

PARTISAN POLITICIANS AND ECONOMIC POLICY

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Abstract

This paper seeks to identify the causal effect of governor party affiliation on state tax burden and tax legislation from 1975-2000. This helps shed light on whether policy making by different political parties diverge or converge. We employ parametric and nonparametric regression discontinuity approaches. Our results indicate that when a state has a closely elected Democratic governor, the state has a significantly higher total tax burden than it would have had if the Republican candidate would have won instead.

1. INTRODUCTION

This is an empirical investigation of differences in tax policies set by Democratic and Republican governors in the U.S. states. The political economy literature has recently renewed its interest in the role played by party affiliation for politicians' choices and behaviors (Lee et al.^[7]; Lee^[6]). While a considerable body of theory suggests that competition between office-seeking politicians will push policymaking towards the middle (Downs^[3]), Besley and Case^[2] point out that this result hinges crucially on the ability of politicians to commit to campaign promises. Alesina^[1] finds that partisan politicians with different policy preferences may be unable to commit to middle-of-the-road policies if her promises are not perceived by voters as credible.

The empirical evidence on the role of party affiliation is mixed. While Ferreira and Gyourko^[4] find no impact of the party affiliation of U.S. mayors' on e.g. spending, Lee et al.^[7] report that members of the U.S. House from the two main parties vote differently. They find that voters "pick policies" (policy platform) rather than "affect policies" by pushing politicians towards the middle. At the state level, Besley and Case^[2] establish that a higher share of Democratic state legislators results in higher state spending, while Knight^[5] and Reed^[8] find that Democratic control of state legislatures raises the tax burden. Knight^[5] and Reed^[8] find little effect of governor party affiliation on state tax rates.

The current paper contributes to the state tax policy literature by utilizing recently developed regression-discontinuity approaches. These are designed to deal appropriately with the endogeneity associated with governors' political affiliations as they mimic a random assignment of the governor's party affiliation (Lee et al.^[7]; Lee^[6]). Utilizing 1970-2000 data, we study the effect of party affiliation on the change in several tax policy measures four years subsequent to a governor's election victory (in particular, total tax revenue per capita; sales tax receipts per capita; income tax receipts per capita; corporate income tax revenue per capita).

2. EMPIRICAL METHODOLOGY

To begin, let Y_i and Y_0 denote two variables of tax policies to be compared, in particular if a governor is a Democrat or Republican, respectively,

$$Y_{1i} = x_i \beta + \delta + u_{1i} \quad (1)$$

$$Y_{0i} = x_i \beta + u_{0i} \quad (2)$$

where x is a vector of observable characteristics of state i (including an intercept) and u is the error term as usual. The difference in tax policy between Democratic and Republican governors is captured by δ . Note that we never observe both Y_1 and Y_0 for the same governor as the governor cannot be a Democrat and Republican at the same time. The observed tax policy for governor i could be expressed as $Y_i = Y_1 D_i + (1 - D_i) Y_0$ where D_i is the party membership of the governor in state i , $D_i = 1$ if Democratic, $D_i = 0$ if Republican. Thus, we may write the observed outcome as a regression model,

$$\begin{aligned} Y_{it} &= Y_1 D_{it} + (1 - D_{it}) Y_0 \\ &= D_{it} (\beta + \delta + u_{1it}) + (1 - D_{it}) (\beta + u_{0it}) \\ &= x_{it} \beta + \delta D_{it} + u_{it}, \end{aligned} \quad (3)$$

where $u_{it} = u_{0it} + D_{it}(u_{1it} - u_{0it})$. Eqn. (3) is a common regression model. If $E[u|D] = 0$, we can consistently estimate the effects of party ideology on tax policy by Ordinary Least Squares (OLS). If we take advantage of the panel structure and further assume that the error term consists of two parts; a time-variant ε_i and a time-invariant v_i , (3) becomes

