ANALYSIS OF CLASSIFICATION CRITERIA RELEVANT IN DETERMINING COMPANIES' SIZE

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Abstract- The paper present results of conducted research onranking classification criteria for determining a company's size by importance. Classification criteria for determining the size of a company in the European Unionare the average employee number, the balance sheet total and the annual income. The Accounting law in Croatia is harmonised with the European Union accounting legislation included in Directive 2013/34/EU on the annual financial statementconsolidated financial statements and related reports of certain types of undertakings. The paper includes analysis of ranking classification criteria which is conducted for the companies from Croatiafor the period from 2005 to 2014 by using correlation analysis, multiple regression analysis and dominance analysis.

Indexterms- size classification criteria, small and medium-sized companies, multiple regression, dominance analysis, zero-order correlation.

I. INTRODUCTION

The size of a company is an important factor in the context of determining applied accounting standards, extent of annual financial statements and reports, obligations to conduct statutory audit, forming particular organizational bodies, obligations related to tax authorities and government. It represents concrete and limiting external factor in a business decision process. From that point of view, the size of a company is not negligible micro- and macroeconomic factor.

Accounting practice in Croatia can be defined as a developing one considering the fact that during the independence period of 26 years there were implementation of new accounting laws for four times. The latest Accounting law(Official Gazette No. 78/2015) entered into force from 01 January 2015. The new law is followed by anew Regulation on a structure and content of financial statements (Official Gazette No. 96/2015), and the Croatian Financial Reporting Standards (Official Gazette No. 86/2015). By implementing new regulations Croatian accounting system is completely adjusted to the European legislation system.

Significant change in new Accounting law compared to previous ones includes changes in thresholds of classification criteria for determining the size of a company. The new law introduces micro-entities as a new type of a company's size. The European Union implements and promotes the idea of micro-entities. The main objective is to simplify requirements for small and medium-sized companies (SMEs) in the European Union regarding financial reporting and other administrative burdens. By doing that the Union tries to encourage entrepreneurship.

Companies in Croatia and in the European Union are classified by the three criteria: the average employee number, the balance sheet total and the annual income (net turnover). Until 2016 accounting legislation in Croatia included three size classes (small, medium-sized and large companies). The new Accounting law, which entered into the force in the 2016, introduces micro-entities as an additional size class. Next to adding a new size class, value of thresholds for all three criteria and all class sizes are adjusted to the European Union legislation[1]. Compared to previous Accounting law in Croatia from 2007 thresholds for large companies are increased which ends up with a more rigid benchmark for entering in that size class. Opposed to that, thresholds for small companies are decreased. Altogether,the changes result with a wider range of criteria thresholds for medium-sized companies.

II. DISPERSION OF COMPANIES BY EMPLOYEES NUMBER IN THE EUROPEAN UNION AND CROATIA

Structure of companies in Croatia is similar as in the European Union. In 2013 in the European Union was over 22,6 million companies and over 93 % of them employs less than ten employees(European Commission). Those companies in 2013 employ 39 million people, which is a bit over 29 % of total employees' number in the business economy sector.

Table 1: Number of companies in total business economy sector in the European Union from 2010 to 2014 (in thousands)

[1]Companies' size classes in the European Union are defined by reference to balance sheet total, net turnover and the average number of employees during the financial year. Micro-entities are those which have less than 350 thousand EUR of balance sheet total, less than 700 EUR of net turnover, or less than 10 employees (two of three criteria). For medium-sized companies those limits are: balance sheet total less than 4 million EUR (or at maximum value of 6 million EUR), net turnover less than 8 million EUR (or at maximum value of 12 million EUR), or average numbers of employees has to be less than 250. Large companies are those in which at least two of the three criteria are exceeded, i.e. balance sheet total is over 20 million EUR, net turnover is over 40 million EUR, or average number of employees is over 250 (Directive 2013/34/EU).

Persons employed	2010	2011	2012	2013
0 - 9	20.154	20.449	20.718	21.000
10 - 49	1.355	1.380	1.362	1.310
50 - 249	222	225	224	220
> 250	42	44	44	44
Total	21.774	22.098	22.347	22.574

Source: (European Commission)

According to the available data, number of companies in the European Union and Croatia until show similar trend (Table 1 and 2).

