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BUSINESS' FINANCIAL PROBLEMS PREDICTION - CROATIAN EXPERIENCE

ABSTRACT

Actual development in economy, characterized with global crisis, emphasizes the importance of financial instability prediction. Financial instability in transitional countries is often predicted using the model derived using the data from companies operating in developed countries. Some researches have found that simple application of those models in different environment like transitional do not obtain the same result like when applied in developed country. Therefore, new GCE_3 model was derived using the data from Croatian companies' sample. New model, carried out by using the multiple discriminant analysis, include six independent variables that consist of solvency and liquidity ratios, as well as ratio Total revenues/total expenses. Analysis of model classification accuracy favours the possibilities of its practical usage in wide area of everyday business activities making it very useful financial instability prediction tool.

Keywords: *Financial instability, financial instability prediction models, multiple discriminant analysis, Croatian experience*

1. INTRODUCTION

Modern business environment has many inherent risks that are not so difficult to recognize such as hard to evaluate the intensity of their impact. The importance of business risks for stable business operations raised in 19th century when economic activities followed by industrial revolution resulted in raising number and size of the companies. In that time, the first rating company was founded in order to serve the public with information on degree of business risks and financial stability of the firms making the reasonable conviction that the firms that have been analyzed are or are not financial stable. There must be noticed that these rating companies, as well as, for example, auditing firms, are profit oriented subjects and the history has shown that misleading in opinion appear, not only as the result of insufficient or unsuitable information, but also as the consequence of pressures from the firm being evaluated or the other interested parties.

First evaluation of financial stability includes dissemination of different information that resulted in qualitative evaluation of the proper firm. The evolution of quantitative methods and their use in economy represent the important lunge for firms' financial stability evaluation. At the start the simple usage of financial ratios was emphasized. But the fact that they are not entirely analyzing the firm but just the segment of business performance like liquidity, leverage, profitability etc. motivate the researchers to find the most important ratio that was done by performing the univariate statistical methods (Beawer, 1966). Further researches were done in order to carry out the financial problems prediction models that are statistically derived combination of traditional financial ratios (Altman, 1968, Deakin, 1972, Edminster, 1972, Ohlson ,1980). In the last two decades the importance is focused on introducing the nonfinancial variables into different models trying to improve their predictive accuracy. Although the improvements are noticed, there must be said that it is very unreal to expect that one model will be able to precisely predict the degree of financial stability in today rapidly changing environment. One can assert that it is reasonable to expect according to available information and expectation in economy that the firm is financial stable and has

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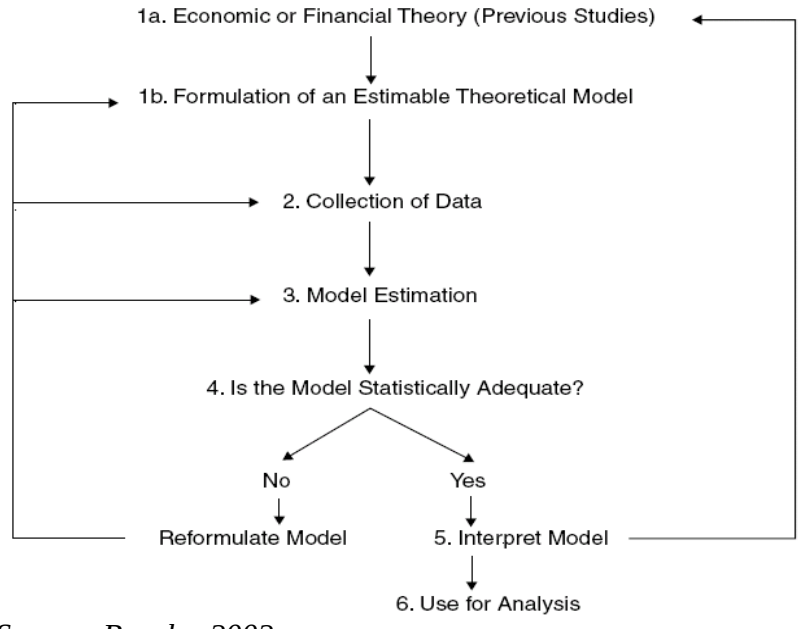
no financial problems, but the precision is not immanent to economy as a social science – the precision is a characteristic of technicians and natural sciences.
Most of financial problems prediction models derived had in the sample of the firms analyzed the companies that were bankrupt as well the healthy ones. The bankruptcy is the legal mechanism used for the protection of the company in order to minimize the negative implication of the crisis the company is facing. The presumption that the firm which going concern ability is questionable should become bankrupted depends on the degree of development of the legal system. In many transitional countries the problem in this area is not only the "quality" of bankruptcy acts but the degree of their practical implication. In this circumstances, the before mentioned presumption is not applicable in many transitional countries so there raises the problem of defining the problematic firms.
In this paper the definition of problematic firms was broaden in order to derive the model for business' financial problems predicting. The model will be suitable for firms' financial problems prediction in transitional countries. Namely, the results of the research on implementation of Altman Z-score in Croatian economy (Deverić, 2002) show that the simple implementation of this model in Croatian business environment is not appropriate and that its' predictive accuracy is quite lower than in the US. In this sense, the need for performing the research among Croatian firms was logically imposed. The first chapter is examining the scientific approach to financial instability prediction. In second chapter the results of the most important studies in the past of financial stability prediction are disseminated. Further chapters are presenting the hypothesis and research methodology as well as the results and the wide area of their applications.

2. SCIENTIFIC APPROACH TO FINANCIAL INSTABILITY PREDICTION

Many financial instability prediction models had evolved through history and today there exist a plethora of available alternatives to use. Regardless of the method used, the process of developing the new model should be scientifically based. In order to follow scientifically based approach, the main steps that characterize this approach are shown (Figure 1).

Figure 1: A Scientific Approach to Financial Instability Prediction



Source: Brooks, 2002.

First step in scientific approach to financial instability prediction include formulation of theoretical model that is assumed to be able to predict financial instability. The findings from financial theory are considered in order to define which and how specific variables explain the probability of financial instability. Defining and selecting the independent variables should be done in order to make a good approximation of real-world phenomenon. Sometimes it is not so easy to select the variables ex ante because they are not well or completely known. In this situations researcher could use techniques like data mining or different mathematical and statistical methods. In the next step researcher is collecting data from available internal and external sources. When examining financial instability, the most important data are those from accounting records of the company, but the other data like bankruptcy information, firm characteristics and information on macroeconomic surrounding are found to be very useful too. The third step involves selection of the appropriate method used to derive financial instability prediction model. This step is closely related to first step in which the theoretical model is defined. The reason for this lays in the fact that theoretical determination of the model includes selection of the relations between independent and dependent variables that can be linear or nonlinear. In the same time researcher has to select appropriate method which presumptions are appropriate for deriving the model as well as to decide which model to derive, static or dynamic, single or multiple equation etc. Performing statistical evaluation of the model is the next step. Evaluation of the model includes calculating various statistical parameters that describe model appropriateness. If the parameters are not satisfying the researcher should reformulate theoretical model, collect more data or choose another estimation technique. Although the result of statistical validation could talk in favor of model derived, the researcher has to evaluate model from theoretical aspect. She or he has to examine the values and signs of variables included and compare them with theoretical postulates formulated in the first step. If the results are satisfied the researcher can proceed to last step. Otherwise, the theoretical framework should be rebuilt. The last step includes model practical use. Once derived the model should be constantly tested and improved, as well as expanded and redefined in order to make a progress in financial instability prediction that is very actual in modern and unstable environment.

3. PREVIOUS STUDIES DISEMINATION

Scientific approach to financial instability prediction that used statistical methods started in the second half of 20^{th} century. For purpose of this article only the findings that involve financial ratios will be presented considering the fact that the ratios itself are in focus of the research. Different statistical methods were applied on many financial ratios in order to find the most important ones that discriminate financial unstable from stable companies. At the very beginning univariate statistical methods were applied. The utility of each financial ratios involved was tested what resulted in defining the most important ratios for financial instability prediction. Result of Beawer's research indicate that the most important ratios in this sense are cash flow/liabilities, net income/assets, liabilities/assets, current assets/current liabilities and working capital/assets (Beawer, 1966).

Further researches used multivariate statistics, especially discriminant analysis in order to find appropriate combination of financial ratios that is able to objectively discriminate financially stable from unstable business subjects. The most known author in this field is Edward I. Altman. In his research he derived the model for bankruptcy prediction using the data of US companies (Altman, 1968). The model, called Z-score, represent combination of financial ratios that is used for classifying the company as bankrupt or financially stable. If the value of Z-score for a particular company is higher than critical value, the company is classified as stable, and vice versa. The other authors like Deakin, Ohlson, Edmister, Kralicek and others used similar technique but on the other sample of companies or the other

developed countries. In their result the model mostly emphasized importance of liquidity, solvency and profitability ratios while others ratios were rarely represented.
Most known financial instability prediction models are derived from the research performed among companies in developed countries where tradition of free market economy as well as legal system exist more than century. In transitional economies, like Croatian, stability of legal system and activities of market institutions in general are not appropriate so the conditions of doing business are quite different from developed countries. Therefore, in transitional countries the financial unstable companies are often doing business normally and not went bankrupt so the presumption of the unstable companies as the ones that went bankrupt should be broaden. This is done in the research which results will be presented.

4. FORMULATION OF THEORETICAL MODEL – HYPOTHESYS AND METHODOLOGY

Scientific approach to financial instability prediction starts with defining the theoretical model. The previous researches on simple implementation of financial instability prediction model derived for companies operating in developed countries, in the transitional environment confirm the statement that those models do not perform well (Deverić, 2002). In this sense the research among firms operating in transitional environment was performed in order to test next hypothesis: Financial instability could be reasonably estimated in the short run (up to two years) by using the combination of liquidity, solvency, profitability and cash flow based ratios.
Theoretical model includes 50 independent variables and one dependent variable. For purpose of this research independent variables consist of 50 financial ratios where six of them represent liquidity, 11 solvency, eight activity, nine profitability ratios and five ratios that are calculated upon relation between different types of revenues and expenses. 11 ratios calculated from cash flow report of companies analyzed are included too. Dependent variable is dichotomous where value 0 is given to firms that are financially unstable, while those treated stable had value 1. Financially unstable companies are those that went bankrupt or disclosed loss above equity in their financial statement. Loss above equity is category of assets that shows the value of loss that is higher than equity. In other words, this balance sheet position shows the value of liabilities that is higher than book value of assets, and it is quite reasonable to expect that firms that disclosed this position in their financial statements have undermined financial stability.
The next step consists of defining the sample and data collection. Defining the representative sample is one of the key elements of model quality. Starting point for sample design was structure of Croatian companies by size and activities. The size, as well as activities structure was analyzed. The result is the final sample shown in the Table 1.

Table 1

Final sample

Activities	**Size**			**Total**
	Small	**Medium**	**Big**	
Manufacturing	9	16	13	**38**
Financially stable companies	5	7	7	**19**
Financially unstable companies	4	9	6	**19**
Building industry	10	10	10	**30**

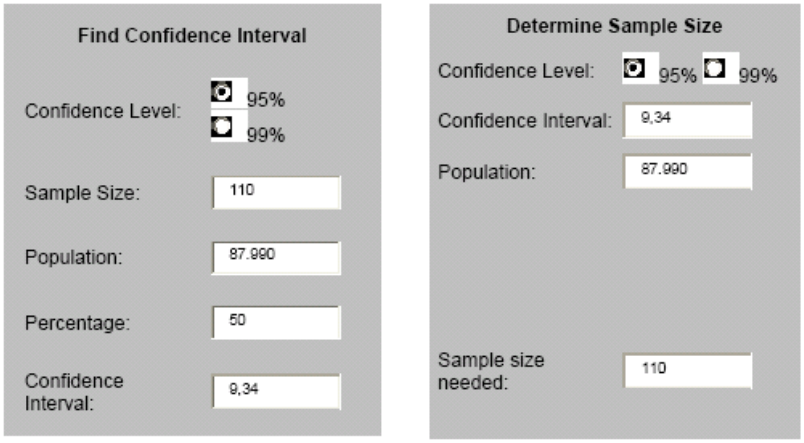
Financially stable companies	5	4	5	**14**
Financially unstable companies	5	6	5	**16**
Traffic, warehousing and communications	3	11	12	**26**
Financially stable companies	2	5	7	**14**
Financially unstable companies	1	6	5	**12**
Hotels and restaurants	4	6	6	**16**
Financially stable companies	2	3	3	**8**
Financially unstable companies	2	3	3	**8**
Total	**26**	**43**	**41**	**110**

The sample consists of 55 financially stable and the same number of unstable companies that are structured by size and by activities. The proportion of companies by size is the result of analysis based on the proportion of employees that each group of companies had, not on the number of companies in each group. When defining the sample by activities the efforts were concentrated on finding the most represented activities, as well as those that do not request application of particular financial ratios such as financial industry and similar. The result was the sample that covers activities in which is employed 55% of total employees in Croatian profit sector, as well as 36% of total profit oriented companies that are doing business.

After the sample was designed the appropriateness of sample size has to be tested. This is done by using the specialized web application[2]. The sample size appropriateness test is based on population size of 87.990 active business entities and the confidence level positioned at 95%. Figure 2 shows the result of minimum sample size needed in order to appropriate represent the population. According to obtain results the sample size is appropriate so the next step – data collection could be done.

Figure 2

Sample size calculation



[2] http://www.surveysystem.com/sscalc.htm

Information needed for calculating 50 financial ratios was obtained from two main sources: publicly disclosed financial statements on Croatian stock exchange and Financial agency, the agency that collects statistical information for all Croatian companies. The information regards different positions from financial statements that are collected for the year before the company went bankrupt or disclosed loss above equity. On the other side the same data for the same period were collected for financially stable companies. In the situations where company that went bankrupt had loss above equity in the appropriate year, the data were collected for the year before the loss above equity was obtained.
Selection and application of appropriate statistical method is the next step toward financial instability prediction model deriving. For purpose of this research the multiple discriminant analysis will be used. Multiple discriminant analysis is a special type of regression analysis that tries to identify independent variables that best discriminates the sample or population units according to their chosen characteristics where those characteristics represent dependent variables that are dichotomous. The result of multiple discriminant analysis performed is discriminant function that is shown in equation 1.

$$Z_i = \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n \quad (1)$$

Some of the most emphasized purposes for multiple discriminant analysis are: classification of cases into groups using a discriminant prediction equation, testing the theory by observing whether cases are classified as predicted, investigation of differences between or among groups, determination of the most parsimonious way to distinguish among groups, assessment of the relative importance of the independent variables in classifying the dependent variable and discarding variables which are little related to group distinctions (Garson, 2008). Multiple discriminant analysis should be performed if most of the further assumptions are satisfied:

- Proper specification i.e. discriminant quotients can change if variables are added to or subtracted from the model.
- Dependent variables should be categorical – dichotomous.
- Cases must be independent – the data cannot be correlated.
- Group sizes should not be significantly different.
- Sample size must be adequate.
- The independent variables should be interval.
- No independents have a zero standard deviation in one or more of the groups formed by the dependent.
- Errors (residuals) are randomly distributed.
- Homoscedasticity
- Homogeneity of covariances/correlations
- Absence of perfect multicollinearity
- Low multicollinearity of the independents
- Linearity
- For purposes of significance testing, predictor variables follow multivariate normal distributions (Garson, 2008).

5. MODEL ESTIMATION AND APPLICATION

Central part of the research consists of estimating the model by using the multiple discriminant analysis technique. Data were processed by SPSS software, most commonly used package for data analysis in social sciences. At the start, discriminant analysis included all independent variable i.e. 50 financial ratios and resulted in deriving discriminant function that is representing the combination of selected financial ratios that are predicting financial

stability of appropriate company. Decision on whether the company is classified as stable or unstable is brought after comparison of discriminant function value with critical value calculated from the data. If the value of discriminant function is lower or equal to critical value, company is characterized as unstable and vice versa. In further phases, from analysis were excluded nonsignificant and autocorelated independent variables as well as some cases (companies) whose ratios were significantly different than groups mean.

First discriminant function i.e. model derived that included all 50 independent variables resulted in structuring the model that involved only 62 of 110 cases. The reason for this laid in the fact that discriminant analysis does not include in calculation the ratios whose denominator is zero. It was noticed that ratios Interest coverage and Extratordinary revenues/Extratordinary expenses cannot be calculated for many cases so in the next step they were excluded from the analysis.

Low multicollinearity, as it is mentioned before, is one of the most important assumption of discriminant analysis so the independent variables that are highly correlated were excluded. The multicollinearity is shown in intragroup matrix of covariances and correlations that are automatically calculated by software. In this step the independent variables that had correlation ratio higher than 0,8 were excluded. The particular attention was given to importance of variables in representing some aspect of financial stability. For example, in the analysis the correlation between Liquidity ratio and Quick test was 0,821. Exclusion of two variables will not be appropriate. One of them has to stay. The decision on which one to leave was brought upon the past experience on their importance, or their importance represented by standardized discriminant and structure quotients.

Important element in discriminant analysis is Wilks' lambda test. It is used to test which independents contribute significantly to the discriminant function. For the purpose of this research, from the analysis were excluded the independent variables that had the significance level higher than 0,005. The result of analysis was discriminant function or GCE_1 model (equation 2). The model is called GCE because it can be very useful instrument in estimating basic accounting presumption - going concern estimation.

$$GCE_1 = -2{,}207 - 0{,}026FS + 0{,}733\,N/I + 1{,}905\,RK/I - 1{,}086Z - 0{,}626SF - 0{,}008FZ + 2{,}812A + 2{,}989EUP - 0{,}047ROA - 0{,}548RTIF - 0{,}124TL + 0{,}433EP \quad (2)$$

GCE_1 model consist of constant and 12 independent variables. The model derived represents discriminant function where each independent variable is multiplied by appropriate unstandardized coefficient. Relative importance of each independent variable in discriminant power of function is shown by standardized coefficients, while structure coefficients represent correlation between independent variable and value of discriminant function (table 2). Definition of fore mentioned coefficients is very important when making the decision on which independents to exclude from function in order to make model more efficient and easy to use. Namely, model is efficient and easy to use when there is reasonable number of independent variables included in its calculation.

Table 2

Selected discriminant function coefficients – GCE_1 model

Independent variable	Structure coefficients	Standardized discriminant function coefficients	Unstandardized discriminant function coefficients
Long term assets/(Long term liabilities + equity) **(*FS*)**	-,345	-,029	-,026
Cash and cash equivalent/Short term assets **(*N/KI*)**	,242	,152	,733
Working capital/Total assets **(*RK/I*)**	,561	,434	1,905
Total liabilities/Total assets **(*Z*)**	-,432	-,259	-1,086
Registered equity/Total assets **(*SF*)**	-,298	-,264	-,626
Total liabilities/(Retained earnings + depreciation) **(*FZ*)**	-,294	-,444	-,008
Retained earnings/Total assets **(*A*)**	,529	,297	2,812
Total revenues/Total expenses **(*EUP*)**	,510	,622	2,989
Return on assets **(*ROA*)**	,448	-,006	-,047
(Net income + interests)/Total liabilities **(*RTIF*)**	,339	-,219	-,548
Liquidity ratio **(*TL*)**	,336	-,174	-,124
Revenues from operations/Expenses from operations ***(EP)***	,498	,098	,433
(Constant)	-	-	-2,207

Table 3 represents the most important function quality ratios. Low Wilks' lambda with 0,00 significance shows that independent variables included in model significantly discriminate financially stable from unstable companies. Canonical correlation value of 0,793 means that 79,3% variations of dependent is discriminated by the set of independents i.e. discriminant function what can be characterized as acceptable.

Table 3

Selected di scriminant function quality coefficients – GCE_1 model

Eigenvalues				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	1,690	100,0	100,0	,793
Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	,372	98,966	12	,000

One of the most important objectives of discriminant function derived is classification of companies into one of the two groups. Classification is done for period of one year prior to bankruptcy or disclosure of loss above equity for financially unstable companies and for the same period for financially stable firms. The value of the model for each company as a sample unit is calculated and compared with model critical value of - 0,000148. Classification results presented in table 4 are shown for original sample where the classification is done for each sample unit included in deriving the model. The results show that 93,5% of original units are correctly classified. Cross section analysis is an alternative for testing the model classification accuracy by using the so called hold-out sample. This classification analysis is performed in a way it calculates the classification of the sample unit using the discriminant function derived from all other units from the sample. Findings from the cross section analysis shows that 89,8% of units tested are correctly classified.

Table 4

Classification results – GCE_1 model

Financial stability			Prior probabilities for group		Total
			Unstable	Stable	
Original	Count	Unstable	47	6	53
		Stable	1	54	55
	%	Unstable	88,7	11,3	100,0
		Stable	1,8	98,2	100,0
Cross-validated	Count	Unstable	44	9	53
		Stable	2	53	55
	%	Unstable	83,0	17,0	100,0
		Stable	3,6	96,4	100,0

a Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
b 93,5% of original grouped cases correctly classified.
c 89,8% of cross-validated grouped cases correctly classified.

When interpreting the classification results, it is quite logically to ask how to make a conclusion if the accuracy is acceptable or not. The conclusion can be done by comparing particular classification results with theoretical probability increased by 25%. Theoretical

probability for two equal groups is 50%, while in the case the groups' sizes are different it can be calculated by using the equation 3 where *p* represent proportion in group 1, and *1 – p* proportion in group 2.

$$P_{sluc} = p^2 + (1 - p)^2 \quad (3)$$

In the case of GCE_1 model the classification results are acceptable because both of them are higher than calculated probability of 62,52143%[3].
In further phase, analysis of independent variables and its signs as well as model improvements were done. Three independents, Return on assets, (Net income + interests)/Total liabilities and Liquidity ratio, were excluded from the model. The reason for such exclusion lays in the fact that they had negative signs that are not in accordance to postulates of financial theory. At the same time from the model were excluded some less significant variables. Decisions on which variables are less significant were brought on analysis of standardized discriminant function and structure coefficients taking into account the model classification accuracy. Equation 4 shows new GCE_2 model.

$$GCE_2 = -1{,}802 + 1{,}478\,RK/I - 0{,}995Z - 0{,}647SF - 0{,}008FZ + 3{,}048A + 2{,}808EUP \quad (4)$$

After elimination of six independent variables, the quality of new GCE_2 model is still acceptable what is shown in table 5 where canonical correlation and Wilks' labda are shown.

Table 5

Selected discriminant function quality coefficients – GCE_2 model

Eigenvalues				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	1,589	100,0	100,0	,783
Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	,386	97,964	6	,000

GCE_2 model classification ability, using new calculated critical value of 0,00013, has improved and reached 95,4% for original sample units and 93,5% using the cross section analysis what is shown in table 6.

[3] The theoretical probability is 50,01715% ($0{,}490741^2 + 0{,}509259^2$) and it has to be increased by 25%, not 25 percentage points. Following this logic the probability to compare with will be 62,52143% (50,01715% + (50,01715 × 25/100)).

Table 6

Classification results – GCE_2 model

Financial stability			Prior probabilities for group		Total
			Unstable	Stable	
Original	Count	Unstable	49	4	53
		Stable	1	54	55
	%	Unstable	92,5	7,5	100,0
		Stable	1,8	98,2	100,0
Cross-validated	Count	Unstable	48	5	53
		Stable	2	53	55
	%	Unstable	90,6	9,4	100,0
		Stable	3,6	96,4	100,0

a Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
b 95,4% of original grouped cases correctly classified.
c 93,5% of cross-validated grouped cases correctly classified.

Final model for financial stability prediction was carried out after the two sample units were omitted from the GCE_2 model. Both sample units had significantly different values of independent variables than the mean of groups i.e. they had the biggest standard error. One sample unit belonged to financial unstable group, while other was a part of group of financial stable companies. New GCE_3 model is presented in equation 5.

$$GCE_3 = -1{,}74 + 1{,}517\,RK/I - 1{,}079Z - 0{,}601SF - 0{,}008FZ + 3{,}151A + 2{,}771EUP \quad (5)$$

Independent variables in new model remained the same, but unstandardized discriminant function coefficients have changed. Two sample units exclusion did not result in model quality modification. Namely, most of discriminant function quality coefficients were not significantly changed (table 7).

Table 7

Selected discriminant function quality coefficients – GCE_3 model

Eigenvalues				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	1,685	100,0	100,0	,792
Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	,372	100,729	6	,000

Classification results of GCE_3 model show the improvements in classification done using cross section analysis what was expected having in mind the fact that two most untypical sample units were excluded from analysis (table 8). New critical value was calculated in the level of - 0,000019 The classification accuracy of 95,3% can be characterized as very high emphasizing high predictive ability and wide possibilities of model practical application.

Table 8

Classification results – GCE_3 model

Financial stability			Prior probabilities for group		Total
			Unstable	Stable	
Original	Count	Unstable	49	4	53
		Stable	1	53	54
	%	Unstable	92,5	7,5	100,0
		Stable	1,9	98,1	100,0
Cross-validated	Count	Unstable	49	4	53
		Stable	1	53	54
	%	Unstable	92,5	7,5	100,0
		Stable	1,9	98,1	100,0

a Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
b 95,3% of original grouped cases correctly classified.
c 95,3% of cross-validated grouped cases correctly classified.

High predictive ability of the GCE_3 model in the period of one year prior to bankruptcy or loss above equity disclosure has been broaden by testing the model predictive characteristics in a two year run. The model was tested on a subsample of 87 companies from the original sample whose financial statements were available. Results of the test indicate that the model is predicting correctly in 81,7% of cases what is lower than model predictive ability in one year period but still higher than minimum requested level of approximately 62,5%.
Model classification results were further analyzed in order to determine the prevalence of type 1 and type 2 errors. Type 1 error appears in the situations where model classify financially unstable company as a healthy one, while type 2 error appears in opposite situations. Manifestation of type 1 error in one year period prior to bankruptcy or loss above equity disclosure is 7,5% versus 1,9% of type 2 error appearance. The appearance of errors rises by rising the predictive period to two years. In two years period type 1 error occur in 33,3%, while type 2 error appearance is significantly lower and totals 2,4% of the cases analyzed. In classification errors analysis, the occurrences of type 1 errors are less eligible because misclassification of financially unstable company as healthy one mostly results in more significant costs than the costs in the case the financially stable company is characterized as unstable what is the case when type 2 errors appear. Consequently, GCE_3 model can be particularly suitable for financial instability prediction in one year run what is in compliance to going concern presumption, which has to be estimated at least for one year period. Although the classification accuracy is lower and appearance of type 1 error is relatively high in two year period prior to bankruptcy or loss above equity disclosure, GCE_3 model can still be useful, but some other techniques or models, as well as nonfinancial data are suggested to be used. Recent global financial crisis and the velocity of its spreading around the globe make financial instability prediction in longer run quite challenging and

liable to high risk. Despite the existence of many financial instability prediction models, professional judgment based on experience as well as intuition should be intensively used when deciding whether company is unstable or not.

The research performed emphasized the importance of solvency and liquidity ratios as well as ratio Total revenues/total expenses which is a type of profitability ratio. Cash flow ratios are not found to be statistically significant in discriminating financially stable from unstable companies. These findings are mostly in accordance with results of research performed among companies in developed countries where liquidity and solvency ratios were most commonly used independent variables.

Financial instability prediction model designed using the sample of Croatian companies can find broad application areas especially in transitional countries which Croatia is typical representative. GCE_3 model application is particularly emphasized on micro level although it can be useful instrument for predicting the financial instability on the level of economy as a whole. Micro aspects of GCE_3 model application include its usage by most of company's stakeholders. Creditors are interested in financial instability evaluation because they are willing to collect paying as well as to estimate the possibility of future cooperation with company. In this manner GCE_3 model can be very useful credit scoring model. Employees and unions are interested in financial stability prediction too because stable company's business activities in the future assure salaries. Practical model utilization can be useful for customers, existing and potentially new shareholders, company's management, as well as for accountants and auditors, analysts, academic and wide social public.

Broad areas of practical model application open some questions on its limitations and improvements that should be done in future research. Basic model limitation lays in the fact that model was derived from the financial data without taking into account nonfinancial information on companies' business characteristics. Aforementioned open the area for future research that can be done by including some selected nonfinancial variables in deriving the financial instability model. Future activities should be done in direction toward model validation by performing the test on hold out sample of companies i.e. sample of companies that is not part of sample used in model derivation.

Certain improvements could be done in defining the various degrees of company's financial stability. Namely, GCE_3 model is predicting only two degrees of financial stability – stable or unstable, while in real world there is quite long interval of stability within group of stable and unstable companies.

CONCLUSION

Business and legal environment in transitional countries is quite different from developed market economies. Although the market is characterized by same demand and supply forces, institutions and rules are not equal, as well as basic values in the society as a whole. In this sense, financial instability prediction is more challengeable in transitional countries so simply application of financial instability prediction models derived in developed countries is not appropriate.

Croatia represents quite good approximation of transitional country with many problems immanent to transitional environment. The research among Croatian companies performed in order to test the basic hypothesis that financial instability could be reasonably estimated in the short run (up to two years) by using the combination of liquidity, solvency, profitability and cash flow based ratios, resulted in deriving the model able to predict financial instability in the period of two years prior to instability circumstances appear. In model derivation statistical technique known as multiple discriminant analysis was used. Model emphasizes importance of solvency and liquidity ratios, ratio Total revenues/total expenses, while cash flow ratios were not found statistically significant.

Relevant quality coefficients of discriminant function and classification results indicate that the model is appropriate for financial instability prediction, especially in run of one year prior to manifestation of instability circumstances where it shows the 95,3% of classification accuracy. High classification accuracy is characterized with low type 2 and not significantly higher type 1 error appearance.

Financial instability model can find wide area of practical application what is particularly relevant in today financial crisis circumstances where finding financially stable partner is crucial to survive. Practical model's implementation should verify its diagnostic and prognostic ability and make a starting point for further research that will improve financial instability prediction in transitional countries.

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PREDVIĐANJE POSLOVNIH FINANCIJSKIH PROBLEMA - HRVATSKO ISKUSTVO

ABSTRACT

Stvarni razvoj u gospodarstvu, karakterizira globalne krize, ističe važnost predviđanja financijske nestabilnosti. Financijska nestabilnost u tranzicijskim zemljama često se predviđa korištenjem modela izvedenog pomoću podataka iz tvrtki koje posluju u razvijenim zemljama. Neka istraživanja su otkrila da je jednostavna primjena tih modela u različitim okolinama, kao tranzicijskim okolinama ne daje isti rezultat kao kad se primjenjuje u razvijenim zemljama. Dakle, novi model GCE3 je izveden pomoću podataka iz hrvatskih tvrtki. Novi model, provodi se pomoću višestruke diskriminacijske analize, uključuje šest nezavisnih varijabli koje se sastoje od solventnosti i omjera likvidnosti, kao i omjer Ukupni prihodi / ukupni rashodi. Analiza modela klasifikacije preciznosti zalaže se za mogućnosti njihove praktične uporabe u širem području svakodnevnih poslovnih aktivnosti što je vrlo koristan alat za predviđanje financijske nestabilnosti.

Ključne riječi*: Financijska nestabilnost, model za predviđanje financijske nestabilnosti, višestruka diskriminacijska analiza, Hrvatsko iskustvo*

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STOCK MARKET AND INVESTMENT IN TURKEY: EVIDENCE FROM COINTEGRATION AND CAUSALITY TESTS

ABSTRACT

The objective of this paper is to investigate the causal effect of business investments on stock returns in Turkey for the period following the liberalization of capital flows (1987:01-2006:03). According to results of the cointegration tests and error correction model (ECM) causality is found to run from stock returns to business investments and not vice versa.

Key words: *Granger-causality, investments, stock market*

JEL classification: F31, F37

I. INTRODUCTION

The liberalization of the Turkish economy began with the implementation of a IMF-prompted structural adjustment program in 1980, which was followed by the re-opening of the Istanbul Stock Exchange in 1986. Especially, with the liberalization of capital account in 1989, the Turkish financial markets began to attract inflows of hot money, reversals of which have become a dominant motive in policy-making. The Turkish economy has recently been growing at a rapid rate. It experienced growth rate of 8.9 and 7.4 per cent for the years 2004 and 2005 respectively. Stock market was also booming, stock prices increased by 59.3% in 2005.

In recent times, the Turkish economy has experienced several financial crisis and the government has had only limited success dealing with these problems. A major debt crisis developed during 1977 and 1980. Government response backed by the IMF was to implement a structural adjustment program known as “Jan. 24 decisions”. In 1986 the government began to issue Treasury Bills and Government Bonds and borrowed money in international markets. The liberalization of capital account in 1989 attracted capital inflows that led to the appreciation of lira by as much as 22%. This resulted in increased balance of trade deficits. By the end of 1993 public sector deficits and debt as well as interest rates reached record high levels. The government’s response was to simply impose the interest rate ceilings. Thus, the

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government had short-term perspective and disregarded the long-term consuquences. In 1994, international credit rating agencies lowered rating on Turkish sovereign debt. This again triggered a panic in financial markets at home and abroad. By April 1994, the lira depreciated by more that 50% against the USD. In July 1998, government launched another disinflation program under the guidance of IMF that also met limited success. By 1998, yet another foreign exchange crisis, the Russian debt crisis, the general election in 1999 and natural calamities(2 earthquakes) were the contributing factors. The central bank calmed markets by providing liquidity, but the foreign exchange situation worsened and interest rates soared. A system of crawling-peg regime was adopted by the central bank to deal with the exchange rate problem that met only limited success. Capital outflow continued at a very high speed and by the end of 2000, it appeared that the system was near collapse. However, the IMF bailed it out granting a loan of 7.5 billion USD. By February 2001, it became clear that the crawling-peg system could not survive and the central bank was forced to abandon it. The Turkish economy switched to a a floating exchange rate system. This resulted in a high devaluation of lira. The IMF again came to rescue when Turkey secured a 15 billion USD from the IMF. However, a positive outcome of the new and intensified IMF-backed adjustment program was that it granted the Turkish Central Bank independence from the political intervention. While it can be argued that the Turkish lira is still being subjected to speculative attacks, it appears that the central bank will stand ready to deal with such situation as evidenced by the mini crisis of 2006.

It will be interesting to examine the role of stock prices on investment spending in Turkish economy. Several empirical studies have attempted to investigate the relationship between stock prices and economic performance in many countries. However, the case of Turkey hasn't been examined. The objective of this paper is to focus on the role of stock market in business investment decisions in the case of Turkey in its post-financial liberalization period and to investigate the causal effect of business investments on stock returns in Turkey in the period between 1987:01 and 2006:03.

The rest of the study is structured as follows. Section II reviews the literature. Section III introduces the data and methodology. Section IV presents the empirical results, and Section V points out the conclusions that emerge from the study.

II. LİTERATURE REVİEW

There exists a rich literature on stock market and the economy. In an early attempt, Fama (1981) and Fischer and Merton (1984) conducted studies based on the assumption that asset prices are forward looking. They reflect earnings and dividends expectations, and thus help predict future economic activities in an economy. They found that stock prices are leading indicators of economic growth, and claimed that stock prices led investment and consumption in the U.S. economy. Using time series data, subsequent studies (Schwert, 1990; Barro, 1990; Cochrane, 1991; Morck et Al., 1990) reach similar conclusions. Chirinko (1993), however, uses firm level data in his analysis and finds support for Fischer and Merton (1984) and for earlier studies regarding the role of stock prices. A recent study, Aylward and Glen (2000), however, point out that all markets do not have the same predictive ability. Their study includes data on 23 countries, of which 15 are emerging market countries. The results prove stronger for the industrial countries compared to the emerging markets. However, their over all conclusion is that a 10% rise in stock prices is generally followed by GDP increases of 0.5 to 1.0 percent in the following year.

Some recent studies, on the other hand, have cast doubt on the importance of stock prices as a leading indicator. Binswagner (2000) finds evidence that the strong relationship between stock prices and real economic activities in the U.S. has disappeared since the 1980s. Lamont

(2000) find a significant and negative contemporaneous correlation between stock prices and investment. He suggests that the negative covariation can be explained by looking at lags between the time a decision to invest is made and the actual investment spending takes place. In a subsequent study, Binswanger (2004) extends analysis to other countries and finds evidence suggesting that similar breakdowns have occurred in the aggregate European economy as well as in Japan. He maintains that, since the 1980s, stock markets have not led real activity and that this conclusion holds even when he excludes the 1987 episode in world markets. Laopodis and Sawhney (2002), using cointegration and error correction models, argue that prior studies have looked at the stock prices mainly as leading indicators, and have not addressed the issue of causality. For the U.S. economy they concluded that contrary to conventional wisdom, it is Main Street that affects the Wall Street. In other words, it is the economic growth that determines stock prices in the U.S. and not the other way around. Most of these studies as noted above have generally focused on the relationship between stock markets and macroeconomic variables. Their major objective is searching for the predictive ability of stock prices. In case such a relationship exists, it would provide invaluable information in making macroeconomic forecasts.

