AGRICULTURAL SECTOR PERFORMANCE EVALUATION IN TERMS OF FINANCIAL INDICATORS: A COMPARISON OF CZECH REPUBLIC, SLOVAKIA AND WESTERN BALKAN STATES

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Abstract


Agriculture and food industry have become part of strategic areas for each country and each region of Europe. Important condition on companies in group A (according NACE classification) is fulfilling requirements of management in performance of financial area. Traditional financial indicators (calculated from accounting data) are still used to evaluate performance level, what have been considered to be the most appropriate approach over a long period of time in spite of different accounting and financial indicators. The main objective is to find crucial factors in the field of financial performance for agriculture companies in chosen region. Data from 10438 agricultural companies have been get from Amadeus database and analysed. For purpose of the paper there were used factor analysis, Pearson chi-square test for independence, and correspondence analysis. By application of factor analysis has reduced the basic set, originally formed by seven key financial indicators, into seven indexes according analysed countries. All observed factors were put into Pearson's chi-square test to indicate the dependency between indexes and (1) company size and (2) NACE classification. Finally, there was applied correspondence analysis, by which were found out clusters of countries, industries and size.

Keywords: financial performance indicators, agricultural companies, factor analysis, correspondence analysis

INTRODUCTION

Agriculture plays a significant role in the economics of every country. Land and farm management is a sector the main task of which is to ensure nutrition of inhabitants; nevertheless, at the present time a general perception of agriculture is shifting towards the multifunctional concept of the agriculture with the emphasis on its out-of-production functions and its position as to the sustainable development. The sustainable development is defined as such development that meets the needs of the present without compromising the ability of future generations to meet their own needs, while preserving biodiversity and understanding natural functions of ecosystems (Act on the Environment, 1992).

Agriculture is a highly labour-intensive sector and so it can be revealing to compile a partial productivity indicator from the gross value added for agriculture and the corresponding agricultural labour input data. Despite the decline in the relative economic weight of the primary sector as an inevitable consequence of economic progress (Byerlee et al., 2009), its economic role remains still significant in many rural areas. Indeed, the economic importance of agriculture is generally
much greater in the east and south of Europe than in the west and north (Eurostat, 2013).

**Theoretical Background**

Recently, performance evaluation methods have significantly changed. Performance evaluation can be defined as the ability of a company to boost investments, put into business activities, contributing to continuous self-improvement and accomplishment of business objectives (Sušák and Vacík, 2005; Maria, 2009; Muchiri et al., 2010). Performance evaluation is one of the tools helping the company management to decide how to do the business activity effectively (Arena et al., 2015; Lebas, 1995).

However, according to Tyrychtr et al. (2015) agricultural holdings predominantly focus on technical performance (more than 50% of all companies); only then on financial performance. At the same time, share of companies targeted at the efficient economic agriculture is increasing. Nevertheless, the level of this efficiency is below 13%.

Traditional financial indicators (calculated from accounting data) are still used today to evaluate performance; this approach to performance evaluation and comparison has been recognized as the most appropriate for a long period of time in spite of different accounting and financial indicators. Since 1980 traditional methods have been facing various views, identifying contentious issues in the use of these models, resulting in the search for other opportunities for performance evaluation (Mohamed et al., 2014; Neely, 2004).

Over the time, the performance has been measured either by the company size or its productivity and profit. The scientific literature divides financial indicators of the company performance into three categories (Brignall, 2007; Nicu, 2012).

Accounting results and derivative indicators are derived from financial statements. These results explain structural analysis and express corporate performance in absolute values. The advantage of these indicators is their easy detection, since they are mandatory for companies to report.

Indicators of financial productivity provide information through the value of invested assets. The best known indicator are ROI (return on investment), ROE (return on equity). Ratio indicators of financial productivity provide information helping the company to compare its productivity, which is expected by shareholders.

New category of financial indicators is represented by the metric EVA (Economic Value Added); its positive value indicates that from purely financial point of view the company has successfully generated value after the payment of all capital investments, in particular from capital shareholders. EVA helps the top-level management of the company to maintain enterprise risk management. It also provides a foundation for calculating the market value added to analyse the current market value of the firm over the capital contributed by investors.