Table 2: Number of companies in total business economy sector in Croatia from 2010 to 2014 (in thousands)

Persons employed	2010	2011	2012	2013	2014
0 - 9	152,2	140,9	136.,1	134,3	135,1
10 - 49	10,9	10,4	10,2	10,2	10,1
50 - 249	2,0	1,9	1,8	1,8	1,8
>250	0,4	0,4	0,4	0,4	0,4
Total	165,5	153,7	148,6	146,6	147,3

Source: (European Commission)

By observing the data from the tables 1 and 2 it is noticeable thatmore than 90% of companies employ less than 10 employees.

Table 3: Number of employees in Croatia (in thousands HRK)

	2010	2011	2012	2013	2014
0 - 9	335,1	310,6	303,4	300,4	:
10 - 49	206,3	197,8	192,7	193,2	:
50 - 249	202,2	197,2	188,7	184,4	181,1
>250	331,8	327,5	318,1	318,6	:
Total	1.075,4	1.033,1	1.002,9	996,6	999,4

: data not available

Source: (European Commission)

Business economy sector in Croatia employs 73,26 % of total employed people in Croatia (1.364.298) (Croatian Employment Service 2014, 10). Almost one third of employees in the business economy sector in Croatia is employed in companies with less than 10 employees (Table 3). Another third is employed in companies with more than 250 employees, and the number of those companies represent less than 0,30 % ofthe number of companies in the total business economy sector in Croatia in 2013.

III. IMPORTANCE OF PARTICULAR CLASSIFICATION CRITERIA IN DETERMINING COMPANIES' SIZE – EVIDENCE FROM CROATIA

Conducted pre-analysis of a number of companies in Croatia in the period from 2010 to 2014 showed the dominance of companies with less than 10 employees. Those companies generate around 20 % of total income and employs one third of the total number of employees in the business economy sector in Croatia.

Majority of databases related to the business statistics and the size of companies emphasizes employee number as an important determinant. That factor raises research question of the importance of particular classification criteria in determining companies size. In accordance with that, research hypothesis is: The average employee number represents the most relevant criterion in determining the size of a company in Croatia according to accounting legislation classification criteria.

In order to test the research hypothesis, random sample of companies from the business economy sector in Croatia is created. The sample includes 500 companies which prepared and disclosed their annual financial statements for a ten-year period from 2005 to 2014. Based on the collected data, size of companies in the sample is determined in accordance with accounting legislation which was in force in the years to which data refers (Accounting law, Official GazetteNo. 90/1992, Article 16; Accounting law Official GazetteNo. 146/2005, Article 17; Accounting law Official GazetteNo. 109/2007, Article 3; Accounting law Official GazetteNo. 78/2015, Article 5).

Table 4: Number of companies in the sample classified by size criteria

Year	Size classes		
	Small	Medium-sized	Large
2005	336	81	83
2006	362	93	45
2007	355	102	43
2008	355	100	45
2009	354	105	41
2010	352	107	41
2011	346	113	41
2012	338	117	45
2013	331	119	50
2014	341	107	52

Source: authors' calculation

Ten-year period shows decrease in number of large companies and increase of medium-sized companies in Croatia (Table 4). The most significant change is present in 2006 compared to 2005 for large companies as a consequence of introducing new Accounting law (Official GazetteNo. 146/2005).

By comparing the number of companies from the sample classified by previous and new accounting legislation, it is possible to notice the decrease of number of large companies (Table 5). The majority of companies previously classified as small companies, according to the new legislation are classified as micro-entities. As expected, because of the wider range of criteria thresholds for medium-sized companies, number of companies in that class is increased.

Table 5: Number of companies in the sample classified by size criteria according to new Accounting law

Year	Size classes			
	Micro	Small	Medium-sized	Large
2005	298	82	87	33
2006	287	78	101	34
2007	276	81	107	36
2008	274	76	108	42
2009	277	74	113	36
2010	285	61	120	34
2011	282	58	124	36
2012	285	47	128	40
2013	281	50	127	42
2014	284	54	121	41

Source: authors' calculation

To analyse importance of classification criteria for determining the size of companies',the average employees number (x_1), total assets value (x_2) and annual income (x_3) are determined as independent variables, and a company's size as the dependent variable (Y).Average data for the ten-year period from 2005 to 2014 is used in order to conduct analysis.

Table 6: Descriptive Statistics of classification criteria

	Mean	Standard Deviation	N
x_1	97.7934	304.28239	500
x_2	123.069.939	561421530.103	500
x_3	93.484.538	320140308.691	500

Source: authors' calculation

Descriptive statistics show that the average number of employees per company in Croatia is 98 people (Table 6). On average companies in Croatia had HRK 123 million of total assets value. On average companies generated HRK 93,5 million of annual income.

