PRETESTING THE SUITABILITY OF THE INCOME VALUATION FRAMEWORK ON THE AGRICULTURAL COMPANIES WITHIN THE VISEGRAD GROUP

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Abstract

The income valuation framework presents high-powered, complex and math-intensive process. Therefore, any pretesting of valuation objects can be beneficial and time saving for the individual professional appraisers. Since the income valuation approach is based on the estimation of the income value of the company on an ongoing-concern basis, if this basic assumption is not met by the valuation object, the other approaches need to be employed. This paper closely examines theoretical and practical aspects for the initial stage for the application of the income valuation methods on the agricultural companies within the member countries of the Visegrad Group. Firstly, the applicability of the income valuation methods is verified via the indicator of value spread, as a difference between the return on equity and costs of equity and secondly, the conclusions are drawn properly. This paper finds that only a part of the sample is suitable for income valuation, for the majority of companies the income valuation methods are rather non-applicable, due the fact that some of the basic requirements are not met. Based on empirical tests, it was shown that there is a slightly positive dependence between the value spread indicator and the country of origin of the agricultural company.

Keywords: agricultural company, company value, income valuation framework, net income, value spread

1. Introduction

A large body of literature has explored the magnitude of company value measurement by various methods based on the net present value principle (Plenborg, 2002; Koller, et al. 2010). This principle applied on company valuation is derived from the dividend discount model (DDM) originally employed for valuation of stocks (Brealey, Myers and Marcus, 2007). Despite the broad use of the income valuation methods, their applicability is closely connected with the company's future perspective, so called going concern principle. If it cannot be assumed that a company remains viable and active in the future, the income valuation methods are not applicable. The overall process of company valuation via the income valuation methods is rather complex and extensive including various math-intensive sub-calculations. Therefore, it might be useful to know in advance, whether the income method requirements are met and thus the method is applicable for a specific company (valuation object). Among the essential requirements ranks the going concern principle, which is met if the positive cash flow can be expected in the long term (Mařík, 2007). There is a possibility to examine the fulfilment of some of the other requirements via so called value spread (Mařík, 2007). The value spread is a difference between return on equity and costs of equity and can be considered as a pre-test of applicability of the income valuation framework. The positive

Acknowledgements: The author gratefully acknowledges the comments and suggestions made by Keith Willett, Professor of Economics at Oklahoma State University. This paper was prepared with the support of the international project *"Human Resource Development - Science Education & Research in Faculty of Business and Economics in Mendelu Brno (2011-2014, MSM/EE)"*, nr. EE2.3.20.0006, project is co-financed by the European Union.

difference indicates the retaining the ongoing-concern basis, whereas any negative difference may imply difficulties in preservation of such a basis. Moreover, as presented below in the equation, value spread serves as a basis for the model of residual income (RI) valuation. The empirical usefulness of residual income valuation model (RIVM) was discovered for example by Stubelj, et al. (2009); however, Plenborg (2002) expresses the RI approach in terms of financial ratios, as:

$$P_0 = BV_0 + \sum_{t=1}^{\infty} \frac{(ROE_t - r_e)BV_{t-1}}{(1 + r_e)^t} \quad (1)$$

where P is the firm value, BV the book value of equity, ROE the return on equity, and r_e the cost of capital (equity holder). The RI is defined as the difference between ROE and r_e, known as the value spread, multiplied by the BV (Plenborg, 2002).

Any value creation in a company is closely related to the relation between the rates of return obtained (ROE) and expected (r_e) (Mařík, 2007). The individual profitability ratios do not measure the company's success nor reflect the factor of risk. However, if ROE indicator is compared to the opportunity costs, it provides the information about company's overall financial situation. The success or failure can be easily identified based on the size of the value spread: by how many per cent is the ROE higher/lower than the r_e. The multiplication of the value spread by the shareholders' equity means the economic profit generated within the year by the company (Neumaierová, 2005). The limitation of this spread lies in its historical nature, since it measures only historical parameters and cannot provide predictive perspective (Vavřina and Růžičková, 2012).