Stock prices have been found as better indicator of investment spending than either consumption or economic growth. However, only a few studies have attempted to explain the role of stock prices in predicting investment. As noted above, Fischer and Merton (1984) claim that compared to other financial variables, stock prices are the best indicator of fixed business investment. They further argue that the stock market is a reliable and forward looking asset market and therefore its behavior should give strong signals to managers regarding investment decisions. They strongly believe that managers simply need to follow stock market valuations in making decisions on investment spending. They contend that rising stock market valuations should encourage managers to undertake more investment so as to equate the marginal product of investment to the market rate of return. On the other hand, Blanchard et al., strongly disagree with Fischer and Merton's hypothesis. In a detailed study, Blanchard et al. (1993) examine the role of fundamentals compared to stock market valuations for the U.S. economy. They construct a long time series data for fundamentals and compare their relative strength with that of stock market valuations. Their empirical findings suggest that fundamentals play a very important role in business decisions regarding investment. Stock market variations play only a minor role. Their quantitative estimates suggest that while one percent increase in market valuation increases investment spending by 0.45 percent, the same percent change in fundamentals increases investment by as much as two percent. Thus, since managers are primarily interested in the long run interest of shareholders in increasing value of the firm, they only need to consider fundamentals and do not need to consider stock market developments in investment decision making. Therefore, Blanchard et al. reject the hypothesis that managers should simply follow stock market valuations when making investment decisions.

III. DATA AND METHODOLOGY

DATA

Data used in the present study is quarterly, spans the period 1987:01-2007:03 as data series were available after this date, immediately after the establishment of the Istanbul Stock Exchange (ISE) in 1986. The series were obtained from the IMF International Financial Statistics. Business investment (INV) is represented by Gross Fixed Capital Formation and stock prices (STK) were represented by ISE-National 100. Following the existing literature, series were transformed into natural logs to induce stationarity in the variance-covariance

matrix (Chang *et al*, 2001). Tests in the present paper have been carried out in E-VIEWS 5.1, Stata 9 and Microfit 4.0.

METHODOLOGY

To examine the long-run relationship between stock prices and real business investment, the standard technique of co-integration is employed. In particular, Johansen (1988, 1991) and Johansen and Juselius (1990) bivariate cointegration tests are applied. This methodology is extensively discussed in the literature and therefore has not been discussed here. Please see the above references for details. To implement the Johansen test we first examine the time series properties of the said variables. The Augmented Dickey Fuller (ADF) tests to find out the order of integration of both the series. If these series are found to be of the same order of integration then we can apply the cointegration tests.

The existence of cointegration relationships indicates that there are long-run relationships among the variables, and thereby Granger causality among them in at least one direction. The ECM was introduced by Sargan (1964), and later popularized by Engle and Granger (1987). It is used for correcting disequilibrium and testing for long and short run causality among cointegrated variables. The ECM used in this paper is specifed as follows:

$$\Delta STK_t = a_0 + \sum_{i=1}^{m} a_{1i} \Delta STK_{t-i} + \sum_{i=1}^{n} a_{2i} \Delta INV_{t-i} + \lambda ECM_{t-1} \quad (1)$$

$$\Delta INV_t = b_0 + \sum_{i=1}^{m} b_{1i} \Delta INV_{t-i} + \sum_{i=1}^{n} b_{2i} \Delta STK_{t-i} + \theta ECM_{t-1} \quad (2)$$

where Δ is the difference operator, m and n are the numbers of lags, *a* and *b* are parameters to be estimated and, λ and θ are the error correction term, which is derived from the long run cointegration relationship. In each equation, change in the endogenous variable is caused not only by their lags, but also by the previous period's disequilibrium in level. Given such a specification, the presence of short and long-run causality could be tested. In Equation 1, *INV* causes *STK* if either λ is statistically significant (the long-run causality) or the all *a* are jointly significant (short-run causality). Similarly, in Equation 2, *STK* causes *INV* if either θ is statistically significant (the long-run causality) or all *b* are jointly significant (short-run causality).

As a test of robustness, we also use the ARDL bounds testing procedure proposed by Pesaran et al (2001) to test for the existence of a linear long-run relationship between the series. The ARDL model takes into account a one-period lagged error correction term, which does not have restricted error corrections. Hence, the ARDL approach involves estimating the following Unrestricted Error Correction Model (UECM):

$$\Delta Y_t = a_{0Y} + \sum_{i=1}^{p} b_{iY}\ \Delta Y_{t-i} + \sum_{i=1}^{p} c_{iY}\ \Delta X_{t-i} + \sigma_{1Y}\ Y_{t-1} + \sigma_{2Y}\ X_{t-i} + \varepsilon_{1t} \quad (3)$$

$$\Delta X_t = a_{0X} + \sum_{i=1}^{p} b_{iX}\ \Delta X_{t-i} + \sum_{i=1}^{p} c_{iX}\ \Delta Y_{t-i} + \omega_{1X}\ X_{t-1} + \omega_{2X}\ Y_{t-i} + \varepsilon_{2t} \quad (4)$$

where Δ is the difference operator, p represents the lag structure, Y_t and X_t are the underlying variables, and ε_{1t} and ε_{2t} are serially independent random errors with mean zero and finite covariance matrix. In Equation 3, where ΔY_t is the dependent variable, the null hypothesis is

H_0: $\sigma_{1Y} = \sigma_{2Y} = 0$, i.e. there exists no long-run equilibrium relationship, and the alternative hypothesis is H_1: $\sigma_{1Y} \neq 0$, $\sigma_{2Y} \neq 0$. Similarly, in Equation 4, where ΔX_t is the dependent variable, the null hypothesis is H_0: $\omega_{1Y} = \omega_{2Y} = 0$, i.e. there exists no long-run equilibrium relationship, and the alternative hypothesis is H_1: $\omega_{1Y} \neq 0$, $\omega_{2Y} \neq 0$ (Pesaran *et al*. 2001).

These hypotheses are tested using the *F*-test and *t*-test. Nevertheless, these tests have non-standard distributions that depend on the sample size, the inclusion of intercept and trend variable in the equation, and the number of regressors. Pesaran *et al*. (2001) discuss five cases with different restrictions on the trends and intercepts. The present analysis will consider three of these cases. The estimated ARDL test statistics are compared to two asymptotic critical values reported in Pesaran *et al*. (2001, pp. 300-304) rather than the conventional critical values. If the test statistic is above an upper critical value, the null hypothesis of no long-run relationship can be rejected regardless of the orders of integration of the underlying variables. The opposite is the case if the test statistic falls below a lower critical value. If the sample test statistic falls between these two bounds, the result is inconclusive.

Groenewold and Tang (2007) suggest that Granger causality tests are applicable regardless of the orders of integration of the underlying variables if it has been established that there exists a long-run equilibrium relationship between the underlying series. However, in the presence of a long-run relationship, Granger causality test require the inclusion of a lagged error correction term within a vector error correction model (VECM) in order to capture the short-run deviations of the series from their long-run equilibrium relationship (Narayan and Smyth, 2004). Accordingly, Granger- causality analysis within the VECM involves estimating the following models:

$$\Delta Y_t = \alpha_0 + \psi_{11}^{p}(L)\Delta Y_t + \psi_{12}^{q}(L)\Delta X_t + \delta_1 ECT_{t-1} + \mu_{1t} \quad (5)$$

$$\Delta X_t = \alpha_1 + \psi_{21}^{p}(L)\Delta X_t + \psi_{22}^{q}(L)\Delta Y_t + \delta_2 ECT_{t-1} + \mu_{2t} \quad (6)$$

where $\psi_{ij}^{p}(L) = \sum_{n=1}^{P_{ij}} \psi_{ijn} L^1$ and $\psi_{ij}^{q}(L) = \sum_{n=1}^{Q_{ij}} \psi_{ijn} L^1$ (See Narayan and Smyth, 2004, p.290).

In the above representations, L denotes the lag operator, which implies that $(L)\Delta Z_t = \Delta Z_{t-1}$. ECT_{t-1} denotes the one-period lagged error correction term, and μ_{1t} and μ_{2t} represent serially independent random errors with mean zero and finite covariance matrix (Narayan and Smyth, 2004). In Equation 5, ΔY_t is regressed on its own lagged values and the lagged values of ΔX_t, whereas the opposite is the case in Equation 6. In both equations, ECT_{t-1} captures the speed of adjustment of the variables in response to a deviation from their long-run equilibrium path. The significance of the differenced explanatory variables based on *F*-statistics indicates the existence of short-term causal effects, whereas, the significance of ECT_{t-1} based on *t*-statistics indicates the existence of a long-term relationship

IV. EMPIRICAL RESULTS

TESTS FOR UNIT ROOTS AND STRUCTURAL BREAKS

Before testing whether the series are cointegrated, we investigated the order of integration of each series by means of the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests. Table 1 summarizes the results of the ADF unit root test. Perron (1989) argues that in the presence of structural break, the power of conventional unit root tests to reject the unit

root hypothesis decreases. In our case, ADF statistics may be misleading since several series have been subject to structural breaks over the sample period. While the presence of a long run relationship between variables remains critical to valid estimation and inference, Pesaran et al 2001 suggest that ARDL remains valid regardless of the order of integration of the explanatory variables. The ARDL methodology thus has the advantage of not requiring a precise identification of the order of integration of the underlying data. The ARDL approach to cointegration does not require the pre-testing of the variables, included in the model, for unit root unlike other techniques such as the Johansen approach (Pesaran *et al.*, 2001). However, in this paper we test for unit roots to eliminate the possibility of I(2) variables1. In the presence of such variables the computed F-statistics provided by Pesaran *et al*. (2001) are no more valid because they are based on the assumption that the variables are I(0) or I(1). Consequently, the implementation of unit root tests in the ARDL procedure is necessary to ensure that none of the variables is integrated of order 2 or beyond.

Table 1

ADF and PP Tests for Unit Root

Statistics (Levels)	INV	Lag	STK	Lag	Statistics (First Differences)	INV	Lag	STK	Lag
τ_T (ADF)	-2.93	(4)	-0.59	(0)	τ_T (ADF)	-7.13*	(6)	-6.50*	(1)
τ_μ (ADF)	-1.11	(7)	1.43	(0)	τ_μ (ADF)	-7.15*	(6)	-6.75*	(0)
τ (ADF)	-0.84	(7)	2.33**	(0)	τ (ADF)	-7.15*	(6)	-6.52*	(0)
τ_T (PP)	-14.56*	(13)	-0.50	(6)	τ_T (PP)	-33.73*	(12)	-6.86*	(14)
τ_μ (PP)	-13.46*	(14)	1.82	(9)	τ_μ (PP)	-34.20*	(12)	-6.60*	(8)
τ (PP)	-7.89*	(2)	2.89*	(9)	τ (PP)	-34.50*	(12)	-6.49*	(5)

Notes: τ_T represents the most general model with a drift and trend; τ_μ is the model with a drift and without trend; τ is the most restricted model without a drift and trend. Numbers in brackets are lag lengths used in ADF test (as determined by AIC) to remove serial correlation in the residuals. When using PP test, numbers in brackets represent Newey-West Bandwith (as determined by Bartlett-Kernel). *, ** and *** denote rejection of the null hypothesis at the 1%, 5% and 10% levels respectively.

As evident from the table, INV seems to be non-stationary in ADF test at level but the PP test suggests the opposite. A well-known weakness of the ADF and PP unit root test is their potential confusion of structural breaks in the series as evidence of non-stationarity. In other words, they may fail to reject the unit root hypothesis if the series have a structural break[4]. In other words, for the series that are found to be *I*(1), there may be a possibility that they are in fact stationary around the structural break(s), *I*(0), but are erroneously classified as *I*(1). Perron (1989) shows that failure to allow for an existing break leads to a bias that reduces the ability to reject a false unit root null hypothesis. To overcome this, the author proposes

[4] Perron (1989) argues that the power to reject unit root decreases when the stationary alternative is true and a structural break is ignored.

allowing for a known or exogenous structural break in the Augmented Dickey-Fuller (ADF) tests. Following this development, many authors, including Zivot and Andrews (1992) and Perron (1997), proposed determining the break point 'endogenously' from the data. However, Enders (2004) argues that Perron-Vogelsang (1992) unit root tests are more appropriate "if the date of the break is uncertain". The Clemente-Montanes-Reyes (1998) unit root test allows for two structural breaks in the mean of the series. In these tests, the null hypothesis is that the series has a unit root with structural break(s) against the alternative hypothesis that they are stationary with break(s). The null hypothesis is rejected if the calculated *t* statistic is greater in absolute values than the critical value. The advantage of these tests is that they do not require an *a priori* knowledge of the structural break dates. Clemente-Montanes-Reyes unit root tests offer two models: (1) an additive outliers (AO) model, which captures a sudden change in the mean of a series; and (2) an innovational outliers (IO) model, which allows for a gradual shift in the mean of the series. In this thesis, both models will be used. Nonetheless, the AO model seems to be more appropriate for the variables as they all seem to have sudden structural changes rather than gradual shifts. According to Baum (2004), if the estimates of the Clemente-Montanes-Reyes unit root tests provide evidence of significant additive or innovational outliers in the time series, the results derived from ADF and PP tests are doubtful, as this is evidence that the model excluding structural breaks is misspecified. Therefore, in applying unit root tests in time series that exhibit structural breaks, only the results from the Clemente-Montanes-Reyes unit root tests are considered if the two structural breaks indicated by the respective tests are statistically significant at the 5% level. On the other hand, if the results of the Clemente-Montanes-Reyes unit root tests show no evidence of two significant breaks in the series, the results from the Perron–Vogelsang unit root tests are considered. If these tests show no evidence of a structural break, the ADF and PP tests can be considered. As evident from Table 2, the structural breaks suggested by Clemente-Montanes-Reyes unit root tests are significant at 5% level of significance.

Table 2

Clemente-Montanes-Reyes Unit Root Tests with Two Structural Breaks

	Innovative Outliers				Additive Outliers			
	t-stat	TB1	TB2	Decision	t-stat	TB1	TB2	Decision
STK	-4.86	1994:02*	1996:03*	*I*(1)	-4.89	2000:02*	1997:01*	*I*(1)
INV	-3.53	1994:03*	1997:02*	*I*(1)	-4.18	1994:04*	1997:01*	*I*(1)

*Notes: TB1 and TB2 denote the structural break dates suggested by the tests. * denotes rejection of the null hypothesis of a unit root at 5% level. * also indicates that the structural break suggested by the respective test is significant at 5% level. Tests have been performed using Stata 9.*

In light of the contradicting results of the two tests in case of INV, we opt for ARDL approach in addition to the traditional Johansen cointegration approach. In the case where the orders of integration of the underlying variables are not known with certainty, ARDL test will provide more reliable results.

RESULTS OF THE JOHANSEN COINTEGRATION TEST

Table 3 shows the results of the Johansen conintegration tests. The likelihood ratio tests show that the null hypothesis of absence of cointegrating relation ($r = 0$) can be rejected at 5% level of significance, and that the null hypothesis of existence of at most one cointegrating relation ($r \leq 1$) can not be rejected at 5% level of significance. Thus, we can conclude that STK and INV are cointegrated. That is, there is a long-run relationship between STK and INV for Turkey.

Table 3

Results of Johansen's Cointegration Test

Null Hypothesis	Alternative Hypothesis	Trace Statistics	Critical Value (.05)
r=0	r=1	18.222	15.494
r≤1	r=2	0.372	3.841

RESULTS OF THE ARDL BOUNDS TESTING PROCEDURE

In order to check the robustness of the results, we use the bounds testing procedure proposed by Pesaran, Shin and Smith (2001) to test for the existence of a linear longrun relationship The choice of this test is based on the following considerations. The results of the ARDL estimation remains valid irrespective of the order of integration of the explanatory variables. The ARDL methodology thus has an advantage over co-integration techniques which require the underlying series to be both I(1). the bound test does not impose restrictive assumptions that all the variables under study must be integrated of the same order. Its asymptotic distribution for the Fstatistic is non-standard under the null hypothesis of no cointegration relationship between the examined variables, irrespective whether the explanatory variables are purely I(0) or I(1), or mutually cointegrated. One interesting feature of the ARDL model is that it takes into account the error correction term in its lagged period. The analysis of error corrections and autoregressive lags fully covers both the long-run and short-run relationships of the variables tested. As the error correction term in the ARDL does not have restricted error corrections, the ARDL is an Unrestricted Error Correction Model.

Table 4 reports the critical bounds reported in Pesaran *et al*. (2001) for the case where the number of regressors in the ARDL models (*k*) is 2. In the table, F_η denotes the critical *F*-statistic of the model with unrestricted intercept and no trend; F_θ denotes the critical *F*-statistic of the model with unrestricted intercept and restricted trend; and F_π denotes the critical *F*-statistic of the model with unrestricted intercept and trend. On the other hand, t_η denotes the critical *t*-statistic of the model with unrestricted intercept and no trend and t_π represent the critical *t*-statistics of the model with unrestricted intercept and trend.

Table 4

Critical Values for ARDL Modeling Approach

	0.10		0.05		0.01	
k=2	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
F_{IV}	3.38	4.02	3.88	4.61	4.99	5.85
F_V	4.19	5.06	4.87	5.85	6.34	7.52
F_{III}	3.17	4.14	3.79	4.85	5.15	6.36
t_V	-3.13	-3.63	-3.41	-3.95	-3.96	-4.53
t_{III}	-2.57	-3.21	-2.86	-3.53	-3.43	-4.10

Source: Pesaran et al. (2001): pp. 300-301 for F-statistics and pp. 303-304 for t ratios.

Note: k is the number of regressors for dependent variable in ARDL models, FIV represents the F statistic of the model with unrestricted intercept and restricted trend, FV represents the F statistic of the model with unrestricted intercept and trend, and FIII represents the F statistic

of the model with unrestricted intercept and no trend. tV and tIII are the t ratios for testing $\sigma_{1Y} = 0$ and $\varpi_{1Y} = 0$ respectively with and without deterministic linear trend.

The results of Equation 3 and Equation 4 for each of the hypothesized relationships are reported in Table 5. The representation of the tested hypotheses on the table is such that F_{STK} (STK|INV) denotes the null hypothesis H_0: $\sigma_{1STK} = \sigma_{2STK} = 0$, where *INV* is a long-run forcing variable for STK, whereas, F_{INV} (INV|STK) represents the opposite case where the null hypothesis is H_0: $\omega_{1INV} = \omega_{2INV} = 0$, i.e. *STK* is a long-run forcing variable for *INV*. In each case, the optimum lag length (*p*) selection is based on minimizing Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) (See Atkins and Serletis, 2003). The models are estimated through ordinary least squares regression (OLS).

Table 5

Bounds Test for Cointegration

	With Deterministic Trends				Without Deterministic Trend		Conclusion
Variables	F_{IV}	F_V	t_V		F_{III}	t_{III}	H_o
F_{STK} (STK/INV)	2.80[a]	2.55[a]	-1.16[a]		2.32[a]	0.60[a]	Accept
F_{INV} (INV/STK)	38.58[c]	31.80[c]	-11.03[c]		38.66[c]	-11.11[c]	Reject

Diagnosic tests					
Model	χ^2_{LM}	χ^2_{RESET}	χ^2_{NORM}	χ^2_{HETER}	
F_{IV}	13.689	2.514	1.236	0.030	
F_V	25.123	0.643	2.716	0.339	
F_{III}	9.106	0.918	1.413	2.052	
t_V	24.086	0.926	3.365	0.421	
t_{III}	18.943	1.708	0.175	2.272	

Note: Akaike Information Criterion (AIC) and Schwartz Criteria (SC) were used to select the number of lags required in the co-integration test. Both gave the same level of lag order, VAR= 1. χ^2_{LM}, χ^2_{RESET}, χ^2_{NORM}, *and* χ^2_{HETER} *are, respectively, Lagrange multiplier statistics for tests of residual serial correlation, Ramsey's RESET test using the square of the fitted values for functional form, normality based on a test of skewness and kurtosis of residuals, and heteroscedasticity based on the regression of squared residuals on squared fitted values. * denotes significance at 5% level. Tests have been carried out using Microfit 4.0.*

RESULTS OF THE ERROR CORRECTİON MODEL

Results presented so far suggest the rejection of the null hypothesis of no long-run relationship between STK and INV. **Next,** the error correction modeling (ECM) is employed to investigate both short-run and long-run causality. In the ECM, first difference of each endogenous variable (STK and INV) was regressed on a period lag of the cointegrating equation and lagged first differences of all the endogenous variables in the system, as shown in Equation 1 and Equation 2. AIC, SBC and Likelihood Ratio (LR) information criteria are utilized to select the optimum lag length of Vector Autoregressive (VAR). Since the objective is to select the optimal order for the VAR, it is important that at this stage we select high enough order to ensure that the optimal order will not exceed it. Four VAR (p), p=0, 1, 2, 3 models have been estimated. However, AIC and SBC criteria implied that the max order is 2

for INV and max order is 1 for STK. The results of error correction model are presented in Table 6

Table 6

Results of Vector Error Correction Model

Dependent variable	Lag Length	F-Staticits	t-stats for ECM
ΔSTK	m=1, n=1	0.671688	-0.98231
ΔINV	m=2, n=2	17.3141*	-2.9638***
Note: *** represent 1 percent level of significance			

According to results of the Table 6, short-run causality is found to run from STK to INV and no reverse short-run causality exits. That is, there is unidirectional short-run Granger-causality from STK to INV. The coefficient of the ECM is found to be insignificant in Equation 1 and significant in Equation 2, which indicates that there exists unidirectional Granger causality between INV and STK in long run where causality runs from STK to INV.

CONCLUSION

This paper attempted to examine the relationship between business investment spending and stock prices in Turkey. The study uses data on stock prices since the inception of the Istanbul Stock Exchange in 1986. It is to be noted that while there is a plethora of existing studies that investigate the stock market behaviour as a forecaster of macroeconomic variables, very few studies exist that specifically examine the relation between stock market and investment decision making. This study fills in this gap and contributes to the literature looking at the case of an emerging economy.

The results of this study suggest that there is a unidirectional causality running form stock prices to investment spending. Stock prices cause investments but the reverse is not true in the Turkish economy. Hence, our findings fail to lend support in favour of the hypothesis put forward by Blanchard et al. (1993) that fundamentals play a major role in business investment decisions in Turkey and lends support to the hypothesis suggested by Fischer and Merton (1984).Business investment decision makers can benefit by including stock market developments in their decision making regarding investment plans.

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BURZA I ULAGANJA U TURSKOJ: DOKAZI IZ KOINTEGRACIJE I UZROČNOSTI TESTIRANJA

ABSTRACT

Cilj ovog rada je istražiti uzročno djelovanje poslovnih ulaganja u dionice u Turskoj za razdoblje nakon liberalizacije kapitalnih tokova (1987:01-2006:03). Prema rezultatima kointegracije testova i modela ispravljanja pogrešaka (ECM) uzročnost je pronađena da se kreće od dionica i vraća na poslovna ulaganja, a ne obrnuto.

Ključne riječi: *Granger-uzročnosti, investicija, burze*

JEL klasifikacija: F31, F37

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BETA COEFFICIENT ANALYSIS ON THE CAPITAL MARKET OF BOSNIA AND HERZEGOVINA

ABSTRACT

In this paper authors research: how changes on the capital markets (developed financial markets and financial markets of transitional countries) determine investor's decision about the scope of international portfolio diversification, in other words about the scope of reduction of system risks, and whether beta coefficient movements on the financial market of BandH (beta coefficient estimation on BandH financial market are made) can be an indicator for investors in which stocks to invest.

Key words: *correlation, stock exchange indexes, prices, shares, beta coefficient, capital market*

INTRODUCTION

Goal of the paper is to determine (non)existence of correlation between S&P 500 index, as one of the main indicators of capital market movements, and indexes which are established on the stock exchanges in Bosnia and Herzegovina, Serbia, Montenegro, Slovenia and Croatia, and also to estimate the beta coefficient of selected issuers on the capital market of BandH. In accordance with that, two basic hypotheses have been established.

- There is no significant correlation between S&P 500 index and indexes which are established on the stock exchanges in Bosnia and Herzegovina, Serbia, Montenegro, Slovenia and Croatia.
- Taking into account the existing stock exchange indexes which show the changes on capital market (SASX-10, BIFX, BIRS and FIRS) it is possible to estimate beta coefficient on capital market in BandH.

Four issuers sample has been chosen for the testing of beta coefficient on the free markets of Federation of Bosnia and Herzegovina and Republic of Srpska. Two of these issuers are the part of stock exchange index of these markets, and two are not. On investment funds markets of Federation of Bosnia and Herzegovina and Republic of Srpska, the sample has been made of two issuers which are the part of relating stock exchange indexes. Testing could have been realised for all other issuers, however, taking into concern the paper goal, this sample is enough representative for making relevant conclusions. In accordance with the basic theoretical-methodological postulates of beta coefficient estimation, in this research, particular stock exchange indexes have been treated as market portfolio. Research limitations are as follows:

- Short financial time series.

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- As for beta coefficient estimation, a dependent variable (y_i) refers to stock price time series of the issuer, while an explanatory variable (x_i) refers to index time series, meeting the following criteria:

$$(x_i, y_i) = \begin{cases} y_i > 0 \Rightarrow estimation \\ y_i = 0 \Rightarrow data\ is\ leftover \end{cases}.$$

This condition is rather necessary due to the phenomenon of asynchronous trading and low liquidity on examined capital markets.

1. EXAMINING CORRELATIONS OF CHANGES OF STOCK EXCHANGE INDEXES: S&P 500, BELEX, MBI, SASX-10, BIRS, CROBEX, SBI20, MOSTE

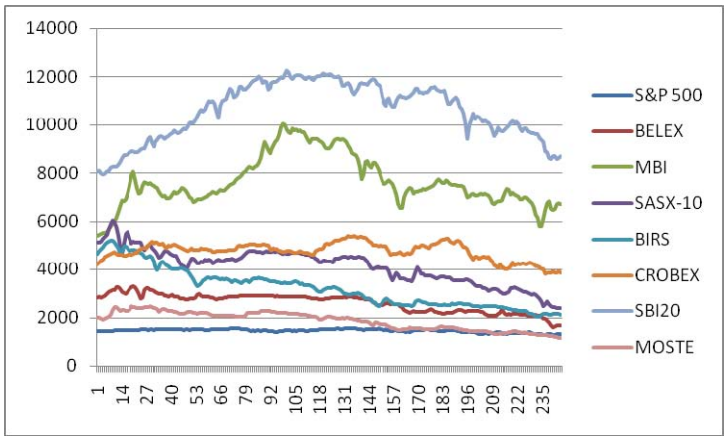
This research includes the eight stock exchange indexes, one of them (S&P 500) is treated as the indicator of changes on the world capital market and the remaining seven are the indicators of changes on not so developed capital markets (Serbia - BELEX, Montenegro - MOSTE, Bosnia and Herzegovina (Federation of BandH – SASX-10 and Republic of Srpska - BIRS), Croatia – CROBEX, Macedonia – MBI, Slovenia – SBI20).

1.1. PRE-ESTIMATING ANALYSIS

Since the time series graphical presentation ensures preliminary classification of the same, our first step will be graphical presentation of time series which will be the subject of research in this paper[4]. It is important to emphasise that the observed time series are annual time series for the period from 2nd April 2007. to 2nd April 2008. or 235 days of trading.

Graph 1.1

Changes of stock exchange indexes for the period from 2nd April 2007. to 2nd April 2008.- Comparative presentation



If a trend is noticed in a time series, it is not difficult to conclude that the serie is nonstationary, and in that case it is necessary to differentiate the serie in order to achieve stationarity. Graph 1.1 presents complex index value changes and non-existence of any kind of stationarity can be easily

[4] An pasan, real time series value of all analyzed indexes (as well as the share prices of selected issuers which are analyzed in the second and the third section of this paper) are available at http://www.sase.ba, http://www.blberza.com, http://www.nyse.com, http://www.transfer-biro.hr, http://www.ljse.si, http://www.montenegroberza.com, http://www.mse.org.mk, http://www.belex.co.yo, http://www.zse.hr

noticed. Therefore, equivalent transformations - daily yields[5], are used in the process of modelling instead of original data of index values.

It is possible to determine whether it is a stationary or non-stationary time serie just on the basis of graphical presentation of the time serie. However, autocorrelation (ACF) and partial autocorrelation (PACF) and appropriate test[6] are used in order to clear any doubts concerning truth of the (non)stationary statement. The first test which is possible to use for this purpose is Ljung-Box test, which is used for testing the following hypotheses: H_0: coefficients of autocorrelation processes equal 0 and H_1: coefficients of autocorrelation processes differ from 0. Zero hypothesis is accepted if *p*-values are higher than the level of significance, $(p \geq \alpha)$. Based on examining (partial) autocorrelation function, using Ljung-Box test, with significance of 5%, following hypotheses were confirmed: BELEX - H_1, BIRS - H_1, CROBEX - H_0[7], MBI - H_1, MOSTE - H_1, SASX-10- H_1, SBI20- H_1, S&P 500 – H_0.

"Dominance" of alternative hypothesis, H_1[8], about the existence of autocorrelation established with presented results, is not unexpected. It can be generally said that this phenomena is the consequence of the following factors[9]:

- *Occasional trading with particular securities*. Securities of low capital issuers are not so often the matter of trading as the securities of high capital issuers. Therefore, new information reflect first on the security prices of high capital issuers, and only later new information influence the security prices of low capital issuers. This time difference can cause positive correlation of security prices movements.
- *Trading according to need*. This way of trading refers primarily to trading in order to achieve liquidity. Therefore, this kind of trading is not initiated on information.
- *Fast growth of transactional markets*. Developing economies increase rapidly, so autocorrelation of prices on capital markets can be caused as the result of economical growth.

1.2 ESTIMATIVE ANALYSIS

Correlation matrix, which presents the correlation of stock exchange daily yields included in this research, is presented in the following table.

[5] More about the process of original data transformation into time series of yields see: GARCH: Toolbox User's Guide, The Math Works, Inc., p. 1-8, or http://www.mathworks.com

[6] Autocorrelation test is frequently used in case of examining market efficiency; more precisely weak forms of efficiency. More about this, see: Reilly, Brown (1997), p.209-250, and Cuthberston (1996), p.116-151.

[7] As it can be seen, hypothesis H_1 is confirmed up to the 7th lag.

[8] For example, hypothesis H_1 is confirmed in the case of stock exchange indexes: SASX-10, FIRS and ERS10. More about this see: Okičić (2007), p. 109-170.

[9] Adapted according to Deželan, 1996, p. 81; and Žiković 2005, p. 76.

Table 1.1

Daily yields correlation matrix[10]

	BELEX	*BIRS*	*CROBEX*	*MBI*	*MOSTE*	*SASX-10*	*SBI20*	*S&P 500*
BELEX	*1*	*0,018*	*0,226***	*0,067*	*0,198***	*0,155**	*0,086*	*0,074*
BIRS		*1*	*-0,001*	*-0,059*	*-0,025*	*0,449***	*0,106*	*-0,049*
CROBEX			*1*	*0,119*	*0,254***	*0,098*	*0,236***	*0,300***
MBI				*1*	*0,233***	*-0,016*	*0,039*	*-0,019*
MOSTE					*1*	*0,087*	*0,029*	*0,133*
SASX-10						*1*	*0,153**	*-0,100*
SBI20							*1*	*0,235***
S&P 500								*1*

** Correlation is statistically significantly different from zero when α=0,05 (two-way test)*

** * Correlation is statistically significantly different from zero when α=0,01 (two-way test)*

Summa summarum, on the basis of the results presented in Table 1.1, it can be concluded that there is no significant correlation in changes of stock exchange index S&P 500 and indexes: SASX-10, MBI, MOSTE, BELEX and BIRS. However, for the period from 2nd April 2007. and 2nd April 2008. there is a significant correlation between S&P500 index and the indexes: CROBEX and SBI20. It is interesting that there is a significant correlation among: CROBEX, BELEX and MOSTE, and also significant correlation among: SASX-10, BELEX, BIRS and SBI20. It should be emphasised that there is also a significant correlation between MBI and MOSTE.

1.3 POST-ESTIMATIVE ANALYSES

In favour of the above mentioned statements about the correlation (in)significancy between analysed stock exchange indexes goes estimated determination coefficient (R^2), taking into account that the variable S&P500 is treated as independent and some previously analysed indexes as depended variables.

Table 1.2.

Estimation of intercept, slope (beta coefficient) and coefficient of determination for the case of observed variable: S&P500

No.	*Stock exchange index*	α	β	R^2
1.	*BELEX*	$-2{,}77\cdot10^{-3}$	*0,116*	*0,005*
2.	*BIRS*	$-4{,}39\cdot10^{-3}$	$-6{,}56\cdot10^{-2}$	*0,002*
3.	*CROBEX*	$-7{,}60\cdot10^{-4}$	*0,329*	*0,090*
4.	*MBI*	$1{,}067\cdot10^{-3}$	$-3{,}42\cdot10^{-2}$	*0,000*
5.	*MOSTE*	$-2{,}46\cdot10^{-3}$	*0,192*	*0,018*
6.	*SASX-10*	$-4{,}11\cdot10^{-3}$	*-0,191*	*0,010*
7.	*SBI20*	$4{,}44\cdot10^{-4}$	*0,274*	*0,055*

In the case of prime linear regression, it is also significantly important to test the hypothesis if the slope coefficient (β) equals zero. In that case, the following hypotheses are tested: H_0:

[10] All results in this research are generated by software *SPSS® Student Version 11.0 for Windows®*, ©SPSS Inc., 2002.

$\beta = 0$, H_1: $\beta \neq 0$. Zero hypothesis is also confirmed in this case, if p – values are higher than level of significance $(p \geq \alpha)$.

Based on *p*-values, with 0,05 risk, we conclude that variable *x* (S&P 500) influences variable y (CROBEX/SB120), and that the estimation of parameter β is statistically important. According to that, there is a linear correlation between the variations of observed parameters in the basic set and regressive line can be used in the process of predicting for the given time period. However, again with 0,05 risk, we conclude that there are not enough evidences that variable *x* (S&P 500) influences variable *y* (BELEX/BIRS/MBI/MOSTE/SASX-10), which means that for the given time interval the zero hypothesis is confirmed.

2. BETA COEFFICIENT ESTIMATION ON THE CAPITAL MARKET OF FEDERATION OF BOSNIA AND HERZEGOVINA

Two indexes exist on the regulated capital market of Federation of Bosnia and Herzegovina (FBandH), more precisely on the Sarajevo stock exchange (SASE). One of them (SASX-10) shows the changes on the free market, and the other one (BIFX) is "in charge of" following the changes of investment fund prices. In this research, when estimating beta coefficient on the free market, the following issuers were included: BH-Telecom Ltd. Sarajevo, Elektroprivreda BiH Ltd. Sarajevo (which are included in the index) and Klas Ltd.Sarajevo and Sipad komerc Ltd. Sarajevo (which are not included in the index). When estimating beta coefficient on the fund market, the issuers Big Ltd. Sarajevo and Mi-Group Ltd. Sarajevo are included in the content of the relating index.

On the basis of Ljung-Box test, it can be concluded that in the case of share price changes of the issuer BHTSR, with the level of significance of 5%, hypothesis $H_{1,}$ according to which autocorrelation process coefficients differ from 0, is accepted. For the issuers JPESR, KLASR and SPKMR hypothesis $H_{0,}$ according to which autocorrelation process coefficients equal 0, is accepted. The results of beta coefficients estimation are given in the following table.

Table 2.1

Beta coefficient estimation for BHTSR, JPESR, KLASR and SPKMR

Dependent variable: BHTSR *Independent variable: SASX-10*				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	$1{,}57 \cdot 10^{-3}$	*0,001*	*1,516*	*0,131*
Slope	*1,255*	*0,048*	*26,146*	*0*
Standard regression error	*0,0151*			
Determination coefficient (R^2)	*0,742*			
Dependant variable: JPESR *Independant variable: SASX-10*				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	$-9{,}09 \cdot 10^{-4}$	*0,001*	*-0,782*	*0,435*
Slope	*0,857*	*0,052*	*16,503*	*0*
Standard regression error	*0,0177*			
Determination coefficient (R^2)	*0,537*			
Dependant variable: KLASR *Independent variable: SASX-10*				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	$-3{,}57 \cdot 10^{-4}$	*0,003*	*-0,128*	*0,898*

Slope	*0,660*	*0,099*	*6,680*	*0*
Standard regression error	*0,035248*			
Determination coefficient (R^2)	*0,215*			
Dependant variable: SPKMR *Independent variable: SASX-10*				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	*$-3{,}18 \cdot 10^{-5}$*	*0,003*	*-0,011*	*0,992*
Slope	*0,981*	*0,126*	*7,770*	*0*
Standard regression error	*0,044464*			
Determination coefficient (R^2)	*0,215*			

The results presented in the Table 2.1. show that beta coefficient for the issuers BHTSR, JPESR, KLASR and SPKMR is 1,255; 0,857; 0,660 and 0,981, respectively. Moreover, since *p*-value is lower than the level of significance, zero hypothesis is rejected and alternative $H_1: \beta \neq 0$ is accepted. It is concluded, with 0,05 risk, that slope parameter β in regressive line of the basic set differs from zero. According to that, there is a linear correlation between variations of observed parameters in basic set and regressive line can be used in the process of predicting. Furthermore, it can be concluded that variable *x* (SASX-10) influences variable *y* (BHTSR/JPESR/KLASR/SPKMR), and that estimation of parameter β is statistically important.
On the basis of Ljung-Box test, it can be concluded that in the case of share price changes of the issuer BIGFRK, with the level of significance of 5%, hypothesis H_1 according to which autocorrelation process coefficients differ from 0 is accepted. But, for the issuer MIGFRK, with the level of significance of 5%, hypothesis H_0 according to which autocorrelation process coefficients equal 0 is accepted. The results of beta coefficients estimation are given in the following table.

