The impact of intellectual capital on the financial performance of agricultural enterprises: evidence from the West Balkans Counties

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Abstract

The purpose of this paper is to identify and analyze the impact of the key elements of intellectual capital (according to the VAIC model) on the financial performance of agricultural enterprises operating in emerging markets. In addition to the key elements of IC, the paper examines the impact of size, age and leverage on financial performance. The research was conducted on WBC, using balanced panel data techniques, which enables the control of the bias generated by potential heterogeneity, on a sample of 47 agricultural enterprises. Different estimators were used for the estimation parameters of the dynamic panel data model. The research results indicate that CEE is the most important element of IC and that HCE has a minor impact, while SCE has a negative impact on the financial results of agricultural enterprises in WBC. Also, research points out the importance of the correct choice of estimators of model parameters and the important to take into account the problem of endogeneity.

Keywords: Agricultural enterprises. Intellectual capital. Panel data. GMM estimator.

1. Introduction

In the era of industrialization, enterprises created value by transforming physically tangible assets (land, buildings, equipment and supplies) into products. Unlike the industrial era, in the information era, the value of physically intangible resources is significantly increasing, and intangible assets become the main source of competitive advantage. Companies characterized by high business performance have realized in time that the market value of their assets increases with a greater share of intangible (intellectual) resources compared to tangible assets. Intellectual capital is the most important source of a company's competitive advantage.

Dividing sectors into those intensively based on high-tech and knowledge, today becomes less and less meaningful, since now the so-called traditional sectors, such as agricultural and food industry areas based on knowledge and the outputs of tangible and intangible technological knowledge (Komnenic et al. 2014). Unlike the situation in the 1980s, when 60% of the value of the company was related to tangible assets, and the rest to intellectual resources (intangible property), the situation is significantly altered today. The global trend has caused the company's value to be predominantly related to intangible assets, i.e. intellectual resources (from 70% to 84%) (Kaplan and Norton (2004), Ocean Tomo (2015)). The most successful companies today have the IC value 10 to 20 times higher than the value of the tangible assets (Osinski et al. 2017). If we take a look at the period 1975-2005, the share of the book value of intangible assets in the total book value of assets increased from 1.9% to 43.2%, while in the same period the share of the book value of intangible assets in market capitalization increased from 1.6% to 15.5%. The share of intangible assets had doubled every 10 years, which indicates the importance of IC for the company's successful business operations (Cardoza et al. 2006). Hence, it is stated that in modern business conditions, intellectual capital (IC) is the most important source of the competitive advantage of the company.

With the popularization of the informatics economy, IC has special importance and role in the process of creating value. The results of a study conducted by Sydler et al. (2014) show that investments in IC are transformed into revenues within one year. There are numerous theoretical and practical examples and evidence that unambiguously point to the

fact that IC determines the growth potential of the company and generates the bulk of added value (Khalique et al. (2013), Reed et al. (2006)).

In other words, the new core of economic advancement is the concept of IC that becomes more important over time, as the impact of financial assets on the financial performance of the company decreases, while the impact of intangible assets is increasingly dominant. Hence, today many researchers believe that IC is the most important strategic assets in evaluating the performance of an organization in developing and emerging countries (Khalique et al. (2015), Chan (2009)).

However, all this on the other hand requires that IC be managed systematically, that its impact on enterprise performance is understood and valorized. It is especially important to understand the impact of its elements, human, structural and employed capital on various business performances, and above all on financial ones.

Given the above, it is not surprising that many authors have studied the impact of IC and its elements on different business performance. However, there is little research and papers that have studied the impact of IC on the financial performance of agricultural enterprises using panel analysis. In addition, the findings of these studies are often contradictory, and no clear position can be drawn regarding the intensity and direction of the impact of different IC elements on business performance. This is especially evident for companies operating in emerging economies such as Balkan countries. In addition, despite warnings from numerous authors, such as Zouaghi et al. (2017), Hirsch and Gschwandtner (2013), who are pointing to the potential problem of endogeneity in models which examine the impact of IC and other internal variables on the business performance of agricultural enterprises, a large number of studies did not take this into account. Hence, the primary aim of this paper is to examine the impact of key components of the IC, such as human capital, which represents a combination of different human's abilities for solving business problems, structural capital which consists of set an intangible asset and knowledge which arise from organizational processes and employed capital which represents a combination of physical and financial capital, on the performance of agricultural enterprises operating in WBC. In addition to the primary goal, it is possible to draw a set of subordinating goals, the most important of which is to point out the potential problem of the presence of endogeneity, as well as the crucial importance of choosing an adequate estimator for the estimation of model parameters. In addition to the primary goal, it is possible to draw a set of subordinating goals, the most important of which is to point out the potential problem of the presence of endogeneity, as well as the crucial importance of choosing an adequate estimator for the

estimation of model parameters. Apart from the fact that this research is the first study that uses a dynamic panel analysis model to examine the impact of IC elements on business performance, this study contributes to the literature in such a way that unlike previous studies it is not restricted to publicly quoted firms or to a minimum firm size criterion. The study is based on data that has nearly no firm size restrictions making a more precise representation of the industry possible. The justification for conducting such differentiated examination of agricultural enterprises lies in the specifics of agricultural production in relation to other sectors.

The paper is structured as follows. The first part of the paper is introductory. The second part of the paper presents the results of previous research in this field. The third part of the paper presents the methodology and data sample. The fourth part contains the results of empirical research. The finale part of the paper is concluding and it summarizes the findings and outlines the conclusions of this study.

2. Literature review

Different studies (e.g. Bontis et al. (2000), Lim and Dallimore (2004), Vishnu and Gupta, (2014), Urbanek (2016), Al-Musalli and Ku Ismail (2014), Meles et al. (2016), Khalique (2019), Bornemann and Wiedenhofer (2014), Poh et al. (2018), Khalique (2019), Peng et al. (2007), Hidayat et al. (2016)) are showing a significant positive impact of IC on different kinds of organizational performance. These studies cover companies from different sectors. Most of these studies relate to the service sector and the study of the impact of IC on the financial performance of enterprises. This is not surprising when has the insight that the tertiary sector is dominant today, and that in the market economy the greatest attention is paid to the financial results of operations.