The results of the correlation matrix showthe existence of positive, moderate correlation between dependent and independent variables. The correlation is statistically significant among all variables (Table 7). The highest correlation is present between a company's size (dependent variable) and employees' number (independent variable). It can be concluded that there exists a relationship betweena dependent variable with independent variables. That is expected due to the fact that those independent variables determine the company's size according to Croatian Accounting law.

Table 7: Correlation between dependent and independent variables

Pearson Correlation Sig. (1-tailed)	Y	x_1	x_2	x_3
Y	1.000	.619 (.000)	.454 (.000)	.594 (.000)
x_1	.619 (.000)	1.000	.612 (.000)	.756 (.000)
x_2	.454 (.000)	.612 (.000)	1.000	.819 (.000)
x_3	.594 (.000)	.756 (.000)	.819 (.000)	1.000

Y: company's size (size class)
x_1: employees number
x_2: total assets value
x_3: annual income

Source: authors calculation

Nevertheless, it is important to notice that correlation among independent variables is positive and very strong, from 0,612 to 0,819 imposing the question of autocorrelation problem. To remove that doubts multicollinearity problem is tested.

Table 8: Summery of multiple regression model (dependent variable: company's size)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.651[a]	.423	.420	.47699

Model	Change Statistics					Durbin-Watson
	R Square Change	F Change	df1	df2	Sig. F Change	
1	.423	121.443	3	496	.000	2.031

a. Predictors: (Constant), Income, Employeesnumber, Assets
b. Dependent Variable: the size of a company
Source: authors' calculation

As a next step in determining the importance of particular independent variable on company size multiple regression model is used. Independent variables are employee number, total assets value and annual income (total turnover). The dependent variable is the size class.

The correlation between dependent and independent variables is positive and moderate (R = 0,651). R^2 is a squared correlation between observed (Y) and predicted ($\hat{Y}$) value of independent variable (criterion) and it can be written as $\rho^2_{Y\hat{Y}}$.(Azen & Budescu, 2003, p. 130) It represents the proportion of variance in the model that is explained by the p predictors (independent variables).

According to obtained results (Table 8), the independent variables explain42,30 % of the proportion of variance in the dependent variable (the size class). Durbin-Watson test with value of 2,031 shows independence of observations (residuals). Possible values of the Durbin Watson test are between 0 and 4, while the critical thresholds of the test are between 1,5 and 2,5 implying that value of 2 represent no auto-correlation. It can be concluded that there is no linear auto-correlation in the multiple linear regression model.

Table 9: Analysis of variance (dependent variable: company's size)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	82.893	3	27.631	121,4	.000[b]
Residual	112.851	496	.228		
Total	195.744	499			

b. Predictors: (Constant), annual income, employees number, total assets value
Source: authors' calculation

The analysis of variance (ANOVA table) shows if a model is a good fit for variables, i.e. if the independent variables predict dependent variable (Table 9). As it can be seen from the table, the combination of the three independent variables is statistically significant in determining the size class for companies (dependent variable) because the empirical p-value is 0,000 and its lower that theoretical significance level of 5 %.

Table 10: Coefficientsof the regression model

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
C.	2.269	.022		100.938	.000
x_1	.001	.000	.395	7.580	.000
x_2	-1.029E-10	.000	-.092	-1.553	.121
x_3	7.264E-10	.000	.371	5.175	.000

Dependent Variable: company's size
x_1: employees number
x_2: total assets value
x_3: annual income
Source: authors' calculation

Employee number, total assets value and annual income determine size class, i.e. the overall model is statistically significant (Table 10). Those results are expected due to the accounting legislation in Croatia. The more important question is which of the three independent variables have major impact in determining the size of companies in Croatia. For that purpose, predictors in the model are analysed separately.

At first, it is necessary to test if there exist multicollinearty which represents high correlation between two or more independent variables. The existence of multicollinearity can result in confusion about the contribution of each independent variable to the variance explained in the dependent variable. Multicollinearity is tested by using tolerance level and variance inflation factor (VIF). Generally, if the tolerance level is below 0,2 it can represent a potential multicollinearity problem, i.e. the value of VIF factor should not be greater than five.

The results obtained from the research shows that neither independent variable has a tolerance level below 0,2 which consequently means that the VIF factor for every variable is lower than five which leads to the conclusion that there is no multicollinearity problem among independent variables (Table 11).