In this paper, the value spread criterion is challenged by the traditional economic tool: the book profit/loss, i.e. earnings after taxation (EAT). Even though this indicator is still widely used and connotes the overall economic prosperity of a company, its validity as economic performance indicator is rather arguable. EAT of a company are calculated as the sum of all relevant expenses deducted from sales realized. EAT can be considered as net income (NI) or profit/loss for the year. To have a positive EAT does not necessarily mean showing adequate economic performance, not only due to the different accounting policies, but also due to the extraordinary company activities (Mařík, 2007). In addition, EAT provides only the information from the current year, and uses nominal or historical prices. Companies can be also compared based on EAT, however, there is a need for respective system of peer group clustering according to for example range of economic activities, provided services and total economic size of all participants via employing relevant indicator (Vavřina and Růžičková, 2012).

This paper contains an investigation of whether or not agricultural companies from member countries of the Visegrad group (V4) create value using the value spread between company's ROE and r_e. Moreover, the value spread is challenged by the net income of these companies. Finally, the independence of the value spread and country of origin of the agricultural company is verified via the Chi-square test of independence, and if the dependence is detected, the Cramer's V coefficient is employed. The following hypothesis is tested:

- H_0: Creating/destroying value according to the value spread method does not depend on the country of origin of the agricultural company within the observed sample.

The objective of this paper is to examine the dependence between the value spread and the country of origin of the agricultural company. The findings of this paper may be used for the process of company valuation, namely for pre-selection of suitable valuation objects, since the income valuation methods cannot be applied widely. Moreover, the findings may also discover potential

differences between the sample companies from the V4 countries. These differences can stem from the different political systems, public subsidy policies, climatic zones, or geographical location.

2. Methodology

The sample used in this paper consists of all active agricultural companies from the V4 member countries listed in the database Amadeus of Bureau van Dijk (Amadeus) in 2010. The Amadeus database contains and provides comprehensive financial information on millions European companies. The data are standardized and collected by national agencies. For the purposes of this paper, the year 2010 was selected together with 4004 companies from the agricultural sector (CZ NACE 01), see table 1.

Table 1. Number of companies according to the country of origin

Country ISO Code	Number of companies
CZ	1616
PL	1064
SK	714
HU	610
Total	4004

Source: own elaboration based on the data provided by the Amadeus

For each company the following variables were calculated as follows:

- The net income is the profit (loss) for the year. If this indicator is lower than zero, it means company is making a loss, i.e. negative net income. If the indicator is above zero, it means company is generating a profit.
- Return on equity *(ROE)* is calculated as profit (loss) for period divided by shareholders equity, expressed as a percentage (i.e. multiplied by 100).
- Costs of equity *(r_e)* are estimated via build up model INFA as heuristic model which determines r_e as a sum of risk-free rate and individually estimated risk premiums specific for particular company (Neumaierová, 2005).

$$r_e = r_f + RP \tag{2}$$

where r_f is the risk-free rate and RP stands for additional risk associated with company size, business risk, financial stability and financial structure.

- The value spread is calculated as a difference between ROE and r_e. If the return is higher than costs, the new value is created, if the return is lower, the value is destroyed.

$$value\ spread = ROE - r_e \tag{3}$$

To verify the value creation of agricultural companies in the each V4 member country, the value spread was calculated for each individual company within the sample.

Chi-square test of independence was used to investigate the independence between value spread and country of origin of the agricultural company. Both variables are categorical: value is created/ is not and country of origin of the agricultural company is CZ (Czech Republic), PL (Poland), SK (Slovakia), or HU (Hungary). The general Chi-square test of independence framework by Hendl (2009) is used, as provided below:

$$\chi^2 = \sum \frac{(observed\ frequency - expected\ frequency)^2}{expected\ frequency} \tag{4}$$

where χ^2 is Pearson's test statistic which can be compared to critical value with degrees of freedom on the given significance level. The degrees of freedom (*df*) can be calculated as a number of categories in the table *r* x *s: (r-1)*(s-1)*. In the case the hypothesis is rejected, the dependence is further examined by other coefficients, for example by the Cramer's V coefficient.

$$V = \sqrt{\frac{\chi^2}{n(m-1)}} \tag{5}$$

in which *V* is the Cramer's V coefficient, *n* the total number of cases and *m* is the lower number of total rows or columns. The Cramer's V coefficient is within the scope of (0, 1); when the coefficient is equal to zero, there is no dependence; if the coefficient is 1, there is a strong relation between selected variables.

