

## The determinants of agricultural industry profitability: evidence from southeast Europe

Recebimento dos originais: 06/10/2016  
Aceitação para publicação: 06/04/2017

**Kristina Mijić**

PhD in Accounting

Institution: University of Novi Sad, Faculty of Economics

Address: Subotica, Republic of Serbia

E-mail: [mijick@ef.uns.ac.rs](mailto:mijick@ef.uns.ac.rs)

**Dejan Jakšić**

PhD in Accounting

Institution: University of Novi Sad, Faculty of Economics

Address: Subotica, Republic of Serbia

E-mail: [jaksicd@ef.uns.ac.rs](mailto:jaksicd@ef.uns.ac.rs)

### Abstract

In this paper, the profitability determinants of the agricultural industry in countries of CEE region, such as Hungary, Romania, Bosnia and Herzegovina, and Serbia, were analyzed. The research results for the period 2011-2014 show that profitability of agricultural industry in all countries is positive but below the reference value. Estimation of the influence of independent variables on the profitability in agricultural industries was realized by panel data technique. The results show that the profitability determinants of agricultural enterprises in Hungary and Romania are the same. In these countries, the profitability of agricultural enterprises are positively affected by leverage, quick ratio, growth, and lagged profitability. Furthermore, size and fixed assets to total assets ratios are negatively related to the profitability in these countries. On the other side, significant profitability determinants in Serbia, Bosnia and Herzegovina have only positive influence. In both of these countries, the profitability of agricultural enterprises are affected positively by quick ratio, lagged profitability and growth, while in Bosnia and Herzegovina, one more determinant, leverage, is significant. The results are of interest to various stakeholders, including managers, investors, debt holders, and other users of financial statements, since it makes a profile of agricultural enterprises by associating firm internal characteristics with intensity and direction of profitability ratio in countries in SEE region.

Keywords: Agricultural industry. SEE region. Profitability.

### 1. Introduction

Agriculture is the backbone of the economic system of countries in Southeast Europe (SEE region), thanks to the existence of the good natural resources. As subsistence agriculture still dominates in most parts of the SEE region, agricultural industry ensures a minimum level of food security and socio-economic stability in rural areas. Therefore, the sector has an important function as a social and economic buffer for rural economies (Volk et al. 2014).

The agricultural sector in SEE region contributes significantly to GDP and to the exports of SEE countries. The sector is important for its contribution to overall employment, bearing in mind that generally, unemployment is quite high in these countries and has considerably increased since the global financial crisis. On the other hand, there is a strong tendency of rural depopulation in these countries, leading even to some seasonal labor shortages in rural areas, and also leading to a certain percentage of uncultivated land (GFA, 2010). Different agricultural policies in countries in SEE region can provide differences in the performance of agricultural industries.

Countries in SEE region are members of the Central European Free Trade Agreement (CEFTA). The purpose of CEFTA is removing trade barriers, both tariff and non-tariff barriers. Hungary and Romania, as members of European Union, are affected by the Common Agricultural Policy. Some of the reforms in EU agriculture, such as ensuring food safety and quality, guaranteeing the stability of farmers' income, rural development grant etc. led to higher profits. Also, in order to improve the trade balance, the European Union has established a Western Balkan Trade Pact, which allows that all products from the Western Balkans can be imported customs free. There are preferential tariff quotas for some products such as wine, certain fish products, and baby beef. Furthermore, some of the countries in SEE region have bilateral trade agreements in the sector of agricultural products, which offers opportunities from customs-free export outside CEFTA and the EU. All of this should be for the purpose of the improvement of the agricultural sector in the countries.

The main measure of the success of enterprise, sector, as well as the economy, is a profitability. Profitability indicates the ability of enterprises to generate a profit in relation to investment. There are two reasons which indicate the power of profitability. Firstly, profitability is an important precondition for long-term enterprise existence and development. Secondly, enterprise profitability has a significant effect on the growth of the sector, economic growth, employment, innovation and technological changes. In order to achieve better competition, improve efficiency, and answer to pricing pressure, enterprises are experiencing greater difficulty attaining the required profitability (Yazdanfar, 2013).

According to this, in this paper profitability of agricultural industry in SEE region will be investigated. Profitability analysis is focused on identification of the determinants of profitability of agricultural industry in countries in SEE region. The difference in the level of profitability of agricultural industry among countries could be affected by numerous internal or external factors. The question of what factors determine profitability should be one of the

high priority for both researchers and practitioners, including managers, investors, debt holders, and policy makers (Yazdanfar, 2013).

## 2. Literature Review

Research papers about profitability determinants are usually focused on specific industry sector (e.g. Adams and Buckle, 2003; Goddard et al., 2005). These research papers can be classified into two groups. The first group focuses on external determinants, i.e. factors that reflect the market, business, and economic environment in which enterprises operate (Scherer, 1980; McGahan, Porter, 1997; Callado, Soares, 2014). The second group focuses on internal determinants, i.e. factors at the enterprises level (McDonald, 1999; Goddard et al. 2005; Stiewald, 2010; Asimakopoulos, Samitas, Papadogonas, 2009; Chandrapala, Knapkova, 2013; Chandrapala, Guneratne, 2012; Coban, S. 2014; Agiomirgianakis et al. 2006; Papadogonas, 2005). Since the focus of this study is on the internal profitability determinants, the literature review will be based on relevant studies for this group.

