Development of the main production and economic indicators of Czech farms

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Abstract

The aim of this paper is to evaluate the economic situation of Czech farms and its development. The analysis was conducted on the basis of the sample survey comprising farms classified according to their economic conditions – LFA (Less Favoured Areas). The profitability of farms is poor with frequent slumps into deficit. These fluctuations are caused by the dependency of profit on external conditions. An average farm operating in other LFA seems to be the most vulnerable in this respect. Dependency on subsidies is showed most markedly in the mountain LFA. In NON LFA, on the other hand, the influence of other external factors, notably weather and high price volatility, is most notably manifested. The long-term decline in workers is the main cause of the growth of labour productivity. An important trend is the growth in the land rent, which has doubled over the last five years. The share of rented land still constitutes the majority of the utilised land.

Key words: Labour productivity. Profitability. Subsidies.

1. Introduction

Agriculture is of strategic importance for the provision of goods and ensures, in particular, the strategic rate of food security, landscape management and protection of the
environment. The risks associated with conducting business in agriculture result from the specific conditions of agriculture, especially the influence of climate and price changes. Some of the risks are specific to Czech farms. The problem lies in long-term undercapitalisation, high credit exposure of business and finance outflow from the agricultural sector during the course of the transformation. These factors led to obsolescence of equipment, buildings and technologies due to which Czech agriculture has shown relatively low productivity (e.g. Střeleček et al. 2010). Farming is still one of the most risky businesses in the Czech Republic. Farmers are subject to the biggest risk of bankruptcy, credit problems or insolvency. Divila (2004), Kopta (2009), Čechura (2014) and others deal with the problems of Czech agriculture. Investigation based on the analysis of holdings that really went bankrupt revealed that agricultural holdings are in danger due to both the long-term negative profitability and by the steep fluctuation of the profit/loss followed by, the negative cash flow and financial insolvency. The permanently low or negative profitability affects especially agricultural holdings in the mountain and submountain regions.

Czech agriculture has also been significantly affected by political changes. Accession to the European Union was an important milestone. For the first time in the history of the Czech Republic, the agricultural sector is facing direct competition as a result of the European single market. The regional landscape of the European Union changed dramatically during the early years of the 21st Century. Two waves of enlargement meant the number of farmers in the EU more than doubled, increasing from 5.7 to 13.7 million, while the utilised agricultural land area rose from 125 to 174 million hectares, a rise of 39% (Fredriksson et al. 2017).

2. Literature Review

A large number of authors are concerned with the influence of the Common Agricultural Policy (CAP) on the performance of agricultural holdings (Ciaian et al. 2015; Kroupová and Malý 2010; Bakucs et al. 2010; Bojnc and Latruffe 2013; Mary 2013; Rizov et al. 2013), or with a comparison of the amount of subsidies according to the different methods of farm classification (e.g. Roman et al. 2010; Gocht et al. 2013; Sinabell et al. 2013; Latruffe and Mann 2015). Góral and Kulawik (2015) studied the capitalisation of direct payments and other subsidies. Capitalisation of support in the prices of assets is the main source of inefficiency of direct transfers to agriculture, especially those that are to improve the income situation of farmers. The higher the capitalisation, the lower is the efficiency of direct
payments as an instrument supporting the income of agricultural land users. The model of sustainability and multifunctionality of agriculture, based mainly on subsidies, may strengthen the existing logic and consequences of their capitalisation. As they say in their work Reiff et al. (2016) one of the aims of the CAP is mitigate differences in its performance. They were to study disparity in the agriculture and food industry sectors’ performance in the EU countries during the period 2010 to 2013. They used taxonomic measure of development proposed by Hellwig and Ward’s method. The results of both methods are consistent. They confirm the existence of significant disparity in the performance of agricultural sector between the old and new member states. From new member states only Estonia and Latvia are among the top ten positions, remaining accessing countries are listed at last rank positions.