Recently, researchers have begun to examine firm performance as a function of alternative managerial orientations such as an entrepreneurial orientation (Ross and Westgren, 2009; Verhees et al., 2011), market orientation (Verhees and Meulenberg, 2004; Johnson et al., 2009), and strategic choice (Hansson, 2007). For a firm to achieve success in implementing orientations different from a production orientation, the manager must have a willingness to change and to question current business strategies (Michaels and Gow Hamisch, 2015).

Several studies have explored farm performance across Europe, using indicators such as profitability, economic efficiency, and technical efficiency (Latruffe et al., 2012; Bojnec and Latruffe, 2013; Svatůš et al., 2014). Within this study, farm economic performance is assessed through the use of gross value added indicators that have been used often for measuring industry’s economic performance. Thomassen et al. (2009) use gross value added productivity indicators to measure the economic performance of dairy farms. Similarly, Van Passel et al. (2007) use partial labour productivity, capital productivity and land productivity indicators to measure economic performance (Giannakis, Bruggeman, 2015).

**Agriculture Situation**

**Situation in Czech Republic**

In 2016, the Czech Republic was among the EU’s fastest growing economies. In 2015, investments accounted for the dominant source of Czech economic growth. In 2015, the statistics of national accounts reported the share of agricultural sector in the total creation of gross added value in regular common prices in the value of 1.68%; i.e., the year-on-year decrease by 0.23%. In contrast, the share of the food industry in the total creation of gross added value decreased by 0.01% to 2.54%. Expressing the gross added value in comparable prices of the year 2010, mentioned share in the agriculture sector decreased by 0.01% and food industry increased by 0.11%.

Agricultural production expressed in the regular common prices represented – preliminary results for 2015 – the amount of CZK 127,048.7 M. Plant production amounted to CZK 75,149.7 M and stock farming CZK 46,008.6. The remaining part (in addition to the plant production and stock farming) was constituted by agricultural works delivered by suppliers, i.e., agricultural services output (CZK 3,258.6 M) and non-agricultural secondary activities (inseparable) worthing CZK 2,631.8 M.

As the Czech agrarian foreign trade is considered both trade performance with third countries and trade in the single market with other members of the EU. In 2015, the year-on-year value of the Czech agrarian export increased by 11.5% (i.e., by CZK 207 B), the value of import increased by 9.7%
Situation in Slovakia

Slovakia's economy continues to perform extremely well both in terms of macroeconomic outcomes and public finances. GDP growth exceeded 3.3 per cent on average in 2015 and 2016 and is projected to stay strong in the next two years. Prices have been stable, the unemployment rate has fallen below 10% – its lowest level in seven years – and the current account is near balance. The fiscal situation is solid, with a deficit of well below 2% of GDP in 2016 and a public debt around 52% of GDP, far below the OECD average. International competitiveness, fiscal and financial stability and ample foreign direct investment (FDI) are all contributing to a sustained rise in living standards (OECD, 2017).

This statistic shows the distribution of the gross domestic product (GDP) across economic sectors in Slovakia from 2005 to 2015. In 2015, agriculture contributed around 3.66 percent to the GDP of Slovakia, 34.82 percent came from the industry and 61.52 percent from the service sector. In 2014, entities in the Slovak Republic created GDP in the volume of € 75,214.9 mil. in c.u.p. (€ 72,840.2 mil. in c.o.p.), which, compared to 2013, increased by 3.2 % at c.u.p.; by 2.4 % at c.o.p.

According to the SO SR preliminary data for 2014, agriculture reached a negative economic result, i.e. loss of - € 4.7 mil., which was higher by € 2.2 mil. than in 2013. 2014 was characterised by notable fall in prices of agricultural commodities that was not compensated by the significant increase of natural production. The price development of agricultural commodities was affected by short-term and long-term factors that were reflected in the economy of products and subsequently in the economy of agricultural holdings.