The profitability determinants of Australian manufacturing enterprises for the period 1984-1993 were examined by McDonald (1993). The results indicate that lagged profitability and industry affiliation are the crucial factors of profitability.

Goddard et al. (2005) investigated profitability determinants of manufacturing and service sector in Belgium, France, Italy and the UK for the 1993-2001 period, using panel data technique. Their research suggests that enterprises size and gearing ratio are negatively related to profitability, market share and liquidity positively influence profitability.

In order to identify the factors of profitability, Stierwald (2010) used a panel data set of 961 large Australian enterprises for the 1995-2005 period. The author used a random and fixed-effect regression including lagged profitability, productivity, size and industry affiliation as independent variables. The results indicate that lagged profitability, productivity, and size are crucial factors of profitability, while the effect of industry affiliation is not.

Asimakopoulos et al. (2009) were investigated the factors of profitability for the Greek non-financial enterprises listed on the Athens Stock Exchange for the 1995-2003 period. They used a panel data estimation technique and found that size, sales growth, and investment positively related to profitability. On the other side, leverage, current assets, EMU participation, and adoption of the euro are negatively related to profitability.

Chandrapala and Knapkova (2013) investigated the impact of firm-specific factors on the financial performance of 974 firms in the Czech Republic over the period 2005 to 2008. They used pooled and panel cross-sectional time series techniques for the analysis of the impact of eight independent variables on the return on assets (ROA). The results indicate that the firm size, sales growth and capital turnover have significant positive impact on ROA, while debt ratio and inventory have significant negative impact on it.

Chandrapala and Guneratne (2012) examined the impact of ownership concentration and other internal factors on the financial performance of enterprises listed on the Colombo Stock Exchange. Pooled and ordinary least square regression was used to analyze the data. The results indicate that the ownership concentration does not have a statistically significant relationship with ROA. Furthermore, firm size, quick ratio, and the ratio of inventory investment to total assets have a positive impact on the ROA, while debt ratio has a negative impact on ROA.

Coban (2014) used a panel data of 137 Turkish listed manufacturing companies over the period 1997-2012 to investigate the interaction between firm growth and profitability. The research, based on system-GMM, showed that there is a statistically significant positive relation between current profit and current growth.

Agiomirgianakis et al. (2006) used a panel data of 3,094 Greek manufacturing firms for the period 1995-1999 in order to investigate which internal factor have an impact on profitability. They found that firm size, age, exports, sales growth, reliance on debt and fixed assets growth, as well as efficient management of assets influence profitability. Similar research was conducted by Papadogonas (2005), but his research is based on the small and large enterprises. The results of his study show that profitability is positively affected by the firm size and managerial efficiency, and negatively by leverage. Also, findings show that sales growth is significant for small firms, while it is not a significant factor for large companies.

Analysis of the debt and impact on cost of debt and profitability of companies listed on Brazilian agribusiness BM&FBovespa showed that agribusiness companies have a greater impact on the cost of debt to the capital structure, but has better returns than other firms (Hall et al. 2014).

Jaksic et al. (2015) conducted comparative profitability analysis of milk production companies to milk processing companies in Serbia. The research results for period 2010-2013 suggest that milk processing companies had a better return on investment, profit margin, and

assets turnover than milk production companies in observed period, while the difference in return on equity was not significant.

### 3. The Determinants of Profitability

The profitability as dependent variable can be represented by several indicators such as:

- Return on Assets (ROA) – indicates a company’s success in using assets to earn net income.
- Return on Equity (ROE) – measures how much profit a company generates with the shareholder's equity.
- Profit Margin (PM) – indicates net income per unit of sales.
- Gross margin (GM) - compares the gross margin of a business to the net sales.
- Assets Turnover (AT) – measures how efficiently a company using its assets to provide sales.

The following table shows the overview of indicators and their reference values.

**Table 1: Profitability ratios**

Profitability Ratio	Calculation	Unit	Reference Value
Return on Assets (ROA)	$NI / TA_{avg}$	Percentage	$\geq 10$
Return on Equity (ROE)	$NI / (C+R)$	Percentage	$\geq 15$
Profit Margin (PM)	$NI / NS$	Ratio	$\geq 0$
Gross margin (GM)	$(NS - CGS) / NS$	Ratio	$\geq 0$
Assets Turnover (AT)	$NS / TA_{avg}$	Ratio	Higher value preferred

Source: Author’s illustration (according to Horngren et al. 2012; Hall et al. 2014; Walsh, 2008)

*Legend:*

NI - Net Income

TA<sub>avg</sub> - average Total Assets

C - Capital

R – Reserves

CGS – Cost of Goods Sold

NS - Net Sales

The most relevant determinant in explaining the market value of enterprises is ROA (Asiri, 2015), so the further profitability analysis will be based on ROA.

Internal factors that influence the profitability are numerous, such as size, liquidity measures, debt ratios, structure of assets, growth, investment, company's age, productivity, lagged profitability (Yazdanfar, 2013; Stierwald, 2009). According to the available data and characteristics of the agricultural industry, the following factors of profitability are used: size, quick ratio, leverage, fixed assets to total assets ratio, sales growth, investment, and lagged profitability. The following table presents the overview of profitability factors.

