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IMPACT OF THE STRUCTURE OF AGRICULTURAL PRODUCTION TO THE FINANCIAL HEALTH OF FARMS

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Abstract

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The first part of the paper deals with the influence of individual commodities on the profitability and risks of farms. Production structure was given thought share of twelve basic crops in total agricultural production yield. Volume of accumulated profit for five-year income was chosen as viability criterion. The research did not show that specialization in one of the commodities had significantly influenced achieved profitability. The only exception is the production of milk, which clearly lead to lower profitability. Production structure determined the risk of farms. Farms were constantly threatened by both negative profitability, and also steep fluctuations of cash flow (in other of long-term positive profitability), leading to temporary loss of solvency. The analysis showed that different types of production structures lead to different types of threats. The probability of falling into production losses, or that the loss is so great that not even cover variable costs (a farm finds itself under the point of termination of production) was calculated using the EaR method. The results again supported previous findings. Loss is highly likely to be achieved in commodities of animal production. For commodities of crop production the probability of loss was roughly a half, but the probability of exceeding a period of variable costs is higher.

financial health, risk, profitability, structure of production, agricultural firms

An assessment of farms is a part of a long-term project (MSM 6007665806) of the Department of Accounting and Finance at the University of South Bohemia in České Budějovice in cooperation with the Agrarian Chamber.

The results revealed that to interpret the number of economic processes, it is not satisfactory to have standard financial statements only, but it is necessary to analyze the operation data on commodity production. A questionnaire on production structure with calculation of the most important commodities is a part of the research.

The importance of the data has also been revealed in relation to a research of possible dangers and risks to farms. This paper analyses a relation of profitability and risks of production structure.

- The first aim of the paper is determine how the production structure of farms influences their profitability and risks.
- The second aim of the paper is to calculate the profitability and risk of commodities and what are the causes of production risks.

Risk is not defined very clearly in the financial theory. One approach defines risk as ignorance of future events (Knight, 2002). The second approach divides the concepts of uncertainty (the inability to estimate future outcomes) and risk (quantifiable possibility that actual results will differ from expected) (Valach, 2011). The paper assumes the possibility of quantifying risk and therefore is based on the concept of the second approach.

A number of risk assessment methods were extended at the end of eighties of the 20th century. The Value at Risk (VaR) method seemed to be one of the most progressive methods at that time (Chavas, 2004). Currently, the possibilities of use of the method are discussed, especially in relation to the financial crisis. However, the method still provides

the basis for calculation of potential losses in the portfolio of financial assets. The Earnings at Risk (EAR), is presented as a modification of this method (Newbery, 1981). The EaR's classic form defines the maximum profit decrease (compared to the expected value), which can occur for a certain period and a certain level (usually 95%) Development of risks in agriculture was recently discussed by J Hardeker (Hardaker, 2004), or in J. Harwords studies (Harwords, 1999). Jindřich Špička's study used the Value at Risk method to calculate agricultural risk (Špička, 2012). As a tool for the EaR calculation the Monte Carlo simulation was employed (Newbery, 1981).

MATERIAL AND METHODIC

The sample and production structure

The sample was based on farms with a double-entry bookkeeping in 1996–2010. The database of the Faculty of Economics at the University of South Bohemia consisted of 940 farms, 58 of which were selected as they were included in the statistics for at least five consecutive years and provided both financial statement data and data on calculations and profitability of commodities. Based on production volume and an average strike price (less subsidies) total value of realized production for each commodity of a farm were calculated. The sum of those values revealed total volume of operating income from agricultural production. Shares of commodities in total income revealed the production structure.

Impact of production structure on farm profitability

Accumulated profit/loss (the sum of profits) in five years of the research was defined as a limit of success. Due to different sizes of farms the profit/loss was related to an amount of assets in the initial year. The resulting amount revealed the profit produced in five years from an initial crown of assets.

Quite long five-year period was chosen due to great differences in the profit/loss of farms.

High variability of profit led to the fact that the relation between the structure of production (the share of each commodity in total sales) and overall profitability was calculated using the Spearman coefficient, not only by traditional correlation coefficient.