The territorial structure of the Slovak agricultural trade is many years almost same. Most of exports and imports are realized with the EU 28 countries. The share of the EU as the most important partner is currently about 97%. This fact also means strong Slovakian dependence on the European Union; in 2005, this share reached already 96%. Slovakia is mostly trading with the countries as Czech Republic, Poland, Hungary and Germany. The development of foreign trade of the Slovak Republic in 2014 was characterised by a different development between the total and agri-food foreign trade. While the total foreign trade showed a growing trend, the agri-food foreign trade recorded a year-on-year drop. Significantly higher dynamics of the decrease of agro-export compared to agro-import lead to the increase of negative trade balance by as much as € 354.8 mil. (51.9%) and the negative balance accounted for – € 1,038.1 mil. From the agro-trade territorial structure point of view, it is the EU member states that continue to strengthen their dominant status. The export to the EU-28 accounted for 96.0% within the total export of agricultural and food products, and the import from the EU-28 accounted for 91.2% within the total import (Ministry of Agriculture and Rural Development of The Slovak Republic, 2015; Smutka, Rovný, Hambalková, 2016).

Situation in Western Balkan states

The Western Balkan countries (Albania, Bosnia and Herzegovina, Serbia, Montenegro, Macedonia, and Kosovo) are still in the process of transforming their economies from the socialist system of the Socialist Federal Republic of Yugoslavia (SFRY) into a capitalist one following the Western model. Croatia became member of the European Union on 1 July 2013. The EU is the Western Balkans' largest trading partner, accounting for over 75% of the region's total trade. In 2014, the EU's main imports from Western Balkans were (1) machinery and transport equipment (26.5%); (2) miscellaneous manufactured articles (21.3%); (3) and manufactured goods classified chiefly by materials (19.8%).

The EU’s exports to the Western Balkans were mainly (1) machinery and transport equipment (27.0%); (2) manufactured goods classified chiefly by material (23.4%); (3) chemicals (14.2%); (4) mineral fuels (12.3%) (European Commission, 2016).
MATERIALS AND METHODS

The main aim of this paper is to find crucial factors in the field of financial performance in agriculture companies (as one of the most important industry sector). Partial aim of the paper is to identify relationship between observed factors and company size and NACE classification. Main hypothesis suggests dependence between realization of individual activities and their performance in connection with agriculture. Agriculture has become the very important part of industry production in the past. Data have been gathered from Amadeus database and processed by the statistical program IBM SPSS Statistics 24; subsequently, (1) factor analysis, and (2) dependency between two nominal variables by means of contingency tables and Pearson's chi-squared test have been studied. To graphical design complex view on agriculture field there were used correspondence analysis.

The conditions for choice of companies:

- geographical location (West Balkan, Czech Republic, Slovakia);
- dividing according corporate size;
- classification of economic activities according to NACE classification, reduced to agriculture sectors (A1 – Crop and animal production, hunting and related service activities; A2 – Forestry and logging; A3 – Fishing and aquaculture).

According to selected NACE groups, the basic population has been defined for individual country as follow in Tab. II. Sample population of agriculture companies consist 10438 subject in six chosen countries (Bosnia and Herzegovina, Croatia, Czech Republic, Former Yugoslav Republic of Macedonia, The Republic of Serbia, Slovakia). Only 10015 companies have reported all required data to be used for investigation. Companies, which have not provided required data in Amadeus database, were put into missing values. Total count of companies was decreased about these missing companies (see Tab. II).

Factor analysis is based on the selection of correlation and partial correlation coefficients. The correlation coefficient represents the closeness of linear dependence of individual variables and partial correlation coefficients. The partial correlation coefficient shows a similarity of two variables in such a situation that the other variables are assumed constant. If it is possible to explain the dependence of variables using common factors, the partial correlation coefficients are very small, close to zero. To assess the suitability of the factor analysis, two tests can be used (Taranidis et al., 2015; Conti et al., 2014): (1) Kaiser-Meier-Olkin (KMO) is a coefficient which could reach values between 0 and 1. Its value consists of the rate of squares sum of the correlation coefficients and squares sum of the correlation and partial coefficients; (2) The use of Bartlett's sphericity test lies in testing the null hypothesis stating that the correlation matrix of variables is unit (on diagonal, there are only ones, others are zeros). If the null hypothesis is rejected,
the factor analysis may be used for the defined variables.