$$Y_i = x_{it} \beta + \delta D_{it} + v_i + \varepsilon_{it}. \quad (4)$$

If party ideology D , conditional on x , is uncorrelated with time-variant shocks to tax policy, fixed-effect OLS estimation of yields a consistent estimate. While plausible, such an assumption may still be too restrictive and potentially fail to hold. For example, an adverse economic shock that impacts a particular state may lead to a need to reduce tax burden in the state. If a particular party, say the Democratic party, is more likely to be elected during difficult times, there exists a negative correlation between Democratic party and unobservable determinants of environmental policies. In this case, the negative correlation leads to underestimated effects of party on policies. As a result, we may not find any significant evidence of policy divergence, as the estimates are biased toward zero. Although we can alleviate the bias by controlling for those (observable) variables that are commonly regarded as the determinants of tax policy, it still may not be sufficient to identify the causal effect of party ideology. As a result, recent studies of the party effects on policy outcomes have utilized the regression discontinuity (RD) method (Lee et al.^[7]). This method exploits the fact that the election rule is a deterministic function of vote margin ("sharp" RD design),

$$D_i = I(m_i > 0), \quad (5)$$

where m_i is vote margin. Note that in the sharp RD design, $E[u|D, m] = E[\varepsilon|m] = f(m)$, which implies that we could include and explicitly model the conditional expectation $E[u|D, m]$ in (3). Equation (3) becomes

$$\begin{aligned} Y_{it} &= x_{it} \beta + \delta D_{it} + v_i + \varepsilon_{it} \\ &= x_{it} \beta + \delta D_{it} + v_i + E[\varepsilon_{it}|D, m = m_{it}] + \varepsilon_{it} \\ &= x_{it} \beta + \delta D_{it} + v_i + f(m_{it}) + \varepsilon_{it} \end{aligned} \quad (6)$$

where β is a constant, δ is the coefficient of interest, $f(\cdot)$ is a flexible function of m , and ε_{it} is the error term. δ can be consistently estimated via OLS.

The vector x includes measures of a state's real income, the log of its population, the percentage of the population aged above 65 and below 18, respectively, and dummy variables whether the state House and the state Senate, or both, are controlled by Democrats. All specifications also include state- and year-fixed effects.

3. RESULTS

Column (1) in Table 1 suggests that if we utilize fixed-effects OLS, the only significant effect discovered is a *negative* effect on sales tax receipts per capita four years after a Republican governor is elected, relative to if

a Democrat would have won. Turning to the RD design estimates in column (2), we find evidence that total taxes per capita four year after the election is approximately \$31.85 higher if a Democrat won the governorship. Taking the endogeneity problem seriously by using an RD design thus changes our results dramatically. However, for the remaining estimates, we find few differences in policymaking across parties.

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Tables

Table 1. Four year change results

Variable	OLS-FE (1)	RD Design (2)
Total Tax per Capita	2.377 (4.594)	31.854** (16.174)
Sales Tax per Capita	-4.605** (2.322)	0.265 (10.332)
Income Tax per Capita	0.899 (2.626)	12.372 (11.017)
Corporate Tax per Capita	0.779 (1.001)	3.589 (4.085)

Notes: Robust standard errors in brackets. ***(**)[*] indicates significant at the 1(5)[10]% level, respectively.

UNDERSTANDING FRAME OF TRAINING EVALUATION IN MANAGEMENT DEVELOPMENT: AN ANALYSIS IN TWO PROCEDURES IN A GREEK CASE STUDY

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Abstract

Purpose: The present global business life offers an increasingly important place in management training development. Employing the performance management theory perspective on training, the paper develops and analyzes a functional model of measurement training effects, using both managerial knowledge and behavioral skills as criteria. The main objective of this paper is to verify the concept that "the training attempt as a whole together with its effects can develop middle managers' effectiveness".

Design/methodology/ approach: The research achieves this objective by the use of two alternative statistical analyses, where, under arbitrary destinations, their compatibility is demonstrated. Specifically, the primary data has been generated through a survey research based on open-ended questions as well as through face-to-face structured interviews based on the principle of controllable projection. A total of 190 responses are identified.

Findings: In this particular research, some useful results have emerged. The proposed evaluation model (consisted of 6 levels), enhances the viable option that training improves the work. The analysis of the items in this current research exhibited that the training contributes positively to the managers' expectations in relevance to the technical conditions of the teaching and their personal targets. Moreover, the managers' training contributes to the essential change of their knowledge.