**Table2: Profitability determinants**

Profitability Factors	Calculation
Size	Natural logarithm of the book value assets
Leverage	TD / TA
Quick ratio	(C + AR) / CL
Fixed assets ratio	FA/ TA
Growth	$(S_t - S_{t-1}) / S_{t-1}$
Investment	$(FA_t - FA_{t-1}) / FA_{t-1}$
Lagged profitability	ROA <sub>t-1</sub>

Source: Author's illustration (according to Yazdanfar, 2013; Stierwald, 2009)

*Legend:*

TD – Total Debt

TA – Total Assets

C – Cash

AR – Account Receivables

CL – Current Liabilities

FA – Fixed ssets

S - Sales

t – Current Period

t-1 – Previous Period

The size of enterprises can be measured using several proxies, such as assets, sales or employees. In this study, size is measured as the natural logarithm of the firm book value of assets. Larger enterprises not only enjoy a higher turnover and ability to generate higher income, but also have better access to capital markets (Titman, Wessels, 1988), and lower cost of borrowing (Whited, 1992). According to this, it is expected that size is positively related to the profitability. However, the findings of previous studies are not uniform regarding this expectation. While Ito and Fukao (2006), Asimakopoulos et al. (2009), and Stierwald (2010) found that firm size has a positive influence on profitability, Goddard et al. (2005), Jensen and Murphy (1990), found out the inverse relationship between firm size and profitability.

Leverage indicates the level of debt. Leverage can be measured by using different indicators, such as the ratio of total debt to total equity, or the ratio of total debt to total assets. In this study, leverage was measured by the ratio of total debt to total assets. Higher debt can

negatively influence profitability since high debt requires more resources to settle the debt. On the other side, additional debt can be successfully invested, which will increase profitability. Asimakopoulos et al. (2009) and Al-Jafari and Samman (2015) found out that leverage is negatively correlated to profitability, while Burja (2011) found out that leverage is positively correlated to profitability.

The quick ratio indicates the amount of liquid assets available to offset current debt. The quick ratio is measured as the ratio of cash and accounts receivable to current liabilities. Healthy enterprises should have this ratio at the minimum level of 1.0. Therefore, the firm's ability to settle short-term liabilities is a key factor in determining the firm performance. The findings of the influence of quick ratio on the profitability are also mixed. Barbosa and Louri (2005), and Kuntluru et al. (2008) confirm that there is a positive relationship between quick ratio and ROA. On the other side, Pratheepan (2014) found out that quick ratio does not have an influence on profitability.

Fixed assets to total assets ratio shows which part of fixed assets is financed with owner's equity. The ratio of 0.5 or higher indicates an inefficient use of working capital which reduces the firm's ability to carry accounts receivable and maintain inventory and usually means a low cash reserve. Furthermore, this will limit firm's ability to respond to increased demand. Pratheepan (2014) supported this in his research and found out that there was a negative and statistically significant relationship between fixed assets to total assets ratio and profitability.

Growth measures the ability of the firm to achieve growth in sales. Growth is calculated as the growth rate of sales in two consecutive periods. If the firm achieves greater growth in sales, that means it provides additional income for the current period. Therefore it is expected that growth affects profitability positively (Asimakopoulos et al. 2009, Geroski et al. 1997). In contrary, some researchers showed that growth can be negatively related to profitability (Kaen, Baumann, 2003; Hoy et al. 1992).

Investment refers to increase in fixed assets, and it is calculated as the growth rate of gross fixed assets in two consecutive periods. It is expected that investment affects profitability positively since it expands production capacity, in order to improve sales and at the end to increase profit (Asimakopoulos et al. 2009; Guariglia, 2009).

Lagged and current profitability ratios are related, because lagged profit implies more resources in the current period, such as more liquid assets, a better relationship with the

customer, and possibility to increase market share. Therefore, lagged profitability is expected to be positively related to current profitability (Coban 2014; Yazdanfar, 2013).

#### 4. Data

The data used in this study refer to a sample of agricultural enterprises from Hungary, Romania, Serbia, Bosnia and Herzegovina for the period 2011-2014. The data were collected from the database “Amadeus” which included a detailed balance sheet, income statement, and other data of agricultural enterprises (Amadeus, 2016). The original set includes 2,891 agricultural enterprises. In order to construct balanced panel data and avoid effects of new enterprises, and enterprises that shut down during the period, our sample consists of the enterprises that operated during the whole period 2011-2014. Furthermore, the missing or abnormal data were removed, so the final sample consists of 2,051 agricultural enterprises, or 8,204 observations during the period 2011-2014.

The table 3 shows the descriptive statistics of profitability and factors of profitability for each country.