The relation of the production structure and a possible risk was analyzed by comparing a group of farms with no problems to a group of farm at-risk. The null hypotheses stating that there is no significant difference in a share of a commodity to total revenues between farms without problems and farms at-risk was tested to an alternative hypothesis that there is a difference in the commodity share.

Testing was based on comparing mean values by two-sample Student's test at the significance level of $\alpha = 0.05$. Before the test it was necessary to prove that variances in both samples are significantly different or not so that Fischer-Snedecor's F-test was used to define a test statistic of Student's test (Hindls, 1997).

Impact of production structure on risks of farms

Previous research revealed that farms are in danger of long-term losses (Kopta, 2009). The negative profitability causes termination of farms due to an impossible reproduction and renewal of long-term assets. Unexpected and sudden fluctuations in the profit/loss together with a lot of debts (leading to an impossibility of paying debts) are also risky. Defining farms at-risk was based on the above mentioned dangers.

Such entities with loss during the whole research period (with the negative sum of profit/loss in five years) and such entities profitable in the five-year period with at least one year of the negative cash flow (EBIT + depreciation + change of adjustments + changes in net working capital) were considered as at-risk. Those farms were in danger of the loss of solvency and current inability to pay debts. The influence of production structure on risks was based on comparison by farms without risk and farms at-risk.

Profitability analysis of commodities

By the production structure, the influence of the following commodities was analyzed: beef, pork,

I: *The structure of the database under controlled enterprises achieved a five-year profitability*

Cumulative return in 5 years	Number of enterprises absolute	Number of enterprises (relatively)
Companies with profitability over 25%)	4	6.90%
Companies with profitability from 10.01% to 25%	18	31.03%
Companies with profitability from 0.00% to 10%	22	37.93%
Companies with profitability from –10% to –0,01%	9	15.52%
Companies with profitability from –25% to –10,01%	3	5.17%
Companies with profitability below –25%,	2	3.45%
Total	58	100.00%

Source: Farm database + author's calculation

broilers, wheat, winter barley, rye, oat, grain maize, rapeseed, sugar beet and potatoes.

Causes of changes in profitability of these commodities were calculated for every farm in the research. The following factors were analyzed: the number of production units (number of hectares, number of dairy cows, number of feeding days), intensity of production (efficiency, revenue per hectare), costs of production structure (cost per hectare, cost per cow, cost per feeding day) and price of a production unit. Changes in profitability were calculated by the logarithm or functional method. In plant production, an index of its structure and index of price were calculated as well. The calculation of this index needs commensurateness of the extensive indicator so that it was not calculated for the whole agricultural production. Values calculated for each farm were averaged.

Risk analysis of commodities

Milk production, beef production, wheat production, barley and rapeseed production were analyzed. The risk was set as standard deviation of the development of the indicator per hectare in a five-year period (similarly the profit to revenues). Coefficient of variation was used as the most important indicator of risk.

The index defines fluctuations in profitability of a commodity in a farm in a period of five consecutive years. Similarly to the previous case, values were calculated for all 58 farms and then averaged. This was due to results of previous research studies [8] that revealed significant decrease of volatility in revenue of an average farm.

Averaging input data reduces the influence of local changes in productivity. The variability was calculated for indicators of number of production units, production intensity, cost for production unit and price of a production unit (Kopta, 2009).

A probability that a farm will be in a loss were calculated by the VaR (its modification EaR, respectively) method. Risk, that the loss will be of such extent that it won't cover variable costs (the moment of production termination). Due to differences in methods of calculation in farms, the supposed value of fixed costs was adopted according to "Normativy zemědělských a výrobních technologií" publication (Král, 2012).

RESULTS AND DISCUSSION

Impact of production structure on farm profitability and on risks of farms

Tab. II. revealed values for the coefficient of correlation and Spearman's coefficient expressing the relation of commodity share and long-term total profitability of a farm.

Very low values were calculated for both types of coefficients. The exception is the production of milk. Higher specialization in this commodity was proved to decrease achieved profitability. Correlations of winter wheat and sugar beet were found just below the statistical significance. For these crops, it can be assumed that their higher share further increases total profitability.