For the purposes of verification of the factor analysis Cronbach’s alpha indicator must be used. This indicator is understood as a reliability coefficient, used as a kind of analogy with the correlation coefficient. Normally, values oscillate in the interval (0;1). Zero, as the extreme value, describes the situation in which individual variables are uncorrelated. On the other hand, the value 1 describes correlated variables. When the value is closer to 1, a higher degree of conformity is reported (Hrach, Mihola, 2006; Cronbach 1951; Řehák, Brom, 2016).

However, high Cronbach’s alpha does not imply that the measure is dimensionless. If, in addition to measuring internal consistency, you wish to provide evidence that the scale in question is dimensionless, additional analyses can be performed. Exploratory factor analysis is one of the methods to check dimensionality. Cronbach’s alpha is not a statistical test; it is a coefficient of reliability (or consistency). The value could be expressed as the function of number of test items and the average inter-correlation among the items. Below, for conceptual purposes, we show the formula for the standardized Cronbach’s alpha:

\[
\alpha = \frac{N \times \bar{c}}{\bar{v} + (N + 1) \times \bar{c}}
\]

where

N equals to the number of items,

c-bar is the average inter-item covariance among the items,

v-bar equals to the average variance.

The values of Cronbach’s alpha could be from 0 to 1. If the values are close to 0.5, it signifies a bad level of internal consistency. Over 0.7 means that the value is acceptable and values close to 1 are excellent. A “high” value of the alpha is often used (along with substantive arguments and other statistical measures) as evidence that the items measure an underlying (or latent) construct (Hinton et al., 2004).

Correspond analysis describes relation between both two nominal variables in pivot table and individual categories. In pivot table there is category combination which should become significant or not. If any categories are similar or associated, there are located in graph near themselves. Correspond analysis itself is focused on association rate, usually by chi-square measure. There are nominal variables as input into correspond analysis, and kind of premise, that there is no ordering between variables (McGarigal et al., 2000; Beh, 2008, 2010). Correspond analysis processes dimensional homogenous data which consist only positive values or zeros. Chi-square range has become coefficient which excludes zeros, and help to define relations between rows and columns.

Calculation of correspondence analysis includes three steps (Řezanková, 2010): (1) pivot table transformation into table with support of Pearson chi-square; (2) individual value decompositions are applied into defined table, then there are calculated new values and new vectors; (3) new matrix operations serve as input to graph design. Basis for two dimensional pivot tables is data matrix \( n \times 2 \), in which categorical variable A get \( r \) values \((a_1, a_2, ..., a_r)\) and categorical variable B get \( s \) values \((b_1, b_2, ..., b_s)\). Due realized observation there is created table by two dimensional separations of both variables. In the table is used \( n_{ij} \) frequency, which represents intersect of both variables This \( n_{ij} \) provides number of observations, where are both \( a_i \) and \( b_j \). Except \( n_{ij} \) there are used marginal frequency \( n_{i\cdot} \), where ow observation with \( a_i \) value are observed (similar approach is for \( n_{\cdot j} \), in column).

In that table there are applied relative frequencies (Beh, 2010; Kudlats et al., 2014):

\[
\sum_{i=1}^{r} \sum_{j=1}^{s} p_{ij} = \sum_{i=1}^{r} p_{i\cdot} = \sum_{j=1}^{s} p_{\cdot j} = 1
\]

Set structure is described by contingent relative frequency \( p_{ij} \) in two possible ways:

1. from point of variable B view, if variable A reaches value \( a_i \):

\[
p_{ij} = \frac{n_{ij}}{n_{i\cdot}}
\]

2. from point of variable B view, if variable A reaches value \( a_i \):

\[
p_{ij} = \frac{n_{ij}}{n_{\cdot j}}
\]

Any changes in these values transform variable dependence, which is usually measured by Pearson chi-square test (Beh, 2008):

\[
X^2 = \sum_{i=1}^{r} \sum_{j=1}^{s} \left( \frac{n_{ij} - n_{i\cdot} \times n_{\cdot j}}{n_{i\cdot} \times n_{\cdot j}} \right)^2 = n \times \sum_{i=1}^{r} \sum_{j=1}^{s} \frac{(p_{ij} - p_{i\cdot} \times p_{\cdot j})^2}{p_{i\cdot} \times p_{\cdot j}}
\]

After estimating the theoretical frequencies there is designed chi-square statistics. This statistic has chi-square distribution and number of degrees of freedom \( (r-1)(s-1) \). On this basis, it is decided if exist dependency between variables in the population, and by using correspondence analysis is also possible to determine the structure of dependence (Beh, 2010; Kudlats et al., 2014).