However, these studies were used quite a few different methods for measuring IC. Most studies are based on the application of the Value Added Intellectual Coefficient (VAIC) model was proposed by Pulic (2000). Such research was conducted by Zeghal and Maaliul (2010), Maditinos et al. (2011), Yalama (2013), Goh (2005), Joshi et al. (2012), Kaupelytė and Kairytė (2016), Singh et al. (2016) etc.). It is interesting for this research that their findings are inconsistent. For example, Joshi et al. (2012) which were examined the impact of IC on financial performances in the services sector of Australia in the period 2006-2008, he was concluded that only the employed capital efficiencies (CEE) have a significant and positive impact on ROA, while the impact of human capital efficiency (HEC) and the

structural capital efficiencies (SCE) is insignificant. A similar view is expressed by Khalique (2019). He showed that human capital and structural capital insignificant contributor to the financial performances of banks. Goh (2005) measured the IC efficiency of commercial banks in Malaysia in the period from 2001 to 2003. He concluded that value creation depends exclusively on the HCE. A similar conclusion was presented by Al-Musalli and Ku Ismail (2014). Kaupelytė and Kairytė (2016) state that large banks should invest in structural capital, while small banks should invest in human capital. Meles et al. (2016) argue that HCE has a positive effect on financial performance indicators, while the SCE does not have a significant impact. On other hand, Ikapel (2016) argues that HCE doesn't impact, while CEE has a significant impact on financial performances. The same results were reported by Javed and Jahan (2017), while Nawaz and Haniffa (2017) indicate a significant positive relationship between accounting performance and CEE and HCE, but no significant relationship with regards to structural capital efficiency. The regression analysis results conducted by Poh et al. (2018), indicate that importance of different components of IC changes over time. They have not determined the reasons for these changes. Lu et al. (2014) conducted a study that applies the dynamic slack-based measure (DSBM) model to evaluate the performance of 34 Chinese life insurance companies for the period 2006-2010. They concluded that all components of IC affect the performance of insurance companies, but that the greatest impact has HCE. Hidayat et al. (2016) point out that the following variables have a significant influence on each other: HCE to ROA, ROE to SCE, and ROA to ROE (not vice versa), while Arifa and Ahmar (2016) point out that HCE and CEE positively affect ROA and ROE, while SCE does not have a significant impact.

What is common in these studies is that there is no agreement on what the key component of IC is. It raises the question of which key component of IC affects the performance of agricultural enterprises operating in West Balkan countries (WBC).

As already pointed out, there are very few studies that have studied the impact and importance of different elements of IC on the financial performance of agricultural enterprises. This is especially true of emerging markets, such as Balkan countries. The most comprehensive study related to the study of the impact of IC on the financial performance of agricultural enterprises in emerging markets was conducted by Tsai and Mutuc (2020). Tsai and Mutuc (2020) surveyed a sample of 44 companies in the period from 2011 to 2017 in Asia. Unfortunately, they could not determine which element of IC in the context of the VAIC model (HEC, SEC and CEE) has the greatest impact on the financial performance of agricultural enterprises. They found that the significance of the IC element depends on the

disaggregated effects of each IC component on environmental, social, and governance pillars. Shaiban (2014) used panel data to investigate the impact and significance of IC elements on the financial performance of agricultural enterprises in Malezia. The results show that the IC has a positive impact on financial results. Also, he revealed that the relationship between IC and economic performance is insignificant, but that CEE and SEC are the key elements of the IC that impact financial and productivity performance. Janda et al. (2013) conducted a survey on the example of 300 agricultural enterprises in Poland and found that the size of enterprises and CEE have a positive impact on business results. Their research results are in line with the findings of Kadocsa and Francsovics (2011), who conducted their research on the example of Hungarian enterprises.

Kozera (2016) was conducted a study on the example of Polish agricultural enterprises, and she showed there is a strong relationship between the VAIC and profitability indicators, notice to the growing importance of the IC in agricultural companies. Similarly stated Kujansivu and Lönnqvist (2007), who conducted research, among other things, on agricultural enterprises in Finland. Xu et al. (2020) have sampled listed agriculture companies in China's Shanghai and Shenzhen A-share markets from 2009 to 2018 and categorized them as high-tech (HTAC) and non-high-tech agriculture companies. They found that the CEE and executive human capital efficiency (EHCE) have a significant positive effect on corporate sustainable growth.

One of the most well-known studies concerning the countries that are the subject of research in this paper is the research conducted by Komnenic et al (2014), Djekic et al. (2017) Dobrivojevic et al. (2019) and Kontic and Cabrilo (2009). Komnenic et al (2014) studied the efficiency of IC in agricultural and food enterprises in Serbia. The study was conducted on a sample of 17 enterprises. They found that companies achieved an extremely high level of IC efficiency. The average value of the VAIC coefficient was 8.48, which is considered to be extremely high efficiency. However, such a high average is the result of high IC efficiency in a few companies in the sample. Djekic et al. (2017) were studied the impact of IC in the fruit industry in Serbia. It was revealed that the most valued IC indicators are indicators of relational capital. Similar findings were reported by Dobrivojevic et al. (2019) who studied the role of IC in agricultural systems the bioeconomy-based. Their findings are not in line with findings reported by Kontic and Cabrilo (2009), Miller et al. (1999), which point out that human capital indicators are the most important element of IC. However, Dobrivojevic et al. (2019) explain their findings by the fact since bioeconomy is relatively a new field and that enterprises from this sector try to acquire sustainable competitive advantage through

relationships with customers and other stakeholders. On the other hands, Kontic and Cabrilo (2009) are shown that the most important element of IC is structural capital.

3. Methodology research and the empirical results

As was mentioned in previous parts of the paper, the main aim is to examine the impact and importance of key elements of the IC (such as human capital, which represents a combination of different human's abilities for solving business problems, structural capital which consists of set an intangible asset and knowledge which arise from organizational processes and employed capital which represents a combination of physical and financial capital) on financial performances of agricultural enterprises at emerging markets. The research was conducted in WBC. More precisely, the research was conducted on an example of seven WBC (Serbia, Croatia, Slovenia, Bosnia and Herzegovina, Montenegro, Nort Macedonia, Albania). The countries were selected bearing in mind that they are in a similar phase of the development of their respective economies, i.e. the transition process, the EU accession phase (except Slovenia and Croatia), similar legal regulations from within the economic field and that they all have a common historical economic heritage, except Albania. In the paper authors used balanced panel data consists of on sample of 47 agricultural enterprises. The data was collected from the HR department of these enterprises, for the period from 2011 to 2018 years.

3.1. Data description

Although the business performance of agricultural enterprises can be expressed through various indicators, which are not always fully related to financial indicators, they are most often expressed in the category of financial results, i.e realized profit, since organizations are only sustainable if they are financially solvent and if they show profit growth (Curcic et al. 2020). The ROA has been used as a proxy in the model for the financial performance of agricultural enterprises as it is one of the key financial indicators of business success of enterprises, while elements of the VAIC model, the HCE, the SCE and the EEC were used as a proxy for human, structural and employed capital. It has already been pointed out that different methods have been used in the literature to measure the efficiency of IC on business performances and its elements, ie. there is no single method that is accepted as the best. For this research, the VAIC method, proposed by Pulic, was used. The reason why this

method was used can be found in the claim of Abdulsalam et al. (2011) who point out that the VAIC method is a suitable and impartial method with no subjective grading. IN other words, the VAIC shows the extent to which IC contributes to the business performance of the enterprise compared to the tangible asset.

