in combination with the MySQL 5 database environment and Google Maps API. Therefore, all Google Maps functionalities are available while working with the MPRR 1.0 map portal.

The main research objective was subdivided into the following aims:

- Monitoring and evaluating the production base of organically farming enterprises (legal entities) with a view to their economic efficiency assessment. The production base was assessed on the basis of equity, assets and liabilities. The outputs were compared with those of conventionally farming enterprises and enterprises in the FADN CZ;
- Assessing economic efficiency of organic farms in comparison with conventional farms using the following indicators:
 1. profit (both in absolute values and per hectare of the farmland);
 2. chosen financial ratios.
- Proposing measures that would improve information flow and awareness related to organic farming profitability and economic performance (both for state administration and farmers).

MATERIALS AND METHODS

In order to assess the economic efficiency of organically farming enterprises and to compare it with conventional enterprises in the chosen region, the following sectional data were used:

- Financial statements of 51 organic farms (legal entities) and 153 conventional farms (legal entities) in the South Bohemian Region for 2008, 2009 and 2010. The data were retrieved from the Soliditet database – Company Monitor (Soliditet, Ltd.). The database imports data from the Companies Register. For the sake of the present survey, the sample entails only legal entities as they are obliged, unlike natural persons, to release their financial statements in the Collection of Documents at the Registration Court.
- Database of the Ministry of Agriculture of the Czech Republic – a free-of-charge public database “A List of Organically Farming Enterprises” as at 31st December of 2008, 2009, 2010.
- State Agricultural Intervention Fund – public database of subsidy receivers.

The sample of organic farms in 2008, 2009 and 2010 represented 48.6% of the total number of organically farming legal entities in the South Bohemian region while the sample of conventional farms accounted for about 19% of the total number of these in the region. The production focus of agricultural enterprises in the sample reflected natural and climatic conditions of the region, i.e. a combination of plant and animal production.

Apart from the above-mentioned primary data, a wide range of complementary resources has been used, especially the FADN database (the data stem from annual reports on economic results of enterprises using double-entry accounting), the database of the Institute of Agricultural Economics and Information (IAEI) – Division Brno (the database is made on the basis of data retrieved by the representatives of control bodies) and the public land register LPIS (*Land Parcel Identification System*).

In order to meet the main research objective, the following analytical tools and methods have been applied:

- primary data mining and information gathering;
- document analysis (studies, researches) aimed at mapping recent scientific approaches and evaluating the results of previous research in the sector;
- economic data analysis – on the basis of both corporate financial statements and publicly available databases;
- survey – in person and over telephone with a view to specify the location of the enterprise and the area farmed (organically, conventionally, combined);
- calculation of chosen ratios (for the sake of production base and economic efficiency assessment) for enterprises in the sample within the framework of elementary technical analysis methods;
- comparison of methodical approaches and previous research results in the scientific domain;
- comparison of the data and chosen ratios (in organic farming and conventional farming) with those presented in FADN CZ within the framework of not only legal entities but also the

individual kinds of legal entities, i.e. cooperatives and trading companies.

- synthesis;
- induction.

The software used – MS Word 2007 and the calculations were performed in MS Excel 2007.

RESULTS AND DISCUSSION

In order to bring in a more complex economic efficiency assessment of agricultural enterprises, it is suitable to start off by assessing their production base and then analyzing their economic profitability. The first part of the research deals with evaluating the production base of organic farms (legal entities) in the South Bohemian region using the criterion of assets (total assets per hectare of farmland, fixed assets per hectare of farmland and current assets per hectare of farmland) and assets coverage per hectare of farmland (equity and liabilities per hectare of farmland). For the sake of comparison between and among the individual kinds of legal entities (cooperatives, trading companies, legal entities total) and also between the two farming systems (organic and conventional) and FADN CZ database enterprises, all ratios were calculated per hectare of farmland.