RESULTS

Economic data were obtained from Amadeus database – all cases and data were involved to same year 2015. It is evident that companies commonly
use traditional financial indicators for measurement of their own performance. These indicators were analysed:

- \( x_1 \) - Cash flow [th EUR];
- \( x_2 \) - P/L for period (Net income) [th EUR];
- \( x_3 \) - Operating revenue [th EUR];
- \( x_4 \) - ROA using P/L before tax [%];
- \( x_5 \) - ROE before tax [%];
- \( x_6 \) - Operating P/L (EBIT) [th EUR];
- \( x_7 \) - Shareholder funds [th EUR].

Based on the statistical characteristics of the examined groups the conclusions could be presented as an approximate result, limited by the resulting reliability. In the results of the paper there are characteristics of research barriers and future research possibilities.

For the purpose of factor analysis the value of Kaiser-Meier-Olkin test should reach the value of at least 0.5 (value range is between 0 and 1). In order to assess whether it is possible to use the factor analysis, Kaiser-Meyer-Olkin method (KMO) and Bartlett's test of sphericity have been used. The KMO method is based on selective correlation and partial correlation coefficients. For the indicators in factor analysis KMO are observed according to the highest level of acceptance, which means that the performed level of usefulness of the factor analysis reaches high value. Bartlett's test of sphericity is a statistic test used to examine the hypothesis that the variables are correlated or uncorrelated (see Tab. III).

The total variance of the performance indicators is explained by means of eigenvalues, representing the total variance explained by each factor. The eigenvalues show that only five items have reached the minimum value of 1. From this point of view, Extraction Sums of Squared Loadings with cumulative percentage are important. Factor analysis has extracted different numbers of factors, which explains variances (see Tab. IV).

Results of all factor analysis in five countries provide in total thirteen factors. From that amount acceptable values of Cronbach's alpha for individual factors have been specified for seven indexes according to observed results in Tab. V for five countries. Other six factors have Cronbach's alpha value under minimal acceptable value (under 0.500).

Final values calculating acceptable factors need the transformation of individual coefficients. These coefficients express significance of the used elements. Their sum total must be 1. The individual

### III: Kaiser-Meier-Olkin test and test of sphericity (Bartlett's test)

<table>
<thead>
<tr>
<th>Country</th>
<th>KMO</th>
<th>Bartlett's test</th>
<th>Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bosnia and Herzegovina (BA)</td>
<td>0.463</td>
<td>0.000</td>
<td>NO</td>
</tr>
<tr>
<td>Croatia (HR)</td>
<td>0.634</td>
<td>0.000</td>
<td>YES</td>
</tr>
<tr>
<td>Czech Republic (CZ)</td>
<td>0.856</td>
<td>0.000</td>
<td>YES</td>
</tr>
<tr>
<td>Former Yugoslav Republic of Macedonia (MK)</td>
<td>0.521</td>
<td>0.000</td>
<td>YES</td>
</tr>
<tr>
<td>The Republic of Serbia (RS)</td>
<td>0.605</td>
<td>0.000</td>
<td>YES</td>
</tr>
<tr>
<td>Slovakia (SK)</td>
<td>0.771</td>
<td>0.000</td>
<td>YES</td>
</tr>
</tbody>
</table>

Source: own works by authors

### IV: Total variance of Chosen Indicators in Selected Countries

<table>
<thead>
<tr>
<th></th>
<th>CZ</th>
<th>HR</th>
<th>MK</th>
<th>RS</th>
<th>SK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total variance explained [%]</td>
<td>89.498</td>
<td>90.445</td>
<td>90.061</td>
<td>82.886</td>
<td>84.617</td>
</tr>
<tr>
<td>Number of indexes</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: own works by authors