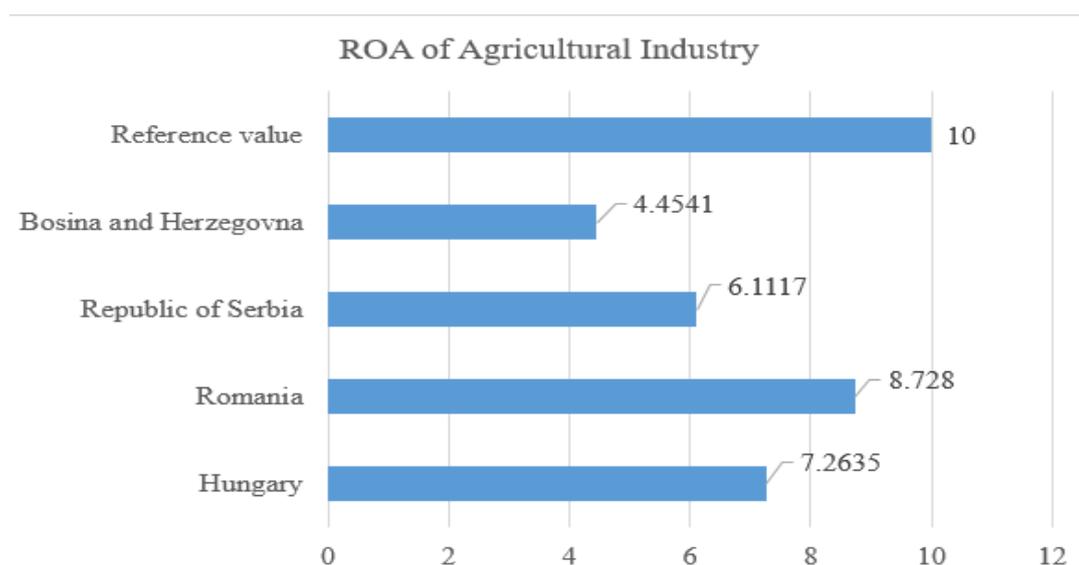
**Table 3: Descriptive statistics of profitability and profitability factors in Hungary, Romania, Serbia, Bosnia and Herzegovina.**

Variable	Observation	Mean	Std. Dev.	Min	Max
<b>Hungary</b>					
ROA	3,052	7.2635	8.3839	-62.1570	67.4590
Size	3,052	7.8344	1.1450	3.2763	11.6578
Leverage	3,052	0.9161	0.1096	0.3501	0.9999
Quick ratio	3,052	2.4831	2.3649	0.0428	23.2494
Fixed assets to total assets ratio	3,052	0.4912	0.2027	0.0007	0.96384
Growth	3,052	1.0514	3.8181	-11.9628	25.6166
Investment	3,052	0.1796	1.3647	-0.9916	51.0517
Lagged profitability	3,052	6.8100	8.9729	-62.1570	67.4590
<b>Romania</b>					
ROA	4,144	8.728044	10.76752	-74.372	79.715
Size	4,144	7.259253	1.237616	3.264869	13.2305
Leverage	4,144	0.93715	0.126228	0.021724	1
Quick ratio	4,144	2.142161	2.172746	0.029648	29.69434
Fixed assets to total assets ratio	4,144	0.462853	0.203349	0.001266	0.993187
Growth	4,144	1.389253	4.288145	-13.0844	26.92801
Investment	4,144	0.356905	1.490496	-0.97475	31.55367
Lagged profitability	4,144	8.94092	11.09553	-74.372	79.715
<b>Republic of Serbia</b>					
ROA	852	6.111759	7.284082	-25.851	49.1
Size	852	7.882858	1.378082	3.592828	12.64528

Leverage	852	0.819752	0.208444	0.100294	0.999913
Quick ratio	852	1.971981	2.382847	0.039026	32.17059
Fixed assets to total assets ratio	852	0.380416	0.222577	0.005457	0.97888
Growth	852	1.013063	4.58274	-11.7038	26.86925
Investment	852	0.254121	1.077545	-0.90549	19.83201
Lagged profitability	852	6.533168	7.917917	-34.183	49.1
<b>Bosnia and Herzegovina</b>					
ROA	156	4.454173	7.481887	-16.408	37.617
Size	156	7.293987	1.27538	3.884472	10.0267
Leverage	156	0.799461	0.227322	0.181067	0.999645
Quick ratio	156	1.69925	1.517112	0.244295	10.47566
Fixed assets to total assets ratio	156	0.495679	0.208912	0.066883	0.879424
Growth	156	1.003299	4.8237	-21.7428	9.7712
Investment	156	0.201333	1.115191	-0.42982	12.81737
Lagged profitability	156	4.732494	7.872943	-16.408	42.085

Source: Author's calculation

According to the descriptive statistics of profitability and figure 1, it seems that no agricultural industry has reached a reference value (above 10%). The good side is that agricultural industry in each country is profitable during the period 2011-2014. The best profitability of the agricultural industry is in Romania (8.73%), while the profitability ratio of the agricultural industry in Bosnia and Herzegovina is only 4.45%. Furthermore, liquidity (quick ratio) and growth are much better in Romania and Hungary, than in Bosnia and Herzegovina and Serbia. The same situation is with the growth. On the one side, the highest growth rates have agricultural industries in Romania (1.39), Hungary (1.05), then Serbia (1.01), and at the end Bosnia and Herzegovina (1.00).



**Figure 1: ROA of agricultural industry in Hungary, Romania, Serbia, Bosnia and Herzegovina**

Source: Author's illustration

## 5. Methodology

The aim of this research is to investigate the profitability determinants of the agricultural industry in Southeast Europe. According to this, the following hypothesis is defined.

*H<sub>0</sub>: Specific internal characteristics (size, quick ratio, leverage, fixed assets to total assets ratio, growth, investment and lagged profitability) have influence on the profitability of agricultural industry in Southeast Europe.*

This research is based on a strongly balanced panel data-set, which means that there is no missing observation during the period 2011-2014. Therefore a panel data estimation technique is the right choice. A data-set that consists of both time series and cross-sectional elements is known as a panel data-set. In panel data models, the data-set has  $n$  cross-sectional units, denoted  $i = 1, \dots, N$ , observed at each of  $T$  time periods,  $t = 1, \dots, T$ . In the data-set, the total number of observations is  $n \times T$  (Knezevic, Dobromirov, 2016).