Varga and Sipiczki (2015) evaluated the agricultural producers foreign liabilities, analysed the technological and business conceptions connecting to a variety of financing products in the agricultural financing in Hungary. The aims of a study Ciutacu et al. (2015) are to highlight the differences and the similarities between the European model of agricultural and rural development, and the state of play in the Romanian agricultural sector. According to the authors the farmers in Romania are still strongly disfavoured in relation to their competitors in the old EU Member States. Novotná and Volek (2016) deal with the analysis of difference in labour productivity of farms categorised according to their size, to determine if the set subsidy system influences labour productivity in the size groups of the farms. The analysis proved that the size of a farm has a significant influence on the labour productivity and the consequence of the subsidy policy is a convergence of the labour productivity of the size groups of farms. According Kroupová and Trnková (2014) farms focusing on field production are characterized by high economic performance differentiation. The area of the farm was identified as the most important determinant of the inequality. Operating subsidies eliminate the differences, but the effect of subsidies is not fully transferred to profit inequality. The works of Foltínová and Špička (2014) aims at the evaluation and comparison of the structure of costs linked to the milk production. The authors concentrate on the potential of cost controlling in agricultural production with a special focus on the target costing method. The results reveal that the output price of milk in Slovakia does not cover the total costs. The situation is better in the Czech Republic due to the higher the average annual milk yield.

The aim of this paper is to evaluate the economic condition of Czech farms and its development between the years 2000 and 2015, and to identify the most impacting factors.
The economic results of these farms reflect the state and development of the main economic indicators classified by the production and climatic conditions of business activities.

3. Materials and methods

The data source for evaluation was taken from the sample survey and economic indicators of a control sample of farms carried out at the University of South Bohemia since 1996. Each year around 100 farms from the whole territory of the Czech Republic are included in the sample. The analysis of the structural and economic development of the farms is based on primary data obtained from the standard statements – Balance sheet from 31st December, Profit and Loss Statement from 31st December, Annual report on the harvest of agricultural crops, the Report on the areas of agricultural crop-sowing on 31st May. This data is supplemented by a questionnaire which includes other production data from the company. The paper classifies the farms according to the percentage of agricultural area in LFA to the total utilized agricultural land.

With regard to the relation with the less favourable areas (LFA), the holdings are classified according to the FADN methodology (2008) as follows: Mountain areas (LFA M) – more than 50% of utilized agricultural area in mountain LFA; Other LFA (LFA O) – more than 50% of utilized agricultural area in other and the specific LFA and LFA M percentage is less than 50%; NON LFA – more than 50% of utilized agricultural area is outside of LFA.

In the context of the analysis of the main economic indicators with relation to the farms, we will pay attention to the production structure, development of major production indicators, development of the structure of assets and capital, profitability and cost ratios, efficiency of production factors, financial stability and development of financial health. For the analysis of profitability, activity, capital structure and liquidity, basic ratios of financial analysis (Giroux, 2003; Peterson and Fabozzi, 2006) will be used and next the assessment of the interaction between these indicators in the period 2000 to 2015. The effectiveness of the factors of production is evaluated by means of the indicators of production intensity, labour productivity and activity. The relationship of revenues to the area of agricultural land is characterized by the intensity of production, the relationship to the number of employees is characterized by the labour productivity and the relationship between revenues and assets is characterized by the activity (turnover). The monetary indicators are expressed in constant prices applicable in 2000 by using average annual rates of inflation (CZSO 2016).
For the evaluation of the development of subsidies the so called index of dependence on subsidies (IDS), which represents the cost rate adjusted for subsidies, where the value over 100% express what share of company costs is needed to be covered by subsidies (CZSO 2010),

$$IDS = \frac{Costs}{Revenues – Subsidies}.$$ 

The dependence between the volume of subsidies and profit in time is described by linear regression and correlation analysis.

For the aggregate evaluation of financial health of companies the most widely used prediction and diagnostic models were used. In our case the IN05 index was used (Neumaier and Neumaierová, 2005). The IN95 model is specified also for the branch of agriculture, but the parameters of model IN05 were estimated on newer data. For this reason also the Slovak model G-index (Gurčík, 2002) suitable for evaluation of the Czech agricultural companies (Kopta, 2009; Zdeněk, 2012), was included into the evaluation of companies.