The mathematically it can be expressed as follows:

$$VAIC = HCE + SCE + CEE \quad (1)$$

Where are:

$$HCE = VA/HC \quad (2)$$

$$SCE = (VA - HC)/VA \quad (3)$$

$$CEE = VA/CE \quad (4)$$

VA - *Value Added – sum of operating profit, Employment cost, Amortization and Depreciation*

HC - *Wage and other personal expenses*

CE - *Physical and financial capital*

HEC - *Human capital efficiency*

SCE - *Structural capital efficiency*

CEE - *Capital employed efficiency*

The advantages of the VAIC method are reflected in the simplicity of calculation and the possibility of comparing results between different companies and industries. Kozera (2016) point out the fact the effectiveness of impact IC on business success, using the VAIC model, is measured based on the same financial statements based on which indicators of the financial success of the company are calculated. That enables the study of the relationship between VAIC and profitability measured with indicators of Return on Assets (ROA) and Return on Equity (ROE). The ROE was not used in this paper because it is generally known that there is a strong correlation between these two indicators that cause the appearance of multicollinearity in the panel analysis (Radivojevic and Jovovic (2017), Radivojevic et al. (2019)).

However, such as everyone method and the VAIC has a few drawbacks. First, the measurement of IC efficiency is based on historical data from the financial statements of the company, which means that it speaks about the effects of the value creation strategy in the past, and not for the forecast in the future. Second, it does not take into account the synergistic effect of different elements of the IC on creating new values. It cannot be used if companies have negative profitability. The main disadvantage of this method is that it does not take into account relational capital.

In addition to these major variables, three control variables are included in the model (1), which is in line with the prevailing literature (Adepoju and Salman (2013), Pattitoni et al. (2014), Mijic and Jakic (2017), Rajčaniova and Bielik (2008), Hall et al. (2014), Kadocsa and Francsovics (2011), Janda et al. (2013), Muhammad et al. (2004), Milic et al. (2018) etc.). Control variables are the size of enterprises (SIZE), the age of enterprises (AGE) and Leverage ratio (LEV).

Although there is a general belief that with the growth of a company grows its profitability and that the size of the company researched through the Amount of Total Assets can be a limiting factor for small businesses to enter the market which further improves profitability, research conducted over the past 30 years indicate that there are numerous exceptions (Hamermesh and Anderson (1978), Herget (1984), Chawla et al. (2010), Yannopoulos (2010), Pattitoni et al. (2014)). Irrespective of the mentioned studies, the analysis of the income statement of agricultural enterprises indicates the expectation that size has a significant positive impact on profitability. This expectation is in line with findings was reported by Adepoju and Salman (2013) and Janda et al. (2013), who point out that company size has positive impact on performance of agricultural enterprises, but it is contrary to the findings of Labintan and Ding (2012) and Mijic and Jaksic (2017). For the purposes of this paper, the size of the enterprise is expressed as the logarithm of the Amount of Total Assets.

It is expected that companies with longer lifespan will achieve better performance due to the accumulated experience and knowledge. The research of Majumdar (1997) can be cited in support of this. However, the experiences of agricultural companies from the WBC are significantly contrary to these expectations. They are in line with findings reported by Coad et al (2018). Since there is no significant research on the influence of the age of agricultural enterprises from the WBC on business results, this variable is also included in the study. For the purposes of this paper, the age of the company is expressed as a natural logarithm of the number of years of the company since its founding in 2019.

Leverage, as a ratio between total liabilities and total assets of the company, is a good indicator that sublimates the quality of the company's management, more precisely its attitude towards liabilities, assets, risk and moral hazard, an ie. tendency to over-indebt the company, etc. It is expected that there is a negative correlation between the value of leverage and business results, which is opposite by findings were reported by Mijic and Jaksic (2017). This expectation is formed on the belief that more profitable companies finance their business from their own income. However, there are numerous examples that successful companies can also be those with a higher value of the leverage ratio than the average in the sector. The tax

treatment of interest on debt can be one of the justifications that profitable companies have a slightly higher value of this ratio compared to the average in the sector.

Selection of the variables was guided by the following: 1) that variables should be the ones significant for the business performances of agricultural enterprises, due to specific characteristics of agricultural production, level of development of the agricultural sector in selected countries and the like; 2) that there are available data on all the variables for all the selected countries; 3) that there are conflicting results in the literature on their impact and significance for the business performances of agricultural enterprises.

3.2. Econometric methodology

For that purpose, the linear dynamic panel data model is used in the paper. Using panel data techniques enables the control of the bias generated by potential heterogeneity (Radivojevic & Jovovic, 2017). Mathematically it can be expressed as follows:

$$y_{i,t} = \alpha_i + \beta_1 y_{i,t-1} + \sum_{n=1}^{n} \beta_n x_{t,n} + \sum_{k=1}^{K} \beta_k x_{i,t,k} + u_{i,t} \quad (5)$$

Where $y_{i,t}$ is the observation on the dependent variable (the ROA) for cross-sectional unit *i* in period *t*, $X_{n,t}$ is a 1 x *k* vector of key elements of the IC observed for unit *i* in period *t*, $X_{k,t}$ is a 1 x *k* vector of rest internal variables observed for unit *i* in period *t*, β_n and β_k are a *k* x 1 vectors of parameters. The α_i is a unit-specific and time-invariant component and $u_{i,t}$ an observation specific error to unit *i* in period *t*.

The structure of the model itself determines the choice of estimator, such as one-step difference GMM, which is capable of capture endogeneity. The inclusion of a lagged dependent variable in the model causes a potential endogeneity problem because it is very likely that the lagged dependent variable is correlated with the model error, imposing a bias in the estimation. According to Radivojevic and Jovovic (2017), the correlation between the lagged dependent variable and the error model generates a bias problem in the estimation. Furthermore, the model might cause bias due to the endogeneity of the explanatory variables which gives a rise to the autocorrelation problems. A well-founded objection to numerous researches that examined internal factors on business performances of agricultural enterprises (which are emphasized in the paper) is that they did not take into account the endogeneity, while the choice of estimators such as Fixed-effects or Random Effects is justified only by applying formal tests for choosing the better estimator. In the case of the presence of endogeneity, the application of these estimators imposing a bias in the estimation, which is