The independence test is given on the 5% level of significance (P value = 0.05).

3. Results and discussion

The contingency table (tab. 2) is provided for the value spread and net income overview according to the country of origin of the agricultural company. Each row presents the absolute and also relative frequency of companies firstly with positive and secondly with negative value spread according to the company's net income, for example, in the CZ there are only 483 companies from the CZ sample, i.e. 29.9% of CZ companies, having positive value spread and generating profit at the same time and 804 companies, i.e. 49.8%, still generating profit but having negative value spread. At the end of each row, the total absolute or relative frequency is shown, for example, in the CZ, there are 1287 companies generating profit, i.e. 79.6% of the CZ sample. Analogously, each column provides absolute and relative frequency of companies according to the profit/loss and at the end, the total absolute or relative frequency for value spread is shown, for example, in the CZ, there are 483 companies creating positive value spread, i.e. 29.9%, but more than 70% is destroying the value, expressed as negative value spread (in 1133 cases).

Table 2. Selected variables and their frequencies in the contingency table

Country ISO Code	Net income	Absolute frequency			Relative frequency		
		value spread		total	value spread		total
		positive	negative		positive	negative	
CZ	profit	483	804	1287	29.9%	49.8%	79.6%
	loss	0	329	329	0.0%	20.4%	20.4%
	total	483	1133	1616	29.9%	70.1%	100.0%
PL	profit	532	424	956	50.0%	39.8%	89.8%
	loss	0	108	108	0.0%	10.2%	10.2%
	total	532	532	1064	50.0%	50.0%	100.0%
SK	profit	139	339	478	19.5%	47.5%	66.9%
	loss	0	236	236	0.0%	33.1%	33.1%
	total	139	575	714	19.5%	80.5%	100.0%
HU	profit	104	384	488	17.0%	63.0%	80.0%
	loss	0	122	122	0.0%	20.0%	20.0%
	total	104	506	610	17.0%	83.0%	100.0%
Total	profit	1258	1951	3209	31.4%	48.7%	80.1%
	loss	0	795	795	0.0%	19.9%	19.9%
	total	1258	2746	4004	31.4%	68.6%	100.0%

Source: own elaboration based on the data provided by the Amadeus

According to the findings it appears, that while profit-generating companies are prevailing in all countries, companies creating value for its owners having ROE (obtained returns) higher then r_e (expected returns) are rather rare, only 29.9% in the CZ, 19.5% in SK, and 17% in HU. The most optimistic situation appears to be in PL, where the ratio is 50% of companies creating value. According to the indicator of net income, the situation appears quite optimistic in all V4 countries: there are almost 80% profit generating companies in CZ, almost 90% in PL, almost 67% in SK and 80% of companies in HU. Therefore, there must be companies generating profits but not creating value for the owners via the value spread approach. These facts lead to conclusion that the EAT perspective provides misleading information about economic performance of agricultural enterprises: profit-generating companies do not cover their r_e by ROE (in almost 50% of cases in CZ, almost 40% in PL, almost 48% in SK and 63% in HU). This disproportion can be a result of low ROE, or high r_e. Unfortunately, both these aspects are typical for agricultural companies (Kopta and Maršík, 2009).

For the verification of the relation between the two variables (value spread and country of origin of individual agricultural company) the Chi-square test of independence was employed (tab. 3).

According to the results of the Chi-square independence test (and critical value approach) the hypothesis about the independence: *„Creating/destroying value according to the value spread method does not depend on the country of origin of the agricultural company within the observed sample"* can be rejected on the given significance level.

Table 3. Results of Chi-square test of independence and Cramer's V coefficient

Pearson Chi-Square (test statistic)	278.028
Degrees of freedom (d*f*)	3
Critical value	7.8153
Significance level of the test (alpha)	5 % (0.05)
Cramer's V coefficient	0.264

Source: own work

Therefore, it can be said that creating/destroying value (value spread approach) depends on the country of origin of the agricultural company: CZ, PL, SK, HU, within the observed sample. Since creating value according to the value spread is not independent on the country of origin of the agricultural company, symmetric measure (Cramer's V coefficient) was employed. Based on the coefficient, the dependence between the variables is slightly positive.