Index IN05 in the form of Neumaier and Neumaierová (2005),

$$IN05 = 0.13 x_1 + 0.04 x_2 + 3.97 x_3 + 0.21 x_4 + 0.09 x_5$$

where $x_1$ stands for assets / debt; $x_2$ is profit before interest and tax / interest cost (max. 9); $x_3$ is profit before interest and tax /assets; $x_4$ is revenues / assets and $x_5$ is current assets / short-term liabilities.

G-index in the form of Gurčík (2002):

$$G = 3.412 x_1 + 2.226 x_2 + 3.277 x_3 + 3.149 x_4 - 2.063 x_5$$

where $x_1$ stands for retained profits / assets; $x_2$ is profit before tax / assets; $x_3$ is profit before tax / revenues; $x_4$ is cash flow / assets and $x_5$ is inventories / revenues.

The dynamics of these indicators is assessed by using the average growth rate,

$$\bar{I}_x = \frac{1}{n} \sum_{i=1}^{n} \frac{x_n}{x_i},$$

or the average increment,

$$\bar{\Delta}_x = \frac{x_n - x_1}{n-1},$$

where $x_1$ is the value of the indicator at the beginning of the series, $x_n$ is the value at the end of the series, $n$ is the length of the series.
4. Results and Discussion

4.1. Control sample characteristics

In 2015, the sample consisted of 104 entities, 46% of which operated outside LFA, 39% in LFA O and 15% in mountain LFA. In terms of the legal structure of business, the agricultural holdings are divided according to the following proportion where 43% represent cooperatives, 41% joint-stock companies, 14% limited liability companies and 2% belong to physical entities. The average business size is illustrated by assets amounting to CZK 158.2m, CZK 136m in LFA M, CZK 167.3m in LFA and CZK 158m in NON LFA. The average total revenues of the holding amount to CZK 93.7m. In terms of area, the smallest revenue is produced in LFA M (CZK 70.6m), followed by LFA (CZK 95.8m) and NON LFA (CZK 99.7m). The average number of employees per business is 51.0: the lowest number of employees is in LFA M (44.9 workers), followed by LFA O (52.8 employees) and NON LFA (51.5 employees). According to the EU classification (EC 2006) 62.5% of farms are classified as small businesses and 37.5% medium-sized businesses.

In 2015, the average agricultural holding farmed an area of 1,614 hectares of agricultural land, considering that the smallest agricultural area belongs to an average holding in LFA M (1,354 ha), 1,686 ha belongs to LFA O and 1,641 ha to NON LFA. The proportions of arable land are as follows: NON LFA 87%, LFA O 72% and LFA M 49%. In 2015 the share of rented land dropped by 3 percentage points compared to the previous year. The rented land, however, represents the majority of utilised land. Production structure (the ratio of specific activities to revenues) in each region in 2015 is specified in the table (Table 1).

<table>
<thead>
<tr>
<th>Production</th>
<th>LFA M</th>
<th>LFA O</th>
<th>NON LFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fieldcrops</td>
<td>24.3</td>
<td>33.0</td>
<td>50.6</td>
</tr>
<tr>
<td>Wine</td>
<td>0</td>
<td>0</td>
<td>0.9</td>
</tr>
<tr>
<td>Horticulture</td>
<td>0.2</td>
<td>0</td>
<td>0.1</td>
</tr>
<tr>
<td>Other permanent crops</td>
<td>0</td>
<td>0.2</td>
<td>1.9</td>
</tr>
<tr>
<td>Milk</td>
<td>33.5</td>
<td>33.8</td>
<td>20.4</td>
</tr>
<tr>
<td>Other grazing livestock</td>
<td>29.3</td>
<td>15.3</td>
<td>5.6</td>
</tr>
<tr>
<td>Granivores</td>
<td>0.8</td>
<td>4.5</td>
<td>9.8</td>
</tr>
<tr>
<td>Non-agricultural production</td>
<td>12.0</td>
<td>13.1</td>
<td>10.8</td>
</tr>
</tbody>
</table>