### V: Cronbach’s alpha for individual factors according to countries

<table>
<thead>
<tr>
<th></th>
<th>CZ</th>
<th>HR</th>
<th>MK</th>
<th>RS</th>
<th>SK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1</td>
<td>0.601</td>
<td>0.708</td>
<td>0.949</td>
<td>0.944</td>
<td>0.501</td>
</tr>
<tr>
<td>Factor 2</td>
<td>0.323</td>
<td>0.825</td>
<td>0.106</td>
<td>0.279</td>
<td>0.285</td>
</tr>
<tr>
<td>Factor 3</td>
<td>X</td>
<td>0.263</td>
<td>0.516</td>
<td>0.408</td>
<td>X</td>
</tr>
</tbody>
</table>

Source: own works by authors
factor indices have been defined by the procedures as follow:

\[
\text{Factor}_{1\text{HR}} = 0.3149x_1 + 0.3475x_6 + 0.3376x_7
\]
\[
\text{Factor}_{2\text{HR}} = 0.2692x_1 + 0.7308x_2
\]
\[
\text{Factor}_{1\text{CZ}} = 0.2025x_1 + 0.2021x_2 + 0.1911x_3 + 0.2022x_6 + 0.2021x_7
\]
\[
\text{Factor}_{3\text{CZ}} = 0.2971x_1 + 0.3594x_2 + 0.3435x_6
\]
\[
\text{Factor}_{1\text{MK}} = 0.2023x_4 + 0.4787x_5
\]
\[
\text{Factor}_{1\text{RS}} = 0.3512x_1 + 0.3171x_2 + 0.3317x_6
\]
\[
\text{Factor}_{1\text{SK}} = 0.2091x_1 + 0.1988x_2 + 0.2001x_3 + 0.2022x_6 + 0.1898x_7
\]

These factors can be calculated for the individual agricultural company and on the basis of their results a list of businesses can be compiled. Companies could apply these factors to compare own business results on the way of improving processes. Factors can determine important variables of business, playing the key role in achieving the set of objectives. Proposed financial performance indicators should help companies to demonstrate a progress towards the objectives of sustainability. Also we can see basic statistics of observed indexes in Tab. VI.

Pivot tables have been employed to find possible dependencies between observed factors and company size and NACE classification, for results of the dependency tests see Tab. 7. Results of the dependence examination in individual variable categories are depicted in the following results of Pearson's chi-square test.

Maintaining the % reliability of the test, the values for connection between individual factors and company size have been determined within 0.05, which represents 5% reliability level. Established values of Pearson's test for the variables are showed in Tab. VII (i.e., less than 0.05).

Therefore, that bring us to the conclusion that an alternative hypothesis is applied – there are dependencies between all observed factors and company size for all observed indexes. Past results have revealed the relationship between indexes

### VI: Descriptive statistics of observed indexes

<table>
<thead>
<tr>
<th>Index</th>
<th>Mean</th>
<th>Median</th>
<th>Variance</th>
<th>Std. deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – HR</td>
<td>824.3820</td>
<td>107.9335</td>
<td>39341638.75</td>
<td>6272.29135</td>
</tr>
<tr>
<td>2 – HR</td>
<td>36.1622</td>
<td>10.4988</td>
<td>708435.765</td>
<td>841.68626</td>
</tr>
<tr>
<td>1 – CZ</td>
<td>1358.3720</td>
<td>455.3022</td>
<td>261767244.7</td>
<td>16179.2262</td>
</tr>
<tr>
<td>1 – MK</td>
<td>9.3446</td>
<td>3.3435</td>
<td>12416.952</td>
<td>111.43138</td>
</tr>
<tr>
<td>3 – MK</td>
<td>8.1245</td>
<td>5.9574</td>
<td>1217.821</td>
<td>34.89729</td>
</tr>
<tr>
<td>1 – RS</td>
<td>57.991758</td>
<td>2.814500</td>
<td>289355.918</td>
<td>537.9181332</td>
</tr>
<tr>
<td>1 – SK</td>
<td>560.9654</td>
<td>150.2338</td>
<td>19894716.40</td>
<td>4460.34936</td>
</tr>
</tbody>
</table>