Table 2.2

Beta coefficient estimation for BIGFRK and MIGFRK

Dependent variable: BIGFRK *Independent variable: BIFX*				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	*$-1{,}63 \cdot 10^{-4}$*	*0,001*	*-0,163*	*0,855*
Slope	*1,163*	*0,051*	*22,933*	*0*
Standard regression error	*0,0138*			
Determination coefficient (R^2)	*0,692*			
Dependant variable: MIGFRK *Independant variable: BIFX*				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	*$5{,}333 \cdot 10^{-4}$*	*0,002*	*0,320*	*0,749*
Slope	*1,040*	*0,092*	*11,326*	*0*
Standard regression error	*0,0251*			
Determination coefficient (R^2)	*0,355*			

The results presented in the Table 2.2. show that beta coefficient for the issuer BIGFRK is 1,163 and for the issuer MIGFRK is 1,040. Moreover, since p-value is lower than the level of significance zero hypothesis is rejected and alternative $H_1: \beta \neq 0$ is accepted. It is concluded, with 0,05 risk, that slope parameter of β in regressive line of the basic set differs from zero. According to that, there is a linear correlation between variations of observed parameters in basic set and regressive line can be used in the process of predicting. Furthermore, it can be concluded

that variable x (BIFX) influences variable y (BIGFRK/MIGFRK), and that estimation of parameter β is statistically important.

3. BETA COEFFICIENT ESTIMATION ON THE CAPITAL MARKET OF REPUBLIC OF SRPSKA

Stock exchange indexes BIRS and FIRS, among the others[11], are eatablished on the regulated capital market of Republic of Srpska (RS), more precisely on the Banja Luka stock exchange (BLSE). The first one, BIRS, is the indicator of the changes on the free market, and the other one, FIRS, is "in charge of" following the investment fund market. When estimating beta coefficient on the free market the following issuers are included: Telekom Srpske Ltd. Banja Luka, Elektrodistribucija Ltd. Pale (which are included in the content of the index) and Petrol Ltd. Banja Luka and Vitaminka Ltd. Banja Luka (which are not included in the content of the index). When estimating beta coefficient on fund market, issuers ZIF Zepter fond Ltd. Banja Luka and ZIF Kristal invest fond Ltd. Banja Luka which are included in the content of relating index. Based on Ljung-Box test, it can be concluded that in the case of share price changes of the issuers TLKM, PTRL-R-A and VITA-R-A with the level of significance of 5%, hypothesis H_0 according to which autocorrelation process coefficients equal 0 is accepted. It can also be concluded that in the case of share price changes of the issuer EDPL, with the level of significance of 5%, hypothesis H_1 according to which autocorrelation process coefficients differ from 0 is accepted. The results of beta coefficients estimation are given in the following table.

Table 3.1

Beta coefficient estimation for TLKM, EDPL, PTRL-R-A and VITA-R-A

Dependent variable: TLKM *Independent variable: BIRS*				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	$9{,}075 \cdot 10^{-4}$	*0,001*	*0,908*	*0,435*
Slope	*0,838*	*0,065*	*12,945*	*0*
Standard regression error	*0,0148*			
Determination coefficient (R^2)	*0,501*			
Dependant variable: EDPL *Independant variable: BIRS*				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	$-3{,}76 \cdot 10^{-3}$	*0,003*	*-1,352*	*0,178*
Slope	*0,460*	*0,127*	*3,638*	*0*
Standard regression error	*0,035*			
Determination coefficient (R^2)	*0,073*			
Dependant variable: PTRL-R-A *Independent variable: BIRS*				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	$-6{,}19 \cdot 10^{-3}$	*0,004*	*-1,709*	*0,089*
Slope	$4{,}12 \cdot 10^{-2}$	*0,034*	*1,204*	*0,230*
Standard regression error	*0,048833*			
Determination coefficient (R^2)	*0,008*			
Dependant variable: VITA-R-A				

[11] There are ERS10 (index of Electroprivreda RS), RSFIN (index of finantial sector of RS), MIRS (index of metallurgical sector of RS) and GIRS (index of construction sector of RS). See http://www.blberza.com

Independent variable: BIRS				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	$-2{,}06 \cdot 10^{-3}$	*0,004*	*-0,575*	*0,566*
Slope	$4{,}217 \cdot 10^{-3}$	*0,009*	*0,463*	*0,644*
Standard regression error	*0,0375*			
Determination coefficient (R^2)	*0,002*			

The results presented in the Table 3.1. show that beta coefficient for the issuer TLKM, EDPL, PTRL-R-A and VITA-R-A is 0,838; 0,460; $4{,}12 \cdot 10^{-2}$ and $4{,}217 \cdot 10^{-3}$, respectively.
Moreover, since for TLKM and EDPL, *p*-value is lower than the level of significance, zero hypothesis is rejected and alternative $H_1: \beta \neq 0$ is accepted. It is concluded, with 0,05 risk, that slope parameter of β in regressive line of the basic set differs from zero. According to that, there is a linear correlation between variations of observed parameters in basic set and regressive line can be used in the process of predicting. Furthermore, it can be concluded that variable *x* (BIRS) influences variable *y* (TLKM/EDPL), and that estimation of parameter β is statistically important. However, since, for PTRL-R-A and VITA-R-A, *p*-value is higher than the level of significance, we conclude that there are no enough evidences that variable *x* (BIRS) influences variable *y* (PTRL-R-A/EDPL-R-A), which means that zero hypothesis $H_0: \beta = 0$ is confirmed.

ZIF Zepter fond Ltd. Banja Luka issuer (ZPTP) is included in the structure of stock exchange index BIRS. ZIF Kristal invest fond Banja Luka issuer (KRIP) is included in the structure of stock exchange index FIRS. On the basis of Ljung-Box test, it can be concluded that in the case of share price movement of the issuers ZPTP and KRIP, with the level of significance of 5%, hypothesis H_1 according to which autocorrelation process coefficients differ from 0 is accepted. The results of beta coefficients estimation are given in the following table.

Table 3.2

Beta coefficient estimation for ZPTP and KRIP

Dependent variable: ZPTP *Independent variable: FIRS*				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	$6{,}293 \cdot 10^{-4}$	*0,001*	*0,6293*	*0,472*
Slope	*1,297*	*0,043*	*30,236*	*0*
Standard regression error	*0,01127*			
Determination coefficient (R^2)	*0,846*			
Dependant variable: KRIP *Independant variable: FIRS*				
Parameter	*Estimation*	*Standard estimation error*	*t-value*	*p-value*
Intercept	$1{,}15 \cdot 10^{-4}$	*0,001*	*0,115*	*0,918*
Slope	*1,332*	*0,055*	*24,245*	*0*
Standard regression error	*0,01444*			
Determination coefficient (R^2)	*0,779*			

The results presented in the Table 3.2. show that beta coefficient for the issuers ZPTP and KRIP is 1,297 and 1,332, respectively. Moreover, since p-value is lower than the level of significance zero hypothesis is rejected and alternative $H_1: \beta \neq 0$ is accepted. It is concluded, with 0,05 risk, that slope parameter of β in regressive line of the basic set differs from zero. According to that, there is a linear correlation between variations of observed parameters in basic set and regressive line can be used in the process of predicting. Furthermore, it can be concluded that variable *x*

(FIRS) influences variable y (ZPTP/KRIP), and that estimation of parameter β is statistically important.

Conclusion

Beta coefficient has proved itself as a very useful instrument which investors can use in the process of defining an investment decision on the capital market. The share classification of the issuers included in the research, and with the accordance to the estimated beta coefficient, is presented in the following table. The issuers for which it has been proved that evaluation of beta coefficient is not statistically important are left out from the classification.

Table 3.13.

Share classification according to the estimated beta coefficient

No.	*Issuer*	*Stock exchange*	*Beta coefficient*	*Share classification*
1.	*BHTSR*	*SASE*	*1,255*	*Aggressive share*
2.	*BIGFRK*	*SASE*	*1,163*	*Aggressive share*
3.	*EDPL*	*BLSE*	*0,460*	*Defensive share*
4.	*JPESR*	*SASE*	*0,857*	*Defensive share*
5.	*KLAS*	*SASE*	*0,660*	*Defensive share*
6.	*KRIP*	*BLSE*	*1,332*	*Aggressive share*
7.	*MIGFRK*	*SASE*	*1,040*	*Aggressive share*
8.	*SPKMR*	*SASE*	*0,981*	*Defensive share*
9.	*TLKM*	*BLSE*	*0,838*	*Defensive share*
10.	*ZPTP*	*BLSE*	*1,297*	*Aggressive share*

To make it clear, an average risk share can be defined as a security which has a tendency to follow market changes in total, and which is reflected and measured by stock indexes, such as: *Dow Jones Industrials, S&P 500, New York Stock Exchange Index* [Šoškić (2000), str. 105]. Such a share, according to the definition, will have beta 1 value, which means that share yield will proportionally follow total market portfolio yield and stock exchange index. However, if beta coefficient value is negative, it means that security yield moves in an opposite direction from total market portfolio yield. Although, it should be emphasised that beta coefficient values can be found between zero and +1. If shares are classified according to beta coefficient, we will reach the following classification:

- $\beta = 1$ (an average share),
- $\beta > 1$ (an aggressive share),
- $\beta < 1$ (a defensive share).

According to the assumption that the researched factors in the observed period (02.04.2007.-02.04.2008.) will be influencing at the same pace and without significant influence of any new factors, shares of BHTSR, BIGFRK1, KRIP, MIGFRK1 and ZPTP issuers can be considered as aggressive (since beta values of these issuers is more than one, $\beta > 1$). It means that the prices of these shares will increase more rapidly on the bull market, compared to the prices of market portfolio in total, while in the bear market, these shares will decrease more rapidly than the prices of market portfolio in total. Following this logic, it can be concluded that, for example, BHTSR share is 25,5% more variable than market portfolio (SASX-10), which means that market portfolio yields increase of 10% will cause yield increase of shares of this issuer for 25,5%.

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ANALIZA BETA KOEFICIJENTA NA TRŽIŠTU KAPITALA U BOSNI I HERCEGOVINI

ABSTRACT

U ovome radu autori promatraju kako promjene na tržištima kapitala (razvijena financijska tržišta i financijska tržišta tranzicijskih zemalja) odrediti odluku investitora o opsegu međunarodne diverzifikacije portfelja, odnosno o opsegu smanjivanja rizika sustava, i da li beta koeficijent kretanja na financijskom tržištu BandH (beta koeficijent procjena BandH na financijskom tržištu su izrađene) može biti pokazatelj za ulagače u koje dionice ulagati.

***Key words**: korelacija, burzovni indeksi, cijene, dionice, beta koeficijent, tržište kapitala*

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VRIJEDNOSNA VAŽNOST GLAVNICE I DOBITI - EMPIRIJSKA ANALIZA ZA HRVATSKE KORPORACIJE SA ZAGREBAČKE BURZE

SAŽETAK

Cilj ovog istraživanja je testiranje veze između računovodstvenih informacija i cijena dionica na hrvatskom tržištu kapitala uporabom pristupa vrijednosne važnosti. Istraživanje je provedeno na uzorku korporacija sa Zagrebačke burze, koji je obuhvatio 72 korporacije u 2007. i 63 korporacije u 2006. godini. Rezultati istraživanja pokazuju da su računovodstvena dobit i glavnica promatrani skupno i pojedinačno statistički značajno i pozitivno povezani s cijenama dionica. Zajednički koeficijent determinacije iznosi 71,5% u 2007. i 70,4% u 2006. što znači da dobit i glavnica kombinirani zajedno objašnjavaju oko 70% cijena dionica u promatranom razdoblju. Rezultati istraživanja pokazuju da su računovodstvene informacije na hrvatskom tržištu kapitala vrijednosno važne, a dobiveni podaci su usporedivi s rezultatima istraživanja iz razvijenih i tranzicijskih zemalja.

***Ključne riječi**: vrijednosna važnost, glavnica, dobit, cijena dionica.*

1. UVOD

Sukladno koncepcijskom okviru IASB[1]-a cilj financijskih izvještaja je pružiti korisnicima financijskih izvještaja informacije o financijskom položaju, uspješnosti poslovanja te o promjenama financijskog položaja korporacije (IASB, 2005). U ovom radu će se kroz analizu vrijednosne važnosti (engl. *Value relevance*) računovodstvenih informacija testirati važnost i pouzdanost računovodstvenih informacija. Da bi bila važna, računovodstvena informacija mora utjecati na odluku korisnika, a da bi pouzdana ona mora vjerno predočavati stvarne poslovne događaje. Testovi vrijednosne važnosti računovodstvenih informacija predstavljaju istovremeno testiranje i važnosti i pouzdanosti, kao dvije glavne karakteristike računovodstvenih informacija (Barth, Beaver, Landsman, 2001).

Važnost i pouzdanost računovodstvenih informacija nije baš jednostavno testirati zasebno jer je jako teško izmjeriti koliko je porast/pad cijene dionice uzrokovan važnošću objavljene računovodstvene informacije, a koliko njenom pouzdanošću. Pojedina istraživanja po modelu vrijednosne važnosti mogu biti fokusirana na konkretni računovodstveni standard i varijablu, te može testirati je li empirijski ocijenjeni koeficijent različit u odnosu na teorijski. Dokazivanje tako postavljene hipoteze fokusirano je primarno na pouzdanost računovodstvene informacije. Naime, ako se hipoteza dokaže to u biti znači da računovodstvena metoda mjerenja nije pouzdana za ulagače s burze jer oni računovodstvenu varijablu vredniju na drugačiji način. Međutim, budući ovo istraživanje obrađuje dvije glavne računovodstvene varijable (dobit i glavnicu) autori ovog istraživanja su slijedili klasični

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[1] International Accounting Standards Board (IASB) predstavlja operativno tijelo za donošenje standarda International Accounting Standards Committee Foundation (IASCF).

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pristup studije vrijednosne važnosti, prema kojem se istovremeno testira i važnost i pouzdanost računovodstvenih informacija, kroz njihovo reflektiranje u tržišnoj cijeni dionice
Empirijska istraživanja iz područja računovodstva provedena u razvijenim zemljama pokazuju da računovodstvene varijable (prije svega dobit i glavnica) mogu biti značajni čimbenici u vrednovanju korporacije te da su spomenute varijable značajno povezane s kretanjima cijena dionica. Drugim riječima, znanstvena istraživanja pokazuju da su računovodstvene informacije vrijednosno važne u vrednovanju korporacije. Vrijednosna važnost računovodstvenih informacija je jedna od osnovnih pretpostavki kvalitete istih, a prema ustaljenoj definiciji (Beaver, 2001) ističe se da je računovodstvena informacija vrijednosno važna ako je povezana s tržišnom vrijednošću glavnice (s cijenom ili povratom).
U ovom istraživanju ispituje se veza glavnice i dobiti sa cijenama dionica na hrvatskom tržištu kapitala, odnosno na uzorku korporacija koje svoje dionice listaju na Zagrebačkoj burzi. Hrvatsko tržište kapitala posljednjih se godina razvija brže od očekivanja, a glavna značajka tržišta posljednjih godina je konstantan rast te sve veći broj domaćih i stranih investitora. S obzirom na konstantni rast tržišta i sve veći broj zainteresiranih investitora korisno je istražiti povezanost između računovodstvenih varijabli i cijena dionica. Stoga je osnovni cilj analizirati vrijednosnu važnost računovodstvenih informacija, odnosno testirati vezu između kretanja dobiti i glavnice sa kretanjima cijena dionica na hrvatskom tržištu kapitala.

2. PRETHODNA ISTRAŽIVANJA

Početkom 90-ih godina prošlog stoljeća u računovodstvenim istraživanjima orijentiranim prema tržištu kapitala javlja se tzv. pristup vrednovanja. Ovom smjeru istraživanja cilj je utvrditi vezu između računovodstvenih informacija i cijena dionica, istovremeno objašnjavajući kako se računovodstvene informacije transformiraju u cijene. Pristup vrednovanja podrazumijeva korištenje modela vrednovanja glavnice, a teorijsku razradu tog modela su napravili Ohlson (1991), te Feltham i Ohlson (1995). Feltham-Ohlsonov model (dalje F-O model) se temelji na knjigovodstvenoj vrijednosti glavnice korporacije i računovodstvenom dobitku, a prema konačnoj verziji modela tržišna vrijednost glavnice korporacije jednaka je knjigovodstvenoj vrijednosti glavnice uvećanoj za sadašnju vrijednost neočekivanih dobitka (budućih dobitaka koji prelaze trošak glavnice). Feltham-Ohlsonov model je najčešće korišteni model u istraživanjima vrijednosne važnosti, a istraživanja prikazana u nastavku imaju ishodište upravo u tom modelu.
Usporedbu vrijednosne važnosti računovodstvenih informacija korporacija iz SAD-a i Njemačke proveli su Harris et al. (1994). U radu se uspoređuje vrijednosna važnost računovodstvenih informacija korporacija iz SAD-a i Njemačke za razdoblje od 1982. do 1991. Autori su uzorak (230 njemačkih odnosno američkih korporacija) podijelili s obzirom na industriju i veličinu tvrtke. Rezultati istraživanja su pokazali da su računovodstvene varijable značajno povezane s cijenama i povratom na dionice, te da su rezultati za korporacije iz SAD-a i Njemačke usporedivi. Rezultati regresijskog modela koji analizira vezu između povrata i godišnje dobiti pokazali su da nema razlika u vrijednosnoj važnosti između njemačkog i američkog uzorka (R^2 za oba uzorka iznose 7%), dok rezultati analize međuovisnosti kretanja cijena dionica i računovodstvenih varijabli (dobiti i glavnice) ukazuju na dvostruko nižu eksplanatornu moć računovodstvenih varijabli u Njemačkoj nego u SAD-u (14% u Njemačkoj naspram 34% u SAD-u). Nadalje, autori su analizirali posebno eksplanatornu moć dobiti i glavnice koristeći regresiju sa samo jednom varijablom, te je uočena neznatna razlika u eksplanatornoj moći dobiti njemačkih i američkih korporacija, dok je eksplanatorna moć glavnice značajno niža za njemačke korporacije. Rezultati istraživanja također pokazuju da je ekspalanatorna moć računovodstvenih varijabli veća kod

konsolidiranih nego kod nekonsolidiranih izvještaja tj. da se vrijednosna važnost računovodstvenih informacija povećava sa stupnjem konsolidacije[2].

Collins et al. (1997) u svom istraživanju analiziraju vezu između glavnice i dobiti, te cijene dionica na uzorku korporacija iz SAD-a u razdoblju od 1953. do 1993. Cilj istraživanja je bio utvrditi promjene u vrijednosnoj važnosti računovodstvenih informacija (glavnice i dobiti) tijekom promatranog razdoblja. Rezultati istraživanja pokazuju da se zajednička vrijednosna važnost glavnice i dobiti u promatranom razdoblju nije smanjila, nego je čak uočeno blago povećanje, a R^2 za cijeli uzorak (sve godine promatrane zajedno) iznosi 54%, što znači da glavnica i dobit objašnjavaju oko 54% varijacija cijena dionica u promatranom razdoblju. Nadalje, inkrementalna vrijednosna važnost dobiti je imala tendenciju opadanja u promatranom razdoblju, dok je vrijednosna važnost glavnice porasla. Ovaj pomak vrijednosne važnosti, sa dobiti na glavnicu, autori tumače sve učestalijim objavama gubitaka, te povećanjem broja malih korporacija u uzorku kao i u sve većem značenju nematerijalne imovine (koja u pravilu nije iskazana u glavnici zbog strogih pravila priznavanja).

Komparativnu studiju vrijednosne važnosti napravili su King i Langli (1998) analizirajući vezu između računovodstvenih informacija i kretanja cijena dionica u tri države: Njemačkoj, Norveškoj i Velikoj Britaniji. Istraživanje je provedeno na uzorku korporacija iz Njemačke, Norveške i Velike Britanije za razdoblje od 1982. do 1996. Rezultati istraživanja ukazuju na postojanje značajne povezanosti između računovodstvenih varijabli (glavnice i dobiti) i cijena dionica u sve tri zemlje. U skladu s očekivanjima autora i postavljenim hipotezama najveću eksplanatornu moć imaju računovodstvene varijable u Velikoj Britaniji (R^2 iznosi oko 70%), eksplanatorna moć za norveški uzorak iznosi oko 60%, dok njemački uzorak ima najnižu eksplanatornu moć i računovodstvene varijable objašnjavaju otprilike 40% kretanja cijena dionica. Autori su analizirali i inkrementalnu eksplanatornu moć dobiti i glavnice, a rezultati pokazuju da postoje razlike u inkrementalnoj eksplanatornoj moći dobiti i glavnice, kako među zemljama tako i unutar pojedine zemlje tijekom vremena. Glavnica ima veću inkrementalnu eksplanatornu moć u Njemačkoj i Norveškoj, dok je dobit bolji prediktor kretanja cijena dionica u Velikoj Britaniji. Brojne studije vrijednosne važnosti u razvijenim zemljama pokazuju da su glavnica i dobit važne varijable u vrednovanju dionica korporacija. Vezu između računovodstvenih varijabli i tržišne vrijednosti korporacija u tranzicijskim zemljama su, između ostalih, istraživali Gornik-Tomaszewski (2001), Hellstrom (2006), te Anandarajan, Hasan i Isik (2006).

Studiju vrijednosne važnosti na poljskom tržištu kapitala su provele Gornik-Tomaszewski i Jermakowicz (2001) za razdoblje od 1996. do 1998. godine. U svom istraživanju su analizirale vrijednosnu važnost računovodstvenih informacija, tj. vezu između glavnice i dobiti sa kretanjima cijena dionica. Uzorak se sastojao od 77 korporacija (ukupno 231 opservacija) koje su kotirale na Warsava stock exchange (WSE) u promatranom razdoblju. Koristeći model koji su u svom istraživanju primijenili Collins et al. (1999) autorice su analizirale i inkrementalnu moć glavnice i dobiti. Rezultati istraživanja pokazuju da su računovodstvene informacije na poljskom tržištu kapitala vrijednosno važne, te da ukupna eksplanatorna moć glavnice i dobiti iznosi 62%, što znači da ove dvije računovodstvene varijable objašnjavaju 62% kretanja cijena dionica u promatranom razdoblju. Dakle, glavnica i dobit su pozitivno i značajno povezani s kretanjima cijena dionica, a rezultati su usporedivi s istraživanjima provedenim u razvijenim zemljama. Inkrementalna eksplanatorna moć glavnice je veća od inkrementalne eksplanatorne moći dobiti, a eksplanatorna moć zajednička za glavnicu i dobit iznosi 31% što je usporedivo s rezultatima koje su dobili King i Langli (1998) za tržišta Norveške i Velike Britanije.

[2] Ovdje je vrijedno spomenuti da obveza konsolidacije financijskih izvještaja kod hrvatskih korporacija proizlazi iz primjene Međunarodnog računovodstvenog standarda 27, međutim neke korporacije sa Zagrebačke burze ulagačima ne prezentiraju konsolidirane financijske izvještaje, već temeljne izvještaje matice koji su manje informativni.

Korelaciju između glavnice i dobiti sa kretanjima cijena dionica su na turskom tržištu kapitala proveli Anandarajan, Hasan i Isik (2006). Ovim istraživanjem autori su analizirali postoji li veza između računovodstvenih informacija (glavnice i dobiti) i cijena dionica na turskom tržištu kapitala. Uzorak se sastoji od ukupno 3.671 opservacije turskih korporacija u 19 razdoblja (promatrano na polugodišnjoj razini). Rezultati istraživanja pokazuju da su glavnica i dobit promatrani pojedinačno povezani s tržišnom vrijednošću tvrtke, dok kombinirani zajedno objašnjavaju gotovo 75% kretanja cijena dionica na turskom tržištu kapitala.

Istraživanje za češko tržište kapitala napravila je Hellstromova (2006). Ona u svojoj studiji analizira vrijednosnu važnost računovodstvenih informacija u Češkoj za razdoblje od 1994. do 2001., te istovremeno komparira dobivene rezultate s rezultatima za švedsko tržište kako bi se vidjele razlike u vrijednosnoj važnosti između tranzicijske i razvijene ekonomije. Naime, polazna pretpostavka je da je vrijednosna važnost računovodstvenih informacija niža u tranzicijskim nego u razvijenim zemljama, te da razvoj institucija i kontrolnih mehanizama u tranzicijskim zemljama doprinosi povećanju vrijednosne važnosti računovodstvenih varijabli tijekom vremena. Eksplanatorna moć računovodstvenih varijabli na češkom tržištu se u promatranom razdoblju povećala što ukazuje na povećanje vrijednosne važnosti, međutim R^2 je za češki uzorak niži nego za uzorak švedskih tvrtki tijekom cijelog razdoblja, a posebno na početku tranzicijskog procesa.

3. STRUKTURA ISTRAŽIVANJA

3.1. OPIS UZORKA

Polazeći od toga da su sva prethodno prezentirana istraživanja vrijednosne važnosti računovodstvenih informacija bazirana na uzorku korporacija koja kotiraju na burzama, identičan pristup je primijenjen pri definiranju uzorka za istraživanje u Hrvatskoj. Sukladno tom pristupu, istraživanje obuhvaća samo ona hrvatska dionička društva koja svoje dionice listaju na Zagrebačkoj burzi[3].

U odnosu prema razvijenim zemljama tržišnoga gospodarstva, tržište kapitala u Hrvatskoj još je uvijek prilično nerazvijeno. Međutim, podaci o tržišnoj kapitalizaciji i ukupnom prometu Zagrebačke burze posljednjih godina prikazani u tablici 1 ukazuju na činjenicu da se hrvatsko tržište kapitala posljednjih godina razvija bolje od očekivanja.

Tablica 1

Promet i tržišna kapitalizacija Zagrebačke burze

Godina	2003.	2004.	2005.	2006.	2007.
Promet (000.000 kn)	12.331	23.754	34.204	45.328	66.487
Tržišna kapitalizacija (000.000 kn)	37.130	61.734	80.724	161.692	352.238

Izvor: www.zse.hr

Iako je krajem 2007. godine na Zagrebačkoj burzi bilo uvršteno 374 dionice (ZSE, 2007) znatnim dijelom tih dionica nije se aktivno trgovalo. U cilju što kvalitetnije analize vrijednosne važnosti računovodstvenih informacija osnovni skup istraživanja je ograničen samo na ona dionička društva kojima se tijekom 2007. godine aktivno trgovalo. Naime, cilj rada je analizirati vrijednosnu važnost računovodstvenih informacija društava koja su listala svoje dionice na Zagrebačkoj burzi 2006. i 2007. godine, a u cilju dobivanja što kvalitetnijih rezultata u uzorak su uključene samo aktivno trgovane dionice. Radi selekcije korišten je jednostavan kriterij – promet dionicama na Zagrebačkoj burzi tijekom 2007. godine. Subjektivnom odlukom autora istraživanja u uzorak su uključene one korporacije čijim je

[3] Internet adresa: www.zse.hr

dionicama tijekom 2007. godine ostvaren promet od minimalno 50.000.000 kn. Pri interpretiranju rezultata istraživanja bitno je voditi računa o odabiru uzorka, budući da bi drugačiji kriterij za formiranje uzorka možda rezultirao i drugačijim uzorkom i zaključcima. Formiranje uzorka prema navedenom načelu selekcije je prikazano sljedećom tablicom.

Tablica 2

Formiranje uzorka iz osnovnog skupa

	ZSE - 2007.
Broj dioničkih društava na službenom tržištu	14
Broj dioničkih društava na ostalim tržištima	360
Ukupan broj dioničkih društava na burzi	374
Dionička društva s prometom višim od 50.000.000 kn	72
Postotak osnovnog skupa	19,25

Izvor: www.zse.hr

Tablica 2 prikazuje da odabrani uzorak obuhvaća 19,25% populacije svih korporacija koja su kotirale na Zagrebačkoj burzi tijekom 2007. godine. U 2007. godini na ZSE su kotirale 72 korporacije koje su zadovoljavale navedeni kriterij, a isti uzorak korporacija je analiziran i u 2006. godini uz napomenu da je uzorak umanjen za korporacije kojima nije trgovano tijekom 2006. godine. Budući da je takvih bilo 9 korporacija, konačni uzorak za 2006. godinu se sastoji od 63 korporacije.

3.2. METODOLOGIJA ISTRAŽIVANJA

Za empirijsku analizu vrijednosne važnosti računovodstvenih informacija u Hrvatskoj koristi se već ustaljena metodologija iz studija vrijednosne važnosti. U istraživanju se kao model vrednovanja korporacija primjenjuje F-O model koji je korišten u većini studija opisanih u poglavlju 2. F-O model izražava vrijednost tvrtke kao linearnu funkciju dobiti i glavnice (Ohlson, 1995) :

$$P_{it} = a_0 + a_1 E_{it} + a_2 BV_{it} + e_{it} \quad (1)$$

$$P_{it} = b_0 + b_1 E_{it} + e_{it} \quad (2)$$

$$P_{it} = c_0 + c_1 BV_{it} + e_{it} \quad (3)$$

Gdje su:

P_{it} = cijena dionice tri mjeseca[4] nakon kraja fiskalne godine t

E_{it} = dobit po dionici u godini t

BV_{it} = knjigovodstvena vrijednost glavnice po dionici na kraju godine t

e_{it} = ostale vrijednosno važne informacije u godini t

Prvi regresijski model omogućava testiranje povezanosti cijene dionice s dobiti i glavnicom istovremeno. U drugom modelu se analizira postoji li pozitivna i značajna veza između kretanja cijena dionica i dobiti, a u trećem modelu postoji li statistički signifikantna veza između cijena dionica i glavnice.

U cilju usporedbe eksplanatorne moći glavnice i dobiti primjenjuje se metodologija koju su koristili Collins et al. (1997), te se ukupna eksplanatorna moć glavnice i dobiti mjerena koeficijentom determinacije (R^2) dijeli na sljedeće tri komponente:

- inkrementalna eksplanatorna moć dobiti,
- inkrementalna eksplanatorna moć glavnice, te

[4] Cijene dionica se u studijama vrijednosne važnosti uzimaju na zadnji dan kada se izvještaji moraju prezentirati ulagačima na burzi, te je u Hrvatskoj riječ o koncu ožujka (31.03.). Cijene dionica mogu biti uzete i na zadnji dan fiskalne godine (najčešće 31.12), stoga su i u okviru ovog istraživanja modeli rađeni i sa cijenom dionica na 31.12., međutim rezultati takve analize nisu značajnije odstupali od rezultata prikazanih u okviru poglavlja 4.

- ❖ eksplanatorna moć zajednička za dobit i glavnicu.

Koeficijenti determinacije iz jednadžbi 1-3 se označavaju kao R^2, R^2_E , R^2_{BV}, a označavaju: ukupnu eksplanatornu moć dobiti i glavnice, eksplanatornu moć dobiti, te eksplanatornu moć glavnice. U cilju utvrđivanja inkrementalne eksplanatorne moći definiraju se i sljedeće relacije:

$$R^2_{IE} = R^2 - R^2_{BV} \quad (4)$$

$$R^2_{IBV} = R^2 - R^2_E \quad (5)$$

$$R^2_{com,\ E,BV} = R^2 - R^2_E - R^2_{BV} \quad (6)$$

gdje je: R^2_{IE} - inkrementalna eksplanatorna moć dobiti, R^2_{IBV} - inkrementalna eksplanatorna moć glavnice te $R^2_{com,\ E,BV}$ - eksplanatorna moć zajednička za dobit i glavnicu.

3.3. OPIS VARIJABLI

U radu se analizira vrijednosna važnost glavnice i dobiti u tržišnom vrednovanju korporacija, što znači da se u regresijskom modelu kao nezavisne varijable koriste glavnica i dobit, a zavisna varijabla je tržišna vrijednost, odnosno cijena dionice. Sve varijable su mjerene po dionici, a podaci o dobiti i vrijednosti glavnice su preuzeti iz godišnjih financijskih izvještaja dioničkih društava za 2007. i 2006. godinu. Zavisna varijabla je cijena dionice, a podaci o istima su preuzeti sa Zagrebačke burze. Deskriptivna statistika za varijable iz uzorka je prikazana u narednoj tablici.

Tablica 3

Deskriptivna statistika za varijable iz uzorka

	Veličina uzorka		Aritmetička sredina		Standardna devijacija	
	2006.	2007.	2006.	2007.	2006.	2007.
Cijena dionice[a] (P)	63	72	4.582,56	4.469,15	9.835,14	10.643,09
Dobit[b] (E)	63	72	141,51	189,40	342,61	538,64
Knjigovodstevna vrijednost glavnice[c] (BV)	63	72	1.589,74	1.774,91	2.520,07	3.047,69

[a] *P - cijena dionice na dan 31.03. odnosno 3 mjeseca nakon završetka fiskalne godine.*

[b] *E - dobit po dionici u godini t, izračunata kao omjer neto dobiti i broja dionica.*

[c] *BV - knjigovodstvena vrijednost glavnice, izračunata kao omjer ukupne glavnice i broja dionica.*

Tablica 4 prikazuje korelaciju između varijabli u regresijskom modelu. Kod višestrukih regresijskih modela, u kojima regresijski koeficijenti odražavaju parcijalni utjecaj jedne utjecajne varijable na zavisnu varijablu kada se ostale utjecajne varijable ne mijenjaju, treba biti ispunjena pretpostavka da su regresorske varijable međusobno nezavisne. Ako ta pretpostavka nije ispunjena onda postoji problem kolinearnosti dviju, odnosno problem multikolinearnosti više regresorskih varijabli. U praksi se perfektna multikolinearnost vrlo rijetko sreće, međutim jaka ili vrlo jaka mulikolinearnost nije rijetka (Gujurati, 1992). Bitno je naglasiti da sve dok multikolinearnost nije perfektna OLS metoda daje nepristrane ocjene parametara. Međutim, multikolinearnost uzrokuje visoke standardne greške parametara zbog velike varijance, što može dovesti do prihvaćanja teze o neznačajnosti neke varijable u modelu. Nadalje, kao anomalije zbog multikolinearnosti mogu se navesti: neznačajni t

testovi, visoki R^2 uz mali broj značajnih t testova, standardne greške su vrlo osjetljive na promjene podataka, itd.
Sukladno očekivanjima, u promatranom regresijskom modelu zarade i knjigovodstvena vrijednost glavnice su statistički značajno i pozitivno korelirane međusobno, a isto tako i sa cijenom dionica. Budući da postoji korelacija između regresorskih varijabli u cilju kontrole značajnosti problema multikolineranosti analizirani su tzv. VIF-ovi[5]. Naime, radi provjere problema multikolinearnosti, statistički paket SPSS primjenjuje faktore inflacije varijance, tzv. VIF-ove. Ako su VIF-ovi manji od 5 može se zaključiti da problem multikolinearnosti nije značajan, međutim neki autori smatraju da VIF-ovi mogu biti do 10, a da se multikolinearnost na smatra kao značajan problem. Iako između nezavisnih varijabli u promatranom regresijskom modelu postoji korelacija problem multikolinearnosti u regresijskom modelu (Tablica 7) nije značajan. Naime, budući da nijedan VIF nije veći od 5 (za 2006. godinu VIF iznosi 2,397, a za 2007. 2,773), može se zaključiti da multikolinearnost u promatranom regresijskom modelu nije značajan problem.

Tablica 4

Korelacija[a] između varijabli u uzorku u 2007. godini

Varijabla	Cijena dionice (P)	Dobit (E)	Knjig. vrijednost glavnice (BV)
Cijena dionice (P)	1,000	0,827	0,779
Dobit (E)	-	1,000	0,800
Knjig. vrijednost glavnice (BV)	-	-	1,000

[a] Svi koeficijenti korelacije su signifikantni na razini od 1%.

3.4. OPIS HIPOTEZA

Studije vrijednosne važnosti u razvijenim zemljama pokazuju da računovodstvene varijable mogu biti značajni čimbenici u vrednovanju korporacije. Cilj ovog istraživanja je uporaba pristupa vrijednosne važnosti i testiranje veze između računovodstvenih informacija i cijena dionica za korporacije s Zagrebačke burze. Sukladno navedenom cilju istraživanja moguće je definirati radnu hipotezu:

H_1. Postoji statistički značajna povezanost između računovodstvenih informacija i cijena dionica.