Source: Calculation on a sample of farms

4.2. Development of the indicators of production

The volume of total revenues (at 2000 prices) in an average business increased from CZK 60.9m in 2000 to CZK 67.9m in 2015. According to LFA, the highest revenues per
hectare were in NON LFA (CZK60.8k per ha in 2015), the average growth rate, however, is the slowest since 2000 (2.86% per year). The production growth in LFA O (CZK 56.8k per ha in 2015) was faster (3.58% per year). LFA M (CZK 52.1k per ha in 2015) show an annual increase of 3.8%. The growth of average revenues per hectare at constant 2000 prices (adjusted for inflation) is significantly slower and represents 1.6% in LFA M, 1.38% in LFA O and 0.68% in NON LFA. Sales from the products and services at constant prices fluctuates during reference years, their annual averages are almost unchanged – there has been a slight decrease in LFA M (-0.48%) and in NON LFA (-0.1%). The growth rate can be observed in other LFA (0.86%).

Natural yields for most crops grow despite frequent annual fluctuations. An average farm reports the growth in winter wheat yield from 4.63 t per ha in 2000 to 6.99 t per ha in 2015, with the highest yield reached by the average holding in NON LFA (7.31 t per ha). Yet, the average growth rate is the fastest in LFA M (3.4% per year). The average growth rate in NON LFA is 2.7% and 2.5% in LFA.

In 2015 livestock density was 55.5 heads per 100 ha and since 2000 has increased by 4.7% in the sample. The other LFA areas showed an increase of 6.6% and mountain LFA 15.2%. The lowest increase compared to 2000 can be observed in NON LFA (12.4%). Yield from livestock production in the average business has increased during the reference period from 0.811 kg per day to 0.930 kg per day. The highest yield is in NON LFA (0.953 kg per day) with an annual increase of 1.18%. LFA O demonstrates the average growth rate of 0.71%, and in mountain LFA 0.82% per year. According to the analysis elaborated by Kopeček et al. (2009), all model results with the current intensity of cattle fattening indicate negative profitability in this sector. Positive results in this sector could be achieved if the cattle fattening was increased to a level of 0.9 kg per day. Our sample of agricultural holdings shows such a yield only in case of the average holding in NON LFA and in LFA O in 2013 and 2015 (Figure 1).
Cederberg and Stadig (2003) estimated that approximately 50% of European beef production is a by-product of the dairy sector. In Germany, approximately 70% of total beef production can be regarded as a secondary product in the dairy sector. In the United States the annual milk yield increased between 1990 and 2009 from 6,700 to 9,300 kg and from 4,900 to 6,600 kg in Germany. As with the yield from the dairy and beef industry, these sectors tend to be independent of each other (Zehetmeier et al. 2012). Our sample of farms indicates that compared to 2000 the average annual milk yield increased steadily from 5,057 l per cow to 7,834 l in 2015, while the average growth rate in NON LFA is 3.45% per year, in LFA 2.71% and in LFA M about 2.2% per year (Figure 1).

Downsizing of swine production is a significant long-term trend. Although the popularity of pork with consumers is almost unchanged, the situation on the Czech market is unfavourable to the producers because of the low production efficiency and cheaper prices of meat imported from abroad (Duda and Křížová 2010). The study (Boudný and Špička 2012) reveals the average profitability of pig farming is negative in all yield intervals. Our sample shows that the average yield growth for fattening pigs is 1.3% per year in NON-LFA and 1.2% in LFA O. The lowest yield, and its rather stagnant growth, can be observed in LFA M (-0.16% per year). The pig population in the average agricultural holding has fallen since 2000, from 944 heads to 417 heads, i.e. by almost 56%. The most pronounced decrease to less
than 7% of the year 2000 is reported in mountain LFA. The pig population has decreased to 30% compared to 2000. The slowest pig population decline concerns LFA O (to 48%).