The research shows that middle managers' organizational commitment is not crucially affected by the training procedure. In addition, middle managers' job satisfaction is positive up to an extent. According to the analysis of the data middle managers' performance of their work is slightly affected by their training. Also, the morale of the middle managers is improved by training whereas their stability remains unchanged. As regard their self-actualization, self-confidence and prestige, training has a positive effect on them.

Research limitations/implications: Other criteria should be subjects of future research in relation to managers' training are their participation in training-related decisions, organizational climate and diversity of training methods. The comparison of the effects of training interventions tactics of mid-level managers in large and small organization, in state-owned and private companies in countries with different economies should also be studied.

Originality/value: The study addresses provides us with an implemented frame training evaluation through which the job effectiveness of managers and all other types of employees is observed.

Keywords: Training evaluation, training effectiveness, management development, statistical methods

Paper type: Research paper

Introduction

Rapid and discontinuous change within organizations, flatter organizational structures, broader spans of control, and self-managing work groups, combined with network structures and looser business relationships have emphasized the importance of human capital as a crucial competitive advantage. In the intensifying war of talent, management development is seen as an important method of attracting and retaining high-quality employees. Management development is a dynamic and complex process by which individuals learn to perform effectively in managerial roles (Baldwin & Padgett, 1994; Longenecker & Fink, 2001). Management development and training activities linked to the needs of the business is one of the key high-performance work system that improves the financial performance of organizations (Becker & Huselid, 1998). Martin (2002), points out that managing people requires skills such as analysis of self and others, motivating teams to complete tasks, delegating and decision making. Most of these skills can be acquired through effective management development programs. However, there is much evidence suggesting that a considerable part of organizations' investment in training does not result in optimal transfer (Burke &

Baldwin, 1999). To improve job performance, the skills and behaviors learned and practiced during training have to be transferred to the workplace, maintained over time, and generalized across contexts (Holton & Baldwin, 2003). As the transfer of training remains an important issue for researchers and practitioners (Holton & Baldwin, 2003), it becomes essential to test models that include central, but less frequently studied training effectiveness factors. For the purpose of the current study, training can be defined as “the systematic acquisition of skills, rules, concepts, or attitudes that result in improved performance in another environment”.

There are calls of studies, where they have investigated the importance and potential impact of training on managers and the costs associated with the development and implementation of training as well as the relationship between design and evaluation features and the effectiveness of training and development (Salas & Cannon-Bowers, 2001; Tannenbaum & Yukl, 1992).

Concerning the assessment of training outcomes, the paper is consistent with current trends in the literature, and view training effectiveness as a multidimensional construct (Colquitt et al, 2000).

Researchers have called for more integrative models of training effectiveness, in an effort to include both individual and organizational contextual factors as antecedents of transfer of training (Baldwin & Ford, 1988; Colquitt et al., 2000; Kozlowski & Salas, 1997; Mathieu & Martineau, 1997; Quinones, 1997).

The present study takes these suggestions into account and propose a model connecting a type of evaluation criteria of training with training effectiveness dimensions. In the paper, a comprehensive analysis of six aspects of management training is conducted in measuring its effectiveness. Management development interventions can yield desired results only when the knowledge and skills acquired in management development programs is actually transferred to the workplace. These activities include systematic follow-up evaluation of participants and provide opportunities to utilize the new knowledge and skills in the workplace. Philips and Philips (2001) present a comprehensive discussion on evaluation process. These authors argue that executives and managers who fund training and development programs need evaluation data. In addition, factors of training programs to deliver the desired results, wish to link training to organizational strategy, growth in training budgets and greater focus on return on investment have resulted in a much greater emphasis on evaluation (Philips and Philips, 2001). The process is necessary to assess whether or not participants' knowledge, skills and attitudes have been changed and can improve the realization of organizational objectives.

Unfortunately, many organizations do not have adequate follow-up systems once management development programs are completed (Lien et al., 2007; Melum, 2002). Some organizations measure the quality of management development by using four levels of rigors, i.e. Reaction, Learning, Behavior and Results (Kirkpatrick, 1983). Although past research indicated that management development is important, no powerful intervention tool of evaluation exists for clarifying outcomes.