Tab. III showed that companies at risk of long-term negative profitability were more focused on livestock production. Revenues for these commodities in the total volume of sales were increased by 14 percentage points in milk production (from 22 to 36%) and by 15 percentage points in beef production (from 6 to 21%) in comparison with the average company. Accordingly, the share and structure of crop production was changed as well. A decline of the wheat and the complete disappearance of corn and sugar beets is the most significant. On the contrary, there was a slight (not statistically significant) increase in the share of winter barley. This structure proved that

II: *Correlation between the proportion of crop production mix and profitability*

Commodity	The correlation coefficient between the share of crop and viability	The coefficient of determination between the crop share and viability	Value of Spearman's correlation coefficient
Milk	–0.1204	0.0143	**–0.2250**
Cattle	0.0393	0.0015	0.0120
Pigs	0.0011	0.0000	0.0130
Broilers	0.0033	0.0000	0.0210
Wheat	0.1252	0.0157	0.1630
Rye	0.0261	0.0007	0.0350
Barley	0.0366	0.0013	0.0440
Oats	0.0041	0.0000	0.0120
Corn	0.0821	0.0067	0.0990
Rape	–0.0601	0.0036	0.0780
Sugar Beet	0.0452	0.0021	0.1540
Potatoes	0.0242	0.0006	0.0320

Statistically significant difference (compared to business without problem) in bond
Source: Farm database + author's calculation

III: *Structure of production of a seamless, threatened enterprise (data for most commodities)*

Category of companies	Companies with no problems		Companies vulnerabled by low profitability		Companies at risk of cash flow fluctuations		
Number of companies	34		14		10		
Commodity	The share of commodities in total revenues	Value of profitability of sales (average of 5 years)	The share of commodities in total revenues[7]	Value of profitability of sales (average of 5 years)	The share of commodities in total revenues[7]	Value of profitability of sales (average of 5 years)	The value of profitability of sales in a year of negative cash flow
Milk	22.25%	–7.27%	**36.40%**	–9.30%	12.30%	–6.33%	–6.52%
Cattle	6.10%	2.23%	**20.80%**	3.70%	5.10%	–3.45%	–4.71%
Pigs	8.17%	11.30%	0.00%	x.	2.02%	7.20%	6.87%
Broilers	1.00%	5.60%	0.00%	x.	0.00%	x.	x.
Wheat	17.93%	12.08%	**6.40%**	**4.23%**	**26.70%**	20.88%	**–28.40%**
Rye	1.20%	14.75%	1.90%	7.91%	0.70%	8.69%	7.54%
Barely	12.20%	9.20%	13.00%	8.90%	7.30%	13.64%	**–10.72%**
Oats	1.33%	12.30%	2.50%	7.62%	0.20%	x.	x.
Corn	6.07%	22.60%	**0.00%**	x.	**11.10%**	29.80%	–12.33%
Rape	9.93%	11.54%	3.20%	–3.43%	**17.80%**	18.45%	**–36.96%**
Sugar Beet	3.13%	14.66%	**0.00%**	x.	9.20%	22.08%	15.50%
Potatoes	5.93%	12.97%	11.60%	11.37%	**0.10%**	x.	x.

Statistically significant difference (compared to business without problem) in bond
Source: Farm database + author's calculation

these farms will be located mainly in sub-mountain and mountain areas.

Production structure of farms at risk of cash flow fluctuations corresponds to production areas. Higher volume of revenues for winter wheat, grain maize and rapeseed is statistically significant in particular. Higher share of total revenues was reached by farms with sugar beet production. In contrast, there was a lack of potato production and lower (though statistically insignificant) share of income from livestock production.

Higher share in total crop revenues may not mean that the overall profitability of a farm was influenced by this commodity. Profitability of production of individual products is revealed in Tab. III. It compared results of five-year averages of sales profitability for farms without problems and farms at-risk.

Profitability of production of commodities in the year in which the threat occurred was showed as well for farms at risk of cash flow volatility. An interesting result is the fact that the return of a commodity for farms vulnerable by low profitability corresponds roughly to the results from group without problems. The main reason for the loss of these farms was the focus on non-profitable milk production. Due to the fact that these farms were located mainly at higher altitudes there is no chance to change the structure of production and to increase the focus on crop production. A solution could be found while expanding the production of beef as the profitability of the commodity is above sector averages.