A major motivation for using panel data has been the ability to control for possibly correlated, time-invariant heterogeneity without observing it (Williams, 2015). The two models, depending on the nature of the variables, are included into this estimation. If variables are constants over time, random effect model is better (Hsiao, 2010). Random effect model is given as (Bruderl, 2005):

$$Y_{it} = \beta_0 + \beta_1 x_{it} + v_i + \varepsilon_{it}$$

It is assumed that the  $v_i$  are random variables (random effects) and that  $Cov(x_{it}, v_i) = 0$ . Using a pooled-GLS estimator provides the random effects estimator. The following transformation is required to estimate random effects model from the pooled regression (Bruderl, 2005):

$$(y_{it} - \theta \bar{y}_i) = \beta_0(1 - \theta) + \beta_1(x_{it} - \theta \bar{x}_i) + \{(1 - \theta)v_i + (\varepsilon_{it} - \theta \bar{\varepsilon}_i)\},$$

Where

$$\theta = 1 - \sqrt{\frac{\sigma_{\epsilon}^2}{T\sigma_v^2 + \sigma_{\epsilon}^2}}$$

If  $\theta = 1$ , random effect estimation is similar to fixed effects estimator, but if  $\theta = 0$ , the random effect estimation is similar to pooled regression. Normally  $\theta$  is between 0 and 1. If  $(x_{it}, v_{it}) = 0$ , it is good, it even increases efficiency. If  $(x_{it}, v_{it}) \neq 0$  the random effect estimator will be biased and the degree of bias depends on value to  $\theta$ . If  $\sigma_v^2 \gg \sigma_{\epsilon}^2$ , then  $\theta$  is expected to be close to 1, and the bias of the random effects estimator will be lower (Bruderl, 2005).

If independent variables vary over time, fixed effects model is appropriate.

$$Y_{it} = \beta_1 x_{it} + v_i + \epsilon_{it}$$

Including the time demand, the above model over time is:

$$\bar{y}_i = \beta_1 \bar{x}_i + v_i + \bar{\epsilon}_i.$$

In a both random and fixed effect model  $Y_{it}$  is a depended variable (ROA) and  $x_{it}$  is  $x_{it}$  is a 1 x k vector of observations on the explanatory variables,  $t = 1, \dots, T$ ;  $i = 1, \dots, N$ . Following seven variables were used as explanatory variables: size, leverage, quick ratio, fixed assets to total assets ratio, growth, investment, lagged profitability.

Answer on question which model (fixed effects or random effects model) is appropriate will be realized by tests model validation such as Bresuch-Pagan Larange Multiplies test and Hausman test.

In order to test for the potential multicollinearity problems, correlations between the variables were analyzed. The following table presents the results of correlation analyze.

**Table 4: Correlation analysis of profitability and profitability determinants**

<i>Hungary</i>								
	ROA	Size	Leverage	Quick Ratio	Fixed assets ratio	Growth	Investments	Lagged profitability
ROA	1							
Size	-0.133	1						
Leverage	0.1547	-0.1573	1					
Quick ratio	0.2182	-0.0325	-0.0008	1				

Fixed assets to total assets ratio	-0.2212	0.1417	-0.0754	-0.2474	1			
Growth	0.1886	-0.0055	0.0081	0.0214	-0.0083	1		
Investment	0.0429	-0.0469	0.0565	-0.0375	-0.0515	0.0736	1	
Lagged profitability	0.5192	-0.1018	0.1957	0.2191	-0.2156	-0.0166	0.0835	1
<b>Romania</b>								
	ROA	Size	Leverage	Quick Ratio	Fixed assets ratio	Growth	Investments	Lagged profitability
ROA	1							
Size	-0.1388	1						
Leverage	0.1935	-0.0989	1					
Quick ratio	0.2441	-0.0588	-0.0384	1				
Fixed assets to total assets ratio	-0.1784	0.1958	-0.1211	-0.2072	1			
Growth	0.2107	-0.0084	0.0238	-0.0075	0.0255	1		
Investment	0.0833	-0.0199	0.0605	-0.012	0.0041	0.0544	1	
Lagged profitability	0.5878	-0.1169	0.2207	0.2464	-0.15	-0.0614	0.1259	1
<b>Republic of Serbia</b>								
	ROA	Size	Leverage	Quick Ratio	Fixed assets ratio	Growth	Investments	Lagged profitability
ROA	1							
Size	-0.0031							
Leverage	0.1122	-0.1376	1					
Quick ratio	0.3058	0.1155	-0.2317	1				
Fixed assets to total assets ratio	-0.1116	0.3491	-0.4807	0.0372	1			
Growth	0.215	0.0257	-0.0232	-0.0144	-0.0182	1		
Investment	0.0655	-0.0376	0.1083	-0.0375	0.0069	0.0316	1	
Lagged profitability	0.6082	0.0215	0.2156	0.2572	-0.1405	-0.0278	0.1086	1
<b>Bosnia and Herzegovina</b>								
	ROA	Size	Leverage	Quick Ratio	Fixed assets ratio	Growth	Investments	Lagged profitability
ROA	1							
Size	-0.1568	1						
Leverage	0.4056	-0.0299	1					
Quick ratio	0.0826	-0.1349	-0.36	1				
Fixed assets to total assets ratio	-0.1456	0.3042	-0.1764	-0.3054	1			
Growth	-0.2019	-0.0256	-0.1312	-0.0181	0.1517	1		
Investment	-0.0034	0.0863	0.0431	-0.0085	0.1518	0.0478	1	
Lagged profitability	0.7107	-0.0971	0.4115	0.0493	-0.1454	-0.1302	0.0252	1