Table 11: Coefficients of zero-order correlation

	Collinearity Statistics	
	Tolerance	VIF
C.		
x_1	.428	2.336
x_2	.330	3.034
x_3	.226	4.428

Dependent Variable: C.: company's size
x_1: employees number
x_2: total assets value
x_3: annual income
Source: authors' calculation

Created model includes three independent variables which, according to Croatian Accounting law, determine companies' size. As it was already stated those variables are employees number, total assets value and annual income. The research question of this paper includes analysis which of that three variables has the most important influence in determining companies' size. By observing significance level (p-value) of predictor variables it can be concluded that employees number and annual income have significant influence in determining companies' size because empirical p-value is lower than theoretical significance level of 5%. Oppose to that, according to the obtained results, total assets value doesn't have statistically significant influence in determining the size of a company in Croatia.

The common interpretation of coefficients in the regression model in this case is irrelevant. Standardized coefficients show the change of the dependent variable in units of its standard deviation related to one standard deviation change of independent variable, of course leaving other independent variables unchanged. If employees number increases for one standard deviation, the dependent variable will change for 0,353 standard deviations.

Generally, multiple regression model consists of $p\ (p \geq 1)$ predictors and one criterion. Predictors are independent variables and criterion is dependent variable. In multiple regression there is more than one predictor. Usually, in order to determine the importance of particular predictor in a multiple regression model its standardized values are used. When using standardized values intercept is not needed, and β_i coefficients are explained as a change of criterion in standard deviation units. In that case the multiple regression model is as follows:

$$Y_j = \beta_1 x_{1j} + \beta_2 x_{2j} + \cdots + \beta_p x_{pj} + \varepsilon_j$$

$$= \sum_{i=1}^{p} \beta_i x_{ij} + \varepsilon_j$$

There exist numerous measures of importance mainly based on correlations, variances, regression coefficients and its combinations. One of the last developed is dominance analysis."Dominance analysis determines relative importance by using the additional contribution each predictor makes to the overall prediction ability of each possible subset model"(Petscher , Schatschneider , & Compton , 2013, p. 42). The same authors emphasize that dominance analysis results in qualitative rather than quantitative comparisons. "Dominance analysis is a means of rank ordering the regressors in a model with respect to importance as defined by improvement in the fit of the model. It is based on how one regressor relative to another contributes to increasing R, which coincides with the amount of the variance in Y a regressor explains or how much it shrinks the error in estimation."(Darlington & Hayes, 2016, p. 233). There exist three levels of dominance analysis. The first one is complete dominance of one predictor over other ones. It represents a situation in which the additional contribution of one predictor is greater than the additional contribution of other predictors

(Petscher , Schatschneider , & Compton , 2013, p. 48). "If incremental validity is always higher for x_i than for x_j for every submodel, then x_i is said to show complete dominance over x_j. Complete dominance is a restricted form of dominance that may rarely occur."(Nimon & Oswald, 2013, p. 6) In case when it is not possible to determine complete dominance, it is suggested to determine conditional and general dominance. In case of conditional dominance conclusion is based on average additional contribution, and in general, dominance overall averages can be compared to each pair of predictors in order to determine which one dominates another one.

Table 12: Dominance analysis

Subset Model (X)	$\rho^2_{Y.X_i}$	Additional Contribution of:		
		x_1	x_2	x_3
CD, k = 0 average		0,383	0,206	0,353
x_1	0,383	0	0,007	0,038
x_2	0,206	0,184	0	0,151
x_3	0,353	0,068	0,004	0
CD, k = 1 average		0,126	0,006	0,094
x_1x_2	0,390	0	0	0,033
x_1x_3	0,421	0	0,002	0
x_2x_3	0,357	0,066	0	0,000
CD, k = 2 average		0,066	0,002	0,033
$x_1x_2x_3$	0,423			
GD, overall average		0,064	0,003	0,042

x_1: employees number
x_2: total assets value
x_3: annual income
$R^2_{Y.X_1}$: the proportion of variance in Y that is accounted for by the predictors in the model
CD: conditional dominance
GD: general dominance

Source: authors' calculation according to (Nimon & Oswald, 2013, p. 7)

Table 12 includes results of conducted dominance analysis. Applied approach refers to analysis, which is reviewed and refined in 2003 by Azen and Budescu. "Dominance analysis is unique in that (a) it measures relative importance in a pairwise fashion, and (b) the two predictors are compared in the context of all $2^{(p-2)}$ models that contain some subset of the other predictors"(Azen & Budescu, 2003, p. 134).