It would of course seem appropriate to complement the above indicators and ratios by converting the entries into the AWU (Annual Work Unit). However, this is not applicable for the farming systems analyzed. The Institute of Agricultural Economics and Information (IAEI) – Division Brno monitors the staff of organic farms (using their own statistical surveys – Hrabalová *et al.* 2011, 2012). However, the survey results are released in a summary or anonymous form (only for the

I: Production base of agricultural enterprises (legal entities) in the South Bohemian Region in 2008–2010

Ratios Czech crowns.ha ⁻¹	sample	Cooperatives			Trading companies			Legal entities total		
		2008	2009	2010	2008	2009	2010	2008	2009	2010
Assets total	1	41 087	45 387	48 676	73 839	84 683	81 669	68 353	69 955	65 846
	2	71 768	76 116	70 363	70 163	76 960	74 273	71 035	76 393	72 958
	3	56 040	55 312	57 136	56 083	55 951	58 422	55 869	55 340	57 585
Fixed assets	1	19 501	24 238	27 854	45 136	50 756	49 556	40 843	44 596	41 699
	2	43 896	46 750	44 903	38 038	42 644	40 093	41 220	44 873	44 399
	3	33 252	34 577	35 562	35 580	36 691	38 123	33 921	35 207	36 457
Current assets	1	21 080	20 735	20 494	26 885	31 772	29 340	25 912	24 640	23 509
	2	27 719	28 963	25 146	31 703	34 026	33 752	29 539	31 278	28 349
	3	22 111	20 264	21 215	20 183	19 064	20 107	21 402	19 768	20 828
Equity	1	16 408	13 251	12 916	41 901	49 992	47 136	37 632	35 790	33 450
	2	33 689	37 866	32 379	40 399	44 930	43 998	36 754	41 095	41 500
	3	29 984	28 903	29 683	31 278	31 798	31 846	30 327	29 876	30 439
Liabilities	1	24 679	32 136	35 760	31 789	34 475	34 224	30 598	33 984	32 224
	2	38 065	38 032	37 977	29 411	31 578	30 075	34 113	35 081	31 280
	3	26 023	26 392	27 381	24 771	24 069	26 474	25 509	25 421	27 065

Source: authors' own elaboration, based on Soliditet, State Agricultural Intervention Fund and FADN CZ databases

authors' sake). It is therefore impossible to relate these data to the financial statements of concrete enterprises and carry the conversion out. Moreover, the AWU is neither available for conventionally farming enterprises since the FADN database does not entail the data in question.

Table I below shows averages recorded for the above ratios within all legal entities and the individual kinds of legal entities (cooperatives, trading companies) in organic farming system (sample 1), conventional farming system (sample 2) and among FADN CZ enterprises (sample 3) in 2008–2010.

It stems from the above table that legal entities farming conventionally have higher average *assets per hectare* (moreover, the values recorded are quite stable for both cooperatives and trading companies) than the organic farms. However, we can observe significant differences between the cooperatives and trading companies surveyed. In general, cooperatives reach lower figures than trading companies (these on the other hand record higher assets than average values in conventional farming). The figures recorded in the FADN CZ sample fluctuated between sample 1 and 2 while the trading companies recorded a lower figure than both conventional and organic agriculture samples.

As for the *structure of assets*, fixed assets prevail over current assets in all three samples of legal entities (between 54% and 56.3%).

As for the *capital structure*:

- Equity is slightly higher than liabilities in all samples surveyed (reaching between 50.8% and 56.9%).
- More significant differences were recorded between cooperatives and trading companies. The most distinct difference is recorded in the organic farming sector. The equity share is significantly lower in cooperatives (39.9% in 2008, 29.2% in 2009, and 26.5% in 2010) than in trading companies (equity share was 56.7% in 2008, 59% in 2009 and 57.7% in 2010).

However, we can state that both the structure of assets and capital structure differ not only

between and among the samples surveyed (organic, conventional and FADN CZ samples) but also within the samples as such. There are a lot of underlying factors that influence the present state: e.g. the way an enterprise was established, initial resources invested (tangible, financial, know-how, information etc.), owners' approach and policies regarding assets, investments, external financial resources etc.

The second part of the research was focused on economic efficiency assessment within organic farms in the South Bohemian region. Their efficiency was assessed in comparison with conventional farms and FADN CZ farms in the region. While talking about economic performance indicators, *profit* indicators are the first to be mentioned.

Profit indicator was recorded and calculated in the following way:

- Firstly, the profit was recorded in absolute values, i.e. the share of profit-making and loss-making farms in samples 1 and 2 was monitored.
- Subsequently, the profit was also calculated per one hectare of farmland in order to draw a comparison with the third sample. That is why three kinds of profit were chosen: *operating profit 1*, *operating profit 2* and *accounting profit* (economic result for the accounting period).