For farms threatened by cash flow fluctuations, the profitability of production of individual commodities was often above the long term average (That was corresponding with data of financial statements, according to which the five-year cumulative profitability of these enterprises was above average). However, the problem is the high variability of the dominant commodities: winter wheat, rapeseed, barley partially. Fluctuations in yields and profitability decreased exercise prices of these commodities sales in some years up to – 36.9% for rape – 28.4% for wheat. This represented a loss of –10.3 and –9.4 million CZK just for these commodities. The total loss then reached almost CZK 20.5 million. Such significant fluctuation of income led to a negative operating cash flow, threatening the existence of the farm. The situation makes worse higher debt burden of these farms. The solution for these entities is in debt reduction. Lower debt eliminates the impact of operational risk. Theoretically, it is possible to expand livestock production structure at risk of decreased profitability.

Farm situation is complicated by fact that in case of fall in yields per hectare of a single commodity, there is a similar decrease in other crops. The research shows that the yield per hectare of crop production commodities is relatively highly correlated. For details see Tab. IV.

The highest correlations were revealed between wheat and rapeseed (i.e. the two most important commodities producing the most important part of

IV: *Correlation of productivity of commodities (in kind units above the diagonal; in CZK below the diagonal)*

Commodity	Milk	Cattle	Wheat	Barely	Rape
Milk	1.000	0.081	0.036	0.079	–0.025
Cattle	0.079	1.000	0.121	0.112	0.089
Wheat	0.033	0.075	1.000	0.278	0.324
Barely	0.002	0.110	0.002	1.000	0.214
Rape	–0.002	0.083	0.036	0.211	1.000

Source: Farm database + author's calculation

revenues). The second most important correlation was revealed for barley and wheat.

The development of yield of livestock is not correlated both among different commodities, and between performance and forage yield per hectare of arable land.

Similarly, a correlation between strike price of a commodity and crop yield (or yield of livestock production) was tested. In this area, there was no evidence of dependency. It can be assumed that the correlation of yields is caused by weather events at the local level (i.e. within the same geographical area). Similarly, it can be assumed that to achieve the yields weather at harvest time is particularly crucial (or at the time of maturing of crops). This finding is supported by the fact that they and yields of winter wheat and oilseed rape are correlated to spring barley.

Profitability analysis of commodities

Previous part of the paper dealt with identifying what commodities affect the profitability and risk of agricultural production. The second part of the article will analyze the factors that affect changes in profitability and lead to the risk of specific commodities. Tab. V showed the results of functional decomposition methods for changes in profit for the important commodities.

Milk production was loss-making during the whole period. The most striking feature of this production is a decrease in number of production units (i.e. reducing the number of dairy cows). Compared to 2005 and 2008, the number of animals decreased by up to 33% (from 317 to 202 animals). Since 2009, a partial stabilization of breeding could be seen (probably as a result of a subsidy policy change).

Reducing production was clearly caused by the increasing loss rates of milk production due to fall in sales prices. Influence on the cost of the production units is negative, but insignificant in comparison with other factors. Moreover, it is most likely caused by a positive increase in annual yields (from the 6,787 to 7,377 liters). There is no significant difference between farms in lowland and mountain areas.

Beef production was (similarly to milk production) influenced by high variability of exercise prices. Tendencies of other factors are difficult to describe as there was high variability among farms. Features of beef production were different in farm from mountain (LFA) areas and lowland areas (NON-LFA). Farms in low areas are typical for an increase in costs per feeding day, an increase of performance (daily increment), an increase of loss (due to exercise prices) and a decrease of production.

Farms in mountain areas were typical for stagnating production with lower intensity related to a decrease in performance. Exercise prices are higher compared to NON-LFA farms.

We can assume that farms use a more environmentally-friendly meat production as a marketing argument, and are able to secure more favorable purchase prices.

Significant drop in pork production makes it difficult to describe this commodity.