4.3. Development of assets and capital structure

The assets structure of the average farm in terms of long-term and short-term items does not show any trend. In 2015 fixed assets were reported as follows: 66.7% in LFA M, 64.6% in LFA O and 61.5% in NON LFA. A closer look into individual groups reveals significant trends. Whilst at the beginning of the survey the percentage of lands was 1.1% to the value of the total number of lands in the average farm, in 2015 this percentage reached 13.2% (Figure 2). The fastest growth of land percentage can be observed in NON LFA, i.e. by 0.97% point per year up to 16.1%. This trend is also evident in the land percentage development within the cultivated farmland, which showed a growing tendency from 2.7% in 2000 to 15.6% in 2015.

![Graph of share of tangible fixed assets on total assets](source: Calculation on a sample of farms)

The percentage of buildings included in the assets has declined in all areas (-0.65% of a point per year). The most significant decrease was reported in NON LFA. The decline is partly due to a decline in the net asset value and to the growing percentage of lands in particular. Differences are caused by a typical production specialization in the areas.
Machineries showed a slight increase in their share in the assets in all areas, i.e. 14.1% in 2015 (insignificant differences among areas).

Differences in the debt ratio are insignificant among the areas. In 2015 the debt ratio was 33.6% in NON LFA, 34% in LFA O and 39.6% in LFA M. The development of the debt ratio of the average agricultural holding showed a declining trend in all areas, the average annual change is -0.33% point in the LFA M, -0.93% points in LFA O and -1.01% points in NON LFA. In 2015, no farm from the sample showed accounting over-indebtedness.

This decrease was due to a decline in the long-term debt ratio at the nearly constant short-term debt ratio. Long-term debt ratio decreased in all areas, and in 2015 reached the following values: 27.4% in LFA M, 21.3% in LFA O and 22.4% in NON LFA. Long-term debt ratio is given by long-term bank loans and long-term liabilities (the ratio of reserves is negligible – less than 1% in 2015). Changes in the structure of long-term external financing are shown in the graph (Figure 3). The ratio of long-term liabilities has been continuously decreasing. They are predominantly represented by other long-term liabilities, where agricultural cooperatives recorded liabilities from transformation.

This fact leads to the accumulation of profits from previous periods within the equity. The period between 2000 and 2004 was marked by accumulated losses, the change in this
situation can be observed in 2005. The following years were characterised by an increase in accumulated profits, the share of this item on the assets is: 17% in LFA M, 9% in LFA O and 19% in NON LFA.

4.4. Trends in the profitability and cost/revenue ratio

The synthetic indicator of profitability is usually a return on equity (ROE) based on profit after tax. This indicator includes both the formulation of efficiency of the manufacturing process and its economy, conditions of commercialization and also the company’s capital structure. Considerable fluctuations in the development of profit and of course profitability can be seen from year to year. They are influenced by many external factors. The graph (Figure 4) shows the return on equity of an average farm in different areas and its comparison to the annual average inflation rate.

The significant declines in profitability occurred in 2002, 2003 and 2009. Average farms in all areas made a loss due to unfavourable external conditions. Since 2010 the average return on equity in all areas has been positive and exceeded the inflation rate. The average values in 2015 are as follows: 4.9% in LFA M, 3.4% in LFA O and 4.4% in NON LFA.

![Figure 4: Development of profit on equity, corrected profit to assets and the inflation rate](image)

Source: Calculation on a sample of farms
Long-term profitability which includes, besides the current profit, retained profit and revenue reserves, has been growing in all areas. In 2015 long-term profitability reached 36.4% in LFA M, 35.3% in LFA O and 39.6% in NON LFA.

In terms of the cost/revenue ratio, the most significant item is the cost/revenue ratio of consumption from production. Its values are relatively stable over time and the long-term average is 46.4% in LFA M, 50.4% in LFA O and 53.0% in NON LFA. The reference period reflects changes in the structure of consumption from production, which is due to changes in the cost/revenue ratio of materials and services. The fastest grow can be observed in the services/revenue ratio in LFA O (0.28% of the point per year), in NON LFA (0.24% of the point per year), and in LFA M (0.23% of the point per year).