Svobodová *et al.* (2011) states that: *operational efficiency is expressed in added value and therefore in operating profit 1 (OP1¹)*. Operating profit 1 does not take into consideration the results of e.g. fixed assets sold, accounting for reserves, difference between other yields and costs, including a substantial part of yields represented by subsidies. For each agricultural enterprise, operational subsidies constitute significant financial resources and therefore a great deal of total yields. That is why both categories (OP 1 and OP2²) were analyzed.

- Last but not least, the ratios of profitability were employed – return on assets (ROA) and return on equity (ROE).

Table II below shows the share of profit-making and loss-making farms in sample 1 and 2 for

II: Profit and loss-making organic and conventional farms in the South Bohemian Region. Profitable and loss-making farms in the whole organic farming sector in the CR (in %).

	farms	sample 1		sample 2		IAEI survey
		OP1	OP2	OP1	OP2	OP1
2008	profit	80.6	11.1	75.0	18.7	75.5
	loss	19.4	88.9	25.0	81.3	19.0
2009	profit	72.2	8.3	58.4	18.7	82.8
	loss	27.8	91.7	41.6	81.3	6.7
2010	profit	80.5	9.8	73.0	24.3	90.7
	loss	19.5	90.2	27.0	75.7	9.1

Source: authors' own elaboration, based on Soliditet database, Darmovzalová *et al.* (2010) and Hrabalová *et al.* (2011, 2012)

1 OP 1 = added value – personnel costs – fixed assets depreciation

2 OP2 = operating profit – see line 30 of the profit and loss account

the South Bohemian region in 2008–2010. For comparison's sake, the aggregate results of statistical surveys carried out by the Institute of Agricultural Economics and Information (Division Brno) – are also introduced in the chart (Darmovzalová *et al.*, 2010; Hrabalová *et al.*, 2011, 2012).

It stems from the above table that the share of profitable organic farms was significantly higher than in conventional agriculture in all three years surveyed. However, it was the operating profit 1 (i.e. the result for the accounting period – line 60 of the profit and loss account) that was inclusive of subsidies (operational subsidies³). In case subsidies were not taken into consideration (operating profit 2 – authors' own elaboration), a vast majority of enterprises (both organic and conventional) recorded a loss. The importance of subsidies for positive economic results of agricultural enterprises is clearly illustrated also by the statistical data of IAEI Brno – see Tab. II.

Table III brings an overview of economic results calculated per hectare of farmland and at the same time illustrates the importance of subsidies. We can clearly see from the table that operational economic activities (i.e. OP1) is not efficient (in samples 1 and 2, the FADN CZ does not monitor this category). Recorded averages in both samples were negative. Nevertheless, after taking the subsidies into consideration (operating profit 2), it was only the cooperatives that recorded a loss in all surveyed samples (sample 1, 2 and FADN CZ sample) but only in one year. As far as the accounting profit is concerned, the situation was almost identical with operating profit 2 in the South Bohemian region. Also Šarapatka and Urban (2006) affirm that organic farms depend on subsidies a lot and that these stand for 15–20% of their income. Without being

subsidized, some kinds of farms would go out of business.

As for the profitability per hectare of farmland, legal entities farming organically recorded higher average profits (operating profit 2 = 4, 429 Kč.ha⁻¹; accounting profit = 3, 735 Kč.ha⁻¹) than those farming conventionally (operating profit 2 = 1, 989 Kč.ha⁻¹; accounting profit = 1, 383 Kč.ha⁻¹). If we take a closer look at the individual kinds of legal entities (cooperatives, trading companies), we can observe quite big differences between organic and conventional farming systems. In organic farming, trading companies recorded higher profits (both operating and accounting) while in conventional farming the same applied to cooperatives.

Differences occur not only between and among the individual kinds of enterprises (and also within one kind) but also between the two farming systems (and also within one system). These are not exceptional and it would be very difficult to find a general reasoning for them. Anyhow, even if it is hard or almost impossible to draw an objective comparison, we should still have in mind the dissimilarities arising from the differences in the nature of the two farming systems. These should, as Kouřilová (2006) assumes, indicate lower production effectiveness of organic farms (resulting from stricter norms, limited number of processors, tradability of commodities, objective risks etc.). On the contrary, the effectiveness per one hectare of farmland is higher mainly thanks to the aforementioned subsidies and other factors (higher retail price of bio-products and bio-food, activities diversification etc.).