The slightly positive dependence may confirm the facts that in agriculture, the return ratios are often negative (Kopta and Maršík, 2009) and therefore cannot cover the r_e which are estimated via INFA method, which uses risk premium for each individual company. Moreover, Střeleček et al., (2007) have identified important characteristics of Czech agricultural companies: increasing dependence of public subsidies on net incomes, which can be considered as above-average compared to EU-15. Moreover, Vavřina et al. (2012) provide the evidence, that this is the case of all V4 agricultural companies. Based on this fact, it can be inferred that EAT can be partly shielded by these subsidies. Vavřina et al. (2012) also show that there is an increasing tendency of public subsidy financing in the period 2004 – 2011. As far as the public subsidies are concerned, any reduction or elimination of this kind of financing would inevitably lead to slump of the entrepreneurial income in Slovakia (Božík, 2011). Agricultural companies in PL appear as most economic efficient, on the other hand, they are beneficiaries of side-subsidies which may result in better economic performance (tab. 3). Therefore, it cannot be directly assumed that Polish agricultural companies are more competitive in comparison with the other V4 member countries (Vavřina et al., 2012).

There are also other differences stemming from the production deviation: crop vs. animal production. In SK, for example, local agricultural companies have to face decreasing trend of

the arable land area, in favour of setting the land aside of the producing (Božík, 2011). Moreover, Božík (2011) states that there is a slump of animal production tending to the end of animal production in SK at all.

Considering selected variables, net income and the value spread, as proper indicators of applicability of income valuation methods, these indicators have highlighted 30% of companies in CZ, 50% of companies in PL, 20% of companies in SK, and 17% of companies in HU with positive value spread and net income, therefore suitable for the application of income valuation methods. The indicator of net income has individually highlighted 80% in CZ, 90% in PL, 67% in SK and 80% of companies in HU. Based on these facts, the indicator of the value spread is more precise and provides more accurate information about the applicability of income valuation method. Companies with positive value spread (30% in CZ, 50% in PL, 20% in SK and 17% in HU) can be suitable sample for smooth application of the income valuation method. Cumulatively, only 31.4% of all V4 agricultural companies are suitable for the income valuation methods application (tab. 3). Based on this fact, there are 68.6% of companies to be valued by alternative approaches. Besides the income valuation approach, these companies can be objects for asset approach valuation framework (Koller et al., 2010). The aforementioned facts may lead to conclusion, that a majority of V4 agricultural companies do not cover their r_e by ROE and therefore cannot be objects for income valuation methods.

4. Conclusions

Overall, the picture that emerges from agricultural companies in the V4 is consistent with the findings of Banaszak (2007), Kopta and Maršík (2009), Mickiewicz (2012) or Vavřina et al. (2012). There is a confirmation, that the value spread is positive only in 31.4% of cases: only 31.4% of the sample report higher ROE than r_e. This fact may be caused by agricultural specifics, namely by considerable fluctuations in cash flow, low return ratios or high indebtedness which is reflected in the higher r_e, as outlined by Střeleček et al., (2007), Banaszak (2007) or Vavřina et al. (2012). Whereas the net income indicates greater percentage of companies to be profitable, according to the value spread, the majority reports negative difference between obtained and expected returns. Additionally, there is evidence that companies creating value do have to generate a profit, but companies destroying their value do not have to report a loss.

For the verification of the relation between the two criteria (value spread and country of origin of the individual agricultural company) the Chi-square test of independence was employed to accept or reject the null hypothesis: *„ Creating/destroying value according to the value spread method does not depend on the country of origin of the agricultural company within the observed sample "*. On the given significance level, the null hypothesis was rejected and alternative hypothesis was accepted: it can be said that creating/destroying value depends *on the country of origin of the agricultural company*, within the observed sample. Based on Cramer's V coefficient, the dependence is slightly positive.

Finally, the paper findings have proved that the value spread depends on the country of origin of individual agricultural company; in other words, it can be assumed that the differences among individual agricultural companies in the V4 countries are statistically significant. Moreover, there are 68.6% of V4 agricultural companies do not cover their costs of equity by returns on equity and therefore cannot be objects for income valuation methods.

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