reflected in the conclusions of these studies. Hence, in the paper, the choice of estimators is determined by the structure of the model, but also by the presence of endogeneity in the regressors. The endogeneity was tested using the Hausman test. The results of the Hausman test are shown in Table 1A in the appendix. The results of the endogeneity test show that only the SIZE is an endogeneity variable. The presence of endogeneity in this variable requires finding the appropriate IV (or excluding a variable from the model) and it, also, affects the choice of estimator. The choice of adequate IV was made the modified Okui (2005) procedure that pays attention to the effects of large heterogeneity. The procedure based on higher-order asymptotic theory under double asymptotics. According to the procedure was chosen squared SIZE (sqSIZE) as IV. For the paper four estimators were used: the Two-Stage Least Squares (TSLS), IV-one-step difference GMM, Fixed-effects TSLS and the Panel Limited Information Maximum Likelihood (PLIML) approach that handles dynamic effects and endogenous variables with individual effects at the same time. These estimators were selected keeping in mind their asymptotic properties. According to Wooldridge (2003) and Radivojevic and Jovovic (2017) the TSLSs represent the most efficient IV estimators. However, it true if and only if all the assumptions on which they are based are met. Otherwise, it will generate biased/unbiased and consistent/inconsistent estimates, depending on which assumptions are not met. The research was conducted by Anderson et al. (2009) shows that the TSLS estimator has a much larger variance for some values of the parameter than the LIMI estimator. Also, Akashi and Kunitomo (2015) have been shown that the PLIML estimation method for the filtered data does give not only consistency but also has the asymptotic normality and often attains the asymptotic efficiency bound when the order of orthogonal conditions is large or many instruments in some sense. On the other hand, according to Radivojevic et al. (2019), Cottrell and Lucchetti (2016), Chausse (2010), Roodman (2009), the GMM gives consistent assessments even in conditions when the assumptions of others are not fulfilled. The GMM can be viewed as a generalization of many other methods, and as a result, it is less likely to be misspecified. The GMM generates correct standard errors and p-values, only under the condition that the defined moment conditions are valid. It is based on a simple idea that the estimations of parameters are done by solving a set of moment conditions. On the other hand, Hayakawa (2006) points out that the degree of heterogeneity affects both the asymptotic bias and the variance when using the GMM.

4. Empirical Analysis

A summary of the descriptive statistics of the collected data given in table 1.

Table 1: Descriptive Statistics of collected data

Variable	Obs.	Mean	St. Dev.	Min	Max
ROA	376	0.001	0.116	-1.413	0.387
HCE	376	1.870	2.290	-10.200	12.900
SCE	376	0.641	2.920	-10.600	48.700
CEE	376	0.190	0.341	-3.000	2.450
SIZE	376	22.400	2.880	16.700	27.100
AGE	376	2.690	0.543	0.693	4.060
LEV	376	0.676	0.304	0.003	2.680

Source: Author's

As can be seen from Table 1, the average HCE value in the observed period is 1.87, with a pronounced imbalance between the enterprises in terms of height HCE, in the range from -10.20 to 12.90. The obtained value of HCE is significantly lower in comparison with the values of this component reached by Joshi et al. (2013), Al-Musalli and Ismail (2014), Javed and Jahan, (2017), Alipour, (2012), Arifa and Ahmar (2016) and similar to Meles et al. (2016), Lu et al. (2014), and higher than the value of HCE in Tran and Vo (2018).

In the case of the SCE, an even higher disparity is present, ranging from -10.60 to 48.70, while the average value is 0.64, which is similar to the results of the research carried out by Joshi et al. (2013), Al-Musalli and Ku Ismail (2014), Javed and Jahan (2017), and greater than the recorded values in Meles et al. (2016), Lu et al. (2014). In contrast, the value of the SCE is lower than values reported by Tran and Vo (2018), Alipour (2012), Arifa and Ahmar (2016).

The average value of the CEE is 0.19, and the value of this coefficient ranged from -3.00 to 2.450. The CEE of the selected countries is lagging behind the value achieved in emerging countries in Asian and in the Middle East (Ozkan et al., 2017). This means that these enterprises use equipment and machinery more modestly than companies from emerging countries in Asian and in the Middle East.

The value of standard deviations for the HCE and the SCE is 2.290, or 2.920, respectively, which implies relatively high variability in the amount of these components over the observed eight-year period. This is primarily a consequence of the completion of the process of ownership transformation and the process of privatization of these companies. With the completion of the privatization process in these countries, there has not only been a

better utilization of human capital, but new management has also brought new ways of organization. The confirmation of this claim we can find to increase the value of the HCE and the SCE coefficients over time. On the other hand, the value of the standard deviation for EEC of 0.341 indicates relatively low variability in terms of the value of this coefficient by years. This may indicate that not enough is being invested in the improvement of physical capital in selected countries, but also not engaging fresh financial capital, which can be interpreted as a consequence of unfavourable conditions and poorly developed financial markets in these countries for the engagement of additional financial capital.

The average value of the ROE is 0.1% approximately, which means that these companies gather recorded poor financial results in the observed period. However, the ROA illustrates a relatively high disparity between enterprises, taking value ranging from -141,3% to 38,7%. The high standard deviation of the dependent variable can be interpreted as a consequence of great oscillations in the financial performances of the selected companies. The average value of the LEV is 68% approximately, which means that companies mainly finance their operations from debt. However, the high value of the standard deviation of the LEV also points to large differences between enterprises. The value of this indicator ranges from 0.3% to 268%. This points to the inequity in the financial power of enterprises, which was expected because the panel consists as well as large agricultural combines, but small agricultural enterprises. The value of the SIZE variable is large because the panel contains the largest agricultural combines operating in selected WBC. It is similar to the variable AGE. The panel includes agricultural combines with a long tradition, but private enterprises that are relatively recently founded.

The first step in deals with time series is to check the panel stationary by using a unit root test for stationary. For that purpose, in the paper, were used the Levin-Lin-Chu pooled ADF test. The results of the test are shown in Table A1 in the Appendix. None of all series has a problem with non-stationarity. The next step in deals with panel data is an analysis of the correlation matrix, which is given in Table 2A in the Appendix. The results are shown in Table 2A point out that there is no strong correlation between any two pairs of variables. For this reason, no variable is excluded from further research. The analysis was further carried out by examining the presence of multicollinearity. Although there is no strong correlation between variables, not more than 0.8, a multicollinearity test was performed in the paper. For this purpose, the Variance Inflation Factors (VIF) test was used. The results of this test are shown in the second part of table 2A. As could be expected, there is no multicollinearity between the variables.

Results of the four different estimators of dynamic panel data estimation are shown in Table 2. The findings are robust across all considered models. All of the models have satisfactory characteristics. The value of the Hausman test and the values of the Weak instrument test shows that the selected instruments are valid, the value of the Wald test shows that all regressors are significant, while the test for differing group intercepts shows that everyone unit have a specific intercept. R-squared takes value from 48.7% in the case of the Fixed-effects TSLS estimator to 51.1% in the case of the TLSL estimator.