U cilju bolje razrade radne hipoteze postavljene su dvije pomoćne hipoteze:

$H_{1.1.}$ Postoji statistički značajna veza između dobiti i cijena dionica.

$H_{1.2.}$ Postoji statistički značajna veza između knjigovodstvene vrijednosti glavnice i cijena dionica.

Dokazivanjem navedenih hipoteza došlo bi se do odgovora na pitanje o vrijednosnoj važnosti računovodstvenih informacija, odnosno do odgovora u kojoj mjeri te informacije objašnjavaju cijene dionica kao i do odgovora na pitanje koja je računovodstvena varijabla, dobit ili glavnica bolji prediktor kretanja cijena dionica.

4. REZULTATI ISTRAŽIVANJA

Rezultati istraživanja vrijednosne važnosti dobiti i glavnice na izabranom uzorku korporacija sa Zagrebačke burze prikazani su kroz tablice 5-8:

[5] VIF-ovi (engl. *Variance Inflation Factors*) izračunavaju se kao omjer $1/(1-R^2i)$, gdje R^2i označava pomoćni regresijski model u kojemu se nezavisna varijabla X_i iz osnovnog modela tretira kao zavisna varijabla, dok se sve ostale nezavisne varijable iz osnovnog modela i dalje tretiraju kao nezavisne (Gujurati, 1992).

Tablica 5

Rezultati analize vrijednosne važnosti dobiti [a] za uzorak dionica listanih na ZSE

Godina	N	b_1	R^2_E	t- omjeri	Signifikantnost	F omjer
2006.	63	0,832	0,686	11,787	0,0001	138,94[b]
2007.	72	0,827	0,680	12,323	0,0001	151,86

[a] *Regresijski model:* $P_{it} = b_0 + b_1 E_{it} + e_{it}$

[b] *Regresijski model je u obje godine signifikantan na razini od 1%.*

Kao što je prikazano u tablici 5, regresijski koeficijenti uz dobit su pozitivni i signifikantni u obje promatrane godine što znači da dobit ima informacijski sadržaj i da je značajno povezana s cijenama dionica. Takav pronalazak potvrđuje hipotezu $H_{1.1.}$. Koeficijent determinacije, tj. eksplanatorna moć modela u 2006. iznosi 68,6%, a u 2007. 68,0%. Takav podatak ukazuje da dobit objašnjava oko 68% cijena dionica u promatranom razdoblju i uzorku.

Tablica 6

Rezultati analize vrijednosne važnosti glavnice[a] za uzorak dionica listanih na ZSE

Godina	N	c_1	R^2_{BV}	t- omjeri	Signifikantnost	F omjer
2006.	63	0,731	0,527	8,378	0,0001	70,194[b]
2007.	72	0,668	0,438	7,663	0,0001	58,720

[a] *Regresijski model:* $P_{it} = c_0 + c_1 BV_{it} + e_{it}$

[b] *Regresijski model je u obje godine signifikantan na razini od 1%.*

Koeficijenti uz glavnicu u promatranom razdoblju su također pozitivni i značajni što pokazuje da je vrijednost glavnice značajno povezana s varijacijama cijena dionica, čime se potvrđuje i hipoteza $H_{1.2.}$. Eksplanatorna moć glavnice iznosi 52,7% u 2006. i 43,8% u 2007. godini. Dakle, rezultati analize eksplanatorne moći dobiti i glavnice pokazuju da i dobit i glavnica pojedinačno objašnjavaju varijacije cijena dionica u promatranom razdoblju, međutim dobit ima veću eksplanatornu moć nego glavnica u promatranom razdoblju. Naime, dobit objašnjava oko 68% varijacija cijena dionica tijekom 2006. i 2007. godine, dok vrijednosna važnost glavnice u 2006. godini iznosi oko 53%, a u 2007. oko 44%. Iz navedenog je vidljivo da se vrijednosna važnost dobiti u promatranom razdoblju nije mijenjala, dok se eksplanatorna moć glavnice smanjila u 2007. u odnosu na 2006. godinu.

Tablica 7

Rezultati analize vrijednosne važnosti dobiti i glavnice[a] za uzorak dionica listanih na ZSE

Godina	N	a_1	a_2	R^2	t- omjeri	F omjer	VIF
2006.	63	0,654	0,232	0,704	6,121[a1] 2,168[a2]	74,805[b]	2,397
2007.	72	0,566	0,327	0,715	5,367 [a1]	90,020	2,773

	3,095 [a2]

[a] *Regresijski model: $P_{it} = a_0 + a_1E_{it} + a_2BV_{it} + e_{it.}$ Regresijski koeficijenti su u obje godine značajni na razini od 1%.*
[b] *Regresijski model je u obje godine signifikantan na razini od 1%.*

Iako su dobit i glavnica pojedinačno povezani s tržišnom vrijednošću korporacije, odnosno s kretanjima cijena dionica, ove računovodstvene varijable imaju veću eksplanatornu moć, tj. bolje objašnjavaju kretanja cijena dionica ako se promatraju zajedno. Naime, rezultati analize regresijskog modela koji kombinira obje varijable pokazuju pozitivnu i značajnu vezu između računovodstvenih varijabli i cijena dionica u promatranom razdoblju. Korigirani koeficijent determinacije pokazuje da dobit i glavnica zajedno objašnjavaju 70,4% promjena u cijenama dionica tijekom 2006. godine, i 71,5% varijacija tijekom 2007. godine. Rezultati, dakle, ukazuju na visoku objašnjenost modela, a model je signifikantan na razini od 1% u obje promatrane godine. Rezultati istraživanja također pokazuju da je korigirani koeficijent determinacije (R^2) veći u modelu koji uključuje obje varijable nego u pojedinačnim modelima.

Tablica 8
Rezultati analize inkrementalne eksplanatorne moći[a] varijabli regresijskog modela

Godina	R^2	R^2_E	R^2_{BV}	R^2_{IE}	R^2_{IBV}	$R^2_{com, E,BV}$
2006.	0,704	0,686	0,527	0,177	0,018	0,509
2007.	0,715	0,680	0,438	0,277	0,035	0,403

[a] $R^2_{IE} = R^2 - R^2_{BV}$
$R^2_{IBV} = R^2 - R^2_E$
$R^2_{com, E,BV} = R^2 - R^2_E - R^2_{BV}$

U tablici 8 su prikazani rezultati dekompozicije korigiranog koeficijenta determinacije, odnosno analiza inkrementalne eksplanatorne moći računovodstvenih varijabli. Rezultati pokazuju da dobit ima veći informacijski sadržaj od glavnice. Naime, inkrementalna eksplanatorna moć dobiti je iznosila 17,7% u 2006., a 27,7% u 2007. godini dok je inkrementalna eksplanatorna moć glavnice dosta niža te iznosi u 2006. godini samo oko 2% i u 2007. godini oko 3,5%. Također, uočava se porast u inkrementalnoj eksplanatornoj moći dobiti i glavnice, dok eksplanatorna moć zajednička za obje varijable se smanjuje sa 50,9% u 2006. godini na 40,3% u 2007. godini.

ZAKLJUČAK

Kroz ovo istraživanje je po prvi put u Hrvatskoj analizirana vrijednosna važnost računovodstvenih informacija na hrvatskom tržištu kapitala. Rezultati istraživanja pokazuju da su dobit i glavnica promatrani i skupno i pojedinačno vrijednosno važni, odnosno da značajno utječu na kretanja cijena dionica u promatranom razdoblju. Naime, rezultati pokazuju da je dobit značajno povezana s cijenama dionica, budući je regresijski koeficijent uz dobit značajan i pozitivan u obje promatrane godine, a eksplanatorna moć same računovodstvene dobiti iznosi oko 68%. Računovodstvena glavnica je također vrijednosno važna u vrednovanju hrvatskih korporacija jer je regresijski koeficijent uz glavnicu također pozitivan i značajan, a koeficijent determinacije iznosi oko 53% u 2006., te oko 44% u 2007. godini. Navedeni rezultati upućuju na pad eksplanatorne moći glavnice u promatranom razdoblju, dok se eksplanatorna moć dobiti nije mijenjala.

Rezultati provedenog istraživanja ukazuju da su i dobit i glavnica vrijednosno važni u vrednovanju korporacija, međutim ove računovodstvene varijable bolje objašnjavaju kretanja dionica ako se promatraju zajedno. Ukupna eksplanatorna moć dobiti i glavnice iznosi 70,4% u 2006. i 71,5% u 2007. godini. Rezultati ukazuju na visoku objašnjenost modela, odnosno visoki koeficijent determinacije, a dobiveni rezultati su usporedivi sa rezultatima istraživanja vrijednosne važnosti provedenim u razvijenim i tranzicijskim zemljama.

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THE VALUE RELEVANCE OF BOOK VALUE AND EARNINGS – EMPIRICAL ANALASIS ON CROATIAN CORPORATIONS FROM ZAGREB STOCK EXCHANGE

ABSTARCT

The aim of this research is analyzing relationship between accounting information and share prices on Croatian capital market, using value relevance approach. The research was conducted on a sample of corporations from Zagreb Stock Exchange, which consisted of 72 corporations in 2007. and 63 corporations in 2006. The research results show that accounting earnings and book values, observed jointly and individually, are significantly and positively related to share prices. The common explanatory power amounts 71,5% in 2007., and 70,4% in 2006., which indicates that earnings and book values jointly explain about 70% share prices in selected period. The research results indicate that accounting information on Croatian capital market are value relevant, and results are comparable to research results from developed and transition countries.

***Key words**: value relevance, book value, earnings, share prices.*

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THE IMPACT OF CHANGING BUSINESS ENVIRONMENT ON RISK TYPES

ABSTRACT

The changes in business environment resulted in new types of risks in the electric power companies. Therefore, it is very important for electric power companies to identify risks and to find correlations between them on a regular basis, so as to protect and increase the company value. This paper proposes the following three hypothesises: H1 There are changes in types of risks in electric power companies in the course of the last decade. H2 There is a correlation between the intensity of market competition and the impact of the present types of risks. H3 There is a correlation between present types of risks in electric power companies. All theses were proven to be true. Moreover, we identified the most critical risks that the electric power companies are facing today, and have compared them with those of a decade ago. We explored the intensity of market competition and examined a relationship with different types of risks.

Keywords: *Power Companies, Market competitive intensity, Changing business environment, Risk type*

I. INTRODUCTION

A decade ago electrical power companies operated in a stable environment and held monopoly positions on the market. In 1990 the energy market opening has started by adopting the Directive to improve the transparency of gas and electricity prices charged to industrial end-users.

After a short while the first Directive for electricity was adopted in 1996, setting the rules for creating an internal electricity market. The initial goal was to open 33% of the electricity market by February 2003.

In 2003 the second Directive for electricity was adopted to stimulate the market opening defining a new threshold for market opening, 1st of July 2007 for all customers.

Liberalisation of electricity markets has resulted in dramatic change in business environment characterized by the following: changes in energy regulatory policies, introduction of competition and a subsequent loss in market share, increased customer demand; price volatility of electricity, fuel and CO_2 emissions; difficulties in securing fuel supply routes, changes in quota policies for CO_2 emissions, difficulties in securing adequate transmission facilities at acceptable prices etc.

Therefore, in order to achieve an effective risk management system in electrical power companies, it is a vital to understand these changes and to identify the most critical risks from

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aspect of business performance. Risk management protects and adds value to the organization and its stakeholders and it is a factor of business performance [1].

In this paper three hypothesis are proposed.

H1 There is a change of risk types in electrical power companies over a decade.

H2 There is a correlation between market competitive intensity and the impact of the present risk types.

H3 There is a correlation between present risk types in electrical power companies.

In order to tests these hypotheses, we used the results from the survey conducted in 1995 by Unipede and the results from our research completed in 2007.

The main goals of this paper are to examine the most important risks today for electricity industry as well as to identify the changes in risk types due to changes in business environment over the decade.

II. THE MOST CRITICAL RISKS A DECADE AGO IN THE ELECTRICAL POWER COMPANIES

Professional organization UNIPEDE (Union de producteur et distributeur d'Europe) was the professional association which represents the common interests of the electricity industry. The organization has been founded in 1925 in Paris. At the UNIPEDE level, Steering Committee in 1994 set up a Task force whose objectives were [2]:

- to create a framework that allows the collection and exchange of information on how Risk Management is being applied in the UNIPEDE member companies,
- to exchange experience,
- to stimulate the implementation of Risk Management.

Task force, together with Datamonitor from London conducted a survey in 1995 [2]. The survey included 133 companies in 45 countries. The final sample included 85 companies from 31 countries. Therefore the response rate was 61%. The results indicated the most critical risks for power companies at that time.

Respondents were asked to rank the three most critical risks of those listed. The results were analyzed using a weighted average. Percentage ranking was generated by summing the proportion of 1st place risks + proportion of 2nd place risks x 0,5 + proportion of 3rd place risks x 0,25.

Figure 1

The most critical risks in order of importance

31,7% of participants listed environmental risks among the top three most critical risks to their company's viability and profitability followed by employee and public safety.

Political risk was considered also critical, especially by companies in countries which suffered increased legislative and market uncertainties on account of international political activity. Other significant risks include market competition and regulation risks placing business interruption risks as well as corporate image risks in management focus.

III. EMPIRIC RESEARCH OF RISK MANAGEMENT SYSTEM IN POWER COMPANIES

A. Basic Research Information

Research officially commenced in November 2006. The collection phase was completed in July 2007, and the data was processed using the software solution SPSS, version 15.0. Initial pattern included seventy-seven participants from Power Utilities, 21 of whom answered the questionnaire (response rate: 27.3%).

Datamonitor is the leading provider of online data and analytic platforms for key industrial sector. Its clients are five thousand of the world's leading companies. Croatian Power Utility is one of Datamonitor's clients, it has access to its knowledge base. For the purpose of this research Datamonitor prepared a contact list according to defined criteria. In addition to primary data sources, secondary data sources were also used such as company news, company annual reports published on the Internet and in journals, as well as materials from professional organizations (ERGEG, Eurelectric etc.), other available researches and studies etc.

During the research, different scientific methods were used as following:

- a method using a questionnaire in which data, information, attitudes and opinions on the topic of the investigation were gathered about the investigated subjects [3],
- a statistical method by which phenomena are analyzed, indices are calculated, correlations are found etc., with the goal of determining their structure, characteristics and the patterns among the phenomena [4],
- a verification method, used to find arguments for verifying specific hypotheses and
- other methods such as methods for analysis and synthesis, inductive methods, descriptive methods etc.

B. The Research Sample

The research sample was chosen according to the following criteria:

- the number of company employees engaged in risk management,
- the size of the electrical company.

Table I represents geographical distribution of the power companies. Nine of them operate in countries of the European Union, two countries are candidates for EU membership or have applied for accession to the European Union (Croatia, Bosnia and Herzegovina), and two countries are not EU members (Switzerland and Norway) [5]

Table 1

Geographical distibution of the power companies in the final sample

Country	Total Number
Austria	2
Bosnia and Herzegovina	1
Finland	1
France	1
Croatia	1
Ireland	1
the Netherlands	2
Norway	4
Portugal	1
Slovenia	2
Sweden	2
Switzerland	3
Total	***21***

In the preparation of contacts, it was taken into account that the target group should be the managers who manage risk in the companies and who have sufficient knowledge and access to information in this area in order to provide us with an accurate picture of risk management in electrical power companies. Of the total number of contacts (seventy-seven), thirty-one of them (or 36% of the research subjects) are risk managers in their companies, two of them lead risk management organizational units, four are risk managers at the corporate level, twenty-three are chief finance officers and the remaining twenty-six are engaged in operations related to risk (trade, supply etc.) or are part of general management.

Table 2

Functions of the participants interviewed in power companies

	Total Number
Risk manager	4
Chief Financial Officer	2
Risk Analyst	2
Risk Controller	1
Financial Officer	1
Corporate Risk Manager	1
Head of Finance Controlling	1
Trader	1
Portfolio Manager	1
Head of Finance Trading	1
Head of Risk Management	1
Risk Manager responsible for Supply	1
Chief Risk Officer	1
Head of Electricity Procurement	1
Board Consultant	1
Managing Director of Supply	1
Total	***21***

By analyzing final sample, as presented in Table II [5], we can conclude that eleven participants are closely related to risk management activities in their companies, which amounts to 52.4% of the total number. Four participants were risk managers in electrical companies. The others were related to business areas including trade, supply, finance, controlling, etc. and various managerial functions. The reason for this is the fact that risk management is at various stages of development in these companies. Companies that have developed risk management systems also have independent risk management units, while risk management in the other companies is a part of other business functions such as finance etc.

If we examine the sample from the aspect of company size, we can conclude that seven large companies (33.3%), one medium-large, five medium-sized, six medium-small and two small companies are represented [5].

Table 3

Number of employees in the power companies of the sample

Number of employees	Count	Percentage	Cumulative percentage
less than 200	2	9,5	9,5
between 200 and 1000	6	28,6	38,1
between 1000 and 2000	5	23,8	61,9
between 2000 and 5000	1	4,8	66,7
more than 5000	7	33,3	100,0
Total	***21***	***100,0***	

IV. METHOD FOR DEVELOPING THE MARKET COMPETITIVE INTENSITY, MCI, FOR ELECTRICITY MARKETS

Market competitive intensity, MCI, for electricity markets was taken from Datamonitor to describe and evaluate the impact of business environment in terms of electricity market liberalization on electrical power companies [6]. The Datamonitor research was conducted on twenty European electricity markets. The goal of the research was to determine the degree of market openness on the electricity market. The research began in mid 2005 and lasted until mid 2006. In the first phase, the results of a hundred interviews of experts were collected and verified, and in the second phase the results were reviewed and classified.

The MCI is calculated using the following nine metrics (measurements):

- the effectiveness of the regulator,
- the ease of third-party access to the network,
- the effectiveness of balancing and data transfer,
- wholesale market fragmentation,
- retail market fragmentation,
- traded market maturity,
- access to market information and assistance,
- consumer representation,
- propensity to switch suppliers.

These metrics have been divided into three groups:

- ❖ market framework,
- ❖ supplier push and
- ❖ customer pull.

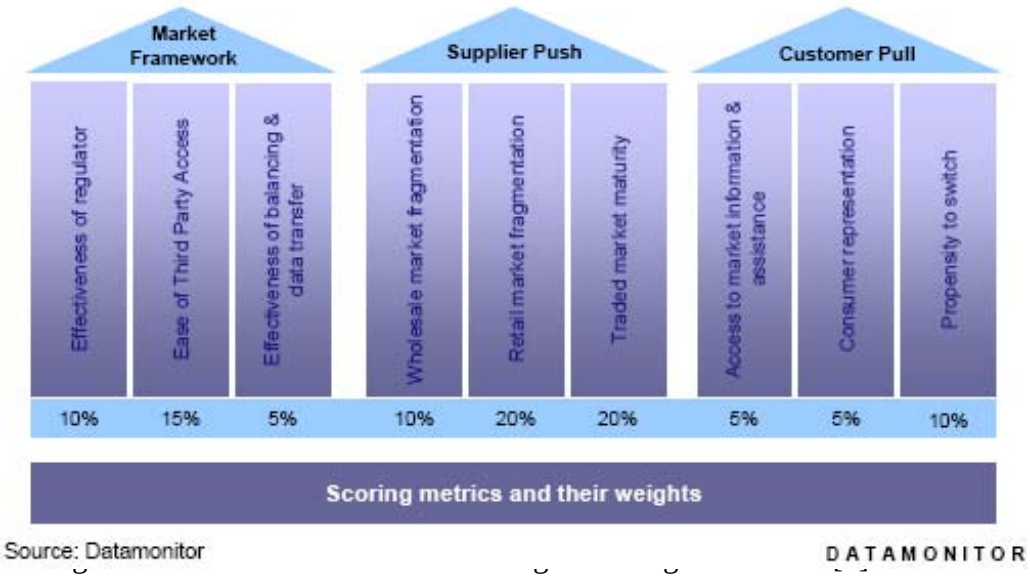
The professional interviewed was scored according to each of these nine metrics on a scale of 0 – 10. To calculate the overall score, i.e. the market competitive intensity index, the following two methods were employed:

1. Simple additive measure – the score of each underlying factor is weighted by the importance of that factor. By adding together all the final index scores, the MCI is obtained:

$$MCI = \sum_{i=1}^{9} z_i \quad . \qquad (2)$$

2. The multiplicative measure – an alternative method to the additive measure, uses the multiplicative measure with the application of the following formula:

$$MCI = \prod_{i=1}^{9} z_i \quad , \quad z = xi^{yi} \quad . \qquad (3)$$



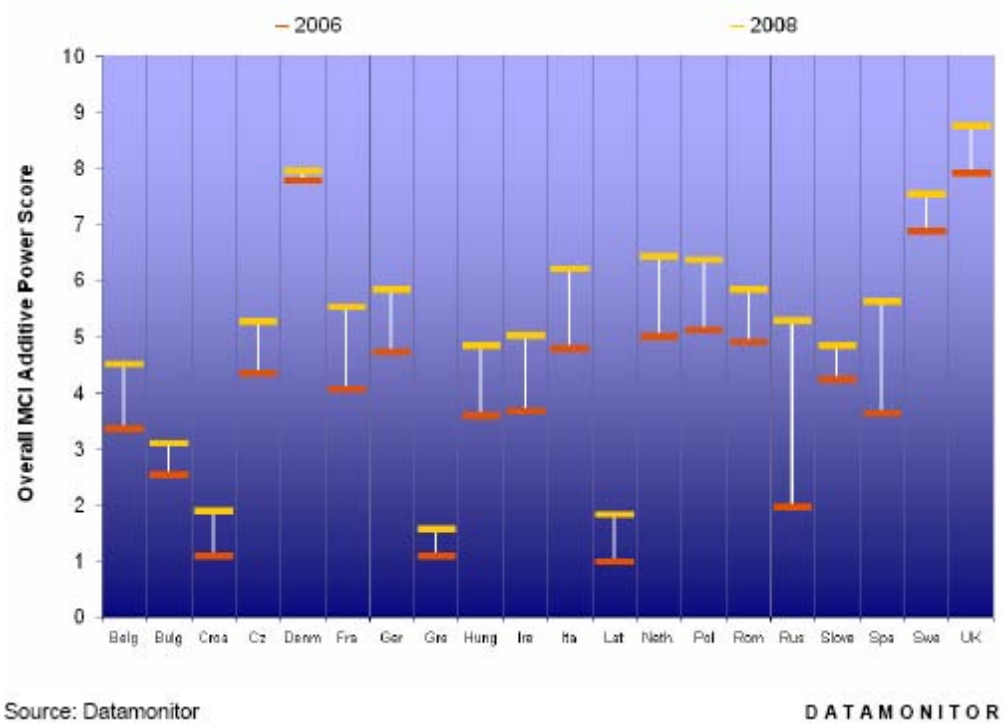
Source: Datamonitor

DATAMONITOR

The results of the research indicate that the electricity market is the most developed in the United Kingdom, i.e. that there are a large number of competitors on the market. Regardless of the dynamics of the opening of markets in the European Union, according to which as of July 1, 2004, all customers except households can freely choose their electricity supplier, the degree of market openness is still low in the majority of the countries of the European Union, as evident from Figure 2.

Figure 3

Total MCI of electricity markets [6]



In Figure 3, the results for the year 2006 are presented in red and for the year 2008 in yellow. From the figure, it is evident that there are clusters around a score of 5, indicating that the countries of the European Union have nonetheless begun the process of opening the electricity markets. The highest scores were obtained by the United Kingdom, Sweden and Denmark. The total score of Sweden was greatly influenced by the existence of a very mature and liquid wholesale electricity market. Reasons for the slow opening of markets differ for each country but they all have monopolistic electrical power companies, disinterested customers and a dearth of knowledge concerning the process of changing suppliers [6].

V. DEFINITION OF RISK TYPES

In order to understand the results of analysis, it is necessary to define a few risk types.

Market risk: Risk of financial gain or loss due to exposure to fluctuations in market prices. The four standard market risks are: interest rate risk, or the risk that interest rates will change; currency risk, or the risk that foreign exchange rates will change; equity index risk, or the risk

that stocks or other index prices will change; and commodity risk, or the risk that commodity prices (e.g., energy, emission rights, bio-fuels, metals) will change [7].

Credit risk: Risk of loss due to a counterparty defaulting on a contract or, more generally, risk due to uncertainty about a counterparty's ability or willingness to meet its obligations (contractual disputes and arbitration due to operational issues are usually covered in operational risk) [7].

(Commodity) price risk: the risk of prices rising above the projected or "trend" level, as a result of which the overall energy cost increases to an extent that compromises the user's cash flow and/or profitability [8];

Load risk: the risk of consuming high volumes of energy at peak price times although the average market price may remain unchanged compared with the projected level, the unfavourable timings of peak periods may still result in significantly increased costs [8];

Volumetric risk: the risk of actual energy demand exceeding the projected, and previously secured, level, which often necessitates purchasing the volume shortfall at a higher price [8];

Balancing risk: the risk of the actual physical position differing from the position previously declared to the wholesale market operator, which in certain markets may result in heavy fines [8].

Currency risk: Risk caused by payments in foreign currency of fuel and electricity, etc. therefore this correlation was expected.

Most published papers analyze management of specific risk type and particularly electricity price risk. There are many papers discussed price risk volatility [9], commodity risk hedging [10, 11] or price movement [12]. Recent introduction of new holistic approach in risk management forced electrical companies to think about other risks beside commodity risk. The energy policy of European Commission, translated into energy directives, i.e. third package set down a number of goals e.g. reduction of carbon emission, increase of energy efficiency, increase of renewable resources etc. Consequently, new type of risks came into the focus of power utilities.

VI. RESULTS OF EMPIRICAL RESEARCH

C. Analysis of correlation between the MCI index and the impact of the most critical risks in electrical power companies

We examined all possible correlation between MCI and listed risks and found only one statistically significant.

Therefore, a comparison of the MCI index and impact of the commodity price risk (Qa) on electrical power company performance is presented in order for us to test the hypothesis that there is a correlation between the openness of electricity markets, i.e. market competitive intensity — MCI, and the impact of the present risks on business performance of electrical power companies.

Prior to comparison, it is necessary to test the normality of the index. From the following figure, we conclude that the distribution is normal, somewhat skewed to the right (skewness = -0,034) and relatively flat (kurtosis = –0,485).

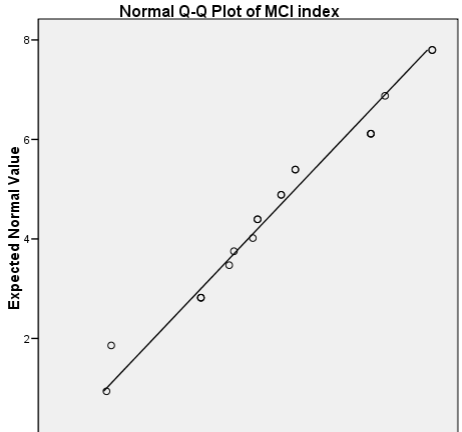


Figure 4 – Q-Q plot of MCI

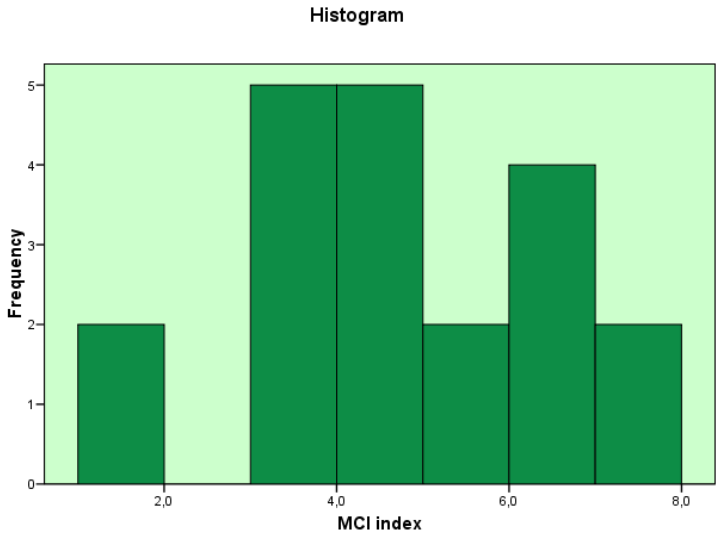


Table 4.

Correlation between market competitive inensity and impact of the commodity price risk

		MCI index	Qa impact
MCI index	Pearson Correlation	1	-,524(*)
	Sig. (2-tailed)		,021
	N	20	19
Qa impact	Pearson Correlation	-,524(*)	1
	Sig. (2-tailed)	,021	
	N	19	20

* Correlation is significant at the 0.05 level (2-tailed).

Table 4. shows that there is a *very strong correlation* between the variables (correlation coefficient r=0,524, n=19). The correlation is negative meaning that variables move in different direction (when one variable increases, the other decreases, and vice versa). This was expected due to the definition of the impact of commodity price risk (1- very high, 5- very low). The level of significance is less than 0,05 indicating a statistically significant correlation.

We can interpret these results in a way that in the mature electricity markets the exposure to the

commodity price risk is a higher due to the existence of reasonably well established and liquid wholesale market.

D. Analysis of importance and impact of the most critical risks in electrical power companies

We asked participants to asses the consequences for the company by using two criteria:

- importance (very important/not very important)
- impact (1-very high, 5- very low).

By analyzing risks in power utilities from aspect of risk importance we can conclude that today the most important risks for power companies are:

- environmental risk,
- interest rate risk,
- credit risk,
- legal/regulatory compliance risk.

Table 5

The impact of the most important risks for power companies today

The most important risks	Response Frequency
Environmental risk	21
Interest rate risk	21
Credit	21
Legal/regulatory risk	21
Commodity price risk	20
Political	20
Interest currency risk	20
Network loss risk	20
Peak load	20
Fuel price risk	19
Volume risk	18

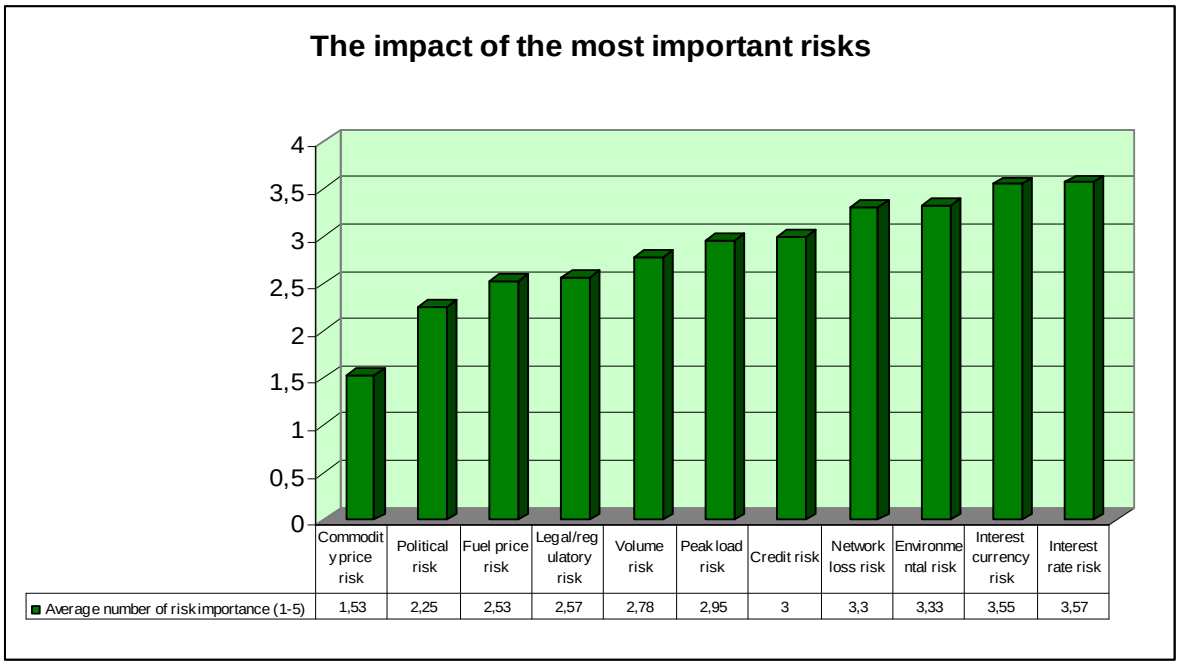
Moreover, we asked participants about the impact of different risk types on company performance. They could choose the mark from 1 (risk with very high impact) to 5 (very low impact).

The results show that risks with most impact on power company's performance today are:

- commodity price risk,
- political risk,
- fuel price risk,
- legal/regulatory compliance risk.

Figure 6

The impact of the most important risks



By analyzing risks in electrical power companies from aspect of risk impact on company performance we can conclude that the biggest impact has the following risks:

- commodity price risk,
- political risk,
- fuel price risk and
- legal/regulatory compliance risk.

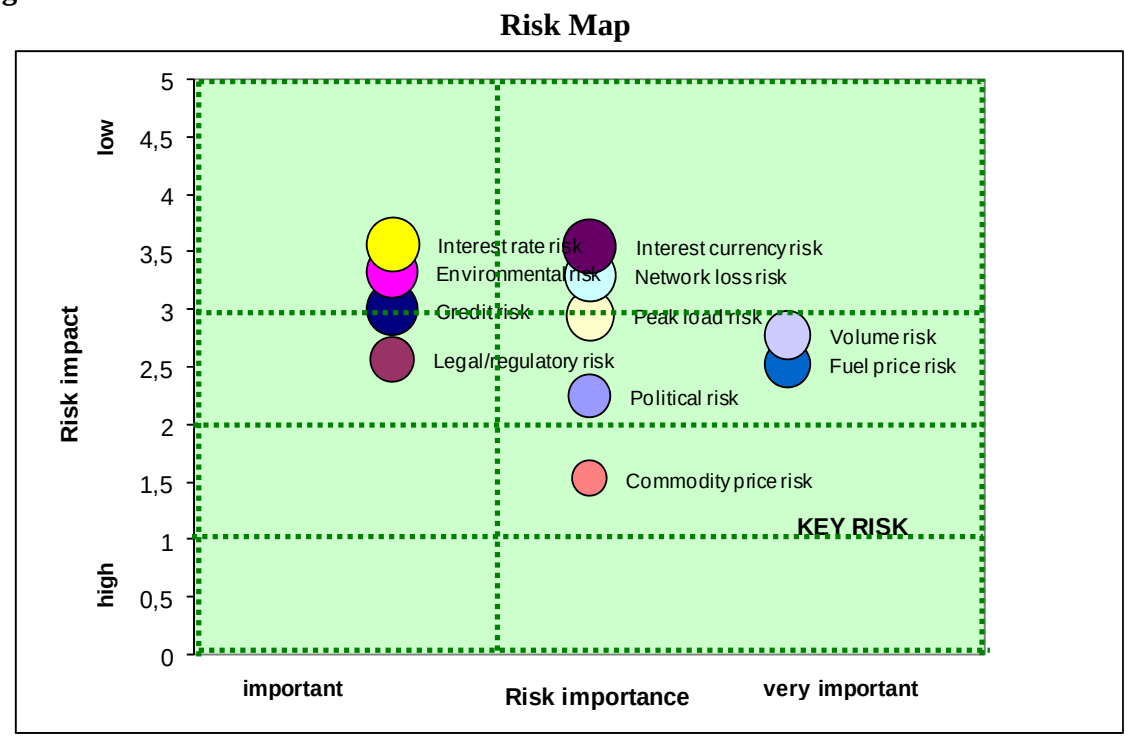
Credit risk has an average mark of 3 and is placed at his middle of the scale. All risks positioned left from credit risk (see Fig. 5) indicate very high and high impact on the company performance and risks positioned right from credit risk indicate low or very low impact.

Two participants are rated image risk as very important with medium impact on company performance.

To sum up the most important risk from both aspects importance and impact are:

- commodity price risk,
- political risk,
- fuel price risk,
- legal/regulatory compliance risk.
- volume risk and
- peak load risk.

Figure 7



E. Comparison of risk types over the decade

If we compare the results from Unipede survey and our research we can conclude that legal/regulatory risk was very critical for electrical power companies in the past decade and is still today. The energy market opening has started in 1990 by adopting the Directive 90/377/EEC to improve the transparency of gas and electricity prices charged to industrial end-users. Even then this risk was perceived as very critical for company performance. Ten years later, the market liberalisation is in different stages of development and therefore still in the focus of Power utilities.

In the past the operational risks were in focus. Today they are replaced by financial risks. Energy market opening caused volatility of wholesale electricity prices placing the commodity price risk in the management focus. Fuel price risk and volume price risk are related to these changes.

Political risk was and still is a very critical for company performance due to direct impact on business performance.