The services/revenue ratio includes, among other things, the land rent/revenue ratio. Although the land rent/revenue ratio is not its major component, a significant increase was marked - up to 0.025 in LFA M, 0.031 in LFA O and 0.039 in NON LFA. This increase occurred despite the decreasing percentage of rented land. In 2015 the average land rent amounted to CZK 1,582 per m2 in LFA M, CZK 2,032 per m2 in LFA O and CZK 2,865 per m2 in NON LFA. Land rents in the sample have been monitored since 2011. These last five years have shown an enormous increase – the average growth rate is the highest in LFA O, which represents 21% per year, 18% in LFA M and 14% in NON LFA.

Operating subsidies are included in agricultural holding revenues and hence profits. In 2015 the percentage of operating subsidies in total revenues amounted to 25.6% in LFA M, 17.6% in LFA O and 14.4% in NON LFA. These shares have been stable since 2006 and have only slightly varied from the above figures in the given years.

If we express the profitability of the total capital exonerated from operating subsidies (operating profit minus operating subsidies to total assets, ROAcorr) the loss is significant in all areas throughout the observed time interval. In all referred years the lowest adjusted profitability can be observed in LFA M and the highest in NON LFA (Figure 4).

The average growth rate of subsidies during the reference period was 8.3% per year. The largest increase in subsidies recalculated per hectare of farmland was reported during the Czech Republic’s accession to the EU, with the most dynamic growth in the first three years after this accession. In 2015, the subsidies for the average agricultural holding amounted to CZK 9,850 per ha. The highest amount of subsidies was distributed amongst agricultural holdings in mountain LFA (CZK 13,321 per ha), with an average growth rate of 9.7%. On the
other hand, the slowest growth was reported in agricultural holdings in NON LFA, with an average of 7.6% per annum.

Since 2000 the index of dependence on subsidies has not fallen below the threshold of 100%. Its value increases over time (with a fluctuation in 2009), the average annual growth rate is 1.2% point in LFA M, 0.7% point in LFA O and 0.4% point in NON LFA. In 2015, an average holding farming in LFA M used subsidies to cover 26.7% of the costs, 16.7% in LFA O and 11.5% in NON LFA.

Dependence of the profit per hectare on subsidies per hectare was examined by using multiple linear regression. The LFA group was chosen as a dummy variable. The values of regression coefficients (Table 2) demonstrate that an increase in subsidies per hectare of CZK 1,000 will increase the profit per hectare by CZK 416 in all areas. If a zero value of subsidies was applied, the profit would be only in the holdings situated in NON LFA (CZK 173 per ha). Both LFA would make a loss (CZK -1,894 per ha in LFA M and CZK -408 CZK per ha in NON O). Multiple correlation coefficient shows a moderate degree of statistical correlation, $r = 0.42$.

<table>
<thead>
<tr>
<th>Table 2: Regression coefficient estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect</td>
</tr>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>Subsidies per ha</td>
</tr>
<tr>
<td>Dummy LFA M</td>
</tr>
<tr>
<td>Dummy LFA O</td>
</tr>
</tbody>
</table>

Source: Calculation on a sample of farms

4.5. Efficiency development of production factors

The average efficiency of production factors can be described by the following indicators: the relationship between yields and agricultural land area is characterized by the intensity of production, the relationship between yields and average registered number of employees is characterized by labour productivity and the relationship between yields and assets is characterized by activity indicators.

The intensity of production at constant 2000 prices reveals a slightly increasing trend. The highest intensity of production is in NON LFA. The fastest growth is observed, on the other hand, in LFA M. In each year, the farms in LFA M have achieved 60 to 86% of the intensity of production with regard to the farms outside LFA – the extensive method of farming is associated with lower inputs, but also with significantly lower outputs.
The turnover rate of tangible fixed assets on average farms in all areas decreases (Figure 5). In 2015, the highest value is in NON LFA (1.006) and decreases in poorer areas (0.867 in LFA O and 0.763 M in LFA M). Decline in the turnover rate is due to the higher increase in the value of fixed assets compared to the revenues growth (this reflects the impact of investment subsidies). Decline in the turnover is generally considered unfavourable in financial theory. When evaluating the given agricultural holdings, it is always necessary to take into account the substantial underinvestment before 2000 (a large part of the utilized fixed assets was largely or even completely depreciated) and the substitution of labour by using fixed assets. As a consequence, the value of technical equipment of work has increased constantly (over 5% per year at constant prices in all areas), while its value reached the level of CZK 1.408m in 2015 per worker in LFA M, CZK 1.457m per worker in LFA O and CZK 1.332m per worker in NON LFA (at 2000 prices).