Production efficiency is influenced not only by purely economic factors (costs, yields) but also by non-economic factors such as e.g. natural and climate conditions, production focus of the

III: Economic results I of agricultural enterprises (legal entities) in the South Bohemian Region in 2008–2010

indicator	sample	Cooperatives			Trading companies			Legal entities total		
		2008	2009	2010	2008	2009	2010	2008	2009	2010
OP 1 Czech crowns .ha ⁻¹	1	-3 956	-10 824	-7 472	-8 553	-10 353	-10 876	-7 783	-11 143	-8 508
	2	-6 071	-10 338	-7 559	-5 423	-8 460	-4 299	-5 775	-9 480	-6 531
	3	-	-	-	-	-	-	-	-	-
OP 2 Czech crowns .ha ⁻¹	1	2 056	-4 039	243	5 983	7 062	4 766	5 325	3 793	4 429
	2	2 749	-699	1 822	4 405	2 684	2 350	3 504	848	1 989
	3	1 005	-1 599	1 608	2 489	332	2 434	1 550	-859	1 897
Accounting profit Czech crowns .ha ⁻¹	1	1 364	-4 602	-444	4 517	6 199	3 762	3 897	2 969	3 735
	2	2 287	-771	1 420	3 675	2 370	1 303	2 921	665	1 383
	3	633	-1 870	1 216	1 725	-159	1 666	1 036	-1 213	1 373

- data not available

Source: author's own elaboration, based on Soliditet, State Agricultural Intervention Fund and FADN CZ databases

3 Operational subsidies include, apart from organic farming subsidies within agro-environmental measures, other agro-environmental subsidies, the Single Area Payment Scheme (SAPS), TOP UP, Less Favoured Areas (LFA) payment scheme etc.

enterprise, market position, managerial skills and also quality information availability and accessibility. Šilerová (2010) assumes that ICT equipment and facilities together with relevant ICT skills enable effective use of sector information.

The last part of the research was aimed at evaluating the economic and financial situation of agricultural enterprises (both organic and conventional) in the South Bohemian region by means of chosen financial ratios. The following ratios have been adopted in order to assess economic efficiency: return on assets (ROA), return on equity (ROE), liquidity, indebtedness, and total assets turnover. The choice of ratios has been limited by availability of data from financial statements (provided by Soliditet Ltd.) and indicators available in the Farm Accountancy Data Network (enabling comparison between organically and conventionally farming enterprises).

The *Return on Assets* (ROA) ratio is one of the main indicators of company's ability to use its resources in an efficient manner. Income expressed in the numerator can take various forms. If it takes the form of EBIT (Earnings before Interest and Taxes), the

attention is drawn mostly to enterprise's operating activity while the influence of financial structure and taxation is suppressed. According to the Czech methodology, operating activity result represents a reliable tool for economic efficiency assessment that can replace EBIT (Mrkvička and Kolář (2006)).

The second possibility (that seems more suitable) is based on using income before taxation in the numerator. However, these data were available only for a few enterprises and therefore income after taxation, i.e. economic result for a given accounting period (line 60 of the profit and loss account) was used.

In order to calculate the ROA, both categories were employed – EBIT to calculate the ROA₁ and economic results attained in a given accounting period to calculate the ROA₂.

It stems from Tab. IV that ROA₁ and ROA₂ are significantly higher in the organic farming sector than in conventional agriculture or in the FADN CZ sample (ROA₂ only). Unlike cooperatives, legal entities and trading companies recorded higher average figures. These findings correspond with the above-mentioned results (including per hectare

IV: Economic results II of agricultural enterprises (legal entities) in the South Bohemian Region in 2008–2010