Source: own works by authors

### VII: Pearson's test of the relationship between individual indexes, company size and NACE classification

<table>
<thead>
<tr>
<th>Index</th>
<th>Corporate size</th>
<th>NACE classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – HR</td>
<td>Value</td>
<td>Asymp. Sig.</td>
</tr>
<tr>
<td>Pearson Chi-Square</td>
<td>595.033</td>
<td>0.000</td>
</tr>
<tr>
<td>Contingency Coefficient</td>
<td>0.540</td>
<td>0.071</td>
</tr>
<tr>
<td>2 – HR</td>
<td>Value</td>
<td>Asymp. Sig.</td>
</tr>
<tr>
<td>Pearson Chi-Square</td>
<td>321.857</td>
<td>0.000</td>
</tr>
<tr>
<td>Contingency Coefficient</td>
<td>0.447</td>
<td>0.077</td>
</tr>
<tr>
<td>1 – CZ</td>
<td>Value</td>
<td>Asymp. Sig.</td>
</tr>
<tr>
<td>Pearson Chi-Square</td>
<td>2314.067</td>
<td>0.000</td>
</tr>
<tr>
<td>Contingency Coefficient</td>
<td>0.649</td>
<td>0.127</td>
</tr>
<tr>
<td>1 – MK</td>
<td>Value</td>
<td>Asymp. Sig.</td>
</tr>
<tr>
<td>Pearson Chi-Square</td>
<td>146.230</td>
<td>0.000</td>
</tr>
<tr>
<td>Contingency Coefficient</td>
<td>0.362</td>
<td>0.117</td>
</tr>
<tr>
<td>3 – MK</td>
<td>Value</td>
<td>Asymp. Sig.</td>
</tr>
<tr>
<td>Pearson Chi-Square</td>
<td>24.148</td>
<td>0.019</td>
</tr>
<tr>
<td>Contingency Coefficient</td>
<td>0.156</td>
<td>0.122</td>
</tr>
<tr>
<td>1 – RS</td>
<td>Value</td>
<td>Asymp. Sig.</td>
</tr>
<tr>
<td>Pearson Chi-Square</td>
<td>386.549</td>
<td>0.000</td>
</tr>
<tr>
<td>Contingency Coefficient</td>
<td>0.459</td>
<td>0.094</td>
</tr>
<tr>
<td>1 – SK</td>
<td>Value</td>
<td>Asymp. Sig.</td>
</tr>
<tr>
<td>Pearson Chi-Square</td>
<td>1402.331</td>
<td>0.000</td>
</tr>
<tr>
<td>Contingency Coefficient</td>
<td>0.628</td>
<td>0.211</td>
</tr>
</tbody>
</table>

Source: own works by authors
and company size and NACE classification. Subsequently, degree of such dependence has been examined. To that end, the intensity of dependence determined by means of contingency coefficient.

The intensity of dependence ranges between (0;1). That means that the higher the absolute value, the greater the intensity of dependence. Tab. VII shows that observed indexes in each country are close connected within the size of the company – all significance values are in 5% of limit of error, and three indexes (in Czech Republic, Slovakia and Republic of Serbia) are close connected within the NACE classification. Intensity of the dependence is given by Contingency coefficient, which provides view in this connection. There is defined intensity between indexes and company size in four partial intervals, in which dependence fall inside:

1. values within (0;0,25) have intensity of dependence is low and weak, they couldn't be under continue monitoring (I1_MK = 0,362; I3_MK = 0,156);
2. values between (0,25; 0,5) reach rather low dependence between two variables and become more interesting for monitoring (I2_HR = 0,447; I1_RS = 0,459);
3. interval (0,5; 0,75) shows strong dependences as important field for observation (I1_HR = 0,540; I1_CZ = 0,649; I1_SK = 0,628);
4. interval (0,75; 1,0) shows strong dependences, which should be crucial (none).

In terms of NACE classification, all dependencies are in the first interval, which means a low intensity of these dependencies.

Load indicators (Mass) indicate load line which represents the percentage of information across the table in appropriate category. That loads are obtained as the ratios of the row and column marginal frequencies (n_i+, n + j) in whole table of individual categories (n).