![Figure 5: Development of labour productivity and tangible fixed assets turnover](image)

**Figure 5: Development of labour productivity and tangible fixed assets turnover**

Source: Calculation on a sample of farms

Labour productivity at 2000 prices is shown in the diagram (Figure 5). Labour productivity has grown fastest in other LFA, at a rate of 4% per year, in mountain areas at a rate of 3.5% per year and outside LFA at 3.6%. The main cause of long-term growth in labour
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Productivity in all areas is caused by a decrease in the number of workers, which has also slightly accelerated due to the growth of production in the LFA areas. In 2015, all areas reported a decline in labour productivity due to the decline in revenues. Despite the decrease in the average number of employees, such a decline could not be counterbalanced. A prerequisite for improving labour productivity is the growth of technical equipment of work (the statistical dependence is very high in all areas, \( r > 0.95 \)).

The average annual wage per worker at constant 2000 prices has increased by 2.7% per year in mountain areas (CZK 184.1k in 2015), by 3.5% in other LFA (CZK 208.5k in 2015), and by 3% outside LFA (CZK 200.6k). The pace of growth indicates that the gap in wages between mountain areas and the average in the agriculture sector has expanded – in 2000 wages in LFA M amounted to 97.9% of the average in agriculture, in 2015 it was only 91.3%.

The number of workers needed for 100 hectares has decreased in time, the fastest decline is observed in the production areas (-2.8% per year). In 2015, the differences between LFA O and NON LFA were minimal (3.13, or 3.14 workers per 100 ha), 3.32 workers per 100 ha in LFA M.

4.6. Development of financial stability

The value of the current ratio for an average farm in NON LFA was 3.37 in 2015; 2.62 in LFA O and LFA M. The values of current ratio oscillate and it’s also difficult to discover the relation in the LFA areas; in all reference years and in all areas they have exceeded the range of acceptable values. Since 2010 the highest current ratio has been reported by the farms in NON LFA. If the current ratio does not include animals, its values in 2015 are as follows: 2.18 in LFA M, 2.28 in LFA O and 2.95 in NON LFA. In the case of the quick ratio, values ranging from 1 to 1.5 are considered acceptable. The ratio values have been improving with minor oscillations exceeding the lower limit in all areas since 2005. In 2015, the quick ratio of an average farm was 1.24 in LFA M, 1.23 in LFA O and 1.52 in NON LFA. If the calculation of quick ratio does not consider short-term loans (i.e. the operating quick ratio), it reaches the following values: 2.3 in LFA M, 1.68 in LFA O and 1.91 in NON LFA. High difference in the LFA M results from the use of short-term bank loans (5.7% from liabilities).

The coverage ratio of fixed assets by long-term capital may be modified for the farms as coverage of fixed assets and fattening animals by long-term capital. Its value for an average
farm in all reference years in all areas exceeds the threshold value of 1. The indicator trend cannot be identified in LFA M and LFA O (its values in 2015 are as follows: 1.22 in LFA M, or 1.24 in LFA O). Its value in NON LFA increases over time (1.34 in 2015).

4.7. Development of financial health

The IN05 index has been considered by Czech economists to be the most appropriate for the evaluation of Czech businesses. The upper limit identifies the businesses that create a value for their owners. The bottom limit outlines businesses that are threatened by bankruptcy. The grey zone between these boundaries defines businesses not being immediately hit by financial risk but, on the other hand, not providing a value for the owner. The overall tested success of the IN05 index is 80%, which is a relatively high value, with regard to the fact that the result was tested on a sample of 1,526 Czech businesses (Neumaier, Neumaierová 2005).