As it was stated earlier, the conducted research includes determining relative importance of three predictors in determining company's size. Those predictors are employees number (x_1), total assets value (x_2), and annual income (x_3). In case of three predictors it is possible to create $2^3 = 8$ models. For each created model proportion of variance is calculated ($\rho^2_{Y\hat{y}}$). The table also shows additional contributions by adding predictor which is not included in a model.The obtained results show that in case of simple regression with only one independent variable (predictor) the best results shows model which includes employees number (x_1). The model explains 38,3 % of variance in the criterion ($\rho^2_{Yx_1} = 0{,}383$). An additional contribution of the predictor is calculated as a difference between model which includes two observed predictors (x_1, x_3) and the isolated contribution of particular predictor x_3. For example, observing simple regression model in which predictor is x_1 contribution of x_3 is obtained by using the following equation$\rho^2_{Yx_1x_3} - \rho^2_{Yx_1}$, i.e. 0,421 – 0,383 = 0,038. Annual income (x_3) explains additional 3,8 % of the variance. According to the results the least contribution to the model has predictor total assets value (x_2) with only 0,7 % explanatory contribution. Although predictor annual income (x_3) also has great explanatory contribution its power is lower than in case of employees number (x_1). Additionally, it can be seen that additional contribution of x_1 to the $\rho^2_{Yx_3}$ model is higher than the contribution of x_3 to the $\rho^2_{Yx_1}$ model. According to results of simple regression, conditional contribution of x_1 is the highest and predictors can be ranked as follows $\{x_1, x_3, x_2\}$. It can be said that x_1 conditionally dominates over other predictors.

In case of two-predictor model the highest contribution has a model $\rho^2_{Yx_1x_3}$ which includes predictors employees number (x_1) and annual income (x_3). The created model explains 42,1 % of variance in the criterion. An additional contribution of the predictor x_2 is calculated as a difference between model including all three variables $\{x_1, x_2, x_3\}$ and model including two observed variables $\{x_1, x_3\}$. By adding an additional predictor x_3 to the model, to the previously selected model, the proportion of variance explained is increased, what is expected, but the additional contribution of the predictor x_2 is even lower than in the previous case. Nevertheless, the model which includes all three predictors $\{x_1, x_2, x_3\}$ explains 42,3 % proportion of variance in criterion, and by that explains the greatest proportion. "The last level of dominance summarizes the additional contributions of each predictor to all subset models by averaging all the conditional values." (Azen & Budescu, 2003, p. 136) As it can be seen from the obtained results, predictor x_1 generally dominates the other predictors because the highest overall averaged additional contribution of that predictor.

Table 13: Correlations and Tolerance

	Correlations			Importance	Tolerance	
	Zero-Order	Partial	Part		After Transformation	Before Transformation
x_1	.888	.673	.323	.528	.386	.312
x_2	.453	-.044	-.016	-.010	.719	.510
x_3	.877	.616	.278	.481	.336	.260

Dependent Variable: company's size
x_1: employees number
x_2: total assets value
x_3: annual income
Source: authors' calculation

In order to examine the magnitude and direction between dependent and one independent variable, excluding all other independent variables in the multiple regression model from the consideration, zero-order correlation can be used. "Zero-order

correlation reflect the bivariate relationships between independent dependent variables"(Nathans, Oswald, & Nimon, 2012, str. 3). Feature of zero-order correlation is that it takes into account only observed independent variable, abstracting other ones included in the model.

Results obtained by the analysis show the highest zero-order correlation for the employees number (x_1) with the value of 0,888 which means that 88,8 % of variance is directly shared between dependent variable company's size and independent variable employees number without affection of other two independent variables total assets value and annual income (Table 13). The conclusions are consistent with dominance analysis, and order of variables related to its importance is the same $\{x_1, x_3, x_2\}$.

CONCLUSIONS

The paper includes an analysis of ranking importance of classification criteria for determining the size of company's. Micro and small companies represent the most important part of the economy sector of every country. The hypothesis of the research that the average employees number represents the most relevant criterion in determining the size of a company in Croatia according to accounting legislation classification criteria can be accepted.The results of the conducted research show that employees number represents the most important factor in determining a company's size. Next to the employees' number, annual income represents an important determinant of company size. Conducted results imply that employees' number represents an important factor which must be considered in the case of analysing business economy sector in Croatia. Considering the structural similarities between companies in the European Union and Croatia, the obtained results can have wider application opportunities.

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