Source: Author's calculation

The results show high correlations between ROA and lagged profitability in each country. For example, the correlation between ROA and lagged profitability is high positive (0.7107) in Bosnia and Herzegovina. The more superior multicollinearity test can be realized by examining the Variance Inflation Factor (VIF). The (VIF) explains how much the variance of a coefficient is inflated due to linear dependence with other independent variables. Less VIF means that multicollinearity between independent variables is less. The referent value of VIF is that mean VIF should not be greater than 10. According to the result (Table 5), it can be concluded that there is no multicollinearity problem.

**Table 5: Results of multicollinearity test**

Variable	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF
	Hungary		Romania		Serbia		Bosnia and Herzegovina	
<b>Size</b>	1.13	0.88	1.16	0.85	1.15	0.86	1.62	0.61
<b>Leverage</b>	1.12	0.89	1.12	0.89	1.49	0.67	1.45	0.69
<b>Quick ratio</b>	1.11	0.90	1.10	0.90	1.32	0.75	1.38	0.72
<b>Fixed assets to total assets ratio</b>	1.07	0.93	1.08	0.92	1.19	0.84	1.29	0.77
<b>Growth</b>	1.05	0.95	1.05	0.95	1.18	0.84	1.12	0.89
<b>Investment</b>	1.02	0.97	1.02	0.97	1.03	0.97	1.05	0.95
<b>Lagged profitability</b>	1.01	0.99	1.01	0.99	1.00	0.99	1.04	0.96
<b>Mean VIF</b>	1.07	-	1.08	-	1.20	-	1.28	-

Source: Author's calculation

## 6. Results

This study is focused on the influence of internal factors on the profitability of agricultural enterprises in Southeast Europe. Regression results for the model are presented in Table 6 for Hungary, Romania, Republic of Serbia, Bosnia and Herzegovina. For testing whether we should use fixed or random effects model, Hausman test was performed. The test shows *p*-value greater than .05 for all agricultural enterprises in each country, so data-set is estimated using random effects model. The overall  $R_{sq}$  shows how much of change in profitability of agricultural enterprises is explained by the variables that are used in this model. The overall  $R_{sq}$  of the Hungarian and Romanian agricultural industry is higher (.6338 and .7284, respectively) than  $R_{sq}$  of the agricultural industry in the Republic of Serbia, and Bosnia and Herzegovina (.5508 and .5510, respectively). Wald  $\chi^2$  is significant at 1% level for all four datasets, showing that proposed model fits the data well.

**Table 6: Results of panel data regression**

	Hungary	Romania	Serbia	Bosnia and Herzegovina
Size	<b>-.4594</b>	<b>-.4190</b>	-.1819	-.5564
	<b>.0000</b>	<b>.0000</b>	.2110	.1030
Leverage	<b>3.4958</b>	<b>4.8643</b>	.9644	<b>6.4592</b>
	<b>.0030</b>	<b>.0000</b>	.3770	<b>.0050</b>
Quick ratio	<b>.3088</b>	<b>.4742</b>	<b>.5350</b>	<b>.6320</b>
	<b>.0000</b>	<b>.0000</b>	<b>.0000</b>	<b>.0530</b>
Fixed assets to total assets ratio	<b>-3.5135</b>	<b>-3.4808</b>	-.3089	2.3368
	<b>.0000</b>	<b>.0000</b>	.7620	.3140
Growth	<b>.4269</b>	<b>.6160</b>	<b>.3729</b>	<b>.0575</b>
	<b>.0000</b>	<b>.0000</b>	<b>.0000</b>	<b>.0610</b>
Investment	-.1070	-.0181	-.0046	-.1536
	.2440	.8330	.979	.6830
Lagged profitability	<b>.4402</b>	<b>.5351</b>	<b>.5181</b>	<b>.5803</b>
	<b>.0010</b>	<b>.0000</b>	<b>.0000</b>	<b>.0000</b>
cons	5.1916	2.1722	1.9490	1.4033
	.0010	0.010	0.0109	.0400
R <sub>sq</sub>	.6338	.7284	.5508	.5510
Number of observation	3,052	4144	852	156
Chi <sup>sq</sup>	.0000	.0000	.0000	.0000
Hausman	0.8769	0.6728	0.9827	0.9662

Source: Author's calculation

Estimated results of all agricultural enterprises in Hungary and Romania are very similar. The results show that most of the analyzed parameters (except investment) have statistically significant influence on the profitability of the agricultural enterprises at 1% level. Profitability of agricultural industry is positively related to the leverage, quick ratio, growth, and lagged profitability in Hungary and Romania. Agricultural enterprises with higher debt financing, better liquidity, sales growth and profits in the previous period, have higher profits. It is interesting to notice that agricultural enterprises with higher debt ratio have better profitability. This evidence is in line with capital structure theory, which states that debt financing is favorable to the firm since it delivers tax savings. On the other side, size and fixed assets to total assets ratio are negatively related to the profitability in both countries. From the negative relationship between SIZE and ROA, we can conclude that there is no evidence that larger agricultural enterprises in Hungary and Romania tend to have higher profits due to the economies of scale.