Score in dimension describes individual variables score in two main dimensions. These dimensions don’t represent any specific area, because they are reduced to from multi-dimension space. All data in rows and columns have been usually in multi-dimension space, which are reduced into

1: Symmetrical correspond map of countries and NACE. Source: own works

2: Symmetrical correspond map of countries and corporate size. Source: own works
Agricultural Sector Performance Evaluation in Terms of Financial Indicators: a Comparison... two. Providing information of raw data has not been modified after multi-dimension space reduction of these variables. Inertia indicator represents the share comprehensive information on the profile (on the relevant point). This characteristic is independent of the number of dimensions. Corresponding map includes a graphical representation of both row and column categories according to their dimension scores (Hebák et al., 2007; D’Esposito et al., 2014).

Results of correspondence analysis are included in graphs, which illustrate relations between individual categories and variables. Fig. 1 shows row and column points of two dimensional solution. By using symmetrical normalization simplifies examining the relationships between individual categories of the variables. Both dimension 1 and dimension 2 provide only „describing space”, in which were realised of marketing activities and size of company. Gained results are confirmed by significance value of Chi-square test. According to computation this significance is at value 0.000 (see Tab. VII).

An illustrative graph, attached as Fig. 1, displaying the relations among the individual categories and variables, specific links among countries and NACE classification items, is the output of the correspondence analysis. Three separate groups of categories can be identified. We can say that the Czech Republic, Slovakia and Macedonia focus on the agricultural and animal production, Bosnia-Herzegovina aims mainly at forestry and logging. Moreover, it has been further confirmed that Croatia is a leading producer in the sector of fishing and aquaculture, also based on its geographical location.

Furthermore, a relation between the size of the company and defined countries has been investigated. Interlinks between investigated categories see Fig. 2.

Generally, scheme (Fig. 2) indicates that micro-companies are primarily established in Croatia and Macedonia, small agricultural companies mainly in Slovakia. The Czech Republic reported the largest number of medium-sized agricultural companies. Large companies employing more than 250 people are located in Serbia and Bosnia-Herzegovina.

CONCLUSION

The purpose of this paper was to analyse the performance evaluation in terms of financial indicators, specified in agricultural sector in chosen countries. According to Weill et al. (2005), there is not a universally or even commonly used set of measures for evaluating the financial performance of firms. Multiple measures covering investor and accounting returns are typically recommended including: profitability, efficiency and market value (Poláková et al., 2015).

The main aim of this paper has been to find crucial factors in the field of financial performance in agriculture companies from selected areas and identify relationship between observed factors and company size and NACE classification. Empirical research deals with factor analysis that gives up reduction of surveyed indicators. Our research has showed that there are new two indexes for Czech Republic, three indexes for Croatia, three indexes for Macedonia, three indexes for the Republic of Serbia and two indexes for Slovakia. These indexes are specific groups of financial indicators in the area of agricultural companies and consist of traditional financial indicators complemented of (for instance): Cash flow, P/L for period, Operating revenue, ROA, ROE, EBIT and Shareholder funds. At the same time, dependence among the above mentioned factors (indices) and company size and NACE classification has been identified. Observed indexes in each country are close connected within the size of the company – all significance values are in 5 % of limit of error, and three indexes (in Czech Republic, Slovakia and Republic of Serbia) are close connected within the NACE classification. Than two correspond maps were constructed. Based on correspondence analysis, we can therefore say that the countries Czech Republic, Slovakia and Macedonia are focused on agricultural and livestock production, Bosnia and Herzegovina focuses mainly on forestry and logging, and further confirmed that Croatia is mainly a producer within the field of fishing and aquaculture. The second result of correspondence analysis is finding that that micro-enterprises can be found mainly in Croatia and Macedonia, small farms are mainly in the Slovak Republic, the Czech Republic has the largest representation among medium-sized agricultural enterprises and in Serbia and Bosnia and Herzegovina we can see the representation of large businesses.

Management of the agricultural company can compare its performance with performance of other companies in the market and can identify its weaknesses. The set of performance financial indicators was created and used especially for this study and in the future may be extended to other countries or other indicators. These must be available and discoverable, which may be a limitation in the context of other research.
REFERENCES