F. Analysis of correlation between the most critical risks in electrical power companies

We compared all type of risks listed in a questionnaire and we found some correlations. It is very important to examine those correlations to be able to decide which risks should be

aggregated and which should be treated separately in order to define a good risk strategy. Analysis of correlation between different risk types was performed using Pearson method.

One participant emphasized the correlation between commodity price risk and peak load risk in the production area of Power Utility that was a driver to test this thesis.

Therefore, we performed an analysis of the correlation between the commodity price risk (Qa) and peak load risk (Qj). The results show that there is a *strong correlation* between the variables (correlation coefficient r=0,402, n=19). The correlation is positive, which means that both variables move in the same direction (when one variable increases, so does the other, and vice versa). The level of significance is greater than 0,05 due to a small sample size.

Table 6

Correlations between commodity price risk and peak load risk

		Qj impact	Qa impact
Qj impact	Pearson Correlation	1	,402
	Sig. (2-tailed)		,088
	N	20	19
Qa impact	Pearson Correlation	,402	1
	Sig. (2-tailed)	,088	
	N	19	20

As we inspected the possible correlations between commodity price risk (Qa) and volume risk (Qi) we found a statistically significant correlation. The peak load risk is caused by a higher consumption than expected in time of peak load. This fact increases the company costs and will increase the impact of commodity price risk.

Table 7

Correlations between commodity price risk andvolume risk

		Qa impact	Qi impact
Qa impact	Pearson Correlation	1	,679(**)
	Sig. (2-tailed)		,002
	N	20	18
Qi impact	Pearson Correlation	,679(**)	1
	Sig. (2-tailed)	,002	
	N	18	18

** Correlation is significant at the 0.01 level (2-tailed).

The results show that there is a *very strong correlation* between the variables (correlation coefficient r=0,679, n=18). The correlation is positive, which means that both variables move in the same direction (when one variable increases, so does the other, and vice versa). The level of significance is lass than 0,05 indicating a statistically significant correlation. The volume risk is caused by exceeding in consumption so that electrical power companies have to buy more

electricity in higher prices. When increasing the impact of volume risk we increase the impact of commodity price risk.

The commodity price risk includes other risks such as political or financial risks. The companies use various types of derivative instruments (forwards, futures and swaps) to hedge various financial risks, primarily interest rate risks, currency risks and electricity price risks.

Therefore, we are examining the correlations between commodity price risk, interest rate risk and interest currency risk.

Table 8

Correlations between commodity price risk and interest rate risk

		Qa impact	Qe impact
Qa impact	Pearson Correlation	1	,395
	Sig. (2-tailed)		,085
	N	20	20
Qe impact	Pearson Correlation	,395	1
	Sig. (2-tailed)	,085	
	N	20	21

The results show that there is a *strong correlation* between the variables (correlation coefficient r=0,395, n=20). The correlation is positive, which means that both variables move in the same direction (when one variable increases, so does the other, and vice versa). The level of significance is greater than 0,05 due to a small sample size.

Table 8. presents a correlation between commodity price risk (Qa) and interest currency risk (Qf).

Table 9

Correlations between commodity price risk and interest currency risk

		Qa impact	Qf impact
Qa impact	Pearson Correlation	1	,422
	Sig. (2-tailed)		,064
	N	20	20
Qf impact	Pearson Correlation	,422	1
	Sig. (2-tailed)	,064	
	N	20	20

The results show that there is a *strong correlation* between the variables (correlation coefficient r=0,422, n=20). The correlation is positive, which means that both variables move in the same direction (when one variable increases, so does the other, and vice versa).

The interest currency risk is caused by payments in foreign currency of fuel and electricity, etc. therefore this correlation was expected.

We can conclude that when examine a commodity risk one should also look at peak load risk,

volume risk, interest rate risk and interest currency risks. Those risks are correlated and should be treated together.

CONCLUSION

The first step in risk management process is to identify company's main risks in terms of intensity and impact i.e. to design a risk map. This is the precondition for defining adequate risk strategies. The research results show that risk map has been changed over last decade. New risks related to electricity market liberalization appeared. New challenges presets following the fulfillment of third package in terms of risk management.

This work has demonstrated that there is a change of risk types over a decade due to a change of business environment. Furthermore, in this paper a following three hypothesises are proposed: **H1** There is a change of risk types in electrical power companies over a decade. **H2** There is a correlation between market competitive intensity and the impact of the present risk types. **H3** There is a correlation between present risk types in electrical power companies.

In order to test these, we examine the most important risks today for electrical power companies and compared them to the most critical risks a decade ago, stated by Unipede research. According to this analysis we can conclude that legal/regulatory risk was a very critical risk and still is for electrical power companies due to market liberalisation process. Operational risks are replaced by financial risks, especially commodity price risk, credit risk, interest rate risks and interest currency risk. Those risks are in companies focus today. There is no change in importance of political risk over a decade. This risk is still a very critical for a company due to direct impact on business performance.

The most important risks today from both aspects importance and impact are: commodity price risk, political risk, fuel price risk, legal/regulatory compliance risk, volume risk and peak load risk.

The market competitive intensity was defined by a very specific metrics (MCI index) developed by Datamonitor in order to describe the changes in business environment. This metrics include three groups of issues: market framework, supplier push and customer pull. Based upon the previous analysis of the correlation between market competitive intensity and impact of the commodity price risk on company performance, we can conclude that there is a strong correlation between the variables that is statistically significant. This shows that in the mature electricity markets the exposure to the commodity price risk is a higher due to the existence of reasonably well established and liquid wholesale market.

Moreover, we examined the correlation between present risk types in electrical power companies and we found that there is a positive medium correlation, statistically significant between commodity price risk and volume risk meaning when increasing the impact of volume risk we increase the impact of commodity price risk. We also found a positive correlations between commodity price risk and interest rate risk as well as interest currency risk but not statistically significant. This was expected while commodity price risk includes other risks such as political or financial risks.

A company needs to define a risk strategy for all the risks identified. In order to do it we need to define which risk should be aggregated and treated together and which risk should be treated separately. Therefore it is very important to examine the correlation between them. So, when examine a commodity risk one should also look at peak load risk, volume risk, interest rate risk and interest currency risks. Those risks are correlated and should be treated together.

It is very important for electrical power companies to be aware of the change all changes in business environment and to identify risks on a regular basis in order to protect and increase the company value.

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II. BIOGRAPHIES

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UTJECAJ PROMJENJIVE POSLOVNE OKOLINE NA VRSTE RIZIKA

SAŽETAK

Promjene u poslovnom okruženju uvele su novi tip rizika u poduzeća elektroprivrede. Zbog toga je za poduzeća elektroprivrede vrlo važno identificirati rizike i naći korelaciju među njima, te to činiti redovito kako bi se zaštitile i povećale vrijednost kompanije. U ovom se radu predlažu sljedeće tri hipoteze: H1 Postoje promjene u tipu rizika u poduzećima elektroprivrede tijekom zadnjih 10 godina. H2 Postoji korelacija između intenziteta tržišne konkurencije i utjecaja prisutnih/postojećih tipova rizika. H3 Postoji korelacija između postojećih tipova rizika u poduzećima elektroprivrede. Sve teze dokazane su kao istinite. Nadalje, identificirani su najkritičniji tipovi rizika danas s kojima se suočavaju poduzeća elektroprivrede, te uspoređeni s onima od prije deset godina. Istražen je intenzitet tržišne konkurencije, te ispitana povezanost s različitim tipovima rizika.

Ključne riječi: *poduzeća elektroprivrede, intenzitet tržišne konkurencije, promjenjivost poslovnog okruženja, tip rizika*

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THE EFFECTS OF MARKETING MIX ELEMENTS ON SERVICE BRAND EQUITY

SUMMARY

This paper explores the effects of selected marketing mix elements on service brand equity. Research hypotheses about the relationship between marketing mix elements, brand equity dimensions and brand equity itself, in the context of service brands, are defined on the basis of the literature review. A survey was conducted in order to collect relevant empirical data. Structural equation modeling is used to test research hypotheses. The findings of the research indicate that some marketing mix elements may have a negative effect on service brand equity. Also, the findings suggest that advertising, employees, interior appearance, price level and service operation have a positive effect on service brand equity. The results indicate the importance of a strategic approach to building service brands, with establishing the equity of service brands being the long-term goal. The main contribution of this paper comes from the findings about the effects of different marketing mix elements on service brand equity, and the importance of a strategic approach to building and managing service brands.

Key words: *Brand equity, Service brand, Strategic brand management, Marketing mix*

INTRODUCTION

The concept of brand equity was introduced into the marketing literature during the 1980s. During the 1990s, the topic attracted considerable attention from marketing scientists, which in turn led to the publication of numerous books and articles (Aaker and Keller, 1990; Aaker, 1991; Keller and Aaker, 1992; Keller, 1993; Aaker, 1996; Agarwal and Rao, 1996; Kapferer, 1998; Keller, 1998). Brand equity still attracts active interest (Yoo et al., 2000; van Osselaer and Alba, 2000; Dillon et al., 2001; Keller, 2001; Moore et al., 2002; Hem and Iversen, 2003; Kapferer, 2004; Baker et al., 2005).

Despite the fact that brand equity has already received considerable attention from marketing scientists, the degree to which marketing mix elements affect brand equity remains under-researched. One of the rare examples of a paper exploring this topic is Yoo et al. (2000). Furthermore, the intensity of impact of marketing mix elements on service brand equity is a completely unexplored area.

This paper presents the results of research into the strength of influences that individual marketing mix elements exert on service brand equity, with individual dimensions of brand equity constituting a mediator variable. The findings facilitate a better understanding of the degree to which particular marketing mix elements affect service brand equity. These findings are also useful to service brand managers, by enabling them to encourage marketing activities that build up brand equity, and to avoid those that undermine brand equity.

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In this paper, service brand equity is understood as the difference in consumer choice between the focal branded and unbranded service given the same level of other service features (Yoo et al., 2000). Also, the paper explores two variables representing different dimensions of brand equity, i.e. brand awareness and brand image (Keller, 1998). The following marketing mix elements are analyzed: price level, advertising, price deals, service delivery process, physical environment and employees.
The paper begins with an overview of the literature dealing with brand roles in the services sector, as well as on the relationship between services marketing mix elements, various dimensions of brand equity and brand equity itself. The research hypotheses were formulated on the basis of a literature review and are integrated into the structural model. The research methodology is then described, after which the paper presents empirical results. Conclusions, managerial implications and recommendations for future research are given in the last section of the paper.

LITERATURE REVIEW AND RESEARCH HYPOTHESES

The role of brand equity in services marketing has not yet been subjected to detailed research (Krishnan and Hartline, 2001), despite the clear particularities and uniqueness of services and services marketing.
Onkvist and Shaw (1989) claim that brands in the service industry are more important than in manufacturing, because services are often perceived by consumers as a generic commodity, and their intangible nature presents a problem to consumers trying to assess quality. The employment of brands in the services sector provides some quality assurance to consumers, while also enabling them visualize and gain a better understanding of the intangible characteristics of the service. By using brands, service companies are able to rise above the level of a generic commodity, thus differentiating themselves successfully from the competition (Berry, 2000). Bharadwaj et al. (1993) believe that brands are particularly important in the services sector, since customers buying services encounter more complex problems than in other sectors. Customers often have difficulty in assessing the content and quality of services, before, during and after use (Krishnan and Hartline, 2001). Hence, a risk arises from the purchase and use of services. However, this risk may be reduced considerably through the use of brands (Bharadwaj et al., 1993), because they optimize the ability of consumers to process service characteristics cognitively (Onkvist and Shaw, 1989). In other words, branding increases the tangibility of services.
In the literature, brand equity is regarded as a multidimensional concept (Aaker, 1991; Aaker 1996; Yoo et al., 2000). Keller (1993; 1998) treats brand awareness and brand image as different dimensions of brand equity, and brand equity increases correspondingly with higher brand awareness and its more positive image. In general, these dimensions have a positive impact on brand equity (Yoo et al., 2000).
Therefore, the higher the brand awareness of a service brand and the more positive its brand image, the higher the brand equity. Thus, the following hypotheses are proposed:

H1a: Service brand equity rises as brand awareness rises.
H1b: Service brand equity rises as brand image becomes more positive.

Price level is an important factor in forming brand equity, because it is directly related to the perceived quality of most products and services (Ross, 1984). More expensive brands are often perceived as being of higher quality, so that they are less vulnerable to price cutting by the competition than cheaper brands (Blattberg and Wisniewski, 1989; Dodds et al., 1991; Kamakura and Russell, 1993). Higher price has a positive effect on brand equity, with the perceived brand quality serving as a mediator variable (Yoo et al., 2000).
Therefore, the higher the price of a service brand, the more positive its brand image and brand equity.

H2a: Service brand image becomes more positive as brand price rises.
H2b: Service brand equity rises as brand price rises.

Advertising is used to bring about improvements in perceived service quality, both by reducing the impact of service heterogeneity and by increasing the amount of external information on the services (Hill and Gandhi, 1992). Investment in advertising has a positive impact on brand equity creation (Simon and Sullivan, 1993; Cobb-Walgren et al., 1995). In addition, there is a positive correlation between investment in advertising and perceived quality (Aaker and Jacobson, 1994). The perceived cost of a brand advertising campaign can affect consumer expectations with respect to the quality of a product (Kirmani and Wright, 1989). Advertising also plays a significant role in increasing the strength of associations related to the brand (Yoo et al., 2000). Advertising makes positive brand associations more easily accessible in the minds of customers (Farquhar, 1990).
Advertising plays a central role in building a brand image, and this role is twofold: (1) advertising presents brand characteristics and positions them in relation to consumer expectations, (2) advertising endows the brand with symbolic values that appeal to consumers and represent added value (Meenaghan, 1995).
Advertising is a highly significant element of the marketing mix that can be used successfully to increase brand awareness (Krishnan and Chakravarti, 1993; Keller, 1998; Yoo et al., 2000; Ailawadi et al., 2002; Rajh, 2005). Consequently, advertising has a positive impact on service brand equity, affecting both the dimensions of brand image and brand awareness. The following hypotheses are proposed:

H3a: Service brand awareness rises as the intensity of advertising rises.
H3b: Service brand image becomes more positive as the intensity of advertising rises.
H3c: Service brand equity rises as the intensity of advertising rises.

Price deals tend to decrease brand equity, in spite of short-term financial gains prompted by an increase in sales (Yoo et al, 2000). The impact of price deals is only short-term, with no lasting effects on long-term brand sales (Pauwels et al., 2002). Moreover, price deals may also undermine the brand in the long run, since frequent price changes create confusion among consumers. That is, unexpected differences between the expected and actual price may contribute to the perception of brand quality as unstable (Winer, 1986). Price deals generally have a negative impact on brand assessment by consumers, before they even try out the respective product. Such activities often lead to a decline in perceived brand quality, so that even a single price deal may suffice to undermine the perceived brand quality (Raghubir and Corfman, 1999). Yoo et al. (2000) demonstrated that price deals prompt consumers to assume that a given brand is of poor quality. Price deals thus also have a negative impact on potential brand differentiation (Boulding et al., 1994). Consequently, the use of price deals has a negative impact on brand image, leading to a decline in brand equity. Therefore, the following hypotheses are proposed:

H4a: Service brand image becomes more negative as price deals become more frequent.
H4b: Service brand equity declines as price deals become more frequent.

The service delivery process undoubtedly affects perceived service quality (de Chernatony and Segal-Horn, 2003). In the course of service delivery, customers experience the service provision, with this process itself affecting perceived service value. In this way, the service delivery can either raise or lower the perceived value of the respective service (Tseng et al., 1999). The characteristics of the service delivery process may even have a greater impact on a general assessment of the service than the actual service (Brown and Swartz, 1989). Certain

elements of the service delivery may affect customers assessments of the service they have received (Danaher and Mattsson, 1994). Customer queuing or waiting to receive a service and delivery delays are examples of elements that exert a substantial impact on perceived service quality (Taylor, 1994). The very duration of the process of service delivery may affect the consumer perception of service quality (Danaher and Mattsson, 1998). Also, the service delivery affects consumer satisfaction with the service (Danaher and Mattsson, 1994; Danaher and Mattsson, 1998). Consumer experiences with a service company have a direct impact on the creation of service brand image, which in turn affects brand equity (Berry, 2000). Consequently, the service delivery process also influences the creation of service brand image, in turn affecting brand equity. A high-quality service delivery process therefore has a positive impact on service brand image, leading to an increase in brand equity.

H5a: Service brand image becomes more positive as the perceived quality of the service delivery process improves.

H5b: Service brand equity rises as the perceived quality of the service delivery process improves.

Due to the intangibility of services, it is particularly important to make use of tangible, material elements of a service in order to communicate the value of the service (de Chernatony and Segal-Horn, 2003). Service brands need to be made as tangible as possible so that they represent well-defined reference points to consumers. The use of as many physical elements as possible that consumers can link to the brand is an efficient means of building strong service brands and increasing their tangibility (McDonald et al., 2001). The physical environment in which services are delivered affects not only the service brand image (Upah and Fulton, 1985; Zeithaml et al., 1985; Bitner, 1992), but also consumer satisfaction with the service (Bitner, 1990; Harrell et al., 1980). In this paper, we explore the impact of the physical surroundings in which services are delivered on brand equity. The following hypotheses are proposed:

H6a: Service brand image is more positive when the physical surroundings in which services are delivered are perceived more positively.

H6b: Service brand equity rises when the physical surroundings in which services are delivered are perceived more positively.

In the eyes of customers, employees embody the service brand (Grönroos, 1994). Service companies need to communicate their goals and values, that is, their brand identity to their employees, so that they themselves can contribute to building the respective service brand image (Hogg et al., 1998). Employees need the support of the company in order to act in the best interests of the service brand, and the company should motivate them to contribute to building that brand (Tilley, 1999). The service company's employees influence customer perceptions of the service brand (McDonald et al., 2001).
In his model of services branding, Berry (2000) indicates that client experiences with a service company have a direct impact on the creation of service brand image, which, in turn, affects brand equity. Since service company employees directly influence the creation of general experiences with the company, we conclude that employees also affect the creation of service brand image. The more positive the client perceptions of service company employees, the more positive the respective service brand image will be, prompting an increase in brand equity.

H7a: Service brand image is more positive when service company employees are perceived more positively.

H7b: Service brand equity rises when service company employees are perceived more positively.

METHODOLOGY

The exogenous and endogenous variables of the defined structural model were measured by means of scales containing various statements. The respondents were asked to specify their level of (dis)agreement using five-point Likert scales.
Table 1. contains an initial set of items used to measure the researched variables. The set was adapted partly from the literature, and developed partly for the specific purposes of this investigation. The items were refined further in the course of the research. The items were adjusted to each service category, i.e. the term “bank” was replaced by an appropriate term, depending on the particular service category. The “r” denotes negative statements which are recoded prior to being analyzed.

Table 1

Initial set of items

Price:
PR1 – This bank's prices are too high
PR2 - This bank's services are expensive
PR3 - This bank's services prices are inexpensive (r)
Advertising:
AD1 – This bank's advertising campaigns are very frequent
AD2 - This bank advertises extensively
AD3 - This bank's advertising campaigns are more expensive than those of competing banks
Price deals:
PD1 - This bank has frequent promotions through service price deals
PD2 - This bank's services can often be obtained at promotional prices
PD3 - This bank frequently offers price deals on its services
Service delivery process:
SD1 – The service delivery process at this bank is excellent
SD2 - The service delivery process at this bank is extremely good
SD3 - The service delivery process at this bank is superior to that of competing banks
SD4 - This bank stands out with its service delivery process
SD5 - This bank has an excellently formulated service delivery process
Physical surroundings in which service is delivered:
PS1 – This bank has well appointed outlets
PS2 - This bank's outlets have an impressive appearance
PS3 - This bank's outlets are better appointed than those of competing banks
PS4 - This bank's outlets are well appointed
Employees:
EM1 - This bank's employees are always ready to help clients
EM2 - This bank's employees are friendlier than those of competing banks
EM3 - This bank's employees try to help their clients
EM4 - This bank's employees are helpful
EM5 - This bank's employees are always friendly
Brand awareness:

BA1 – This bank is very familiar to me
BA2 - I know this bank very well
BA3 - I don't know this bank (r)
BA4 - I am aware of this bank
Brand image:
BI1 - This bank satisfies my requirements fully
BI2 - This bank's characteristics satisfy my requirements fully
BI3 - This bank satisfies my requirements best
Brand equity:
BE1 – It makes sense to use the services of this bank rather than of some other, even if the two banks are the same
BE2 - Even if another bank seems no different from this one, it still seems smarter to use this bank's services
BE3 - Even if another bank has the same characteristic as this one, I would rather use this bank's services
BE4 - If there is another bank of the same quality as this one, I would rather use this bank's services

The research included three services categories (fast food restaurants, banks and retail outlets), from which 10 brands were selected. The selection of individual service categories and their respective brands was influenced by the sample structure (university students). Ten in-depth interviews were conducted with students of the Faculty of Economics and Business in Zagreb, in order to develop the individual categories. Students were asked to list the service that they use currently or have used in the past. The service categories were selected on the basis of their input.

In the final selection of service categories, the differences in terms of various criteria (e.g. price, frequency, duration and situations of use, risk etc.) were taken into account, in order to increase the potential to generalize the research findings by including diverse categories. That same objective influenced the selection of individual service brands toward including those that are different with respect to various criteria (e.g. price, quality, market share).

The survey was conducted with a sample of students of the Faculty of Economics and Business in Zagreb. The sample initially included 532 respondents. After univariate and multivariate outliers were excluded, a total of 521 respondents remained in the sample. The data analysis did not take into account particular brand names to which respondents referred, in order to increase the potential for generalizing the results.

In order to assess the reliability, convergent and discriminant validity of the measurement scales, coefficient alpha, an exploratory factor analysis and a confirmatory factor analysis were used. Structural equation modeling was used to test the research hypotheses.

RESEARCH RESULTS

Coefficient alphas were calculated for each scale. Their values ranged between 0.70 and 0.87, which indicates an acceptable level of scale reliability for theory testing research (Nunnally and Bernstein, 1994).

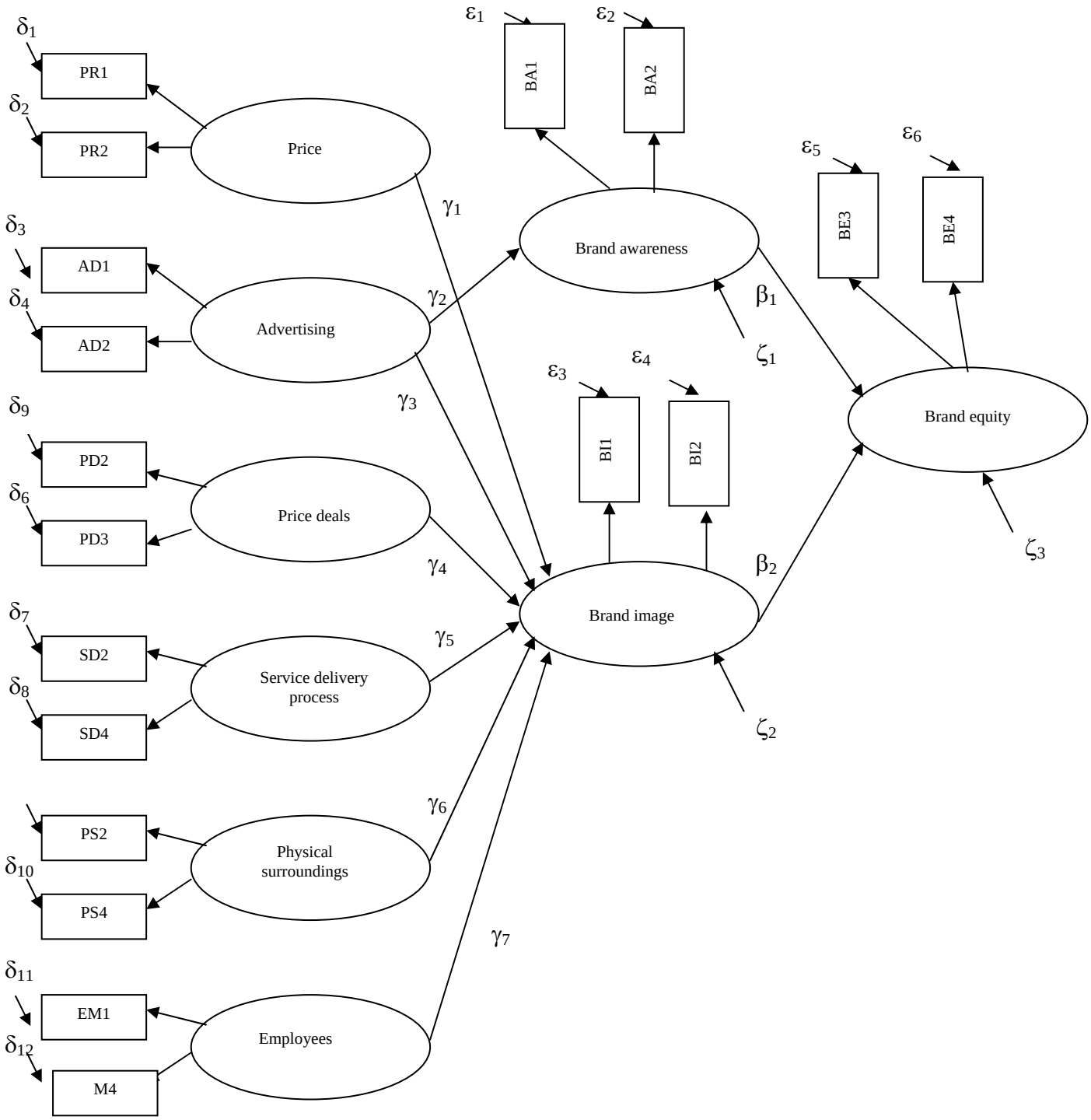
The value of alpha if an item is deleted, indicates the items which (when eliminated) increase the coefficient alpha value of the respective measurement scale. Accordingly, PR3, AD3, EM2 and BA3 items were eliminated from further analysis.

The exploratory factor analysis was conducted to test the discriminant and convergent validity of the scales. Factors were extracted by using the principal components method. A varimax rotation was also applied. The Kaiser-Guttman rule was employed as a criterion for selecting the number of factors. As expected, nine factors were found, and all, except three items, loaded on the appropriate factors. The three items (SD1, SD3, SD5) have a low factor loading on the respective factor, and a high factor loading on one of the remaining factors.

Therefore, they were eliminated from further analysis. The results of the exploratory factor analysis indicate discriminant and convergent validity for the measurement scales.
Structural equation modeling was used to estimate the parameters of the structural model and therefore to test the research hypotheses. Prior to the analysis, all the assumptions for a successful application of the method were checked and found to have been met. Specifically, the empirical data were found to display a satisfactory level of univariate and multivariate normality without unacceptable levels of bivariate and multivariate multicollinearity, while possessing a satisfactory level of homoscedasticity (Kline, 1998).

Figure 1

Structural model of the effects of marketing mix elements on service brand equity



Because the ratio between the sample size and number of parameters in the structural model should be at least 10:1 (Kline, 1998), it follows that each latent variable could be assigned to a maximum of two manifest variables. Two items with the highest item-total correlation were chosen for each latent variable (Figure 1.).
The goodness-of-fit statistics were as follows: GFI = 0.86, AGFI = 0.81, NFI = 0.81, NNFI = 0.80, CFI = 0.84. This indicates an overall acceptability of the analyzed structural model (Hu and Bentler, 1999).

Table 2

Confirmatory factor analysis

Latent variable → manifest variable	**Standardized factor loading**
price → PR1	0.54*
price → PR2	0.72*
advertising → AD1	0.93*
advertising → AD2	0.57*
price deals → PD2	0.62*
price deals → PD3	0.82*
service delivery process → SD2	0.58*
service delivery process → SD4	0.78*
physical surroundings in which service is delivered → PS2	0.63*
physical surroundings in which service is delivered → PS4	0.81*
employees → EM1	0.56*
employees → EM4	0.61*
brand awareness → BA1	0.56*
brand awareness → BA2	0.79*
brand image → BI1	0.64*
brand image → BI2	0.60*
brand equity → BE3	0.67*
brand equity → BE4	0.69*

** statistically significant at the level of p<0.001*

In order additionally to test the discriminant and convergent validity of the measurement scales and to check for scale unidimensionality, the measurement component of the structural model was analyzed first (confirmatory factor analysis). The measurement model was specified to have nine factors, with each item prescribed to load only on their appropriate factor. Standardized factor loadings (Table 2.) show that all 18 items load significantly onto their respective factors. The results indicate that the measurement scales are unidimensional and provide further empirical evidence of their convergent and discriminant validity.
The next step was an analysis of the structural model itself, in order to test the research hypotheses. Parameter estimates are given in the Table 3.

Table 3

Structural model estimates

Hypothesis	Parameter	Estimate	Conclusion
H1a: brand awareness → brand equity (+)	β1	0.21*	Supported
H1b: brand image → brand equity (+)	β2	0.59*	Supported
H2a: price → brand image (+)	γ1	0.24*	Supported
H3a: advertising → brand awareness (+)	γ2	0.34*	Supported
H3b: advertising → brand image (+)	γ3	0.09**	Supported
H4a: price deals → brand image (-)	γ4	-0.22*	Supported
H5a: service delivery process → brand image (+)	γ5	0.16*	Supported
H6a: physical surroundings in which service is delivered → brand image (+)	γ6	0.24*	Supported
H7a: employees → brand image (+)	γ7	0.39*	Supported
H2b: price → brand equity (+)	α1	0.14*	Supported
H3c: advertising → brand equity (+)	α2	0.27*	Supported
H4b: price deals → brand equity (-)	α3	-0.13*	Supported
H5b: service provision process → brand equity (+)	α4	0.09*	Supported
H6b: physical surroundings in which service is delivered → brand equity (+)	α5	0.14*	Supported
H7b: employees → brand equity (+)	α6	0.23*	Supported

** statistically significant at the level of p<0.001*

*** statistically significant at the level of p<0.05*

All path coefficients are significant and yield the hypothesized direction, which leads to the conclusion that each of the hypotheses on the effects of brand equity dimensions on brand equity and about the effects of marketing mix elements on brand equity dimensions were supported.

The direction and strength of the effects of a particular element of the marketing mix on brand equity were calculated as the product of all parameter estimates of the relational routes between marketing mix elements and brand equity. If there is more than one relational route, the products were summed. For instance, α_2 was calculated by summing the products between γ_2 and β_1, and γ_3 and β_2. The resulting parameters indicate that each of the hypotheses on the effect of marketing mix elements on service brand equity were supported.

CONCLUSIONS

Service brand image is most strongly affected by service company employees, while the intensity of advertising has proved to have the lowest effect. The effect that service company employees have on the service brand image indicates the importance of the role played by internal marketing in the development of strong service brands. A service company must concern itself with its employees systematically and appropriately, ensuring an adequate level of competence and job satisfaction. Also, service company employees represent a factor that may exert a positive impact on problems arising from the specific characteristics of services. Problems relating to service intangibility can be dealt with by using more personal, rather than impersonal elements. Problems related to service inseparability can be overcome by placing a greater emphasis on the recruitment and training of contact employees. Problems with respect to heterogeneity can be resolved by personalizing the services, in which employees again play an important part.

In terms of the intensity of effect on brand image, the second largest influence is that exerted by two factors together - the physical surroundings in which services are delivered and the service price level. The importance of both elements derives from the intangibility of services. A pleasing appearance of the outlet makes the service more tangible. Also, the physical surroundings and price are among the rare external indicators that may be assessed by clients when deciding on the purchase of a particular service, and which they can use as the basis for forming the brand image of the respective service. Therefore, a strong intensity of the price effect on brand image is hardly surprising. Closely connected with this is the finding about the negative impact of price deals on brand image. This occurs, because price cutting causes a change in one of the few external service quality indicators that may contribute to client confusion, possibly resulting in a perceived instability of brand quality.

The research findings point to the fact that the intensity of advertising tends to affect the creation of brand awareness more strongly than it does brand image, primarily because raising brand awareness is a far simpler task than creating a positive brand image. This is especially true if only the intensity of advertising is taken into account.

The effect of brand image on brand equity is almost three times stronger than the effect of brand awareness. The lower intensity of the effect of brand awareness can be explained by the fact that brand awareness is, to a large extent, only a prerequisite for brand-image building. Brand image is what gives a particular brand its distinct significance. It is, therefore, exactly what distinguishes that particular brand in the eyes of customers, from other, competing brands of similar familiarity. This is especially true for service brands, since they provide companies with the opportunity to rise above the level of generic commodities and in that way, distinguish themselves from the competition. Furthermore, more complex problems are encountered by consumers during the purchasing of services, than with physical products purchases. The purchase and use of services entail a certain risk for clients, which can be greatly reduced by the employment of brands. In this context, brands optimize customer ability to cognitively process service characteristics by increasing service tangibility.

The research results clearly point to the importance of a strategic approach to brand management in the service sector, through building brand equity, rather than just brand sales being applied as criteria when deciding on the implementation of individual marketing mix elements. If brand management were to focus solely on sales, there is a strong possibility that undertaking such marketing activities would initially boost sales, while undermining brand equity in the long run (e.g. price cutting activities). Also, the research results imply that, in the process of allocating marketing budgets to cover individual marketing mix elements, it is necessary to take into account the potential effects of each marketing mix element on brand equity building.

The investigation further suggests the need for a careful selection of specific marketing mix elements, in order to avoid the erosion of existing brand equity and the possibility that achieving certain short-term goals (such as a sales boost) might undermine the potential for long-term sales increases, or for gaining sustainable competitive advantages that stem from strong brand equity.

Furthermore, the results indicate that managers should focus their efforts with respect to service-brand equity building primarily on developing brand awareness and a positive brand image. Any activities designed to affect brand equity positively, should be directed either at raising brand awareness or at improving brand image, or both. Any service company using sales as the only indicator of successful brand management might be exposing itself to the danger of eroding its own brand equity.

A further generalization of the research findings requires additional research to encompass certain other homogenous respondent samples, while also exploring other service sectors. Furthermore, future research might include some other marketing mix elements, in order to study their effect on the creation of service brand equity. A systematic series of research projects involving different marketing mix elements could provide valuable insight into the effects of various elements of the marketing mix on service brand equity. Such insights

would enable service brand managers to make informed decisions about choosing particular marketing mix elements, taking into account their long-term effect on brand equity.

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EFEKTI MARKETING MIXA NA TRŽIŠNU VRIJEDNOST MARAKA U USLUŽNOM SEKTORU

SAŽETAK

U radu se istražuje utjecaj odabranih elemenata marketinškog miksa na tržišnu vrijednost maraka u uslužnom sektoru. Na temelju pregleda relevantne znanstvene literature definirane su hipoteze o odnosu između elemenata marketinškog miksa, dimenzija tržišne vrijednosti marke i same tržišne vrijednosti marke. Provedeno je anketno istraživanje kako bi se prikupili relevantni empirijski podaci. Hipoteze su testirane metodom modeliranja strukturnih jednadžbi. Rezultati istraživanae upućuju na zaključak da neki elementi marketinškog miksa mogu imati negativan utjecaj na tržišnu vrijednost marke u uslužnom sektoru. Također, rezultati upućuju na zaključak o pozitivnom utjecaju oglašavanja, zaposlenika, fizičkog izgleda mjesta pružanja usluga, razine cijena i procesa pružanja usluga na tržišnu vrijednost marke u uslužnom sektoru. Na temelju rezultata istraživanja autori zaključuju o važnosti strateškog pristupa u upravljanju markama u uslužnom sektoru, pri čemu se tržišna vrijednost marke nameće kao bitan dugoročni cilj upravljanja markom. Doprinos ovog rada se sastoji u identificiranju utjecaja pojedinih elemenata marketinškog miksa na tržišnu vrijednost marke u uslužnom sektoru, te u utvrđivanju važnosti strateškog pristupa u upravljanju markama u uslužnom sektoru.

Ključne riječi: *tržišna vrijednost marke, marka usluge, strateško upravljanje markom, marketinški miks*

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BUSINESS PROCESS MANAGEMENT SOFTWARE SELECTION – TWO CASE STUDIES

ABSTRACT

The interest in business processes management (BPM) is intense among practitioners and scholars and is still growing. Many business process management software (BPMS) tools that are used to serve a variety of applications in BPM are on the market and it is quite difficult to select the appropriate one. The paper presents a flexible method for BPMS selection, which can be applied in different companies and for various project types because the selection criteria are connected to project goals and critical success factors. The method has been developed on the basis of relevant literature and practical experience in BPM projects. It is based on Analytic Hierarchy Process (AHP) method. The applicability of proposed method is demonstrated with two case studies that are also used to analyse and discuss it.