The findings in the Republic of Serbia show that smaller number of independent variables are related to the profitability of agricultural industry. The quick ratio, growth, and

lagged profitability are positively related to the profitability of agricultural enterprises. Agricultural enterprises with better liquidity, sales growth, and good profitability in last period, achieve higher profits. These variables explain 55.08% of profitability.

The results of the profitability determinants of agricultural enterprises in Bosnia and Herzegovina are very similar to the results from the Republic of Serbia. The profitability of agricultural enterprises in Bosnia and Herzegovina is affected positively by leverage, quick ratio, lagged profitability and sales growth. Two independent factors (leverage and lagged profitability) are significant at the level of 1%. Other two factors (quick ratio and growth) are significant at the level of 10%.

## 7. Conclusions

In this paper, profitability determinants of agricultural enterprises were examined in Southeastern Europe countries, such as Hungary, Romania, Serbia, Bosnia and Herzegovina. The agricultural industry is very important in these countries, and present one of the sectors with continuous stability in profitability.

The agricultural policy in these countries is very different. Hungary and Romania, as members of European Union, are affected by the Common Agricultural Policy. Some of the reforms in EU agriculture, such as, ensuring food safety and quality, guaranteeing the stability of farmers' income, rural development grant etc. led to higher profits. Differences in agricultural policy reflect the differences in profitability. Hungary and Romania have better profitability than the Serbia and Bosnia and Herzegovina as non-EU members in Southeast Europe.

In order to analyze factors which affect the profitability of agricultural enterprises in the countries of Southeast Europe, a panel data analysis was conducted. The results show that the profitability determinants of agricultural enterprises in Hungary and Romania are the similar. In these countries, the profitability of agricultural enterprises are positively affected by leverage, quick ratio, growth, and lagged profitability. Furthermore, size and fixed assets to total assets ratio are negatively related to the profitability in these countries. From the negative relationship between size and ROA, we can conclude that there is no evidence that larger agricultural enterprises in Hungary and Romania tend to have higher profits due to the economies of scale.

On the other side, profitability determinants in Serbia, Bosnia and Herzegovina are very similar. In both countries, the profitability of agricultural enterprises is affected positively by quick ratio, lagged profitability and growth. According to this, agricultural enterprises with high liquidity ratio, profit in the previous period and sales growth, achieve better profit in the current period. Despite this, leverage as one more factor is positively related to the profitability in Bosnia and Herzegovina.

Our results are of interest to various stakeholders, including managers, investors, debt holders, and other users of financial statements, since it makes a profile of agricultural enterprises by associating firm internal characteristics with intensity and direction of profitability ratio in four countries (Hungary, Romania, Serbia, Bosnia and Herzegovina). Furthermore, our results are also of interest to further research in similar areas, especially in the area of agricultural industry.

## 8. References

ADAMS, M., & BUCKLE, M. The determinants of corporate financial performance in the Bermuda insurance market. *Applied Financial Economics*. v. 13, n. 2, p. 133-143. 2003.

AGIOMIRGIANAKIS, G., VOULGARIS, F., & PAPADOGONAS, T. Financial factors affecting profitability and employment growth: the case of Greed manufacturing. *International Journal of Financial Services Management*. v. 11, n. 2, p. 232-242. 2006

AL-JAFARI, M. K., & AL SAMMAN, H. Determinants of profitability: evidence from industrial companies listed on Muscat Securities Market. *Review of European Studies*. v. 7, n. 11, p. 303-311. 2015.

AMADEUS. *Database*. 2016. Retrieved 10th April 2016 from <http://www.eui.eu/Research/Library/ResearchGuides/Economics/Statistics/DataPortal/AmadeusBvD.aspx>

ASIMAKOPOULOS, I., SAMITAS, A., & PAPADOGONAS, T. Firm-specific and economy wide determinants of firm profitability-Greek evidence using panel data. *Managerial Finance*. v. 35, n. 11, p. 929-940. 2009.

ASIRI, B. How investors perceive financial ratios at different growth opportunities and financial leverages. *Journal of Business Studies Quarterly*. v. 6, n. 3, p. 1-12. 2015.

BARBOSA, N., & LOURI, H. Corporate Performance: does ownership matter? A comparison of foreign-and domestic-owned firms in Greece and Portugal. *Review of Industrial Organization*. v. 27, p. 73-102. 2005.

BRUDERL, J. *Panel Data Analysis*. 2005. Retrieved 5th May 2016 from <http://www2.sowi.uni-mannheim.de/lsssm/veranst/Panelanalyse.pdf>

BURJA, C. Factors influencing the company's profitability. *Annales Universitatis Apulensis Series Oeconomica*. v. 13, n. 2, p.215-224. 2011.

CALLADO, A. L. C., SOARES, K. R. Analysis of the use of performance indicators in the context of agribusiness. *Custos e @gronegocio on line*. vol. 10, n. 2, p. 272-284. 2014.