Table 2: The results of the four different estimators

Fixed-effects TSLS				**TSLS**		
Dependent variable: ROA				Dependent variable: ROA		
Endogenous: SIZE				Instrumented: VEL		
Instruments: sqSIZE				Instruments: const HCE SCE CEE AGE LEV sqSIZE ROA_{t-1}		
Variable	coefficient	std. error	p-value	coefficient	std. error	p-value
const	-0.202	0.073	0.006	−0.130	0.040	0.001
HCE	0.012	0.002	0.000	0.009	0.002	0.000
SCE	-0.004	0.001	0.000	−0.003	0.001	0.002
CEE	0.152	0.015	0.001	0.182	0.016	0.000
AGE	0.027	0.009	0.005	0.031	0.009	0.000
LEV	-0.037	0.021	0.073	−0.039	0.019	0.038
ROA_{t-1}	0.211	0.039	0.000	0.225	0.038	0.000
SIZE	0.004	0.003	0.168	0.001	0.002	0.551
R-squared: 0.48				R-squared: 0.51		
Wald chi-square(7) = 325.533 (p-value 0.000)				Hausman test Chi-square(1) = 3.4346 (p-value 0.064)		
Test for differing group intercepts F(7, 353) = 2.32646 (p-value 0.024)				Weak instrument test (1, 360) = 51835.6		
LIML				**IV- one step GMM**		
Dependent variable: ROA				Dependent variable: ROA		
Instrumented: SIZE				Instrumented: SIZE		
Instruments: const HCE SCE CEE AGE LEV sqSIZE ROA_{t-1}				Instruments: const HCE SCE CEE AGE LEV sqSIZE ROA_{t-1}		
Variable	coefficient	std. error	p-value	coefficient	std. error	p-value
const	−0.123	0.04	0.002	−0.123	0.092	0.181
HCE	0.010	0.002	0.000	0.010	0.003	0.000
SCE	−0.004	0.001	0.010	−0.004	0.005	0.427
CEE	0.156	0.015	0.000	0.156	0.075	0.038
AGE	0.031	0.009	0.000	0.031	0.001	0.119

LEV	−0.036	0.019	0.055	−0.036	0.019	0.133
ROA_{t-1}	0.236	0.038	0.000	0.235	0.023	0.004
SIZE	0.031	0.001	0.653	0.001	0.002	0.790
Weak instrument test (1, 380) = 52073.8				GMM criterion: Q = 5.539e-23 (TQ = 2.082e-20)		

Source: Author's

Interestingly, all four estimators generated similar coefficient values, but they differ in terms of the statistical significance of the variables such as SCE, AGE, and LEV. More specifically, GMM results differ from those of other estimators. Based on the results obtained using all four estimators the following can be concluded that there are:

a) a positive and significant correlation between the ROA and the HCE - every increase in the HEC of 1% causes an increase of about 1% in the ROA. This finding indicates the importance of nurturing and developing human capital in agricultural enterprises. This is especially important to understand when you keep in mind the results of the research conducted by Osiniksi (2017), according to which the demand for human resources grows at a rate of 9-11%, while the supply grows at a rate of 6-7%. Hence, the task of agricultural enterprises is to encourage the use of their human resources more efficiently, but also to encourage their creativity and mutual learning process. This finding is in line with Xu et al. (2020), but is not in line with Shaiban (2014);

b) a positive and significant correlation between CEE and the RAO - for every 1% increase in the value of CEE, the RAO will rise by approximately 16%. This finding implies that CEE is the most important element of the IC. This was to be expected if we keep in mind that this is a labour-intensive sector in which physical capital (use of machinery and equipment) plays a dominant role in improving productivity, but also a sector characterized by low turnover ratios and liquidity ratios (there is a strong need for financial capital, noting that the capital and money markets are not well developed and that there are unfavourable conditions for borrowing from banks and other financial institutions. Lack of fresh investment capital, both for the purchase of new machinery and equipment, but also for investment in raw materials are the main characteristics for these countries. The situation is somewhat more favourable in Slovenia). The average age of machines and equipment used in these companies is far from the average compared to other European countries). Hence the application of new machines and equipment has a great significance on business results. After the completion of the process of ownership transformation of these companies, significant funds were invested in new equipment, which the results of this research confirm as justified. The results are in

line with research were conducted by Shaiban (2014), Janda et al. (2013), Kadocsa and Francsovics (2011) etc.

c) a positive and significant correlation between the $ROAt_{-1}$ and the ROA - every increase in the ROA_{t-1} of 1% will impact to increase of the ROA by about 23%. This result is corroborated by the literature, highlighting the dynamic persistence of ROA during the observed period;

d) that there is no significant relationship between SIZE and the RAO. This result is unexpected, especially when we take into account the structure and the characteristics of this sector in WBC. Namely, it was expected that larger companies have greater financial and other resources and that they can easily overcome the problems arising from the seasonal nature of agricultural production, but also unfavourable conditions on the financial markets of these countries in terms of additional indebtedness. This result is in line with findings was reported by Labintan and Ding (2012) and Mijic and Jaksic (2017);

According to the Fixed-effects TSLS, the TSLS and the PLIML the following can be concluded that there are:

e) a positive and significant correlation between AGE and the RAO - for every 1% increase in the value of AGE, the RAO will rise by approximately 3%. This can be explained by the fact that with a longer lifespan are achieve better performance due to the accumulated experience and knowledge, which is in line with Majumdar (1997);

f) a negative relationship between the SEC and the ROA - every increase in the SEC of 1% will impact to decrease of the ROA by about 0.4%, which is not consistent with several studies that have already been discussed. This result should be considered in the context or 1) that old inefficient ways and processes of organization and management styles, which were dominant before the privatization of these companies, have been retained or 2) that the effects of new ways of organizing and managing are still not felt due to the short period of implemented or are ineffective;

g) a negative and statistically significant relationship between the LEV and the ROA - every increase in the LEV of 1% will impact to decrease of the ROA by about 4%. This can be explained by the fact that in the financial market there are unfavourable conditions for engaging additional financial capital. Similar results were presented by Mijic and Jaksic (2017).

Based on the previously presented results of parameter estimation using different estimators, it can be noticed that the selection of estimators plays a crucial role in obtaining valid conclusions. Namely, although all the conditions for the application of all four

estimators were met, the GMM generated different estimations in terms of statistics of the significance of particular variables. This only suggests caution when choosing estimators.