Keywords: *business process management, business process management software, AHP method, business process modelling, business process change*

1. INTRODUCTION

Throughout the last decades business process management gained importance in business community. Key literature on business process management (BPM) suggests that companies can improve services to their customers and enhance their overall performance by adopting a process view of business (e.g. Rummler and Brache, 1990; Davenport, 1993; Hammer and Champy, 1993; Khan, 2004; Hammer, 2004; Harmon, 2007). Although BPM methods were first used in manufacturing, now they are widely applied in service industry (Harmon and Wolf, 2008). Recent empirical research (Maddern *et al.*, 2007; Kumar *et al.*, 2008) on linkages between BPM and customer satisfaction confirmed that process management is a critical driver of technical service quality.

There are various BPM principles and methods that have their origins in different managerial practices. In essence they can be summed in three traditions (Harmon, 2007): management tradition, quality control tradition, and IT tradition. The management tradition has always put an emphasis on strategy, on corporate performance, and on business results. The quality control tradition encompasses different methods for continuous process improvement, like

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Total Quality Management, Six Sigma and EFQM model. The emphasis is more on problem-solving and making minor improvements on a frequent basis. The IT Tradition involves the use of computers and software applications (e.g. ERP systems, workflow-management systems, BPM suites, web-based e-business applications) to automate work processes (Smith and Fingar, 2003). In the 1990s radical change methods of Business Process Reengineering (Hammer and Champy, 1993) were very popular. They can be placed between the IT and the management traditions.

The interest for BPM is growing, however, the understanding of BPM is quite diverse. As reported in (Harmon and Wolf, 2008) 40% of companies worldwide, that answered the questionnaire about BPM, understand it as a top down set of principles and methods designed to organise, manage and measure the organisation based on the organisation's core processes. The rest of them perceive BPM in a much narrower sense, i.e. as a cost saving initiative focused on redesigning, improving and increasing productivity of specific processes or even as a set of new software technologies that enable modelling, analysing, measuring and automation of business processes execution.

A large interest in BPM resulted in a growing number of BPM software (BPMS) on the market, which could be considered an advantage for companies buying these tools. On the other hand this situation leads to a very difficult decision for the appropriate software. Since there are many tools with various characteristics in the market and the aims of using them can be very diverse, it is impossible to determine which tool is the best. Although BPMS is not the most important part of BPM it is important for the company to select the right one (Al-Mashari *et al.*, 1999). The aim of this paper is to present the method for BPMS selection to help managers and IT experts in making a flexible and customised selection of BPMS on the basis of project goals and critical success factors (CSF). The method is based on multi-criteria decision making and was successfully applied in two organisations from service industry.

The paper is structured as follows: Section 2 presents a brief overview of BPMS and some possible criteria for their evaluation. The Analytic Hierarchy Process (AHP) based method for BPMS selection in presented in Section 3. In Section 4 the method is illustrated with two case studies that demonstrate its applicability. The two case studies are used to analyse and discuss the proposed framework in Section 5. Section 6 presents some general conclusions and future work directions.

2. BUSINESS PROCESS MANAGEMENT SOFTWARE

Business process management software is a set of software tools used in BPM. BPMS can support one or several activities of BPM. A wide range of such tools can be found on the market. Different tools are focused on different segments of BPM, like organisation and enterprise modelling, process modelling, simulation and optimization business rule management, managing relationships among process participants, monitoring process performance, process automation, workflow management and also software modelling and development (Harmon, 2007).

An important group of BPMS are process modelling tools. They are generally used by practitioners who are trying to understand how their organisations or their business processes work, to create a new process or to redesign or improve an existing process. Models of business processes play an important role in different phases of BPM, especially in the earlier phases of process analysis and redesign. On the other hand, other tools are suitable in implementation phases of BPM, e.g. workflow management tools and software that enables

process measurement. BPM suites cover several segments of BPM are used to automate and control processes as they are executed and also enable process modelling (Miers *et al.*, 2007).

Several characteristics of BPMS can be used for their evaluation. For example Hommes and van Reijswoud (2000) have developed a framework for the evaluation of business process modelling techniques that are very important in BPM. They refer to the quality of the way of modelling and the way of working of a modelling technique, respectively. These criteria are: expressiveness, arbitrariness, suitability, clarity and comprehensibility of models, coherence, completeness, efficiency, and effectiveness.

According to the (Miers *et al.*, 2007) several expected characteristics for BPMS, from which evaluation criteria can be derived, can be identified: modelling capabilities, simulation capabilities, usability and user interface of the tool, suitability for different groups of users, support for different types of process and architectural frameworks (e.g. SCOR framework), different methodologies (e.g. BSC or Six Sigma) support, support for different notations and standards (e.g. BPMN, UML), support for specific technical infrastructures, integration with other products, report generation capabilities, pricing and total cost of ownership (TCO), vendor support, and product positioning (reputation), industry or domain specific templates or frameworks.

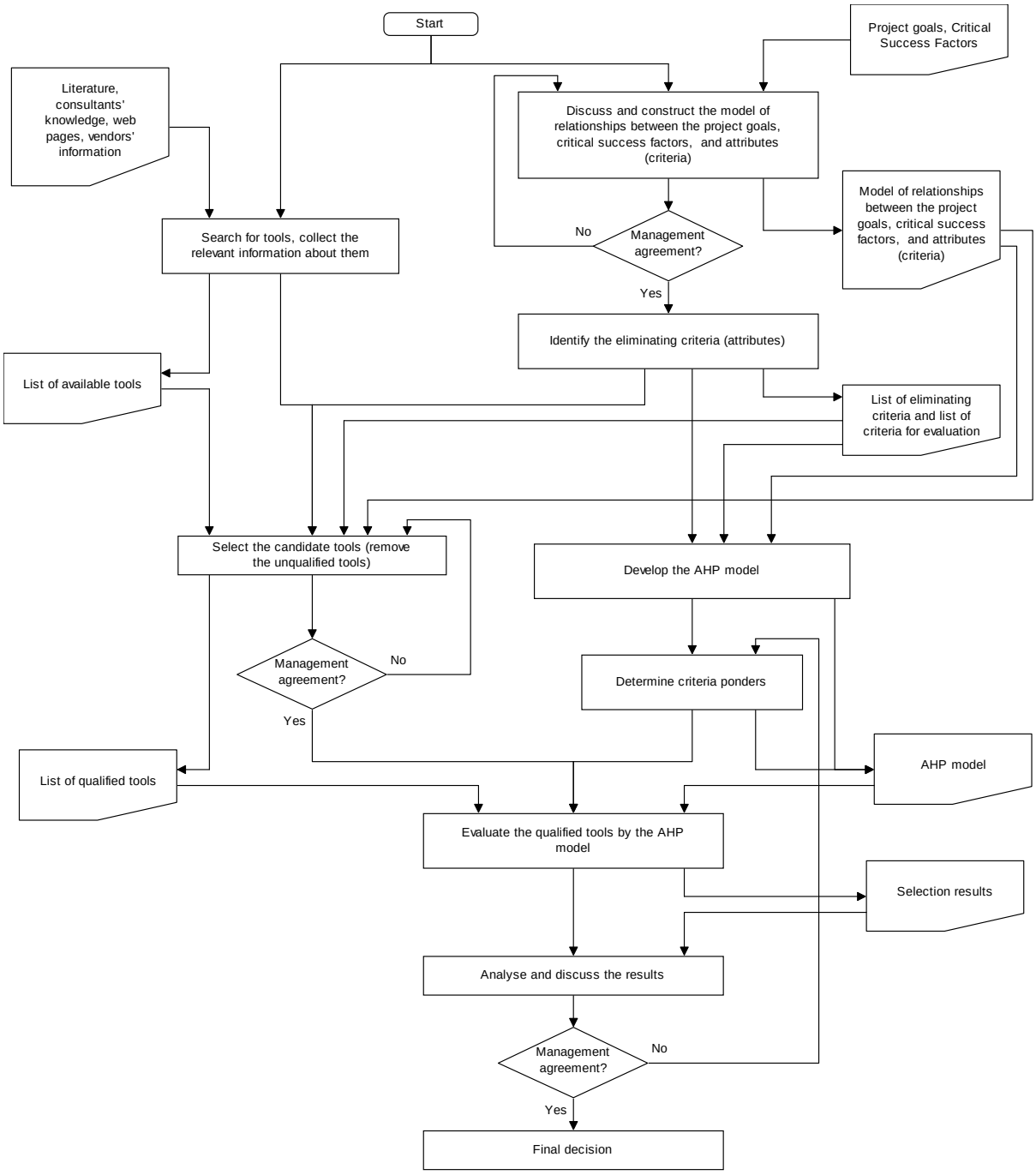
3. THE METHOD FOR BUSINESS PROCESS MANAGEMENT SOFTWARE SELECTION

Because BPM has many different meanings it is impossible to evaluate BPMS without having in mind aims of using it. The overwhelming complexity of the BPM tools is underscored by the Gartner Group which publishes yearly »Gartner quadrants« reviewing the state of practice in BPM domain. Recently, many researches seek to offer some support for organizations facing a software selection decision by developing an evaluation framework (Lin et al, 2007; Ayag and Ozdemir, 2007; Braglia et al, 2006; Haddad and Ribiere, 2007; Malie et al, 2008; Mulebeke and Zheng, 2006; Nevo et al, 2008; Percin, 2008, Stefanou, 2001; Wu et al, 2007; Ziaee et al, 2006). Most of these papers are oriented toward ERP systems selection and evaluation, but similar methods could help managers and IT specialists in BPMS selection process.

Therefore we propose the method for BPMS selection that is based on multi-criteria decision making. Criteria are formed on the basis of project goals and CSFs. The method, which is outlined in Figure 1, is based on AHP decision making process (Saaty, 1997; Saaty, 1980) for making multi-objective decisions. This method helps individual as well as group decision makers to convert qualitative assessment to quantitative scales. In literature many cases of AHP method application in multi-criteria decisions are reported, e.g. (Kim and Lee, 2003; Liua and Shih, 2005). Wei *et al.* (2005) describe an AHP-based approach to ERP system selection.

Figure 1

BPMS selection process



The selection process can start with two branches of activities simultaneously: searching for candidate tools and identification of selection criteria.

Discuss and construct the model of relationships among project goals, CSFs, and criteria

This is the critical step in the selection process. The above discussion has shown that the required features and selection criteria highly depend on the project type (business process

modelling/change, business process management, etc.) and consequently on goals, CSFs of the project, involved participants, plans for future BPM projects, and so on.

At this step the project goals and CSFs have to be identified and related to the appropriate criteria. The combination of top-down decomposition and bottom-up synthesis can be used at this point. Initially, a set of requirements for BPM tools is derived from the project goals and CSFs. During the top-down procedure the project team members should pose questions like "How could a certain goal be achieved? Which properties of a BPM tool will help to accomplish this goal/CSF?" This approach can be combined with the bottom-up synthesis where the previously identified requirements are associated with the project goals/CSF.

While developing the model, it is very important to consider future plans in the field of BPM. The current project may well require only basic modelling features, but if other business process management projects are planned for the future, it is necessary to allow for the criteria of integrability into other tools as well.

The BPMS requirements should then be translated into a set of criteria for BPMS selection. The difference between a criterion and a requirement is that a criterion has to be unambiguous, and not composed to be suitable for the AHP method. Ideally, the BPMS selection team should develop its own structure of selection criteria, based on business environment and requirements (Wei *et al.*, 2005). However, in most cases it is more reasonable to use the existing sets of possible criteria. An overview of criteria from previous section may be used at this point. Determination of the criteria set should be an iterative process with the objective that the attributes are complete, non-redundant, measurable, and minimal (Keeney and Raiffa, 1993).

Using this procedure, the selected criteria and their relative importance will be consistent with the goals, CSFs, and the entire BPM strategy of an organisation. A model of relationships is the starting point (input) for the AHP model development.

The complexity of the goals-criteria relationship model depends on the project type. This model may be of high complexity for integrated BPM projects; strategic and project goals, CSFs have to be linked to the criteria. For example, radicalness of business process change projects determines the importance of documentation and analysis of the existing processes and consequently defines the level of required expressiveness of the process modelling technique. In case of a process modelling project the model is usually less complex.

Search for tools, collect relevant information about them

Simultaneously with the development of the goals-criteria model a set of relevant tools has to be identified. To make a decision of quality, it is necessary to collect as much information as possible for each considered tool. Relevant literature (e.g. Miers *et al.*, 2007), tools documentation, information obtained from resellers and/or consultants of tools, previous knowledge may be used at this step. It is not difficult to find reviews and comparisons of BPMS, however most of them describe the features and functionality offered by various business process tools and are quickly outdated after publication (Melão and Pidd, 2000). There is a risk of previous knowledge of a certain tool to bias in favour of or against same tool, but on the other side this is also an important criterion in the evaluation of a tool, as previous knowledge may considerably decrease the learning time and improve comprehensibility of the models.

Identify eliminating criteria

The tool selection process has two phases, namely a rough selection, in which the unqualified tools are removed from the candidate list, and a fine selection using the AHP method. At this step the eliminating criteria for the rough selection are determined. These criteria may possibly be the required functionalities, TCO, etc. The goals-criteria model is the main input into this phase. The criteria that are highly related to CSFs are the main candidates to be put on the eliminating criteria list. This phase results in two lists of criteria: a list of eliminating criteria and a list of criteria to be used in the AHP model. These two lists might overlap; an attribute, used to eliminate the unqualified tools might as well be used for the tools evaluation with a certain weight. For example, the attribute TCO may be used for the rough selection to eliminate the tools that will not fit within the budget, while in the AHP model it can be used as a criterion: the lower the TCO, the better.

Select candidate tools

Based on the information about the tools obtained from manufacturers/sellers and from literature, own evaluation, and criteria for rough estimation (output from the previous phase), a smaller number of appropriate tools are selected. In strategically important projects it is the top management that has to approve the list of selected tools.

Develop the AHP model and determine criteria ponders

This is the core phase of the selection process. An AHP model consists of an overall goal, criteria, and decision alternatives (Saaty, 1980; Saaty, 1997). In our case the decision alternatives are the candidate tools, selected in the previous phase. The overall goal is to select the best tool, i.e. the tool that best fits the overall organisational and project goals. The criteria for the AHP have already been determined, so it is necessary to determine the way in which each criterion is evaluated, and weights for each criterion at this point. Some of the attributes used for the criteria might not be easily measured. Therefore the criteria are mostly evaluated by pairwise comparison of tools, however some of them can also be evaluated by giving absolute values for each tool (e.g. total cost of ownership may be given in absolute monetary values for each candidate tool).

Decision-makers judge about the relative importance of each criterion in terms of its contribution to the achievement of the overall goal. This judgement has to be based on the goals-criteria model, which describes the relationships between the organisational and project goals on one side and criteria on the other.

Decision-makers and evaluators have to be carefully selected. The members of the two groups may consist of process owners and managers, IT personnel, and even members of the top management. The two groups may consist of the same members; they may overlap, or be completely different. Decision-makers build an AHP model (select criteria and determine hierarchies, compare the criteria) and analyse the results. The main task of the evaluators is to evaluate each candidate tool for all the criteria.

Evaluate the qualified tools, analyse and discuss the results

Each tool is evaluated for each criterion using either pairwise comparison of tools or determining absolute values. Different criteria may have different evaluators. For example, comprehensibility of process modelling techniques and user friendliness of the tools may be evaluated by users (e.g. process owners, managers, and performers), process modelling technique expressiveness, tool’s simulation capabilities, and TCO may be evaluated by consultants, etc.

A project team (evaluators, project manager, consultants) analyses and discusses the selection, which is finally approved by the project manager. A use of an AHP software package (e.g. Expert Choice as one of the most well known AHP tool) is suggested for building the model and analysing the results.

4. TWO CASE STUDIES FROM SERVICE INDUSTRY

The following two case studies present applications of the proposed BPM tool selection method for two different BPM project types. The first project was business process modelling and change project, while the second one was an information system development project with an emphasised business process change component. We used the tool Saaty (Tool Saaty, 2007) for building the AHP model in both cases.

Business process renovation project at the Ministry

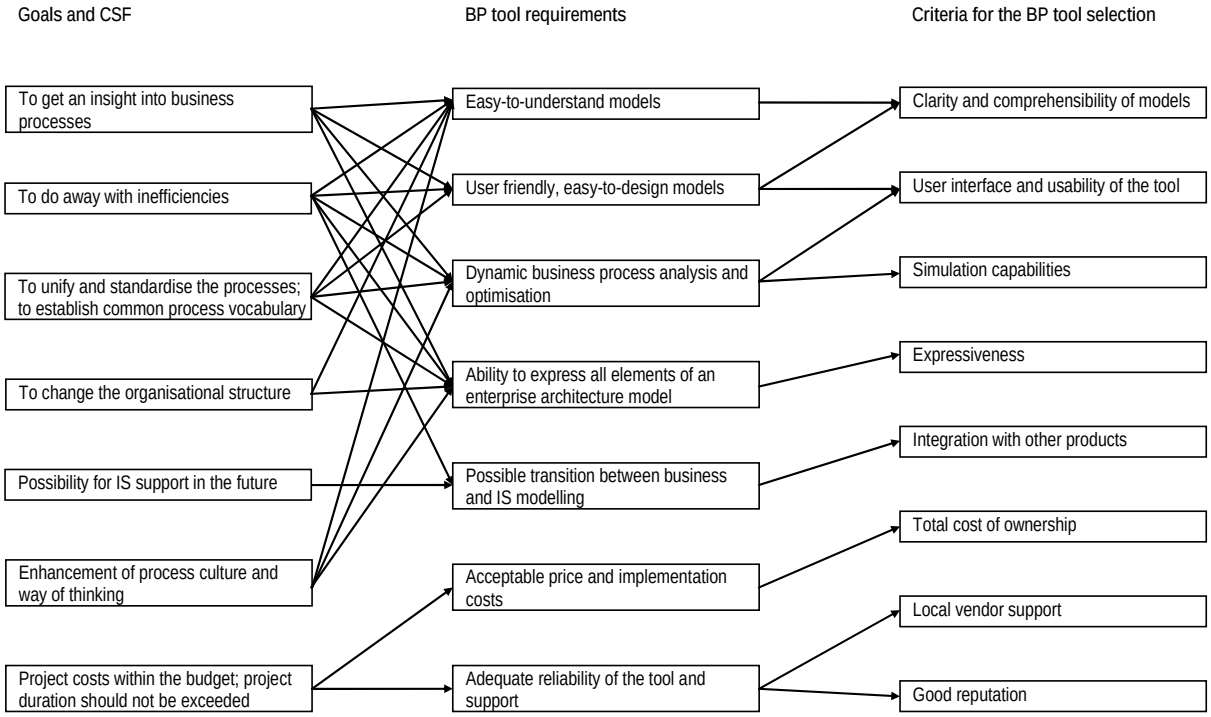
The project of business process renovation at one of the Slovene Ministries started due to internal and external factors. Internal factors that caused business process redesign were the integration of two ministries, versified business processes were not well defined and had redundant activities. Externally, the project has been stimulated by the Slovenian Government that started the anti-bureaucratic program on the governmental level. The goals of the project were (1) to get an insight into business processes, (2) the unification and standardisation of processes, (3) to do away with inefficiencies and (4) to change the organisational structure. The main stress in redesigning the processes was to make them as customer-friendly (not cumbersome, short, etc.) as possible. The project consisted of identification, modelling and analysis of key business processes and proposing changes of business processes, organisational structures and information system. Some of the authors were involved in the project as consultants.

Selection of the appropriate tools was very important for the project success. Other identified CSFs were: (1) realistic expectations and proposals of changes; (2) enhancement of process culture and way of thinking; (3) proper identification and selection of the key processes; (4) dissemination of project goals and understanding the necessity for a change; (5) management commitment should not be of a formal nature, just a consequence of public opinion pressure; (6) willingness to change or to initiate changes of laws, by-laws, and other regulations; (7) project costs within the budget and project duration should not be exceeded.

In the first step of a BPMS selection process a project team constructed the model of relationships among project goals, CSFs, and criteria. First goals and CSFs that are related to the BPMS were selected (see Figure 2). For example, a BPMS is associated with CSF “enhancement of process culture and way of thinking” because they are promoted through models of business processes that are discussed with employees.

Figure 2

Goals, CSFs, BPMS requirements, and selection criteria relationship



Then the requirements for the BPMS were identified by using the combination of top-down decomposition and bottom-up synthesis. For each goal/CSF we had to ask ourselves "What do we require from BPM tool to fulfil this goal/CSF?" For example, for fulfilling the goal "to get an insight into business processes" we identified the following BPM tool requirements:

- Process models have to be easy to understand because many employees were involved in the process modelling phase and we wanted them to understand the models of business processes without additional training.
- The tool should be user friendly and process models should be easy to design.
- The BPM tool should provide the functions needed to dynamically analyse the processes.
- The tool should have the ability to express all elements of an enterprise architecture model (e.g. organisational diagram).

For the remaining goals/CSFs we first tried to match them with the existing requirement by trying to find the answer to the question: "Does this requirement help to accomplish this goal/CSF?". For example, for the goal "to do away with inefficiencies" we identified the relationships with all BPMS requirements identified until then. The third requirement was broadened by the demand of optimisation capabilities, and the requirement of possible transition between business and IS modelling was added because business process redesign requires changes in the IS. Other BPMS requirements and relationships were identified as evident from figure 2.

After that the criteria for BPMS selection were identified from the requirements. In some cases the requirements were decomposed and some criteria match several requirements. For example, the requirement "dynamic business process analysis and optimisation" was

decomposed into two criteria: user interface and usability of the tool and simulation capabilities.

Finally we had a list of the following criteria: (1) clarity and understandability of models; (2) user interface and usability of the tool; (3) simulation capabilities; (4) expressiveness of the tool and the underlying modelling technique; (5) integration of the tool with other products; (6) total cost of ownership (TCO) that included licences for the tool and training time needed for a project group to get familiar with the tool; (7) local vendor support; (8) good reputation of the tool. Criteria 3, 4, 6 and 7 were identified as eliminating for a rough selection of the tools.

In the meantime relevant information about BPMS were collected. We selected four candidate tools: ADONIS, ARIS, iGrafx and WebSphere based on our knowledge and experience, available reports about the tools, vendor descriptions material and also contact with some vendors of the tools. Other tools were eliminated because of their costs, weak or no support on the Slovenian market, unsuitable functionalities (e.g. no simulation capabilities), or insufficient information about the tool.

In the next step an AHP model was developed. First, the pairwise comparison matrix was constructed by comparing the importance of the criteria on the scale from 1 to 9. The weights that are presented in Figure 3 were determined using the tool Saaty. As one can see, the most important criteria were clarity and understandability of models and TCO.

Figure 3

The evaluation of criteria

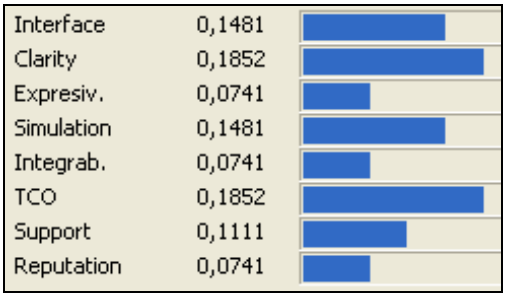


Figure 4 shows the results for one of the most important objectives: clarity and understandability of models. As we can see, Tool 2 and Tool 3 significantly outperformed other tools. To evaluate the tools according to this criterion we showed several models to some employees of the Ministry and asked them to evaluate the clarity and understandability of developed models.

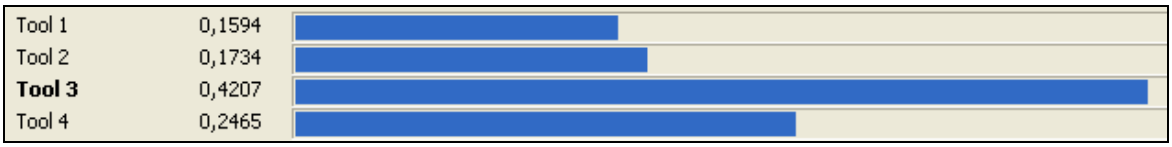
Figure 4

Scores for each tool according to clarity and understandability

Figure 5 shows the scores for each tool according to TCO. As we can see, Tool 3 got a very good score on TCO. This is also because of low costs of learning, since some members of project group were already familiar with some tools.

Figure 5

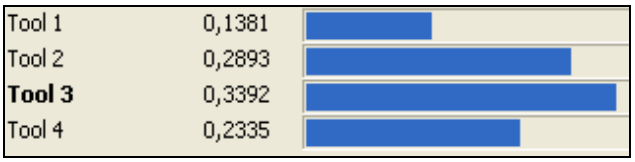
Scores for each tool according to TCO



In the final step of applying the AHP method the best alternative was determined by considering the scores for all objectives and their weights. The results are presented in Figure 6. Tool 3 (iGrafx) got the highest score although it had some weaknesses like integrability with other products. However, integrability was not among the most important criteria.

Figure 6

Final evaluation of the tools



We estimate that the appropriate tool selection contributes to the successfulness of the entire project.

A business process change project in a Croatian insurance company

Business process change and information system development projects in a Croatian insurance company have been ongoing for several years (Bosilj-Vukšić *et al.*, 2006). These projects are of differing scope, with differing goals and cover the core business processes of the company, such as: non-life insurance, life insurance with premium analysis, premium accounting of non-life insurance and claims of non-life insurance with analytic accounting. This section presents one of these projects.

The selected project had three main goals: (1) development of an integrated model of business processes for strict registration and premium accounting; (2) simultaneous development of the data model for those processes; (3) implementation of both models (process model and data model) through developing an application for strict registration and premium accounting. The implementation of software application should prove the unique and standard technology and method of work, as well as enable standardisation and greater efficiency of the process. The most important CSFs of the project were identified: (1) well-defined goals of the project; (2) top management commitment and support; (3) willingness of employees to change and (4) right identification of the processes to be improved.

The completion of the project was planned within two years. The project team consisted of 5 employees (information technology experts) and 2 external consultants. The definition of the processes and the data lasted for 6 months. It took one year to design and create the application. Application changes and implementation also continued through one year. Among the numerous BPMS, ARIS was used according to the suggestion of consultants.

The project was successful although certain problems were evident:

- There were not enough team members, the members had limited time (along with working on the project they continued their regular jobs);
- The project tasks were insufficiently defined;
- The end-users did not understand the process models, therefore they were not able to state that the models met their requirements;
- The inability of ARIS to connect and transform business process models into information system models, accurately, precisely and without the manual revision;
- The business project models did not contain business rules and the information needed for the development of applications were collected, analysed and verified step by step, through subsequent interviews with the users;
- The end users did not test the application which resulted in a greater number of mistakes;
- The changes, enhancements and improvements of the application were conducted during the implementation phase;
- During a relatively long period of conducting the project business changed, which was reflected in the project.

The above stated problems influenced the time and the efficiency of the project realisation. Despite this, the project was successfully completed, primarily owing to the continued and strong support of the top management. Nevertheless, it is obvious that some important issues were neglected at the very beginning of the project and some additional CSFs should be identified. Therefore, we have decided to make the simulation of BPMS selection using the proposed method. Evidently the two CSFs that should extend the list of CSFs are (1) successful communication of process models among employees and (2) ability to efficiently transform process models into applications. From these CSFs some selection criteria can be derived such as integrability, clarity of models, and their completeness.

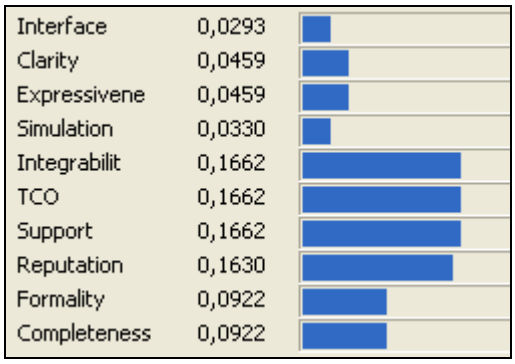
We developed a similar, yet slightly more complex, goals-criteria relationship model as in the previous case study. In this case a similar set of selection criteria as in the first case was used: (1) user interface and usability of the tool; (2) clarity and understandability of models; (3) expressiveness of the tool and the underlying modelling technique; (4) simulation capabilities; (5) integration of the tool with other products; (6) TCO; (7) local vendor support; (8) good reputation of the tool; (9) formality; and (10) completeness of the models. Evidently, only two more criteria are added as a consequence of different project goals (i.e. application development based on process models). However, it will be clear from further discussion that relative importance of the criteria will be significantly changed in comparison to the first case.

In this case we selected five candidate tools: ADONIS, ARIS, iGrafx, WebSphere, and Ultimus again based on the same input as in the first case: experience, available reports about the tools, research on the BPM tools features importance, vendor descriptions material and also contact with some vendors of the tools. An additional tool Ultimus appeared on the list as a candidate, because it is particularly suitable for the latter phases of a BPM project and it fits all the criteria for the rough selection of tools: required functionalities, support on the Croatian market, costs.

The pairwise comparison matrix was constructed by comparing the importance of the criteria on the scale from 1 to 9. The weights that are presented in Figure 7 were determined using the tool Saaty. As one can see, the most important criteria were: integration with other products, support, and TCO, closely followed by reputation.

Figure 7

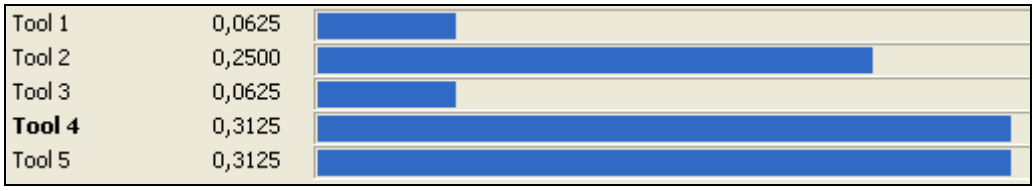
The evaluation of criteria by the AHP method



Consequently, we continued developing the AHP model by determining the score of each decision alternative on each criterion. Figure 8 shows the results for one of the most important objective: the ability of integration. As we can see, Tool 4 and Tool 5 significantly outperformed other tools in terms of their ability to be integrated with other software tools.

Figure 8

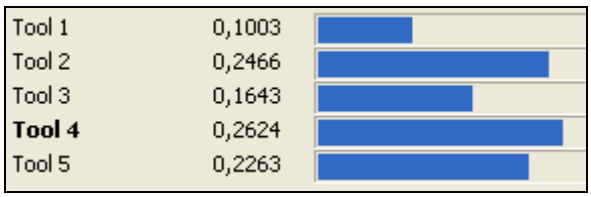
The scores for each tool according to integrability



In the final step of applying the AHP method the best alternative was determined by considering the scores for all objectives and their weights. The results are presented in Figure 9. Tool 2 (ARIS) and Tool 4 (WebSphere) were ranked at the top and their scores were close to each other.

Figure 9

Final evaluation of the tools



According to the results of the simulation, two BPM tools (ARIS and WebSphere) could be recommended for use in the project of the Croatian insurance company. Although one of these BPM tools (ARIS) was selected and used in practice, it must be pointed out that the version of the tool used four years ago significantly underperformed the project's requirements, especially those related to the ability of integration, formality and completeness.

5. DISCUSSION

Despite the fact that both projects can be considered as business process change project, they were rather different regarding their goals and scopes. While the first one in the Slovenian Ministry was a typical business process modelling project, in which the final goal was to unify, standardise, and renovate processes, the second one in the Croatian insurance company was focused on business process redesign in the context of information system development.

In the first phases of both selection processes a similar sets of BPMS were proposed. The main reason was the fact that offers of BPMS was quite limited at the time when the projects started, particularly on the Croatian and Slovene markets. Moreover, similar lists of selection criteria were used in both cases. However, importance of different criteria was rather different for the two projects and also a comparison of tools for each criterion differed. An example of the reason for different comparison of tools may be the criterion "clarity of modelling techniques" since the models were intended to be used by partially distinct groups of users. The consequence of different criteria weights and different assessment of tools was significantly different ranks of tools for both projects. This is consistent with the discussion that a selection of a BPMS heavily depends on the project type and CSFs of the project. In this context the AHP method is very appropriate because weights of the objectives can be determined by comparing their importance related to the project goals and CSFs. Therefore CSFs of a project must be the starting point while selecting the list of criteria and determining importance (weight) of each criterion for BPMS evaluation.

This is the main reason why a full and fixed list of criteria is not defined and given as part of the proposed method (systematisation of criteria was not the primary goal of this research either). Similarly, precise instructions (e.g. how to identify the eliminating criteria) for each activity of the BPMS selection process are not given. This approach leaves some flexibility, so that the procedure can be adapted to a variety of companies and projects, however on the other side this might be a drawback for the practical usage of the procedure in some cases. The experience from the case studies shows that the process flow is defined precisely enough to allow for a systematic selection process.

Another important point has to be stressed here: long-term issues must be taken into consideration. At the time of BPMS selection a project might be focused on process modelling and redesign only, while other BPMS and approaches are planned in the future. This would influence determination of criteria weights (e.g. integrability should have more importance) and assessment of tools.

CONCLUSION

The goal of this paper was to present a method for BPMS selection to help managers and IT experts in making a flexible and customised selection of BPMS. The presented method is based on the AHP method and develops BPM tools criteria from project goals and CSFs. The research reveals two points: (1) in order to choose the most suitable software tool for a particular application and business, a company needs a method for the evaluation of BPMS and (2) the selection of a BPMS is a typical multi-criteria decision process, and therefore an appropriate method for making multi-objective decisions should be used.

The approach does not make the selection of the optimal BPMS easy, but it suggests a process, different possible criteria, and specific techniques to use. The method has been applied in two business process change project in service industry, however, it should be

extended through further research. Some additional work remains to more precisely define how to evaluate different criteria. The trade-off between the usability of the method which is reflected in more detailed specification of the selection procedure on one side and flexibility of the proposed method on the other side has to be further investigated.

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IZBOR SOFTWERA U POSLOVNOM PROCESU MANAGEMENTA – DVIJE ANALIZE SLUČAJA

SAŽETAK

Interes stručnjaka i znanstvenika za menadžment poslovnih procesa je velik i u stalnom je porastu. U skladu s tim, na tržištu postoji ponuda brojnih i raznovrsnih programskih alata iz ovog područja, te je proces njihovog odabira težak i složen. Ovaj rad opisuje fleksibilnu metodu za odabir programskih alata za menadžment poslovnih procesa. Predložena metoda može se primijeniti u različitim organizacijama i u različitim situacijama, ovisno o definiranim ciljevima i ključnim faktorima uspješnosti projekta. Metoda je razvijena na osnovu AHP (Analitic Hierarcy Process) metode, korištenjem relevantne literature i iskustva autora u provedbi projekata menadžmenta poslovnih procesa. Mogućnosti primjene predložene metode prikazane su i analizirane kroz dvije studije slučaja.

Ključne riječi: *menadžment poslovnih procesa, programski alati za menadžment poslovnih procesa, AHP metoda, modeliranje poslovnih procesa, promjena poslovnih procesa*

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Review
Pregledni rad

RECOGNIZING EUROSCEPTICISM IN CROATIA – STUDY UPON A STUDENT POPULATION

ABSTRACT

The paper sets out to provide a consise systematic exposition of a rising euroscepticism in Croatia, giving particular attention to sources and conflicts that euroscepticism generate as well as to consequences that can or will occur. Sources of euroscepticism inside the academic youth are analyzed through the survey of student population. Results shows that students' population are eurosceptical beause of economic cost they expect Croatia will have with the entrance in the EU (fear of poverty and exploitation of national resources, losing sovereignity and bigger emigration pressures). On the other side they also expect some positive influence of EU membership such as better employment possibilities, higher standard of living and more efficient state of law.

Key words: *euroscepticism, integration process, eurorationality, student population, europerspective.*

JEL: F15, F50.

1. INTRODUCTION

Euroscepticism is a term that has in last few years winded around the territory of European Union, as well as the area to which EU is geographically related, i.e. the whole European territory. It is observed around two main questions: is euroscepticism part of integration process of Europe or is it a foundation for political, economic, social and cultural disintegration of the EU? Althought, euroscepticism is currently one of the most important issues in European discussions, this semanticaly adjusted historical and philosophic term has its source primary in political circles. Only in recent times euroscepticism is being analyzed on social and economic levels. Theological approach in defining and interpreting this dubious issue has historically also been a part of «European criticism». It is why this issue is needed to be sistematically approached from many different levels; from utterly utilitaristic approach on the one side to utterly demagogic point of view on the other side.