Any significant trend was revealed for commodities of crop production. Intensity of production and per hectare yields remained approximately at the same level. Changes in profitability were due price evolution mainly. The development of prices is not characterized by a stable trend, but rather a high variability. Due to the rise in prices higher profitability can be achieved especially in the case of rapeseed production.

Analysis of the impact of the structure using the structure index and the fixed composition index (or structure indices, price index and index of production volume) also revealed a significant influence of prices on the profitability of the company. For details see Tab. VI.

The structure index with the exception of two years, was always more than one (although it was often only a very slightly above). This suggests that management of farms can successfully predict the future development of agriculture as a branch (this applies particularly to increase of rapeseed production as bio-fuels). Years, when the index fell below 1, it can be considered as extreme (impact of drought in those years). Price development was estimated correctly, but profit was affected by fluctuations in yields per hectare.

Risk analysis of commodities

Last part of the paper deals with risks related to production of commodities and crops, revealing causes of variability. The coefficient of variation was chosen as an indicator of the risk. First, it was necessary to determine whether risks have to be calculated from volatility of an average farm, or whether it is necessary to calculate volatility for each farm and to average results. It is evident that

V: *Causes of change in profit of the most important commodities in 2005–2010*

Years	Commodity	Area	Changes of profits	Price of a production unit.	Intensity of production	Costs of production structure	Size of production base
2010–2009	Milk	LFA	2 834 968	2 723 435	36 505	–78 939	153 967
		NON-LFA	1 609 249	1 607 831	126 387	–116 099	–8 869
	Cattle	LFA	–1 186 968	–1 252 532	18 809	–8 372	55 127
		NON-LFA	–632 634	–649 740	17 763	–32 487	31 830
	Wheat	LFA	1 167 076	1 007 927	114 428	–38 760	83 481
		NON-LFA	4 315 105	5 884 001	–1 284 333	–69 772	–214 791
	Barely	LFA	137 187	201 371	–49 926	–11 198	–3 061
		NON-LFA	516 071	707 996	–162 217	–17 710	–11 997
	Rape	LFA	788 353	960 365	–206 936	–13 129	48 053
		NON-LFA	2 369 166	2 695 870	–334 147	–3 475	10 918
2009–2008	Milk	LFA	–4 415 489	–4 380 511	316 580	–339 185	–12 373
		NON-LFA	–3 505 701	–3 426 425	135 567	–288 190	73 347
	Cattle	LFA	267 195	288 190	7 497	–12 071	–16 422
		NON-LFA	43 300	42 629	2 172	–2 617	1 117
	Wheat	LFA	–1 450 909	–2 103 313	664 934	–50 604	38 073
		NON-LFA	–6 824 751	–4 577 871	–1 812 565	–665 488	231 173
	Barely	LFA	–663 114	–619 400	14 986	–26 156	–32 543
		NON-LFA	–2 251 834	–2 067 471	–189 567	–20 949	26 153
	Rape	LFA	–866 931	–903 988	44 942	–59 386	51 501
		NON-LFA	–2 579 674	–2 696 928	95 418	–60 548	82 384
2008–2007	Milk	LFA	359 182	340 974	14 483	–12 878	16 603
		NON-LFA	564 973	560 045	14 965	–41 654	31 617
	Cattle	LFA	109 900	107 238	6 989	–6 751	2 424
		NON-LFA	–662 928	–717 930	60 097	–45 014	39 918
	Wheat	LFA	–778 997	–522 784	–217 157	–62 228	23 172
		NON-LFA	–52 240	–25 076	–21 607	–4 685	–872
	Barely	LFA	–53 077	–45 296	–9 113	–911	2 243
		NON-LFA	983 683	824 708	231 276	–50 991	–21 310
	Rape	LFA	–41 844	–28 954	–8 788	–1 303	–2 799
		NON-LFA	–287 144	–155 859	–130 430	–23 179	22 324
2007–2006	Milk	LFA	598 743	640 926	1 968	–17 150	–27 002
		NON-LFA	866 124	818 252	72 882	–61 704	36 695
	Cattle	LFA	186 588	190 288	10 478	–11 688	–2 490
		NON-LFA	313 260	337 169	2 985	–15 499	–11 394
	Wheat	LFA	1 596 338	1 810 764	–120 647	–113 475	19 696
		NON-LFA	4 103 240	4 412 286	–374 294	–57 770	123 018
	Barely	LFA	619 894	651 060	51 639	–47 699	–35 106
		NON-LFA	1 389 027	1 069 967	461 118	–67 024	–75 034
	Rape	LFA	278 435	400 210	–110 242	–12 883	1 349
		NON-LFA	3 258 231	4 345 199	–977 099	–210 252	100 383