An average farm is situated in the grey zone, except for the crisis years. It means that farms are located exclusively in this area without bringing any value to the owners. In 2014 only one area (NON LFA) reached the limit identifying profitable businesses. Another negative is the high volatility of the indicator and frequent slumps of the businesses into the danger zone. In the six monitored years, the IN05 index predicted potentially imminent bankruptcy. The most vulnerable group of farms is located in LFA O (Figure 6). The high risk in this category for businesses is also revealed by other volatility surveys. The farms from mountain areas have the lowest volume of realized production, and the highest dependence on subsidies. In the event of a threat to the business, the farms can rely on these subsidies. The farms in production areas (NON LFA) have the highest yields per hectare, the highest intensity of production and the highest profitability. Owing to the high intensity of production, the slumps in yields per hectare (often given by external factors such as weather) are considerably reflected in the amount of the outcome of operations and in the achieved profitability responding sensitively to these changes. The production potential of these farms, on the other hand, enhances the creation of reserves to cover such losses. The farms in the transitional areas (LFA O) do not have the advantage of stable subsidies (compared with LFA M). They report lower production capability compared to NON LFA, but they also have high volatility of yields from crop production. The combination of these factors makes them the most vulnerable.
The G-index takes into account the specific characteristics of the farm sector and is considered as an index reflecting the ownership and soil quality. This means, in addition to the prediction of bankruptcy, the index allows for the differentiation of farms with primary agricultural production between prosperous and ailing. According to Kopta (2009) the G-index is very efficient when evaluating farms, although the successful businesses are those with a return on equity increasing 8%. This is the reason why an average farm also does not approach the upper limit in the most successful years. Apart from the years 2002 and 2003, the average farms in various areas are located in the grey zone. This graph (Figure 6) illustrates the trend of improving financial health of farms in all areas with a significant deviation in 2009 when all components of the index reported aggravation. The G-index highest values were reached by an average farm in 2014.

Figure 6: Development of the IN05 and G-index values
Source: Calculation on a sample of farms

5. Conclusion

In 2015 the average farm acreage was 1,614 ha of agricultural land. The average farms in the mountain LFA reported the smallest acreage. The proportion of arable land decreases in the areas with unfavourable conditions. There is an evident interest of farms to repurchase the land on which they farm. However, the percentage of the rented land still represents the majority of cultivated land. Land rents have doubled in the last five years. The average growth
rate is 18% per year. The average number of employees has been decreasing, given that 3 workers are needed for 100 hectares of cultivated land in all areas.

Since 2000 the development of economic indicators of agricultural holdings has shown production growth, given that the slowest production growth is identified in connection with extensive farming in mountain LFA. The production growth is mainly caused by the increase in revenues from crop production. Its percentage on the revenues increases in all farm categories. On the other hand, the percentage of revenues from animal production and non-agricultural production is declining. The NON LFA reflects the most significant change in the production structure and the fastest growing percentage of crop production. In the last 3 years, however, the drop in revenues from livestock production has stopped and a decline in non-agricultural production has been reported. A significant trend over the reference period shows the labour productivity growth which is mainly affected by the reduction in the number of workers rather than by the production growth.

Due to the high reliance of the profit in agriculture on external factors, the development of this indicator is characterized by strong fluctuations. The losses occurred in 2002, 2003 and 2009. The average farm operating in other LFA seems to be the most vulnerable in this respect. After evaluating the financial health of farms, the most vulnerable are average agricultural holdings farming in LFA O. The farms in mountain areas have the lowest volume of realized production, and the highest dependence on subsidies. Agricultural holdings, on the other hand, gained stability according to the economic indicators in the crisis years. The farms in NON LFA have the highest yields per hectare, the highest intensity of production and the highest profitability. Due to the high intensity of production, the effects of external factors are considerably reflected in the amount of profit and achieved profitability. The production potential of these farms, however, enhances the creation of reserves to cover such losses. Farms in LFA O do not have the advantage of stable subsidies compared with mountain LFA. They report lower production capability compared to NON LFA, but they also have high volatility of yields from crop production. In addition, the costs, such as wages and rents, are on average the highest in LFA O. The combination of these factors makes these farms the most vulnerable.
6. References


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