5. Conclusion

In this paper, we examined the impact of key components of the IC (according to the VAIC model) on the performance of agricultural enterprises operating in WBC to determine the sign and degree of their significance and the impact on the financial performances of agricultural enterprises. The results point out that CEE is the most important element of IC that affects on financial performances of agricultural enterprises which operate in WBC, unveiling that physical capital (use of machinery and equipment) plays a dominant role in improving business performance. In other words, the investment in the modernization of equipment will lead to an increase in productivity that will reflect on the improvement of financial results. This knowledge should serve decision-makers in these companies to invest in the modernization of equipment, but also economic policy makers to support these companies in the procurement of new equipment through various subsidies, since Erjavec et al. (2021) and Volk et al. (2019) point out that subsidies are the most important macroeconomic factor in the operations of these companies in the WBC. The results further indicate that HEC is a statistically significant factor, but that its impact on improving business performance is small. This finding should be interpreted in the context of the fact that the structure of employees in these companies is dominated by unskilled or low-skilled labour, as well as that these companies, due to the seasonal nature of production, engage temporary workers. The warnings of Ruiz-Valenzuela (2020), García-Pérez (2018) and Hijzen et al. (2017) that temporary workers show low productivity levels, which negatively reflects business results. This is justified by the lack of a sense of organizational commitment and motivation. The SEC has a negative impact on financial results. This result should be considered in the context or 1) that old inefficient ways and processes of organization and management styles, which were dominant before the privatization of these companies, have been retained or 2) that the effects of new ways of organizing and managing are still not felt due to the short period of implemented or are ineffective. Regarding the impact of financial results from the previous period on the current result, the impact is positive, which could be expected. This means that companies that ha positive financial results in the past will be more successful in the future. This should be seen in the context of the fact that the conditions for liquidity loans are very unfavourable so that any borrowing leads to a weakening of business

results. This statement is followed by the discovery that leverage has a negative impact on business results, but also the fact that the age of the company has a positive effect on business results. It is characteristic of these countries that this sector is dominated by agricultural combines with a long tradition dating back to the socialist era of regulation in these countries. Contrary to expectations, the size has no significant effect. This discovery is unexpected, especially considering that these countries, combines with a long tradition are also the largest agricultural enterprises.

The importance of this research is reflected in the fact that it indicates the importance of the correct choice of estimators of model parameters. Namely, obtaining different results by using the use of different estimators, primarily in the context of the statistical significance of particular variables, indicates caution when choosing them. Also, the paper indicates that when examining the internal variables of business success of agricultural enterprises, it is important to take into account the problem of endogeneity.

6. References

ABDULSALAM, F,: QAHERI H.; AL-KHAYYAT R. *The Intellectual Capital Performance of Kuwaiti Banks: An Application of VAIC™,* Business, n. 3, p. 88-96, 2011.

ADEPOJU A.A.; SALMAN K.K. Increasing agricultural productivity through rural infrastructure: evidence from Oyo and Osun States, Nigeria. *International Journal of Applied Agricultural & Apicultural Research*, v. 9, n. (1&2), p. 1–10, 2013.

ALIPOUR M. The effect of intellectual capital on firm performance: an investigation of Iran insurance companies. *Measuring Business Excellence*, v.16, n. 1, p. 53-66, 2012.

AL-MUSALLI M. A. K.; ISMAIL N. I. Intellectual capital and its effect on financial performance of banks: evidence from Saudi Arabia. *Procedia e Social and Behavioral Sciences*, n. 164, p. 201-207, 2014.

AKASHI K.; KUNITOMO N. The limited information maximum likelihood approach to dynamic panel structural equation models. *Ann Inst Stat Math* n. 67, p. 39–73, 2015.

ANDERSON T.W. KUNITOMO, N.; MATSUSHITA Y. The Limited Information Maximum Likelihood Estimator as an Angle, Working paper, 2009.

ARIFA P.A.; AHMAR N. The effect of intellectual capital on the financial performance of insurance companies listed on the Indonesia Stock Exchange (ISE). *The Indonesian Accounting Review*, v. 6, n. 1, p. 45-54, 2016.

BONTIS, N.; KEOW W.C.; RICHARDSON S. Intellectual capital and business performance in Malaysian industries. *Journal of Intellectual Capital*, v. 1, n. 1, p. 85 – 100, 2000.

BORNEMANN M.; WIEDENHOFER, R. Intellectual capital in education: a value chain perspective. *Journal of Intellectual Capital*, v. 15, n. 3, p. 451- 470, 2014.

CHAWLA S. K.; KHANNA D.; CHEN J. Are smal lbusiness critical success factors same indifferent countries. *SIES Journal of Management*, v. 7, n. 1, p. 1–12, 2010.

CARDOZA K.; BASARA J.; COOPER L; CONROY R. The power of intangible assets: an analysis of the S&P 500. Les Nouvelles, 2006.

CHAN K. H. Impact of intellectual capital on organizational performance: An empirical study of companies in the Hang Seng Index (Part 1 & 2). *The Learning Organization*, v. 16, n. 1, p. 22-39, 2009.

CHAUSSE P. Computing Generalized Method of Moments and Generalized Empirical Likelihood with R. *Journal of Statistical Software*, v. 34, n. 11, p. 1-35, 2010.

CHU K. W. S.; CHAN H. K.; WU, W. W. Y. Charting intellectual capital performance of the gateway to China. *Journal of Intellectual Capital*, v. 12, n. 2, p. 249-276, 2011.

COAD A.; HOLM J. R.; KRAFFT J.; QUATRARO F. Firm age and performance. *Journal of Evolutionary Economics*, n. 28, p. 1–11, 2018.

COTTRELL A.; LUCCHETTI, R.Gretl User's Guide: Gnu Regression, Econometrics and Time-series Library. GNU Free Documentation License, 2016.

CURCIC N.; RADIVOJEVIC N.; GRUBOR A.; SIMONOVIC Z. Examining causality between market share and competitiveness: Case study textile industry, *Textile industry,* v. 71, n. 4, p. 364-370, 2020.

DOBRIVOJEVIC G.; ĐORĐEVIC J.; ĐOKOVIC F.; PEJANOVIC R.; SKATARIC G.; DAMNJANOVIC I. Bioeconomy-Based Food Industry of Serbia: The Role Of Intellectual Capital. Economics of Agriculture, v. 66, n. 1, p. 51-62, 2019.

DJEKIC I.; DIMITRIJEVIC B.; TOMIC N. Quality Dimensions of Intellectual Capital in Serbian Fruit Industry. *Engineering Management Journal, v.* 29, n. 3, p. 154-164, 2017.

ERJAVEC E.; VOLK T.; REDNAK M.; CIAIAN P.; LAZDINIS M. Agricultural policies and European Union accession processes in the Western Balkans: aspirations versus reality. *Eurasian Geography and Economics*, v. 62, n. 1, p. 46-75, 2021.

GOH, P. C. Intellectual capital performance of commercial banks in Malaysia. *Journal of Intellectual Capital*, v. 6, n. 3, p. 385-396, 2005.