Source: Farm database + author's calculation

(especially in the yields of commodities in crop production), volatility calculated for individual farms was significantly higher compared to volatility of the average farm. It can be assumed that there was an influence of local weather events in individual areas. This type of volatility would be lost in the case of calculating the risk for the average farm. Therefore, it was necessary to calculate volatility for each farm separately and to summarize the final results.

Highest volatility of indicators of return (profit) was reach within crop production. The sources

VI: *Causes of change in profit (influence of structure)*

Years	Area	Changes of profits	Influence of structure	Influence of price	Influence of volume production
2010/2009	LFA	4 022 346	128 715	3 849 702	43 929
	NON-LFA	7 663 896	160 942	7 311 416	191 538
2009/2008	LFA	–7 421 462	81 636	–7 962 316	459 219
	NON-LFA	–15 695 493	376 692	–16 058 001	–14 184
2008/2007	LFA	–1 538 572	24 617	–1 526 220	–36 969
	NON-LFA	2 642 287	–50 203	2 647 626	44 865
2007/2006	LFA	3 815 446	316 682	3 413 956	84 808
	NON-LFA	6 540 142	732 496	5 808 503	–857
2006/2005	LFA	–106 961	–1 390	–111 715	6 145
	NON-LFA	–977 229	93 814	–1 065 400	–5 644

Source: Farm database + author's calculation

VII: *Comparison of volatility of basic factors of firm's profitability (coefficient of variation) and the EaR values*

Commodity	Volatility of price	Volatility of intensity production	Volatility of costs of production structure	EaR (profitability break-even point)	EaR (threshold of variable cost)
Milk	0.419	0.101	0.080	74.25%	4.27%
Cattle	0.183	0.072	0.066	59.19%	6.66%
Wheat	0.603	0.345	0.101	37.73%	21.06%
Barely	0.640	0.372	0.107	41.34%	17.85%
Rape	0.446	0.460	0.118	39.58%	23.14%
LFA Company	x	x	x	63.24%	1.77%
NON LFA Company	x	x	x	33.29%	12.16%

Source: Farm database + author's calculation

of volatility are both price and yield fluctuations. Within commodity production, the highest risk was related to rapeseed and wheat production. The production of rapeseed was related to higher volatility of yields per hectare. Volatility in exercise prices was more important for wheat production. The cost of production was significantly more stable in a year to year comparison. For commodities of livestock production the volatility was caused by fluctuations of exercise prices almost always.

The last analysis covered the calculation of risk using the VaR method (or the EaR as its modification). For details see Tab. VII. This method is able to estimate the maximum potential loss from the asset, i.e, the worst loss that can occur with a certain probability (often with a probability of 5%) in the future. In the paper, a modified value of the indicator was calculated setting the probability that the loss would exceed a specified level. Two thresholds were established. Stricter indicated the break-even point; the second indicated the threshold of variable costs. They represented the end of production based on the economic theory. The corporate practice it means that their expenses has exceeded incomes. This leads to a negative operating cash flow and potential danger of the lack the ability to pay (see risks as defined at the beginning of the paper). The value was calculated for individual commodities and for two fixed production structures. The first production structure matched farms from lowland areas (LFA NON-area), the second focused on farms in mountain areas (LFA area). The calculation for the entire production structure corresponded to the original meaning of the method that is to calculate risk in a portfolio of securities (a portfolio of commodities in this paper). The analysis was calculated for each farm and the results were averaged within each category.

Loss was more likely to be achieved for companies focused on livestock production (over 63%), but the loss did not reach the value of the variable costs with probability of 98%. For businesses in NON-LFA areas focused on crop production the probability of loss was roughly a half (33%), but the probability of exceeding variable cost amounted to 12%. This confirmed the results of previous analysis.