The present research will attempt to propose a model of training evaluation, which identifies six key aspects, and provides relevant present-day information for the impact of management training into two distinct stages based on the principle of controllable projection.

Designing a tool to measure the management development effectiveness

This study developed a model of management development effectiveness that involves assessment of development needs and evaluating the program. This “staged approach” is adopted to build the model. Specifically, it focuses on what happens after learning occurs. So, it postulates that the group of variables, i.e. post-program components, which deals with follow-up activities, is associated with the dependent variable, management development effectiveness (Figure 1). Post-program components for training evaluation, include: Reactions of process training, Learning, Job behavior, Job performance, Organizational team and Society.

Taking all of these issues raised into consideration, this study addresses the following hypotheses:

H1. Management development will be positively related with the expectations of the participants from the courses that they attended, the context and the technical conditions of the courses.

H2. Management development improves managers' knowledge over basic functions of the management.

H3. Management training has an effect on the enbettering of the professional behaviors of managers.

H4. Management development implies a positive relationship between managers' efficiency and their job performance.

H5. Management training is likely to enhance the effectiveness of the team that the managers belong to which may have relative effects on the team's morale, its coherence and its adaptability.

H6. Management development will be linked more closely to managers society for the greatest satisfaction of their needs.

Methodology

Sample

The sample in this study comprised the managers in Emporiki Bank in Greece as identified by the organizational structure of the branches of the institute.

A semi-structured questionnaire was distributed to collect data from the managers by use of a web-based internal communicational tool of the Emporiki Bank, which resulted in data from 190 managers. Respondents were drawn from 250 managers, who had attended at least three management development program (on subjects of any managerial nature) within the past 5 years. A covering letter accompanied each questionnaire. Respondents were assured that all responses would be kept confidential and that the data were for research purposes only. The sampling rate of the total population was approximately 17 per cent. The response rate of the sample was approximately 63,3 per cent. Of the respondents, 46 were women and 144 were men. Approximately, 32 per cent were managers in Full Service Branches, 24 per cent held managerial positions in Medium- Sized Businesses and Individuals Branches and 44 per cent held managerial positions in Individual Customers Service Branches. With regard to education level, approximately 76,8 per cent held a university degree of 3-year study or more. Their average age and tenure were 45 and 13 years, respectively.

Measures and procedure

The study used a construction of authentic questionnaire borrowing, of course, some parts from the human resource management or psychology literature, conforming them to the needs of the current research. A self-esteem questionnaire instrument was used for this research in measuring the constructs of a management training process. Self-report instruments are appropriate when non-ability-related traits or attributes are measured (Caroche et al., 2001; Mayer, 2001). The analysis suggests the six dimensions have acceptable reliability estimates (coefficient Alpha ranges from 0,75 to 0,9). The six- factor structure also found the empirical data fit reasonably well.

Training programs can be evaluated on a number of different criteria including participants' satisfaction with training, learning during training, and skills at applying material covered in training (e.g., D. Kirkpatrick, 1994; Kraiger, 2002). What is most important to the design of training evaluation measures is that the content of the measures be logically linked to the training content (Kraiger, 2002; Kraiger, Ford, & Salas, 1993). Description of the measures/dimensions of training evaluation follow:

Reactions of process training (the first dimension), was handled by 12 items (questions) designed to assess three criteria/variables (X1= Expectation of the training courses, X2= Training course content, X3= Technical conditions) which were considered as countable standards for the evaluation of the reactions in the process of training changes. *Learning (the second dimension)*: Participants' retention of the key information covered in training was measured in a 4-item exam (questions). *Job behavior (The third dimension)* was assessed by 13 items (questions) designed to assess four criteria/variables (X5= Values and Organizational Commitment, X6= Job Satisfaction) which were considered as countable standards for the evaluation of the degree that the professional behavior is influenced by training. *Job Performance (The forth dimension)* consisted of 8 items (questions) focused on measuring three criteria/ variables (X7= Creative productivity and X8= Attendance) for the evaluation of the changes caused by training in the performance of the work of managers. *Organizational team (The fifth dimension)* consisted of 5 items (questions) designed to assess three variables (X9= Morale of team, X10= Stability) which were considered as countable standards for the evaluation of the results in the Organizational Team that the trainee managers belong to. In measuring *the section sixth* of the evaluation of the training results in *the Society*, there were 5 items (questions) focused on measuring two variables (X11= Self-actualization, X12= Safety) that were considered as countable standards for the evaluation of social goals of the managers' training.