GARCÍA-PÉREZ J.; MARINESCU I.; VALL CASTELLO J. Can fixed-term contracts put low skilled youth on a better career path? Evidence from Spain. *Economic Journal*, n. 129/620, p. 1693-1730, 2018.

HAMERMESH R. G.; ANDERSON M. J. Strategies for Low Market Share Businesses. *Harvard Business Review*, v. 56, n. 3, pp. 95–102, 1978.

HAYAKAWA K. Efficient GMM Estimation of Dynamic Panel Data Models Where Large Heterogeneity May Be Present, Hi-Stat Discussion Paper Seriesd05-130, Institute of Economic Research, Hitotsubashi University, 2006.

HIDAYAT C.; PUTONG I.; PUSPOKUSUMO R. A. A. W. The Interrelationship between Intellectual Capital and Financial Performance: A Case Study of Indonesian Insurance Companies. *Pertanika Journal of Social Sciences & Humanities*, n. 24, p. 83-97, 2016.

HIJZEN A.; MONDAUTO L.; SCARPETTA S. The impact of employment protection on temporary employment: Evidence from a regression discontinuity design. *Labour Economics*, n. 46, p. 64-76, 2017.

HERGERT M. Market share and profitability: Is bigger really better? *Business Economics*, v. 19, n. 5, p. 45-48, 1984.

JAFARNEZHAD M.; YADOLLAHZADE N. A. The Effect of Intellectual Capital on Financial Performance: Evidence from Iranian Banks Listed in Tehran's Stock Exchange. *International Journal of Management, Accounting and Economics*, v. 3, n. 1, p. 1-14, 2016.

MAJUMDAR S. K. The Impact of Size and Age on Firm-LevelPerformance: Some Evidence from India. *Review of Industrial Organization*, n. 12, p. 231–241, 1997.

MIJIC D.; JAKSIC K. The determinants of agricultural industry profitability: evidence from southeast Europe, *Custos e agronegocion online*, v. 13, n. 1, p. 154-173, 2017.

JANDA K.; RAUSSER G.; STRIELKOWSKI W. Determinants of Profitability of Polish Rural Micro-Enterprises at the Time of EU Accession. *Estern European Countryside*, n. 19, p. 177-217, 2013.

JAVED I.; JAHAN Z.; Corporate Governance, Intellectual Capital and Financial Performance of Banks listed in Pakistan Stock Exchange. *Pakistan Administrative Review*, v. 1, n. 3, p. 175-196, 2017.

JOSHI M.; CAHILL D.; SIDHU J.; KANSAL M.; Intellectual capital and financial performance: an evaluation of the Australian financial sector. *Journal of Intellectual Capital*, v. 14, n. 2, p. 264 – 285, 2013.

KADOCSA G.; FRANCSOVICS A. Macro and micro economic factors of small enterprise competitiveness. *Acta Polytechnica Hungarica*, v. 8, n. 1, p. 23-40, 2011.

KAPLAN R.; NORTON D. Strategy Maps - Converting Intangible Assets into Tangible Outcomes, Harvard Business School Press, Boston, Massachusetts. 2004.

KAUPELYTE D.; KAIRYTE K. Intellectual capital efficiency impact on European small and large listed banks financial performance. *International Journal of Management, Accounting and Economics*, v. 3, n. 6, p. 367-377, 2016.

KHALIQUE M.; BONTIS N.; ABDUL J.; ABU S.; ISA H. Intellectual capital in small and medium enterprises in Pakistan. *Journal of Intellectual Capital*, v. 16, n. 1, p. 224-238, 2015.

KHALIQUE M.; RAMAYAH T.; SHAH M. T. A.; IQBAL Z. Intellectual Capital and Financial Performance of Banks in Sialkot Pakistan. *Journal of Management Sciences*, v. 6, n. 1, p. 50-61, 2019.

KHALIQUE M.; SHAARI J. A. N. B.; ISA A. H. B. M. The road to the development of intellectual capital theory. *International Journal of Learning and Intellectual Capital*, v. 10, n. 2, 122–136, 2013.

KOZERA M. The Impact of Intellectual Capital Efficiency on the Profitability of Agricultural Enterprises. In: Dudycz T., Osbert-Pociecha G., Brycz B. (eds) The Essence and Measurement of Organizational Efficiency. Springer Proceedings in Business and Economics, Springer, 2016.

KOMNENIC B.; TOMIC D.; TOMIC G. Measuring efficiency of intellectual capital in agriculture sector of Vojvodina. Applied Studies in Agribusiness and Commerce, Agroinform Publishing House, Budapest, 2020.

KONTIC LJ.; CABRILO S. A Strategic Model for Measuring Intellectual Capital In Serbian Industrial Enterprises. *Economic Annals*, v. 14, n. 183, p.89-117, 2009.

KUJANSIVU P.; LÖNNQVIST A. Investigating the value and efficiency of intellectual capital. *Journal of Intellectual Capital*, v. 8, n. 2, p. 272-287, 2007.

LABINTAN A. C.; DING S., An assessment of agricultural productivity and major driv- ing factors in the Republic of Benin. *Ethiopian Journal of Environmental Studies & Management*, v. 5, n. 4, p. 68–47, 2012.

LIM L.; DALLIMORE P. Intellectual capital: management attitudes in service industries. *Journal of Intellectual Capital*, v. 5. n. 1, p.181-194, 2004.

LIN G. T. R.; TANG, Y. U. H. Appraising intangible assets from the viewpoint of value drivers. *Journal of Business Ethics*, n. 88, p. 679-689, 2009.

LU W. M.; WANG W. K.; KWEH Q. L. Intellectual capital and performance in the Chinese life insurance industry. *Omega*, v. 42, n. 1, p.65-74, 2014.

MADITINOS D.; CHATZOUDES D.; TSAIRIDIS C.; THERIOU G. The impact of intellectual capital on firms‟ market value and financial performance. *Journal of Intellectual Capital*, v. 12, n. 1, p. 132-151, 2011.

MAHESH J.; DARYLL C.; JASVINDER S.; MONIKA K. Intellectual capital and financial performance: an evaluation of the Australian financial sector. *Journal of Intellectual Capital*, v. 14, n. 13, p. 266-285, 2013.

MELES A.; PORZIO C.; SAMPAGNARO G.; VERDOLIVA V. The impact of the Intellectual Capital Efficiency on Commercial Banks Performance: Evidence from the US. *Journal of Multinational Financial Management*, n. 36, p.64-74, 2016.

MELES A.; PORZIO C.; SAMPAGNARO G.; VERDOLIVA V. The impact of the Intellectual Capital Efficiency on Commercial Banks Performance: Evidence from the US. *Journal of Multinational Financial Management*, v. 36 p. 64-74, 2016.