Beyond the euroscepticism and its forms, it is important to distinguish euroscepticism in the member states; scepticism that is related to the historical evolvement of the EU to the higher forms of integration which insist upon stronger connection and co-operation between the countries (usually it appears as a development of strong political tendencies - radical right, which are opposed to process of European integration) and euroscepticism in candidate countries which is far more complex. In transition countries, that were recently negotiating (or are currently in the process of negotiation), problem occurred not with the existence of one or two political parties that are opposing the entrance in the EU, but with the evolvement of so called "popular" euroscepticism whereas people become eurosceptical because of many

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reforms and uncertainty that the process brings. Candidate country needs to create institutional structure for the negotiations, gather around a group of experts in order to harmonize legislation with “acqui communitaire EU” and only then will people of a given country give the final decision “for or against” the entrance throughout the referendum. Closing of the negotiation in that manner does not mean that the country will enter in the EU. Though the rejection of the referendum was not a common practice in last two enlargements of the EU in 2004 and 2007, history did show that people can be reluctant; paradigm was the rejection of referendum by the people of Switzerland and Norway. Emphasized discontent of the people with the situation in the country and the pressure by the EU for the acceleration of expensive reforms presents additional element of uncertainty about the entrance in the EU. In this manner it is so important to consider all source of euroscepticism in order to influence the rational perception of the EU, which is only possible by continuous propagation of quality information about the functioning of the EU as well as the importance of imposed reforms.
The aim of this research is to recognize forms (types) of euroscepticism and to determine does popular euroscepticism exists inside the Croatian society. Recent studies in Croatia showed negative attitudes of the people towards the membership in the EU which tend not to decrease, but it evolves in a rapid sense. Such a trend was noticed in the majority of the countries in their negotiation process. Lack of support was caused by many factors, but the most pronounced ones are: demanding and expensive reforms that must be put through, scarcity of the information about the EU, disappointment with the socio-economic standard and the current situation in the country and similar. After the theoretical part, emphasize will be given to the result of the study upon the students of the last year of undergraduate study at the Juraj Dobrila University of Pula about their stances towards the EU. In recursive way, result will show is academic youth eurosceptic or positively oriented towards the EU. The main and in a way hidden question is: are students in Croatia sceptical of potential membership in the Union and are they more/less sceptical in comparison to the rest of population. It will also be interesting to see if the results will differ from the recent studies in Croatia inasmuch as most of the interviewed students come from Istrian County; one of the most developed ones in the country, has the strongest collaboration network with the EU (involvement in many EU’s projects and programs). This paper is namely based on a survey which was conducted through the questionnaire, and the statistical methods were used in analysing the data.

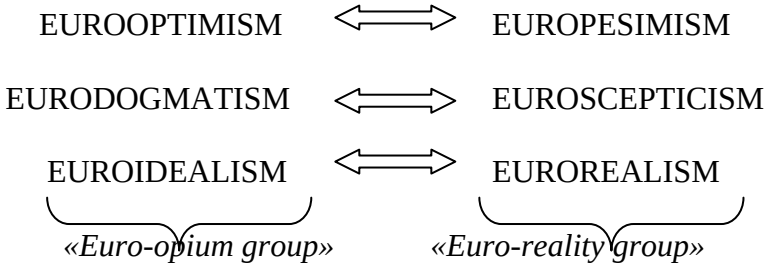
2. EUROSCEPTICISM AS A PART OF EUROPEAN INTEGRATION PROCESS

The term euroscepticism refers to scepticism about European integration process, simultaneously relating to a conceptual conflict about organization and functioning of EU. It is common to relate the origin of the term with the name Margaret Tatcher who was the first to use and describe the word in 1986[3]. Importanly, the term has its roots in scepticism of British Conservative Party («political discourse») about membership in European Economic Community (EEC)- stand aloof from european integration process in 1950is and referendum on membership in 1975, opposing to the second wave of European integration during the 1980s and 1990s and opposing to European Monetary Union nowdays. (Baker et al. 1993, 1994, 2002; Aspinwall 2000; Gifford 2006, Daddow 2006).
The sources of euroscepticism vary from country to country (inside and outside the EU, inside and outside the integration proces), from party to party (radical left, conservative right, radical right, neoliberal right, neoconservative right, Communist parties...) and they vary even to

[3] She was famous for her statement "I want my money back" (at the European Council) and she succeed, amid fierce opposition, in drastically reducing Britain's contribution to the EC budget-UK-rebate mechanism of return of the funds paid into the EU budget (because the UK uses a few funds from the EU budget).

extent of different population structure in some countries. The idea of euroscepticism is that it is opposed to everything that questions political, economic and social safety as well as sovereignty of one country and its people. Importance of this issue is seen through British scepticism towards the whole existence of EU, rejection of EU membership by Norway, «double rejection» by Denmark, «double rejection» by Ireland, etc. Irish «No» to Treaty of Lisbon is nothing else but a democratic legitimacy of euroscepticism at its work. Definitely, it is revealing that scepticism is a global trend which is rising from disbelief and suspicion in politics, politicians and national governments, whereas EU seems to be less promising, more distanced and more attractive for new eurosceptics.

Before carrying out the typology, it is necessary to clarify some formal, but also philosophical aspects of terms that are directly conditioned and limited by the term euroscepticism. Knowing the definition of euroscepticism, as an opposition, disapproval, antagonism and scepticism towards functioning of EU, person who embrace this ambition is called *eurosceptic*. *Eurofobia* is strongly related term that represents irrational fear towards the EU integration process (Milardović, 2007). As a reaction there are *europhiles*, *eurooptimists* and *pro-europeans* who support full integration on federative principles by reducing legislative power of national governments and by imposing stonger centralized rule in EU. *Eurodogmatism* arises from the «ultimate truth» that complete integration of EU is the only right path and the only truth. The followers of eurorealism are the ones that represent moderately and soft euroscepticism and are called *eurorealists*. Their aspiration is acknowledgement of people needs for personal (self-fulfillment, achievements…), domestic (workplace, family, friends…) and national («*right of flag*») sovereignty throughout freedom, responsibility and self-determination that belongs to current as well as future generation based on geographical, material, psychological, cultural, historical and traditional foundations. Since there is a talk about concept oppositions it is worth pointing out the contrarieties. Criticism is opposite to dogmatism, so it is immanent to scepticism. Idealism is beyond realism, and optimism is antithesis to pesimism. Therefor concept opposition of Euroscepticism looks like this:



Taggart and Szczerbiak (2001) are the first to distinguish euroscepticism on “soft” and “hard”:

a) ***hard euroscepticism***; presents outright rejection of entire political and economic eurointegration process, opposition to their country joining or a desire for withdrawal of their country from the EU altogether. In reality it is a principled objection to the current form of European integration. In practice it is almost impossible to find hard euroscepticism in its true form, because it is too extreme. Although, this form presents pesimistic, even sarcastic point of view, it soundly suggests the core from which euroscepticism arises. In political structure of member countries or candidate countries there is no visible strong euroscepticism, or at least those eurosceptic parties do not have political strenght and votes to put it in the front line of political battle. Poland is the only country that has a hard eurosceptic party in its coalition government.

b**) *soft eurscepticism***; is a type of euroscepticism that is based on eurorealism. It is a kind of qualified opposition to European integration and can be divided in «Policy euroscepticism»

(criticize EU politics, institutions, measures …) and «National interest euroscepticism» (criticize discrepancy of EU interest with national interests). Both sub-types do not imply opposition to integration on principled grounds (as hard euroscepticism) and in this way it is more certified term because it opposes certain policy for the sake of mantaining «status quo». Soft euroscepticism is a time and country specific phenomenom that depends on particular issues at stake in the given time and the particular stage of integration process (opposition to Euro, opposition to Treaties, opposition to Constitution, opposition to certain policy issues in CAP, nuclear power, etc) (Taggart& Szczerbiak, 2001).

Kopecký and Mudde (2002) distinguished between 'specific' and 'diffuse' support for integration in the EU on the one hand, and for European integration in general on the other, leading to a 2_2 matrix on which party positions can be plotted and classified as: Euroenthusiastic, Europragmatistic, Eurosceptic or Euroreject. Flood (2002) has developed a six-point spectrum along which party positions towards the EU can be classified as 'rejectionist' through to 'maximalist'.

The most interesting new typology gave Kaniok (2007). Analyzing definitions of eurosceptics, Europhiles and similar terms, by including positive and negative characteristics of the EU, collecting fundamental documents of different parties programmes, analyzing pro-european supranational and federal models etc., Kaniok concluded that euroscepticism is one unstable category. In its core, new typology was based on factors of votings in the EU Parliament and on programme analysis. In this manner Kaniok categorizes three types of people stances toward EU: *europeanists*, *eurosceptics* and *euro-governmentalists*. With first two types we are familiar, but the interesting one is the third type. Euro-governmentalists have conceptual base in intergovernmental paradigm of the EU integration process with more reserved as well as critial guard towards today's model of integration. One of their main stances of disapproval is lack of conviction of the necessity of building or identifying political entities such as European nation, new European identity, etc. From the perspective of political parties and their followers, it is worth pointing out that their «programme» is not built on the acceptance or opposition towards the idea of European integration process, but emphasises gradual process and implementation. Often it can be found that soft eurosceptics are included in this category. By analyzing the structure of European Parliament[4] in terms of the programmes, in terms of voting attendance, in terms of the structure of their votes in EU Parliament and in interdependent correspondence with majority, Kaniok accentuate that euro-governmentalists are closer related to europeanists than to eurosceptics.

Though the term euroscepticism is polemically interesting to theory, it is still very hard to define sources of euroscepticism completely. Analyzing the term just from the philosophical perspective, *problem is a paradigm of scepticism* (Grgurev, 2005), therefor it is impossible to define directly sources of scepticism, in this case the sources of euroscepticism.

Sorensen (2004) recognizes four different sources of euroscepticism: economic factors (material benefits that membership brings); fear of loosing national identity (sovereignty--based euroscepticism); fear of power in decision making (democratic euroscepticism) and politically related factors (which involves social aspect too), all which proved to be important substructure for up-raising euroscepticism in Denmark, France and UK. McLaren (2002) distinguishes economic, cultural and institutional factors and she finds little evidence that exclusive national identity affects perceptions of economic loss or vice-versa and concludes there may be two distinct paths to euroscepticism: one rooted in cultural threat, and one in perceived economic loss. Hooghe and Marks (2007) emphisized that euroscepticism emerges from the interplay between identity and economic interest. On the political right, euroscepticism is expressed in the criticism that the EU undermines national identity and

[4] Finer distinciton between pro-european and anti-european parties was given by a hierarchy of terms: maximalists, reformists, gradualists, minimalists, revizionists and in the end rejectionists.

national independence. Jacobs and Pollack (2004) were also exploring sources of euroscepticism (economic, social, political, religious, personal aspect etc.) and concluded that support for the EU is complex and it is based on more than just a calculation of short-term gains and losses. People in post-communist Europe link the EU not only with economic expectations but also with general political and social expectations. Milardović (2007) noticed some issues which have been embedded with the term euroscepticism: *integration, sovereignty, national state, identity, neoliberalism, globalization, euro-federation, superstate, democracy and bureaucratism*. First four issues are strongly connected and by determing each other, they interfear conceptionally with problems that brings euro-federation and superstate. Distinguishing characteristics between different countries confirme the hypothesis that there is no uniformed trend concerning euroscepticism.

Academic scolars in EU often come to conclusion that the most common source of euroscepticism is mobilization of interest of those who support «status quo» (but it will be seen through this paper that euroscepticism raises from quite the opposite; it raises from relations which are interactively in contrariety, whereas constant process of integration is consider to be a new «status quo state»). The sources of euroscepticism in Scandinavia are directly connected to social and economic factors, where the sector of public opinion is afraid of liberalization, imposed rules and influence of the EU on welfare state. In UK, euroscepticism raises from strong patriotism. In new members of EU there is a fear of Western competition and dominance which has created strong antagonism towards the EU, especially in Poland.

3. APPROACHING EU – EUROSCEPTICISM AND THE EXPERIENCES OF EU NEW MEMBER STATES (NMS)

Central and East European countries started to build their relationships with EU, firstly by signing agreements for the cooperation and/or trade, and then through signing European Agreements with the EU in order to extend their trade experience to a higher political dialog, to shape their economic – business – entraprenaurial foundations to get rather significant financial help through EU programs and to prepare all necessary condition for a quick and socially painless integration in the Union. After Kopenhagen (1993) where it introduced criteria and conditions that candidate countries needed to fulfill to enter the EU, European Council in 1998 took a decision for the start-up of the negotiation process with Cyprus, Hungary, Poland, Estonia, Czech Republic and Slovenia, and in 2000 negotiations were started with Bulgaria, Lithuania, Latvia, Romania, Slovakia and Malta. As negotiation process was in a way, EU started the research of public opinion in candidate countries through special edition of Eurobarometer ("Candidate Countries Eurobarometer") wherefrom it collected much important information such as satisfaction with the way of life within one country, expectations towards the EU, future vision of the EU etc. One of the most consequential issues was the questions about the people's attitudes towards the membership in the EU.

Figure 1

Support towards the entrance in the EU*(%)

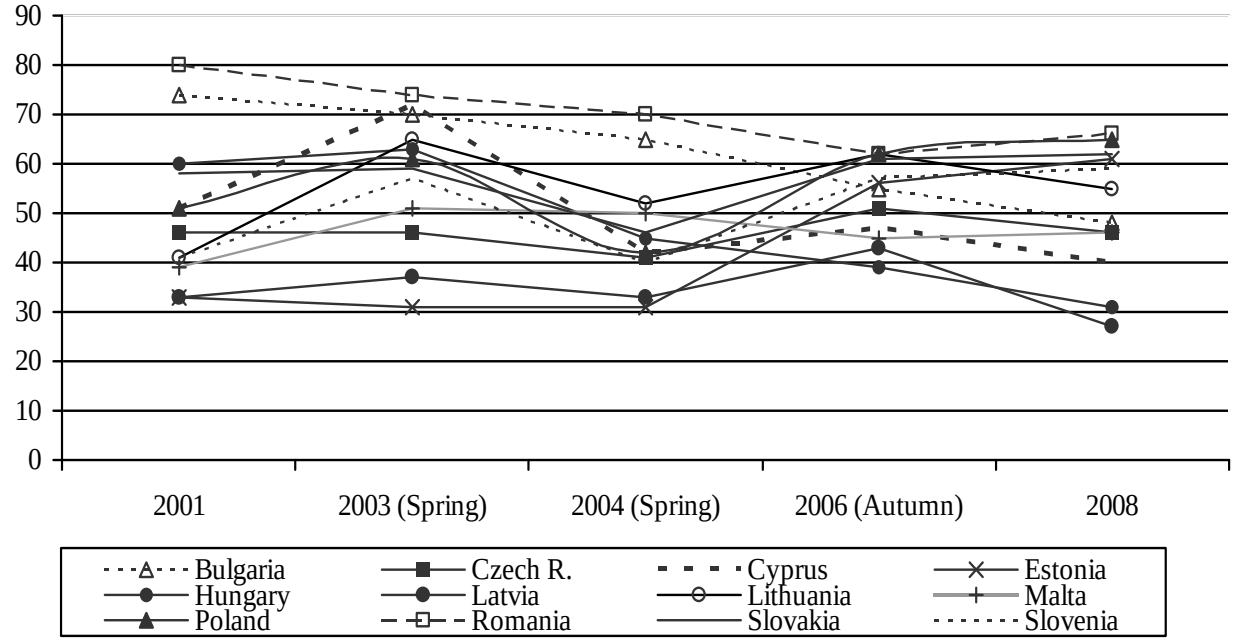


**Figure shows only percentage of those who expressed positive stance towards the EU.*
Source: Data available at Eurobarometer No. 66, 67, Candidate countries Eurobarometer March 2002, Spring 2003, 2004, Autumn 2006, Spring 2008.

If we ought to compare the support towards the membership in the EU in 1992 which was about 80% with the support in 2003 (right before the enlargement in 2004) which was then only 50% we can see that, what was the date of enlargement closer, stances of people were more eurosceptic, i.e. positive attitudes towards the EU were falling. Situation did not improve nor after the entrance in the EU and in some countries (Bulgaria, Cyprus, Hungary, Latvia, Romania), support of the EU was smaller then in 2001. These results confirm the thesis that the process of entering the EU is not a simple one and that the perspective about the integration looks far more promising and attractive from the distance than from the nearer position. This is a result of exshausting negotiation process, costs of adjusting and costs of entering such "promising integration" as it is EU. Though, all above mentioned countries should get considerable amount of financial help from the EU budget, because of their low institutional absorbability these amounts and progress possibilities were not fully utilized. Considering this, it is rational to conclude that the higher costs in first few years of membership in the EU could surpass the benefits and in that way shade the expected progress!

4. EUROSCEPTICISM IN CROATIA

Although initially considered that the entrance of Croatia into the EU will have a great support, initial enthusiasm turned to eurorationality. So the statements like this could «hold the ground»; «*Discrediting Euroscepticism is like unconscious rejection of the critique towards EU policy and its acceptance as a kind of dogma*» or «*There is a temptation with most of Croatian politicians to accept actual political and economic concept of European Union as a universal value in which we all have to trust and which we all have to imitate*» (Grgurev, 2005).

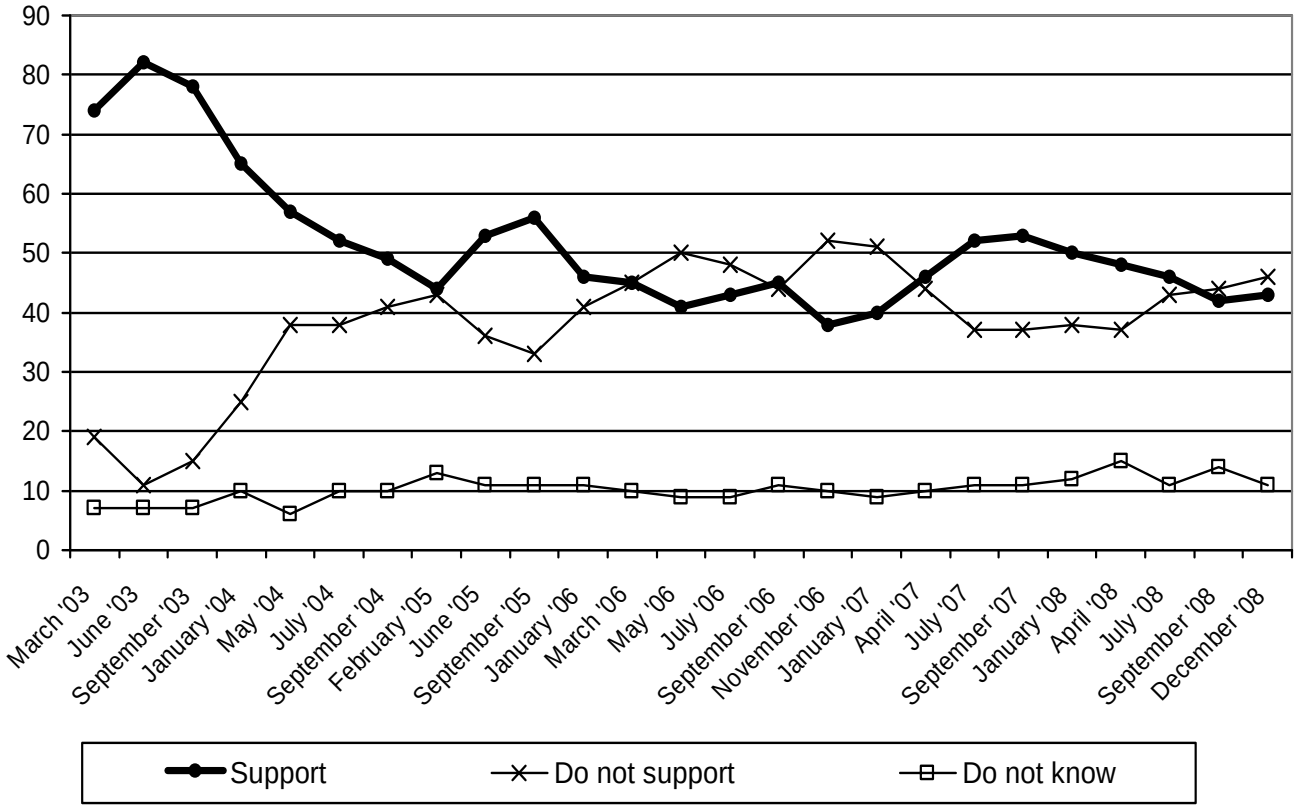
Euroscepticism arises from different points and problems. That is why some scientists have turned to indirect approach in order to explain the cause of this exclamation. At the beginning of Croatian independence there existed political party that was right-oriented and which had negative stance towards European integration because it ironically linked integration with the loss of just gotten independence. After 2000 and the beginning of a new co-operation with the EU, political or party-based euroscepticism disappears and today we can say that the whole political scene, generally is conciliated that the most important goal of Croatian international politics is the membership in the EU. However, with the signing of Stabilization and Association Agreement with EU and the starting of negotiation process, popular euroscepticism[5] started to build up.

The causes of euroscepticism among Croatian people are primarily of economic and social nature. There is a fear of further spreading of negative «robust» consequences that liberalization of trade already brought such as: uncompetitiveness of domestic companies (and probably bankruptcy), loss of working places, departure of important facilities, non-liquidity etc. Sensitive factors are also: low standard of living, incapacity to participate in a decision making in the EU and fear of loosing natural and cultural identity. Recent public studies showed that in the last few years there has been a significant decrease in the desirability for EU integration in Croatian public. The first problem in this newly arosed Croatian euroscepticism is that downfall in desirability was characteristic feature of the integration process of Central European countries as well, but this negative trend was related to a process of negotiation. In Croatia, downfall already preceded negotiation process, what implicates that this negative stance could be additional problem in process of EU integration. The second problem is the source of this euroscepticism. There have been few interpretations of euroscepticism in Croatia and it sources, but neither was strongly confirmed (because of different empirical approach and different methodological base). Although studies have the same goal, confrontations could arise in their direct comparison. Bagić and Šalinović (2006) in their study concluded that Croatian citizens' attitudes about EU integration are not based on rational calculation and cost-benefit analyses, but rather on some general impresions which could be the source of a new «fluid» Croatian type euroscepticism. Štulhofer (2006), emphasise the dynamics of eurocepticism development which is based on bruised national pride (the extradition of a suspected generals to the Hague) and the strenghtening of symbolic resistance, economic fears (the rise of the price of real estates, the rise of the import of cheaper agricultural products, negative trends on financial markets…), and the loss of trust in the EU as an outcome of a rejection of the European Constitution.

[5] The term refers to a public opposition towards EU («Public Euroscepticism»). It is manifested through the results of referenda and statistical enquiry. Opposite term to Popular Euroscepticism is Party-based Euroscepticism. Taggart and Szczerbiak noted that the high level of Public Euroscepticism do not necessarily translate into high levels of support for eurosceptic parties and reversly high level of support for such parties do not necessarily indicates high level of Popular Euroscepticism.

Figure 2

Trends in support of Croatian membership in the EU from 2003 to 2008



Source: PULS, public opinion research agency.

Figure 2 presents the Croatian citizens' attitudes toward EU membership. It can be noticed that the support towards the entrance of Croatia in the EU was biggest in 2003 (82%), then it drastically fell in February 2005 at 44% after the SAA was brought into legislative force, to then be for a longer period around 50%. At the end of 2008 only 41% of Croatian people gave support to the integration process. Fall in support in 2008 could be caused by many rigid reforms that are imposed to Croatia. Example is Croatian shipbuilding; where there was talk about the rapid privatization and the sheer existence of that sector within Croatian economy. Namely, shipbuilding is the most important export industry in Croatia that has strong multiplicative effect on other industries and the whole economy, so that the deterioration of this sector would have multiple negative consequences on the employment and industrial production.

Result of Bagić and Šalinović (2006) study in a field of so called «general expectations» have shown that only 20% of Croatian citizens presume that the entrance in EU will bring them more benefits than harm. Only 20% think that there will be more benefits on national level. About 40% think that EU membership will bring them more harm than benefits in their private life and 46% think that EU will also bring harm to a whole nation. Byproduct of this kind of public opinion can be very dangerous for the integration process in Croatia. Analyzing the situation, Štulfoher (2006) gave few propositions that would have to act as a motivation factors in Croatia in order to form a direct strategy to combat euroscepticism. First, he noticed that there are many factors that affect the dynamics of euroscepticism, so it is impossible to create a single successful strategy for the reduction of euroscepticism in Croatia, and elsewhere. Second, nationalism and its socio-cultural, political and economic premises are major sources of distrust and reluctation towards the EU. Third, euroscepticism is also

influenced by situational tendencies which are caused by party competition policy and large interventions in media. Fourth, the trust in the EU is formed through trust in national institutions, a fact no politician should forget. Fifth, recommendations based on these notions would be: increasing knowledge about EU of Croatian citizens, implementation of measures and policies that would increase trust in national instiutions and creating socio-cultural counterbalance to nationalism.

Particular issue of euroscepticism in Croatia is very comprehensive, similar to the situation in other parts of Europe. Conflict lines are directly confrontated and interwined which makes it even harder to find universal solution to fight euroscepticism, if that is in the end necessary. Euroscepticism could be just a factor of evolutional process of the EU. Throughout the ideological continuum of political sphere in Croatia there could be found traces of soft (radical left, conservative right) as well as hard euroscepticism (radical right), though it is very difficult to publicly name those parties eurosceptic because of their political and social involvement in the integration process. Consequences of euroscepticism in Croatia are evident in socio-economic, political and administrative changes that are occuring on the margins of society, whereas socio-economic factor seems to be the most important for the people.

5. ANALYSIS OF ACADEMIC YOUTH'S ATTITUDES TOWARDS THE EU MEMBERSHIP

Spajić-Vrkaš (2007) in her research of student population at the University of Zagreb and University of Rijeka came to conclusion that 40% of the interviewed students have positive attitudes towards the membership in the EU, though almost 33% of the whole sample is indecisive about that question. The main reasons for the entrance in the EU, as viewed by these students, are better standard of living and better employment possibilities and on the other side the major argument against the membership is exploitation of national wealth.

In this article authors would try to elaborate the factors that determine stances of students of the final year of undergraduate study at the Juraj Dobrila University of Pula towards the membership of Croatia in the EU which would in eclectic way show the prudence of the academic youth about this important issue.

5.1. METHODOLOGY

The research was done in January 2009 through the questionary, on the 200 students and in average only two students did not answer one of the questions in the survey, which is indeed a good result. The polling was conducted by the authors by the pre-agreed schedule visits to all study courses of all departments at the University. The authors explained the aim and the concept of survey, after which the students filled out questionnaires. Conceptual structure of the questionnaire enabled authors to uncover students general affective attitudes towards the EU an to show rational evalutation of a student mind set about socio-demographic, socio-economic and socio-cultural impact that EU has on Croatian people. Upon completion of the process of collecting survey questionnaires, data were entered into the computer and processed statistical program. Some aspects of descriptive statistics[6] are presented in order to explain relations existing between the presented variables, though systematic statistical analysis would request restructuring of the applied questionary, forming another set question that are more appropriate to the quantitative research then to a qualitative one. Scientifically said, it opens a wider scope for further research work in this field, namely different approaches in data analysis.

[6] Based on chi-square distribution.

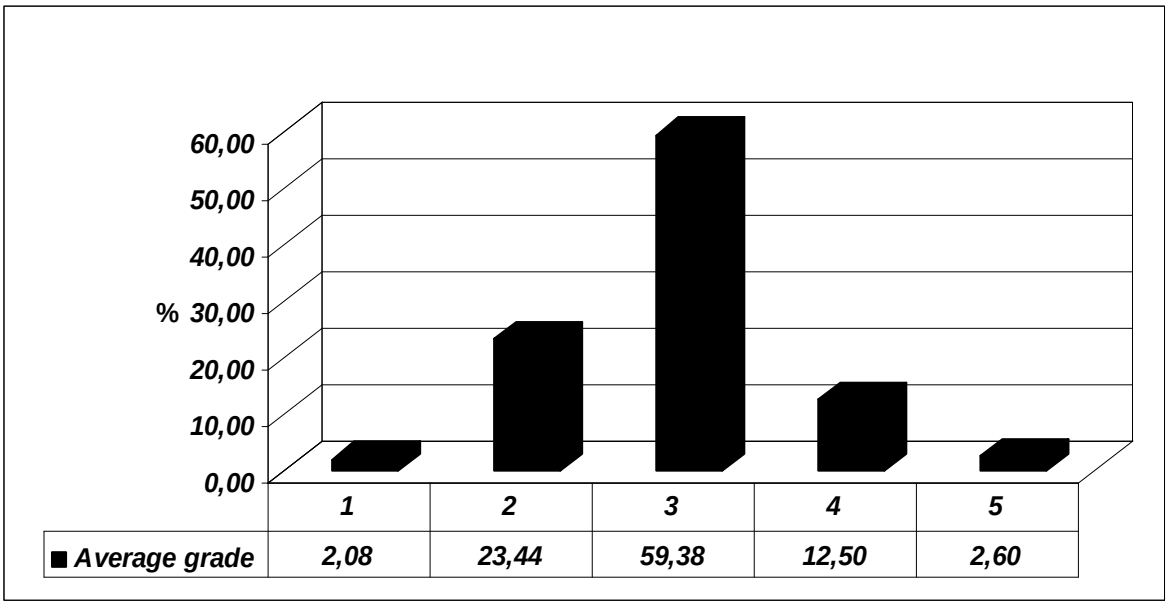
5.2. RESULTS

❖ Knowledge about the EU

One of the most important factors that form the people's attitudes is their knowledge and acquaintance with the problem. Next figure shows that almost 60% of the students are well informed about EU which, if we pool second, third and fourth mark together, in fact brings us to about 95% of students whose knowledge about EU is in recursive way satisfying[7]. This means that students in their forming of attitudes and stances use all available information, which gives this study a solid ground for further analysis.

Figure 3

General knowledge about the EU

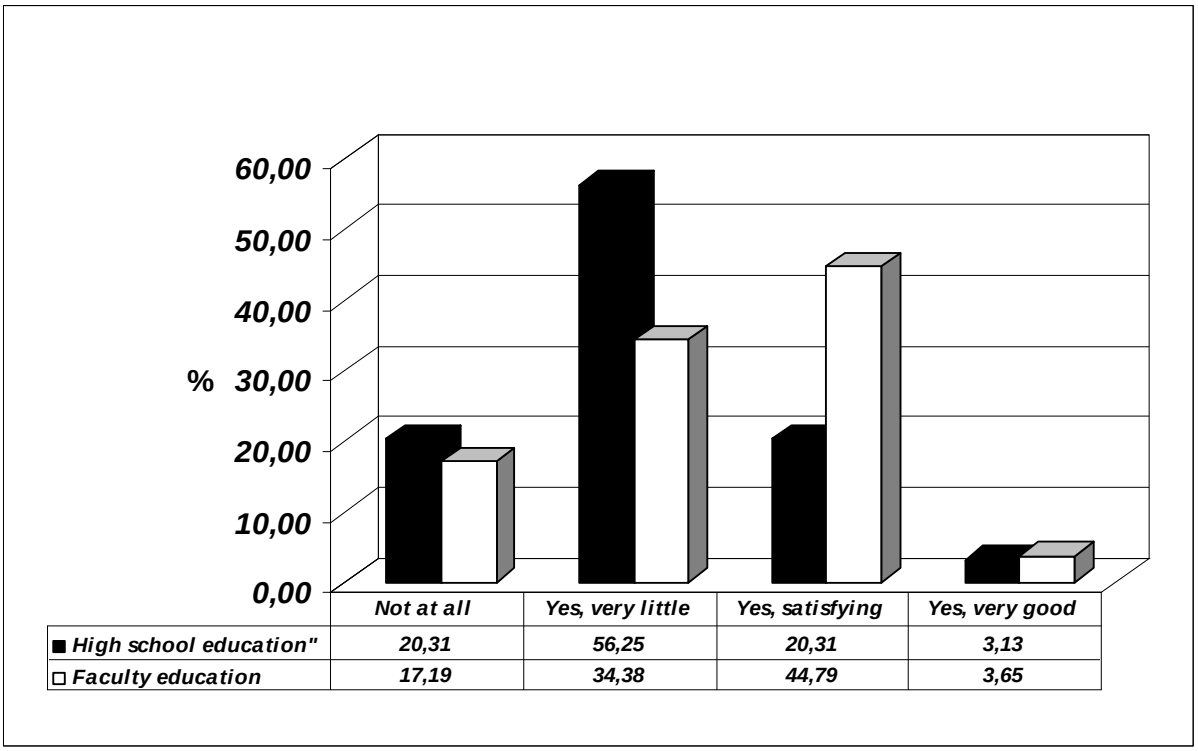


Source: Authors' calculation based on the survey.

[7] students needed to rank their knowledge about the EU from 1-5, where 1 presented little or no knowledge and 5 presented excellent knowledge about the EU

Figure 4

Familiarity with the concept of EU



	Not at all	Yes, very little	Yes, satisfying	Yes, very good
■ High school education"	20,31	56,25	20,31	3,13
□ Faculty education	17,19	34,38	44,79	3,65

Source: Authors' calculation based on the survey.

Figure 4. shows the level of satisfaction with the information that students could gather in their educational life. It can be noticed that there is a difference in satisfaction about the quality of information provided on high school level and faculty level, though in the end we can conclude that both on the high school level and faculty level satisfaction with presented information and knowledge too, is high enough. Those extreme cases ("Not al all" and "Yes very good") in authors view are not statistically important, even though it could be in some way indication that everything is not so transparent, especially on high school level.

❖ Sources of information about the EU

Educational life, schools and faculties are not the only sources of information about EU. The survey shows that 90% of students absorb information about EU provided by television, whereas about 70% use information from different newspapers and press. The power of mass-media in this sense is huge; nonetheless the influence of asymmetric information is often through this way abused. "Compulsory thinking", lack of attitudes and juxtaposed stances are the end result if mass-media is used to spread misinformation. Internet is another influential mean which could be used to misinterpret actions, positions or trends, but it is also an important source of information that could not be found anywhere else. In this way it can form specific stances about specific issue, this time stances towards the EU. About 60% of students in this survey use internet to gather "trustworthy" information which in the end forms their stances and attitude towards the EU. About 20% of them use information given by their house members and friends, which shows that the issue of entrance of Croatia in the EU is a theme often spoken between members of family and friends. Other sources often used are: prospects, brochures, catalogues, bulletins and newsletters. Even though students were using a wide range of sources, a stance towards the quality and quantity of information is relatively divided. In other words, 50% of students think that the quality and quantity of provided

information in Croatia about EU is good, or even very good, and 50% of them think that they are not good or not good at all. The access to quality information about the EU is one of the most important factors which tend to decrease eurosceptic tendencies that could evolve in candidate countries because it brings closer the people of those countries to the issues discussed inside the EU. Though, some past experience did show different trends[8].

❖ Information about Istrian involvement in EU projects

The situation is even worse if we add the fact that the Istrian county is one of the most connected one with the EU through different association and participation in EU programmes and projects[9]. About 80% of students said that they are not satisfied with the level of information that they are getting about Istrian involvement in European trends. This is alarming fact that needs to be solved in near future.

❖ Advantages and disadvantages of EU membership

Next two figures show the main advantages and disadvantages students expect from Croatian membership in the EU (marks from 1 to 10, not as ranks but as points). The highest marks were given to next three advantages: better employment possibilities, higher standard of living and more efficient state of law. These results are comparable with the results of Spajić-Vrkaš (2007). On the other side these two disadvantages are presented as the most frequent ones: fear of poverty and exploitation of national resources, again which confirms that students at all universities have the same perspective about what they will gain or lose with the entrance in the EU, from which they built strong eurosceptic or pro-european ideas. It is also important to notice that analyzing these factors we can conclude that the main source of positive or negative stance towards the EU comes from possible benefits, and that the major concerns of the students are primary economic benefits and costs and only then possible social benefits and cost. In this way we talk about perceived benefits[10], a term that brings us to broader philosophical stance about the entrance, i.e. evolvement of euroscpetic tendencies.