CHANDRAPALA, P., & GUNERATNE, W. Ownership concentration and financial performance: the case of Sri Lankan listed companies. *Corporate Ownership and Control*. v. 9, n. 4, p. 170-177. 2012.

CHANDRAPALA, P., & KNAPKOVA, A. Firm-specific factors and financial performance of firms in the Czech Republic. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*. v. 61, n. 7, p. 2183-2190. 2013.

COBAN, S. The interaction between firm growth and profitability: evidence from Turkish (listed) manufacturing firms. *Bilgi Ekonomisi ve Yoneimi Dergisi*. v. 9, n. 2, p. 73-82. 2014.

GEROSKI, P. A., MACHIN, S. J., & WALTERS, C. F. Corporate growth and profitability. *The Journal of Industrial Economics*. v. 45, n. 2, p.171-189. 1997.

GFA CONSULTING GROUP. *Food industry study in Southeast Europe*. Hamburg: GFA. 2010.

GODDARD, J., TABAKOLI, M., & WILSON, J. Determinants of profitability in European manufacturing and services: evidence from a dynamic panel model. *Applied Financial Economics*. v. 15, n. 18, p. 1269-1289. 2005

GUARIGLIA, A. *Modeling the relationship between financial indicators and company performance – an empirical study for US listed companies*. France: Dissertation Vienna University of Economics and Business Administration. 2009.

HALL J.R. Analysis of the debt and impact on cost of debt and profitability of companies listed on Brazilian agribusiness BM&FBovespa. *Custos e @gronegocio on line*. v. 10, n. 4, p. 39-59. 2014.

HORNGREN, C.; HARRISON, W.; OLIVER, S. *Accounting*. Upper Saddle River: Prentice Hall. 2012.

HOY, F., MCDUGALL, P. P., & D'SOUZA, D. E. Strategies and environments of high-growth firms. In: Sexton, D. L., Kasarda, J. D. (Eds). *The State of the Art of Entrepreneurship*. Boston: PWS. 1992.

HSIAO, C. *Analysis of Panel Data*. New York: Cambridge University Press. 2010.

ITO, K., & FUKAO, K. *Determinants of the profitability of the Japanese manufacturing affiliates in China and regions: does localization of procurement, sales and management matter*. Discussion Paper. Series No. 01-E\_001. 2006. Retrieved 25th May 2016 from <http://www.rieti.go.jp/en/publications/summary/07010001.html>

JAKŠIĆ, D., MIJIĆ, K., ZEKIĆ, S., POLJAŠEVIĆ, J. Comparative profitability analysis of milk production companies to milk processing companies in Serbia. *Custos e @gronegocio on line*, v. 11, n. 3. p. 206-226. 2015.

JENSEN, M. C., & MURPHY, K. J. Performance pay and top-management incentives. *Journal of Political Economy*. v. 98, n. 1, p. 225-264. 1990.

KAEN, F. R., & BAUMANN, H. D. *Firm size, employees and profitability in US manufacturing industries*. 2003. Retrieved 25th May 2016 from [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=382402](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=382402)

KNEZEVIC, A., DOBROMIROV, D. The determinants of Serbian banking industry profitability. *Economic research-Ekonomska istraživanja*. v. 29, n. 1, p.459-474, 2016.

KUNTLURU, S., MUPPANI, V. R., & Khan A. M. Financial performance of foreign and domestic owned companies in India. *Journal of Asia Pacific Business*. v. 9, n. 1, p.28-54. 2008.

MCGAHAN, A., & PORTER, M.E. How much does industry matter, really?. *Strategic Management Journal*. v. 18, S1, p. 15-30. 1997.

MCDONALD, J. The determinants of firm profitability in Australian manufacturing. *The Economic Record*. v. 75, n. 229, p. 115-126. 1999.

PAPADOGONAS, T. The financial performance of large and small firms: evidence from Greece. *International Journal of Financial Services Management*. vol. 2, n. 1, p. 14-20. 2005.

PRATHEEPAN, T. A Panel data analysis of profitability determinants: Empirical results from Sri Lankan manufacturing companies. *International Journal of Economics, Commerce and Management*. v. 2, n. 12, p.1-9. 2014.

SCHERER, F. *Industrial market structure and economic performance*. Boston: Houghton-Mifflin. 1980.

STIERWALD, A. *The causes of profit heterogeneity in large Australian firms*. Working paper No. 7/10. Melbourne: University of Melbourne, Melbourne Institute of Applied Economic and Social Research. 2010.

TITMAN, S., & WESSELS, R. The determinants of capital structure choice. *Journal of Finance*. v. 43, p. 1-19. 1988.

VOLK, T., ERJAVEC, E., MORTENSE, K. *Agricultural policy and European integration in Southeastern Europe*. Budapest: FAO. 2014.

WALSH, C. *Key Management Ratios*. London: Prentice Hall. 2008.

WHITED, T. Debt, liquidity constraints and corporate investment: evidence from panel data. *Journal of Finance*. v. 47, p. 1425-1460. 1992.

WILLIAMS, R. *Panel Data: Very Brief Overview*. 2015. Retrieved 10th May 2016 from <https://www3.nd.edu/~rwilliam/stats2/Panel.pdf>

YAZDANFAR, D. Profitability determinants among micro firms: evidence from Swedish data. *International Journal of Managerial Finance*. v. 9, n. 2, p.150-161. 2013.