NAWAZ T.; HANIFFA R. Determinants of financial performance of Islamic banks: an intellectual capital perspective. *Journal of Islamic Accounting and Business Research*, v. 8, n. 2, p.130–142, 2017.

OCEAN TOMO RELEASES. Annual Study of Intangible Asset Market Value, 2015.

OKUI R. The Optimal Choice of Moments in Dynamic Panel Data Models. *Journal of Econometrics*, v. 151, n. 1, pp. 1-16, 2009.

OSINSKI M.; SELIG M.P.; MATOS F.; ROMAN D. J.; Methods of evaluation of intangible assets and intellectual capital. *Journal of Intellectual Capital*, v. 18, n. 3, p. 470-485, 2017.

PENG T. A.; PIKE S.; ROOS G. Intellectual capital and performance indicators: Taiwanese healthcare sector. *Journal of Intellectual Capital*, v. 8, n. 3, p. 538-556, 2007.

POH L. T.; KILICMAN A.; IBRAHIM S. N. I. On intellectual capital and financial performances of banks in Malaysia. *Cogent Economics & Finance,* v. 6, n. 1, p. 145-3574, 2018.

PULIC A. Measuring the performance of intellectual potential in knowledge economy. *In 2nd McMaster Word Congress on Measuring and Managing Intellectual Capital by the Austrian Team for Intellectual Potential,* 1998.

RADIVOJEVIC N.; CVIJANOVIC D.; SEKULIC D.; PAVLOVIC D.; JOVIC S.; MAKSIMOVIC G.; Econometric model of non-performing loans determinants. *Physics A: Statistical Mechanics and its Applications*, n. 520, p. 481-488, 2019.

RADIVOJEVIC N.; JOVOVIC J. Examining of determinants of non-performing loans. *Prague Economic Paper*, v. 26, n. 3, p. 300-316, 2017.

REED K.K.; LUBATKIN M.; SRINIVASAN N. Proposing and testing an intellectual capital-based view of the firm. *Journal of Management Studies*, v. 43, n. 4, p. 867-893, 2006.

ROODMAN D. How to Do xtabond2: An Introduction to Difference and System GMM in Stata. *Stata Journal*, v. 9, n. 1, p. 86-136, 2009.

RUIZ-VALENZUELA J. Intergenerational effects of employment protection reforms. *Labour Economics*, Vol. 62, 2020.

SHAIBAN M. Intellectual capital on listed agricultural firms' performance in Malaysia. *International Journal of Learning and Intellectual Capital*, v.11, n. 3, p. 202-221, 2014.

SINGH S.; SIDHU J.; JOSHI M.; KANSAL M. Measuring intellectual capital performance of Indian banks: A public and private sector comparison. *Managerial Finance*, v. 42, n. 7, p. 635-655, 2016.

SYDLER R.; HAEFIGER S.; PRUSKA R.; Measuring intellectual capital with financial figures. *European Management Journal*, v. 32, n. 2, p. 244-259, 2014.

TRAN D. B.; VO D. H. Should bankers be concerned with Intellectual capital? A study of the Thai banking sector. *Journal of Intellectual Capital*, v. 19, n. 5, p. 897-914, 2018.

TSAI C. H.; MUTUC, E. B Evidence in Asian Food Industry: Intellectual Capital, Corporate Financial Performance, and Corporate Social Responsibility. *International Journal of Environmental Research and Public Health*, v. 17, p. 1-21, 2020.

URBANEK G. he links between the Intellectual Capital Efficiency Ratio (ICER) and the performance of Polish Listed companies from the food industry sector. *The Electronic Journal of Knowledge Management*, v. 14, n. 4, p. 220-230, 2016.

VISHNU S.; GUPTA K. Intellectual Capital and Performance of Pharmaceutical Firms in India. *Journal of Intellectual Capital*, v. 15, p. 83-99, 2014.

VOLK T.; REDNAK M.; ERJAVEC E.; RAC, I.; ZHLLIMA E.; GJECI G.; BAJRAMOVIC S. ILIC B.; PAVLOSKA - GJORGJIESKA D.; CIAIAN P. Agricultural Policy Developments and EU Approximation Process in the Western Balkan Countries. EUR 29475. Luxemburg, Publications Office of the European Union, 2019.

XU X. L.; CHEN H. H.; ZHANG R. R. The Impact of Intellectual Capital Efficiency on Corporate Sustainable Growth-Evidence from Smart Agriculture in China. *Agriculture*, v. 10, p. 1-15, 2020.

XU J.; WANG B. Intellectual capital and financial performance of Chinese agricultural listed companies. *Custos e Agronegocio*, v. 15, n. 1, p. 273-290, 2019.

YALAMA A. The relationship between intellectual capital and banking performance in Turkey: evidence from panel data. *International Journal of Learning and Intellectual Capital*, v. 10, n. 1, p. 71 – 87, 2013.

YANNOPOULOS P. *The Market Share Effect: New Insights from Canadian Data*, In: *The Journal of Global Business Management*, v. 6, n. 2, p. 257-267, 2010.

ZEGHAL D.; MAALOUL A. Analysing value added as an indicator of intellectual capital and its consequences on company performance. *Journal of Intellectual Capital*, v. 11, n. 1, p. 39-60, 2010.

Appendix

Table 1A: Panel Unit Root Test and the Hausman Test

Variable	LLC test				Hausman test	
	Coeff.	t-ratio	z-score	p -value	Chi-square(1)	p -value
HCE	-0.89	-15.734	-6.81	0.000	0.419	0.517
SCE	-0.953	-43.252	-40.144	0.000	0.887	0.346
CEE	-0.753	-15.909	-5.188	0.000	0.000	0.995
ROA-1	-0.897	-43.831	-41.291	0.000	2.629	0.104
VEL	-0.884	-27.778	-25.729	0.000	7.389	0.006
AGE	-0.001	-11.158	-11.641	0.000	3.050	0.080
LEV	-0.891	-62.745	-65.762	0.000	0.132	0.715

Note: Levin-Lin-Chu pooled ADF test for the variable test with constant including one lag of (1-L) variable.
Bartlett truncation at 3 lags N, T = (47,8), using 282 observations.
Source: Author's

Table A2: The correlation matrix and VIF coefficients

HCE	SCE	CEE	ROA	SIZE	AGE	LEV		VIF
1.000	-0.040	0.478	0.500	0.127	0.036	-0.089	HCE	1.506
	1.000	-0.073	-0.148	0.031	0.023	0.056	SCE	1.008
		1.000	0.572	-0.201	-0.175	-0.092	CEE	1.493
			1.000	-0.053	0.072	-0.140	ROA	-
				1.000	0.412	0.618	SIZE	2.188
					1.000	0.189	AGE	1.228
						1.000	LEV	1.773

Source: Author's