Ratios	sample	Cooperatives			Trading companies			Legal entities total		
		2008	2009	2010	2008	2009	2010	2008	2009	2010
ROA ₁ (%)	1	2.32	-7.12	1.64	13.96	7.42	3.98	12.99	5.89	3.53
	2	4.74	-1.53	3.57	13.99	-3.56	-3.76	10.48	-2.81	-0.94
	3	-	-	-	-	-	-	-	-	-
ROA ₂ (%)	1	1.22	-7.96	1.16	11.27	8.52	4.07	10.43	7.07	3.53
	2	3.70	-2.11	2.95	12.30	2.46	0.95	9.04	0.78	1.72
	3*	-1	-2	1	1	0	2	0	-1	1
ROE (%)	1	1.44	-33.45	5.85	20.22	13.25	22.62	18.65	8.07	19.83
	2	7.20	-6.64	5.35	21.97	23.92	12.35	16.44	17.41	-12.20
	3*	-2	-3	2	2	0	3	-1	-2	2
Cost efficiency (%)	1	20.12	-4.83	0.45	2.76	-24.11	-24.66	4.21	-25.74	-19.64
	2	43.27	27.68	39.31	48.63	-3.66	-19.20	46.60	7.83	5.18
	3	-	-	-	-	-	-	-	-	-
Total liquidity (x)	1	9.23	11.11	-6.81	5.52	3.45	5.21	5.83	4.15	4.32
	2	2.19	4.98	4.37	2.20	0.38	1.21	2.20	2.07	2.42
	3	4.33	3.46	3.05	2.76	2.80	2.47	3.75	3.19	2.83
Indebtness (%)	1	69.56	75.82	75.69	52.35	55.42	60.35	53.79	58.36	60.29
	2	55.87	52.06	54.45	49.62	55.68	60.13	51.99	54.35	57.95
	3*	31	32	33	31	29	31	31	31	32
Interest coverage (x)	1	2.67	-22.45	5.99	34.29	22.34	19.87	31.51	19.37	18.00
	2	14.52	-3.65	11.16	49.75	14.91	0.18	35.91	-10.78	4.40
	3	-	-	-	-	-	-	-	-	-
Total assets turnover (x)	1	0.28	0.24	0.24	0.69	0.19	0.33	0.66	0.20	0.32
	2	0.43	0.30	0.34	0.45	0.35	0.24	0.44	0.33	0.28
	3	-	-	-	-	-	-	-	-	-

data not available decimal places

* a more precise ratio not available – FADN CZ included only two

Source: author's own elaboration, based on Soliditet, State Agricultural Intervention Fund and FADN CZ databases

calculations) that also confirm higher effectiveness of the organic farming system despite a higher risk rate.

Return on equity (ROE) is the second key ratio used by owners with a view to assess economic efficiency of an enterprise. The present ratio measures the rate of return on the means invested in an enterprise. It measures firm's efficiency at generating profits from equity while the numerator represents net income after taxation. The values recorded in the survey are not so much in favour of organic farming in this case, unlike the ROA ratios. Yet, trading companies farming organically saw better results than those farming conventionally. As for the cooperatives, it was exactly vice versa, i.e. lower averages in organic farming than in the conventional one.

Another ratio illustrating the economic performance of an enterprise is its *cost efficiency*. As this ratio has more modifications, we would recommend (with regard to double-entry accounting enterprises in the samples) to perceive it as the ratio of added value to the costs of goods sold, including production consumption. The above Table IV shows that the averages recorded in organic farming were significantly worse than those in conventional farming. Negative values recorded for most enterprises result from higher external consumption (material, energy, services) that exceeded the total yields in the period surveyed. However, differences in costs between organic and conventional farming can be quite disputable. It cannot be said unequivocally which costs are higher or lower in organic farming than in the conventional one and vice versa. Nevertheless, it can be stated that production consumption (higher seed stock purchase costs, amount of seed stock needed, fuel consumption for cultivation and maintenance of vegetation etc.) is definitely higher in the organic farming system.

Another ratio related to economic efficiency is the *total liquidity* that shows the ability of an enterprise to cover (by short-term financial assets, payables, and stock) its short-term debts (short-term liabilities, credits and borrowings). The figures recorded for the individual kinds of organic farms are well above average when compared to conventionally farming enterprises and those in the FADN CZ database (except for 2010 in cooperatives). On one hand, higher figures can be perceived positively as they eliminate the risk of liabilities default. On the other hand, the means fixed in stock or payables do not bring any profit to the enterprise and therefore decrease its profitability. In this aspect, each enterprise deserves a specific solution and strategy based on the management attitude to risk-taking and profitability requirements.

Indebtedness ratio is used with a view to assess total assets coverage by liabilities and external resources. The ratios calculated for organically farming enterprises show (similarly to most per hectare calculations) that these enterprises have a significantly higher share of external financial

resources than the conventional ones or the ones in the FADN CZ sample. The highest indebtedness rate was recorded for cooperatives (even over 70%). These poor results show (likewise the ROA, ROE or profit per hectare of farmland) a less favourable situation in this kind of legal entities. However, also conventionally farming enterprises in the South Bohemian region recorded a higher rate of indebtedness than those in the FADN CZ sample. Nevertheless, in the mid 90's the indebtedness of conventionally farming legal entities was as well on a higher level (58 %). Since then, it has not stopped decreasing and is far below 50%.