CONCLUSION

The first part of the research aimed at the impact on the profitability of farming did not show that specialization in one of the commodities would significantly affect the profitability achieve with the exception of milk production. Farm specializing in this commodity reached significantly lower profitability.

Another part of paper focused on the possible threat of farms. Farms are threatened both by

negative profitability (which does not allow even basic recovery of assets), and by sharp fluctuations in cash flow (with positive long-term profitability otherwise), leading to a temporary loss of margin. The research showed that farms threatened by lack of profitability were closely focused on livestock production, especially the production of milk. The differences in the profitability of production of the commodity are not statistically significant for successful farms and farms at-risk. Milk production was a loss for all of these farms. Threats are resulting from focusing production structure on this commodity, not from the fact that its production would be loss-making in this category of farms.

Businesses affected by cash flow fluctuations were focused on plant production. The most important part of sales was due to production of wheat and rapeseed. Long-term profitability of these farms was even above sector averages. However, businesses were threatened by fluctuations in the profitability of these dominant commodities. Return on sales in the crisis years dropped to –28% for wheat, and –37% for rape. Thus, a significant fluctuation of income led to a negative operating cash flow, threatening the existence of a farm.

Analysis of the individual commodities confirmed previous results. Livestock production (milk and beef) is characterized as loss-making, the trend is to reduce the size of the production base, increasing the cost per unit of production basis (per cow, per feeding day). Growth of performance was of a positive influence. Variability in profitability is mainly due to fluctuations in sales prices.

For commodities in crop production, trends in farming changes are not very significant. Fluctuations in profitability are mainly due to the development of prices (this factor applied for the whole sample given by and the global price change in the economy) and the effect of changes in yields per hectare (especially local effect on farms). None of commodities revealed the correlation between yield (yield per hectare) and the strike price.

The probability of falling into production losses, or that the loss is so great that not even cover variable costs (enterprise finds itself under the point of termination of production) was calculated using the VaR method (or its modification the EaR) for individual commodities. The results again supported previous findings. Loss is highly likely to be achieved in commodities of animal production (probability of loss is more than 63%), but the loss does not reach the value of the variable costs with probability of 98%. For commodities of crop production the probability of loss was roughly a half, but the probability of exceeding a period of variable costs is 12%.

SUMMARY

In the present article there are presented results of the analysis of the impact of production structure of profitability and risk of farms. The production structure was given by proportion of fundamentals crops on total income from agricultural production. The first part of the analysis concerns the impact of the pattern of the overall profitability. For the viability criteria is taken the accumulated amount of profit for five years of management relative of original value of assets. The investigation did not show that specialization in any of the monitored commodities significantly affect the profitability achieved. The only exception is the production of milk. Undertakings aimed at this commodity shows demonstrably lower profitability.

Production structure determined the risk farms. Farms were constantly threatened by both negative profitability, and also steep fluctuations of cash flow (in other of long-term positive profitability), leading to temporary loss of solvency. The analysis showed that different types of production structures lead to different types of threats. Farms threatened by lack of profitability were closely focused on livestock production, especially the production of milk. Farms affected by cash flow fluctuations were focused on plant production. The main part of sales was due to production of wheat and rapeseed. Long-term profitability of these farms was even above sector averages. However, they were threatened by fluctuations in the profitability of these dominant commodities.

Analysis of the individual commodities confirmed previous results. Livestock production (milk and beef) is characterized as loss-making, the trend is to reduce the size of the production base, increasing the cost per unit (per cow, per feeding day). Growth of performance was of a positive influence. Variability in profitability is mainly due to fluctuations in sales prices. For commodities in crop production, trends in farming changes are not very significant. Fluctuations in profitability are mainly due to the development of prices. The effect of changes in yields per hectare is not so important. None of commodities revealed the correlation between yield (yield per hectare) and the strike price.

The probability of falling into production losses was calculated using the VaR method (or its modification the EaR) for individual commodities. Loss is highly likely to be achieved in commodities of animal production. For commodities of crop production the probability of loss was roughly a half, but the probability of solvency problem is higher.

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