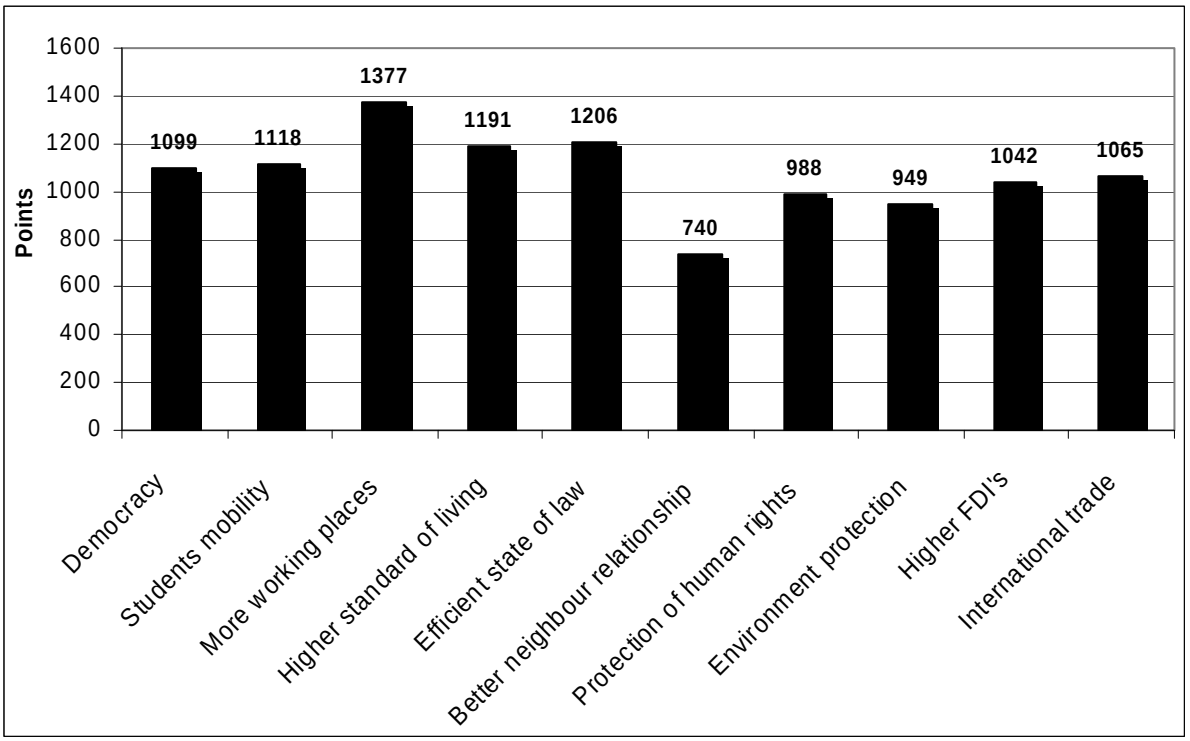
[8] Namely, in countries with better information and better chance of joining the EU support for entrance was not so strong and there evolved strong Euroscepticism, such in Poland and Czech Republic. European Commision study (2001) showed that Poland, Czech Republic, Estonia and Latvia had less idealized view of the EU then Romania and Bulgaria who were farthes away from the EU but were more eager to get in the EU.

[9] Alpe – Danube – Adriatic agency, Adriatic euro region and other projects together with some geographically and historically close countries like Italy and Slovenia.

[10] This term is being recognized by Bo Bjurulf (2005) in his research of the causes of Euroscepticism.

Figure 5

Advantages of the membership in the EU

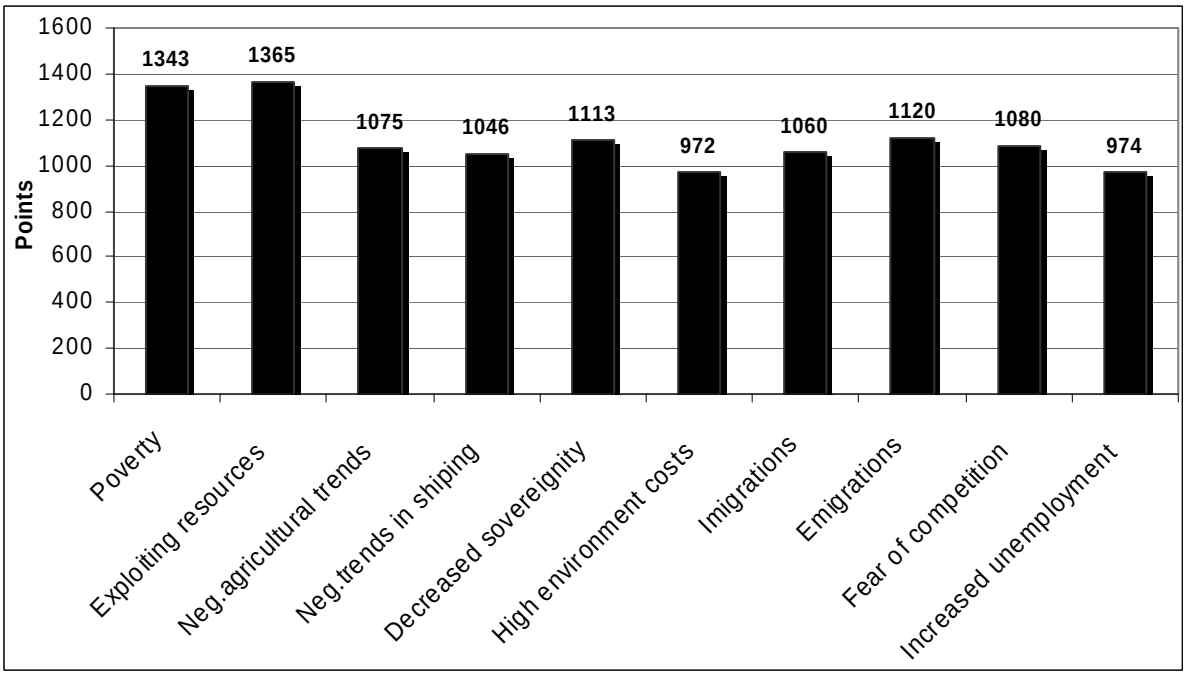


Average: 1077,50	*Standard deviation: 170,31*	*Variance: 29 004,70*

Source: Authors' calculation based on the survey

Figure 6

Disadvantages of the membership in the EU



Average: 1114,80	*Standard deviation: 135,59*	*Variance: 18 383,70*

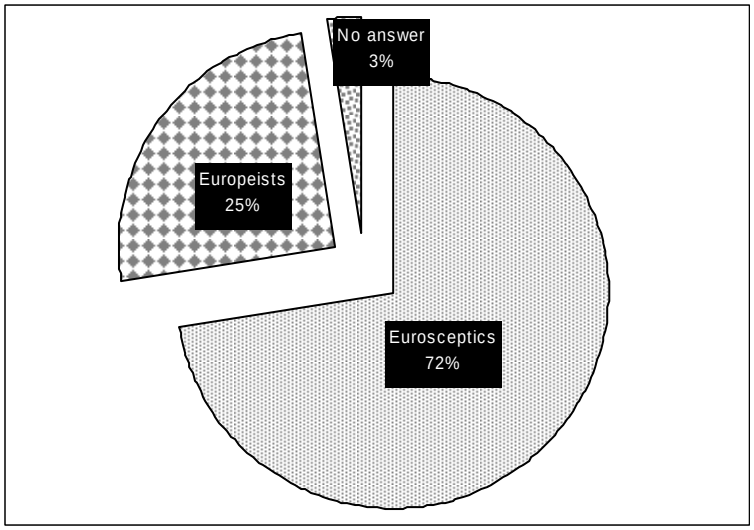
Source: Authors' calculation based on the survey.

❖ Support for the EU membership

In order to test stances towards the entrance in the EU i.e. the existence of euroscepticism, authors presented two type of question. First question needed to show the conformity about the entrance of Croatia in the EU. About 46% of students said they are not conformed to that, about 27% said they support the entrance and 27% were indecisive on the question. Despite the almost 50% of those who are against the entrance and are in a way eurosceptic, there are 27% of student that yet did not choose the side. The issue with indecisiveness shows that there is still a vast area for development of euroscepticism or europeism[11]. The second question did not leave students no space and they had to choose, are they in the manner they understand the issue, eurosceptics or europeists. *Figure 7* shows the result. No less then 72% of students expressed themselves as eurosceptics and only five of them did not give answer. Similar to first question, the second question gave the same result: 25% were proclaimed themselves as those "for EU" or europeists. From the utilitaristic approach this could be seen as unexpected; this orientation classify young people as a group of privileged citizens, or so called transitional winners, because based on their adapted knowledge, skills and competence they should gain more through the eurointegration and in that way they should be more supportive[12]. The results of our analysis are in accordance with the results of public opinion research in the Istrian County which is part of the project Istria Communicating Europe conducted in accordance with the methodology of Eurobarometer (Debeljuh, et.al, 2009). According to that survey 44% of the Istrian County's citizens support Croatia's accession to the EU, while in the age group from 14 to 25 years the support is only 35%.

Figure 7

Stances towards the EU



Source: Authors' calculation based on the survey.

If we look at regional dispersion of eurosceptic stances, we can note that 76% of students that come from the Istrian region are proclaimed eurosceptics, likewise only 66% of students that come from the continental part of Croatia expressed their eurosceptic stances[13].

[11] Similar results were find with the question «How you see entrance of Croatia in the EU», where about 43% of students were indecisive on the question.

[12] Similar statement gave Bagić and Šalinović (2006).

[13] Čulig & Kufrin & Landripet (2007) accentuated regional differences by noting that there is more affirmative stance about the entrance in continental part of Croatia (especially Region of Zagreb and Slavonia) and that there are more eurosceptic tendencies in coastal parts of Croatia. Their conclusions are also comparable with

Table 1

Stances towards the EU by the average income of students' parents

Average income	Stance	Num.	%
a (below 10 000 kn)	**Eurosceptics**	84	**80.00**
	Europeists	19	18.09
	No answer	2	1.91
Total		*105*	*100.00*
b (10 000-15 000 kn)	**Eurosceptics**	43	**66.15**
	Europeists	21	32.31
	No answer	1	1.54
Total		*65*	*100.00*
c (above 15 000 kn)	**Eurosceptics**	10	**55.56**
	Europeists	7	38.89
	No answer	1	5.56
Total		*18*	*100.00*

Source: Authors' calculation based on the survey

Previous table shows the dispersion of eurosceptic/europeist stances by the average income of the student parents. It is notable, that with the increase of the average income eurosceptic tendencies are falling. No less then 80% of students which parents have average income below the 10000 kunas have expressed themselves as eurosceptics, whereas only 55% students with family average income over the 15000 kunas showed their eurosceptic stances. Despite the limited sample of students in the study, it can be concluded that there is visible correlation between eurosceptic stances and the average income of the family (same relations authors drew from the comparison of the eurosceptic stances and average income of the students). Enlargement of the sample would probably show more eligible conclusion; nonetheless it would also show even stronger correlation between these two variable. This correlation sets up a new type of question; does the level of education of student parents also affect the stances towards the EU? Answer for this question is also positive. Namely, students which parents have higher education showed to be less eurosceptic than those which parents have little or no education. About 78% of students which parents have only secondary education tend to show eurosceptic stances and about 67% of students which parents have higher education (higher qualification, high qualification, master degree or Ph.D.) expressed their euroscepticism. The second group was pooled together in the presentation of the results just to show the importance of the education in segregation of thought, choices and actions, making the conclusion more complementary. In an implicit way we can conclude that with the higher level of education eurosceptic stances and attitudes towards the EU tend to decrease, i.e. there is strong correlation between the parents level of education and students tendencies towards euroscepticism. Again, larger sample would unambiguously confirm this conclusion by enlightening more different attitudes even between people with higher education, such as between those with higher qualification and those with doctoral degree.

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conclusions in this research in noting the strong correlation between the parents level of education and students eurosceptic stances. This local survey confirmes specific findings of those authors in indispensable way, connecting all researches in Croatia in one plausible conclusion.

CONCLUSION

This research shows that the main sources of euroscepticism among students population are their perceived cost and benefits, whereas economic aspects have a bigger influence. In an idiosyncratic way we can conclude that distrust toward the EU as negative stance toward the possibility of gaining better socio-economic benefits creates strong euroscepticism in a student population. Simplified, students distrust feeds their euroscepticism. This statement is justified by the share fact of the students' youth. Their acknowledgement of the issue is related only to specific economic benefits, whereas they do not realize wider aspect of the possible benefits or cost (advantages/disadvantages) as they only want a "breakthrough" in a world of grown-ups. Their economic expectation radically forms their stances where the prevailing benefits they expect are: better employment possibilities, higher standard of living and more efficient state of law. On the other side students have fear of poverty and exploitation of national resources, losing sovereignity and bigger emigration pressures if Croatia becomes an EU member.

Čulig & Kufrin & Landripet (2007) found that people under 26 years of age are less optimistic about the membership of Croatia in the EU and tend to refuse their support to the entrance. In that way they are eurosceptics. That statement is strongly confirmed in this paper as 72% of students proclaimed themselves as eurosceptics. National identity shows not to be important factor of eurosceptic stances. But knowledge and awareness (presented through the variable of average family income, average students income and the level of parents education) about the EU shows to be an important factor as this study finds out that if people have quality information about the aims of the EU, they are less likely to be sceptical of European integration processes. There was found no correlation between the average grades and stances of students about the integration because 94% of students were in the middle ranking grades.

This research have some common results with the noted earlier research, and emphisized the rising problem of euroscepticizm among academic youth. The results show that students are even more eurosceptic, 72% against 47% of the total population (PULS researches) which is not good if we consider the level of EU knowledge they have. Although students marks their knowledge about EU with the average value, our opinion is that they have a lot of information about the EU, but this information are fragmented and often inflenced by actual political relations (problems). This kind of information do not give the right picture of EU complexity and functioning model. It is necessary to introduce young people, throughout high school and studies, the EU on systematic way and then, we suppose, the results of polls will give more pro-euro results. Positive step towards greater information could be achieved through specific workshops that inform students about EU projects.[14] The constraint is that the small number of pupils and students participate at that kind of workshops. It is necessary to provide more information, systematic presentations, information about activities of the European Union, but also information about all the positive aspects that membership in the EU can bring.

[14] The example is project Istria Communicating Europe (ICE) in the framework of programme "Europe for citizens".

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PREPOZNAVANJE EUROSKEPTICIZMA U HRVATSKOJ - STUDIJA ISTRAŽIVANJA STAVOVA STUDENTSKE POPULACIJE

ABSTRACT

Ovaj rad pruža sustavan pregled rasta euroskepticizma u Hrvatskoj, stavljajući posebnu pozornost na izvore i sukobe koji generira euroskepticizam kao i na posljedice koje mogu ili će se dogoditi. Izvori euroskepticizma akademske mladeži su analizirani kroz ankete na studentskoj populaciji. Rezultati pokazuju da je studentska populacija euroskeptična zbog ekonomskih troškova koje očekuju da će Hrvatska imati sa ulaskom u EU (strah od siromaštva i eksploatacije nacionalnih resursa, gubitak suvereniteta i većih pritisaka na iseljavanje). S druge strane oni očekuju pozitivan utjecaj članstva u EU, kao što su bolje mogućnosti zapošljavanja, viši životni standard te učinkovitiju pravnu državu.

Ključne riječi: *euroskepticizam, proces integracije, euro nacionalnost, studentske populacije, euro perspektiva.*

JEL: F15, F50.

Dr. Hatice Karaçay Çakmak[1]

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Review
Pregledni rad

A THEORETICAL GLANCE AT MILITARY EXPENDITURES

ABSTRACT

Economic schools have discussed the subject of military expenditures from different perspectives. The point of view of the standard Keynesian economics and of the under consumptionist theories is relatively similar. They argue that military expenditures constitute the most appropriate financial policy instrument against economic fluctuations and recessions. On the other hand, many left Keynesian economists argue that potential positive effects of public expenditures upon economic growth do not valid for military expenditures. The neoclassical analysis regards military expenditures as a security problem. In this study we aim to develop a theoretical glance for military expenditures from different analysis.

JEL Codes: H50, H56

***Key words**: military expenditure, standard Keynesian, left Keynesian, underconsumptionist theory, neoclassical theory.*

A THEORETICAL GLANCE AT MILITARY EXPENDITURES

Armed conflicts are now far more complex and intractable than cold War Period because of increased ethnic, nationalist movements and energy crises that arised from such as water, oil or the other energy sources. In response to these developments there is growing military expenditures around the globe under the great aims of getting global or regional power status, challenging actual or potential conflicts, and increasing the availability of economic resources.

While the growth rates of military expenditures for most nations usually get below than the nation's GDP growth, this ratio exceeds GDP growth rates in some developing countries such as South Korea, Israel, Tunisia, and Syria. However, the majority amounts of total world military expenditures are holded by USA. The USA's military spending accounted for 45 per cent of the world total in 2007, followed by the UK, China, France and Japan, with 4–5 per cent each. Since 2001 US military expenditure has increased by 59 per cent in real terms, principally because of massive spending on military operations in Afghanistan and Iraq, but also because of increases in the 'base' defence budget (SIPRI, 2008).

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Many analysts today view the present growth of U.S. militarism and imperialism as global terrorism and mainly the product of irrational hubris on the part of U.S. leaders (Foster et all, 2008). For example, in his book Hobsbawn writes that "…In effect, the most obvious danger of war today arises from the global ambitions of an uncontrollable and apparently irrational government in Washington....To give America the best chance of learning to return from megalomania to rational foreign policy is the most immediate and urgent task of international politics" (2008: 56).

In response to substantial increase in military expenditures both in USA and in the rest of the world, global arms production is also extremely increasing. According to official records, arms sales by the 100 largest arms-producing companies in the world (excluding China) amounted to $315 billion in 2006, an increase of 9 per cent in nominal terms and 5 per cent in real terms. Forty-one US companies accounted for 63 per cent of the combined arms sales of the Top 100, while 34 West European companies accounted for 29 per cent. Generally, companies specializing in armoured vehicles— in demand by the USA for the conflict in Iraq—and in expanding sectors, such as military services and high-technology electronics and communications, had the biggest increases in arms sales in 2006. Russian companies also experienced high growth rates during 2006, primarily in aerospace and air defence (SIPRI 2008).

Regarding to these rates, it could be argued that economical reasons of military expenditure are vital as political ones as. In this paper, parallel to these facts and figures, we aim to develop a theoretical/economical glance for military expenditures from three basic economic thoughts. In the first part, standart Keynesian analysis and its basic arguments on military expenditures are analysed. In the second part of the study, the political economic theory of Marxian analysis is examined. In the third part, a general picture of Neoclassical and Left Keynesian Analysis relating to their arguments on military expenditures is drawn up. In the conclusion, the strongness and the limits of these economic thoughts in explaining the drastic increase of military expenditures are considered.

1. STANDARD KEYNESIAN ANALYSIS:

Keynes (1935) argued that to achieve full employment in modern capitalism the level of demand was insufficient. Although consumption as a component of the overall demand can be regarded as stable, this situation is not considered as being the same for investments. If the demand for investment does not increase towards a level that creates employment, the economy may enter into a cumulative fall spiral. Investments for profit in a capitalist economy are independent from decisions of saving. Potential profits of investments depend on the demand for the final product of that investment. In order to overcome the economic depression in case of decreasing investments, the solution Keynes suggests is to increase the demand for investment or public expenditures in general by the state and thus to increase the overall demand.

In the 1930's the capitalist class did not like the idea of state intervention into economy. However, against the dilemma of either arrangements in the social regime or recession, certain reforms have been accepted that would stabilize the economy and social system so as to sustain production at a certain level. Kalecki argues that the capitalist class has adopted the following four activities of the state in order to recover from the recession period: Tax reduction, low interest rates, investment subsidies and increase in armament expenses. State intervention in these areas is in line with the interests of the capitalists. For instance, if the state tries to prevent a possible crisis during the recession period by financing public investments with debt, this may receive acceptance from the capitalists. However, this policy may be criticized if it is employed so as to preserve the full employment level (Chester, 1978:

294). Having implemented these policies in the post-war period discussed by Kalecki, the rapid growth rate of the United States has considerably and especially been supported by military expenditures.

Overlapping the policies suggested by Keynes to sustain the activity of the capitalist system, the military expenditures do not go beyond the reform line which the capitalists may possibly approve. According to this mechanism of Keynes (1940), first of all, the state does not negotiate itself in areas where the capitalists can make profit. Aside from substituting for private sector expenditures, military expenditures are effective in sustaining high level use of the existing capacity and thus in encouraging private investments. Secondly, in the armaments industry since there was no definition of a surplus demand due to the constant renewal of existing weapons, an increase in military expenditures did not generate an increase in the production capacity. Finally, military expenditures are used as an instrument against recession and they prevent economic fluctuations of capitalism. According to the general state of the economy, completion or discontinuation of a missile system is more flexible compared to other expenses (roads, dams, schools etc). In connection to military expenditures, developments in space technology also create positive effects on productivity, investments and growth (Cypher, 2007). Especially in the post-war period, the armament competition between the two superpowers –USA and USSR- promoted technological progress as a whole. Technological progress depends on the emergence of new needs and problems; and in this sector this process is experienced intensively. The costs and risks in the research for armament systems are not taken into consideration as much in the military sector but this situation is not seen as often in the private sector or in any other state investment[1].

In the analysis of Keynes (1940)[2], full employment cannot be sustained if the overall demand does not grow as much as the production potential does. The demand for consumption in the overall demand does not increase more rapidly than the GNP; therefore government expenditures must grow until the total of gross domestic investment and net exports reach the level of GNP. If one of these items grows less, the other items must display more growth. In this context, a direct growth in military expenditures increase the overall demand since it will give way to an increase in overall public expenditures. The US economy in which this method is used widespread, could not reach full employment even during the “boom” period of the economic fluctuations after 1957. The deficit between the growing potential productions during these periods and the overall demand for goods and services could not be entirely covered (Hossein- Zadeh, 1993: 255). The problem of insufficient demand was attempted to be overcome by activating the military demand – such as new missile systems- especially during the Kennedy period.

Another factor which leads to a rise in investments is the change in final demand compositions. A shift that occurred in the composition of industrial production increases or decreases the overall demand. Since the speed of harmonization and the desired capital-output ratio of industries affected by the shift in production vary, the effect of this situation on investments can differ although the production shift is balanced. Creating an increase by changing the demand for investment in such a way can be ensured by military expenditures. Declare that there had been a shift of demand from such conventional weapons as tanks and guns to missiles and say that X dollar is spent for the existing weapon M-1; the production of this weapon will not generate any demand for new investments in time or there will be a technological wearing out. On the other hand, if X dollar is spent for a new missile system, new investments will be required for completing this missile system; and after a while, this too will be less motivating for investment demands. Thus, new investment fields are created by generating constant shifts in military demands.

The problem of insufficiency in the investment demand can be resolved by military expenditures in four ways: First of all, a direct growth can be created in military expenditures.

Secondly, the composition of military demands can be shifted (demand shifting policies were implemented more during the post-war period). Also by enhancing employment, the rise in military expenditures plays a motivating role for consumer demands and for increasing investments to meet this demand. Finally, military expenditures that are regarded as the engine of growth have a modernization effect. The reflections of military expenditures on civil sectors such as social stable expenditures as roads, bridges and airports, and in education, specialization and especially technological developments can be regarded within this framework.

2. MARXIAN ANALYSIS

In the "underconsumptionist" variant of the Marxian analysis, military expenditures are discussed within the framework of recessions and economic crises emanating from the capitalist mode of production. The economy enters into crisis when the growth of the forces of production and potential production surpass effective demand which cannot increase due to the pressure on salaries caused by the class structure of the capitalist system. Many Marxists argue that consumption (an effective demand) play's a determinant role for the capitalist system in entering a crisis or recession as argued by the Keynesian analysis.[3] The Keynesian analysis claims that the problem of insufficient demand which leads the economy into recession results from the low tendency to consume, while in the Marxian analysis, this problem is based on the core of the capitalist system and its class structure. Since in the economy which consists of two sections, the output of the 1st section (production goods-producing group) depends upon the input requirements of the 2nd section (consumption goods-producing group), the 2nd section is determinant in the determination of the production level in both sections. The overall effective demand created by this section consists of the renewal demand for inputs used in the production of these goods, salaries of workers and the profit of the capitalist class. The capitalist class does not spend all its profits since they are required for investment, growth and thus for accumulation. Due to the salaries under pressure, workers cannot purchase the entire product –net product- they have produced either. The lower the salaries, the higher insufficiency of demand occurs (Shaikh, 1988: 150). Baran and Sweezy (1966) argued, as discussed also by Hobson, that monopoly market sharpens the problem of massing the economic surplus. They have also argued that in the 20th century, monopolistic capitalism cannot limit itself to the second faction or the demand for consumption, that it will preserve effective demand through external factors (big innovations, imperialist expansion, military expenditures etc).

Most of the analyses, which are regarded as Marxist theories of underconsumptionist, are not synonymous with orthodox Marxist analyses (Ridder, 1986: 575). In the orthodox Marxist analysis, the real obstacle to the capitalist production is not the problems of effective demand or of market, but the capital itself. Capitalist accumulation acts with the motive of profit, but accumulation gradually and increasingly reduces profitability. As a result of shrinking profitability, when capitalists curtail investment expenditures, a portion of marketable products remain unpurchased; and depressions seem to be caused by lack of effective demand and "deficit consumption". However, this "deficit consumption" is actually an outcome of a depression in profitability (Shaikh, 1988:152).

In this context, military expenditures can stop the propensity of profit rates in shrinking. Military production can attract the capital away from accumulation and thus can slow the propensity to increase in its organic composition. On the other hand, the spin-off effect of military expenditures can prevent the increase in the organic composition by reducing the price of the unchanging capital (Dunne, 1990:399).

State interventions made towards preventing an economic crisis that is caused by both shrinking profit rates and by the inability to mass economic surplus are constrained due to the characteristics of capitalism and structure of the bourgeois society. Engaging in profitable fields and in activities that will reduce profits by the government will not be accepted by the capitalists. However, military expenditures will not cause these assumed situations, since while they sustain effective demand with public expenditures directed to the private defense industry, they do not impede capitalists to make profit and mitigate the tendency of profit rates to fall. This is the most appropriate demand motivating method for the capitalist system in terms of property relations.

The fundamental point in the argument of underconsumptionist theory is that: the richer the capitalist economy, the bigger the existing surplus becomes, more than what is required for consumption and investment. As military expenditures bear the same economic function with consumption expenditures, an increase in military expenditures will sustain effective demand and mass the economic surplus. Richer countries have to increase military expenditures more in order to sustain the demand. There is a positive correlation between the welfare level and the proportion of military expenditures in the national income. It is therefore expected that countries with a high amount of military expenditures have low level of unemployment and high level of capacity use. Military expenditures are profitable for the capitalist class to the extent these expenditures make use of the inactive labor force and inactive means of production. Finally, industries (steel and ship production etc) that provide important inputs for weapon production play a role especially in supporting the privileged monopolistic group.

Marxists argue that state intervention is necessary for the long term interests of the capital[4]. Influenced by the analysis of Kalecki[5], Baran and Sweezy argue in their book 'Monopolistic Capitalism' that capitalism enters into stagnation in case of lackage of external factors (e.g. military expenditures) in the monopolistic market (Cypher, 1974:10). O'Connor suggests that the financing of the US state expenditures depends on the production in the monopolistic sector and on the economic circumstances (Griffin, Wallace & Devine, 1982:3). Griffin et al. argue that the US economy has a dual structure consisting of competitive and monopolistic factions, and that the monopolistic sector is the engine of growth. It is therefore claimed that the state will not overlook any stagnation in this sector. In this context, military expenditures as a financial tool against stagnation are under the control of this faction. Griffin argues that military expenditures in the USA are utilized by state officials to increase the effective demand for monopoly products, to motivate R&D and technological innovations, and to secure the external market of the monopolistic capital against military, ideological and national enemies. Monopoly profits do not only depend on state intervention, but also on the existence of a productive, disciplined labor force. Organized labor has economic and political advantages. By using its political power during economic stagnation, the organized labor can create pressure regarding the use of expansionist financial instruments, for instance to increase military expenditures. Griffin is for the opinion that the determination of military expenditures is in effect as regards to the capital and labor market of the capitalist country, rather than the geopolitical and international relations. Although the same economic relations and laws are effective in all capitalist countries; industrial structure, organizational level of the working class and means of state intervention could be different. Heterogeneity with a common capitalist essence brings dissimilarity to the solutions to mass the economic surplus(Griffin, Wallace & Devine, 1982:14).

Studying the subject in terms of financing of military expenditures[6], Luxemburg has attempted to prove that military expenditures enhance employment and facilitate prevention of insufficient demand which constantly threaten capitalism (Rowthorn, 1985:183). According to Luxemburg, militarism emerged as a result of internal factors of all countries and it was no longer an engine of capitalist development, but turned into a capitalist illness. If

military expenditures are financed by the taxes of the workings class, the increase in military demand is balanced by an equivalent decrease in consumption of the working class. Therefore it does not have an effect on the overall demand. If taxes are collected from the capitalist faction that accumulates the bigger part of the revenues or collected through loans from the private sector, this activates the demand. In fact, although Luxemburg emphasized that the major problem was insufficient demand, she mostly discussed capital accumulation. If taxes are used for staff expenditures of the armed forces, the overall demand and profit rates of the capitalist class remain the same. However, if taxes are used for the procurement of weapons, general level of profits will increase. Although Rowthorn (1985) argues that there are mathematical and theoretical mistakes in Luxemburg's analysis of a profit fall, he tries to show the accuracy of the result she achieved. Rather than solving short-term conjunctural problems, militarism is a factor which helps the dynamic and advanced technical branches of production to develop, and which eliminates the internal obstacles of capitalist expansion.

3. NEOCLASSICAL AND LEFT KEYNESIAN ANALYSIS

Classical economists argue that defense expenditures are unproductive and they weaken the economic activity of the state; and that a large army is contrary to political and economic liberty. Arguing that the basic problematic of every state is the "struggle to survive", mercantilists have a different priority ranking from the liberals who claim to take political and economic liberty into their center.

Classical and neoclassical economists attach much importance to the laissez-faire doctrine and international division of labor in order to ensure national welfare and security. When the welfare of the state gets higher the burden of defense will become less significant. As international grade and financial movement become globalized, the economic motives that lead to war will diminish and the way to a more peaceful world order will open. Globalization of economic activities secures international security and world peace. Market economies are superior in terms of efficiency, growth, social and political welfare to state-led economies. However, there appears a market failure when the market cannot secure sufficient resources for national security, and state intervention becomes necessary to enhance national security, because national security is among the public goods that profit-oriented private sector cannot ensure, and thus is not within the borders of laissez-faire of Smith.

From such classical economists as Ricardo and Smith, to such modern scholars as Samuelson and Ohlin, liberals argue that the state must produce and specialize in sectors and goods where it is richer with comparative advantage. Unproductive domestic production by the state in order to maximize social welfare must be abandoned. Therefore state-subsidized defense industry is contrary to comparative advantage and international division of labor (Kapstein, 1992:6). However, this argument concerning the defense industry is in conflict with the fact that defense is a public good and that it has to be financed by state expenditures.

The orthodox analysis of the neoclassical school argues that economic policies, market and mostly the monetary policy ensure that the demand for investment adapt to saving decisions to natural unemployment rates. The whole interpretation takes overall demand as given and ignores the problem of effective demand. While effective demand plays a determinant role in the determination of investments in the underconsumptionist analysis, just the contrary is true in the orthodox analysis. That means there is a departure from expansion of production to expansion of demand, and from saving to investment (Dunne, 1990:398). On a given production level, military expenditures are determined exogenously. Defense expenditures are something that must be considered against a potential enemy and that occur external to the society. High amount of military expenditures is the outcomes of technological changes, increasing costs and the armament competition based on non-economic factors. Orthodox

analysis has an implicit state understanding which is a rational and supra-class institution that balances alternative costs to maximize certain national interests, and the profits out of defense expenditures (Smith, 1977:63).

Traditional optimization techniques are employed in identification of defense expenditures. There is an alternative cost to the supply of resources allocated to military expenditures, and other items in the function of social welfare and the share allocated to security expenditures that are determined by social preferences. In a certain military technology, it is necessary to produce the "defense" level determined by these preferences at minimum cost. Increasing military expenditures in the post-war period can partially be explained by technological conditions. Due to the structure of the arms industry, the belief that the state must be ready for war even before a national threat occurs is widespread. In countries where a pluralist and democratic system works in line with a declared national goal, the problems of conflict of interests in the society will be solved, and a social choice (preference) and social consensus will be achieved. If defense expenditures have deforming economical effects as left Keynesian economists argue, this is not caused by military activity per se; but possibly due to the deformations caused by sub-optimal resource allocation. The orthodox point of view argues that such problems will be mitigated through the expansion of competition. Reducing defense expenditures as a whole will be beneficial to the extent that it reflects a change in public preferences or that it reduces the effects of deformations due to administration to the minimum.

This approach has been criticized by many economists. This approach is criticized on the grounds that not only it is metaphysical, but also it ignores the historical process (Smith, 1977: 609; Dunne, 1990:398). The problem here is in relation to the level of realism of identifying optimum policies in line with data-information and the declared national goal. Very extreme assumptions are made on actors in information and calculation conditions; for instance alternative strategies that must only be suggested in case of war are tested. It is highly unlikely that a national consensus be reached on defense objectives because of the conflicts of interests among interest groups, ambiguity and complexity of international relations, and the confidentiality over military problems.

The orthodox analysis argues that defense production is maximized under resource, productivity, technology and information limits within the defense structure of the state. Left Keynesian thought[7], on the other hand, argues that military institutionalism is constituted not due to external threats but due to domestic pressures, and that private interests are effective in determination of military decisions. They claimed that benefits out of expenditures primarily go to certain interest groups, and that the decisions are not based on a social consensus upon the interests of the nation state, but on agreements and struggles among various classes. Since various interest-holders possess unequal levels of information and power, decisions regarding military expenditures are taken in favor of large interest groups (military industry complex). National interest within the frame of this approach still exists, but this has been distorted by institutionalized interests (Dunne, 1990:398).

According to left Keynesian analysis, increasing military expenditures will neither mitigate the increasing level of capacity utilization nor the unemployment level, as also argued by Standard Keynesian or radical arguments. To the contrary, financing of civil projects will ensure equal employment increase and revenue multiplier effect; such social expenditures must be opted in terms of the positive effects it will yield in the long run on the capital base of the nation (Abell, 1990:406). Military expenditures increase at the expense of shrinking consumption, investments and other state expenditures, or of creating deficit in balance of payments. The increase in military expenditures incurred by the state brings along the problem of "crowding-out" (Melman, 1985:130). Left Keynesian scholars such as Dumas and

Melman argue that disarmament must be complemented by a robust industrial policy in order to repair the deformations due to extensive defense expenditures for decades.

CONCLUDİNG REMARKS

Orthodox Marxian and Keynesian analyses argue that military expenditures assume a role of a financial instrument against the recession and stagnations of capitalism by enhancing effective demand or solving the problem of deficient consumption. Indeed the military Keynesian policies that had been pursued in the post-World War or post-Vietnam War period had been effective in many industrialized countries and the USA. However, the policy of the USA to enhance its military power in order to eliminate the loss of its hegemonic power in economy, technology, finance and politics brings along more burdens to the world economy. For instance, the effect of the invasion of Iraq by the USA in the name of world peace on the world energy price increases cannot be ignored. However, these arguments of Standard Keynesian and Marxian approaches lose their validity for especially developed countries. A lack of foreign exchange and capital etc. exist in these countries rather than the problem of effective demand. As argued by the neoclassical approach, military expenditures create a high alternative cost on consumption, investment and other public expenditures. Moreover, military expenditures create a serious burden on the budget and speed up inflation. On the other hand, in most of the developing countries, consumption of arms is met through import and these expenditures suck up the already-limited foreign exchange resources.

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ENDNOTES

1. Standard Keynesian analysis argue that being effective in overcoming the problem of insufficient consumption, the function of military expenditures will diminish as capital-intensive products and high technology are focused in production; in this case, there will be a departure from salaries and procurement of inputs which increase effective demand to R&D expense effects of which are weaker (Hossein-Zadeh, 1992:255).
2. After Britain entered World War II, Keynes (1940) published *How to Pay for the War: A Radical Plan for the Chancellor of the Exchequer*. In this study, he states that free motion of economic factors are not ultimate determinant of economic growth, instead, the behavior of the political system and its relationship to the economic process is essential to the proper functionality of the economy.
3. This is not orthodox Marxist analysis, but the "deficient consumerism" variant of the crisis theory. In fact Marx did not say much about military expenditures. Gottheill (1986: 563-574) argues that even the Marxist literature on military expenditures is in conflict with the analysis of Marx himself.
4. In Keynes, the state is a supra-class institution which guards the interests of the society and the parasite factors of capitalism must be separated from capitalism itself so as to sustain the activity of the system.
5. Discussing the short-term, Kalecki points mitigating intensity of innovations as the slow growth of monopolistic capitalism.
6. Similarly, though not an underconsumptionist theoretician, but highly influenced by this theory, Robinson also addressed the subject of finance. This economist argues that taking the money necessary for military expenditures only from the pockets of the capitalists will help abstract the surplus (Saybasili, 2000:174).
7. However, they attained very different results from the theory of Standard Keynesian analysis. Similar to radical economists, Standard Keynesian economists claims that military expenditures (other state expenditures do not create this effect) are utilized as an instrument against the recessions and stagnations of the capitalist system.

TEORIJSKI POGLED NA VOJNE RASHODE

SAŽETAK

Ekonomske škole diskutiraju o predmetu vojnih rashoda iz različitih perspektiva. Gledišta standardne Kejnezijanske ekonomije i teorije nedovoljne potrošnje su relativno slična. Oni tvrde da su vojni rashodi najprikladniji financijski instrument politike protiv ekonomskih fluktuacija i recesija. S druge strane, mnogi lijevo usmjereni kejnezijanski ekonomisti tvrde da potencijalni pozitivni učinci javnih izdataka na ekonomski rast ne vrijede za vojne rashode. Neoklasična analiza promatra vojne rashode kao sigurnosni problem. U ovom radu cilj je prikazati teorijski pogled na vojne rashode iz različitih analiza.

JEL: H50, H56

Ključne riječi: vojni izdatci, standardni Kejnezijanizam, teorija nedovoljne potrošnje, neoklasična teorija.