In general, a higher share of external resources can signal lower financial stability and a higher risk rate. On the other hand, a certain rate of indebtedness can prove healthy as it increases capital profitability. This indicator deserves to be seen more in depth, i.e. to be concerned with the structure of the resources, in other words with the share of reserves, long-term and short-term credit, liabilities etc. Nevertheless, this can be done within one single enterprise and not within the whole sample. At this point, we have to content with stating the figures, and having in mind that higher ratio can mean increasing capital effectiveness.

The ability of an enterprise to cover the costs of external resources is expressed in the *interest coverage* ratio. This ratio shows the relationship between the operating profit before tax and interests paid. The differences between and among the individual kinds of legal entities clearly stem from the above Table IV where trading companies recorded significantly higher values. In comparison with the conventionally farming enterprises, the results of organic farms were significantly worse, especially those of the cooperatives (2009 even saw the so-called floating debt).

The last ratio adopted for efficiency assessment is the *total assets turnover ratio* (total sales of goods and own products to total assets ratio). This ratio indicates entrepreneurial activity and effectiveness of fixed and current assets appreciation in the enterprise's production activity. While conventional farm enterprises evince higher volume of assets, assets' use effectiveness within the two farming systems is quite similar. All values recorded for this ratio are quite low, i.e. the ratio of sales to the value of enterprise property is low. In other words, the property is not used effectively in both sectors.

CONCLUSIONS

As we can see from the above tables, the findings and results are quite varied. However, it stems from the research that economic situation of the organically farming enterprises is more favourable. We still need to have in mind that all the results presented in the paper are average. It means that we can always find enterprises that would be far from the average figures recorded. Therefore, all results are to be interpreted carefully. In spite of

all the reservations raised and a lack of a suitable database, the authors consider the research outputs representative. In conclusion, the authors would like to highlight the need for developing a quality database including relevant and valid economic data for the whole organic farming sector.

The above-mentioned lack of sectional economic information and data could be resolved in the following way:

- extending the FADN CZ database so that it would include more organic farms; monitoring organically farming enterprises separately from the conventionally farming ones;
- extending the existing database of the Institute of Agricultural Economics and Information (division Brno) by economic data. As the database monitors almost all organic farms in the Czech Republic, it would then offer opportunities for further analyses.

SUMMARY

The present paper is aimed at assessing the economic efficiency of organically farming agricultural enterprises in a chosen region of the Czech Republic. It strives to analyze as well the viability of organic farms and their contribution to sustainable agriculture and environment. At the same time, one of the paper's aims is to analyze whether the recent databases of organic farms and their structure contribute to meeting the above objectives.

In order to assess the economic efficiency in a comprehensive manner, firstly the production base has been analyzed (equity, assets, liabilities). Secondly, the profit indicator has been employed while monitoring different kinds of profit and chosen financial ratios. The data for organic farms were recorded for a period of consecutive three years (2008, 2009 and 2010) in the South Bohemian region. Subsequently, their results were compared not only with conventionally farming enterprises but also with those of the FADN database.

Primary data (for organic and conventional farms) were drawn from corporate financial statements. Both the FADN CZ database and annual statistical surveys of the Institute of Agricultural Economics and Information were used for the sake of comparison.

It stemmed from the analysis that conventionally farming enterprises (legal entities) have higher average assets per hectare than the organic farms. As for the structure of assets, fixed assets record higher values than current assets in all samples surveyed (organic farms, conventional farms and FADN CZ farms).

In order to assess the enterprises' economic performance and efficiency, profit indicators were chosen. Profits were recorded in absolute values, i.e. the share of profit-making and loss-making farms was monitored. Subsequently, profits were calculated per hectare of farmland (three different profit indicators were employed) and then used for designing suitable efficiency ratios. The research showed that the share of profitable organic farms was (in all three years surveyed) much higher than in conventional agriculture. However, this result was conditioned by including subsidies in the total yields. As for the profit per hectare of farmland, organic farming also recorded higher average figures. The return on assets (ROA) ratio definitely recorded higher average figures than in the conventional farming sector while the return on equity (ROE) was not so much in favour of organic farming. The following financial ratios were adopted in order to assess the economic and financial situation of agricultural enterprises: return on assets, return on equity, liquidity, indebtedness, interest coverage and total assets turnover. All concrete results including detailed commentaries can be found in the present paper.

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