To fulfill the objectives, the research was completed in two stages : face-to- face structured interviews based on the principle of controllable projection (stage 1) and research based on open-ended questions (stage 2), (Stolin, 1983). So, the questionnaire consisted of 46 closed questions in a 5-point Likert scale on various issues and 6 open questions.

Results

Data analysis

Descriptive analysis: First, a descriptive analysis is carried out to examine the behavior of the variables used. From there the attention was directed at testing the hypotheses. Table 1 shows the means, standard deviations, reliabilities and the intercorrelation matrix. Analysis of the intercorrelation matrix indicates that none of the correlations are above 0,70. Hence, the problem of multicollinearity is quite low. In addition, the internal reliability of the scales used in the questionnaire was determined by computing Cronbach's (1951) alpha coefficient. The scales used in this study had a high internal reliability with Cronbach's alpha coefficient for all the scales in the questionnaire between 0,70 and 0,90 (Nunnally, 1994). The data in table 1 indicates that none of the variables had high mean scores.

Regression analysis: What is being searched for at this point, is a statistical model that will verify the role of improvement in the research, that is "the managers' training can develop their effectiveness= basic hypothesis". In other words, how the $x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10}, x_{11}, x_{12}$ (= the factors loading/variables that were defined in this current research in order to count the allocated 6 hypotheses, see Figure 1) affect Y (= basic hypothesis).

the Factor Analysis was used, setting the dimensionality equal to unity for the arbitrary chosen variables- open questions to account as the responding variable Y and make these questions one variable that would be Y (multivariate data).

The open questions are considered as categorical and ordinal variables. For more clarification, the selection of the questions is considered to be logically ordinal. Consequently, so as to use the questions in the quantitative analysis, they were regarded as categorical.

The methodology procedure of this part of the analysis is divided in two logical approaches of the original hypothesis.

a) It is examined how much *each variable* $x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10}, x_{11}, x_{12}$ separately contributes positively to Y (basic hypothesis)

It is attempted to evaluate some univariate regression models for each of the 6 levels/dimensions (reaction towards the training process, learning, job behavior, job performance, organizational team and society) to the Basic Concept "The managers' s training improves their effectiveness".

In the univariate regression procedure, a dependent variable (Y) is estimated by more independent variables ($x_1, x_2, \dots, x_{12}$), in order to produce the knowledge which will be able to contribute to the support of the relationship among the variables.

For a better understanding of the explanatory behavior of these variables it is attempted on quadratic or/and cubic expressions. The results drawn from the regression and quantitative analysis are showed in Table 2.

b) A multivariate regression is being examined, taking into consideration *all the variables* $x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10}, x_{11}, x_{12}$ together, and it is evaluated how much they contribute positively to Y (basic hypothesis) (Chatfield C., 1989)

The research examines 6 models step by step and estimates that with Model No 6 the variability of Y (basic hypothesis) can be translated to a percentage of 55% from the variables that are contained in this model, which $x_2, x_3, x_4, x_6, x_9, x_{11}, x_{12}$. This percentage may not be very high but it is found in a respected and acceptable level.

The Regression analysis was carried out. First of all the overall performance was examined from the linear model ($Y = a + bx$), that is, it was the null hypothesis which was examined so all coefficients are equal to zero (in this case $a = b = 0$). This test was carried out with the F statistic and its corresponding p -value. The second step was taken to examine separately the performance of each variable by examining separately the performance of each coefficient in the linear model. This was done by the t -statistic test for each variable. So, the variables $x_2, x_3, x_4, x_6, x_9, x_{11}$ and x_{12} seem to be statistical significant, throw the stepwise method. Moving from one model to the next, the results of the review are presented in table 3.

Discussion

This study sought to identify the variables associated with management training effectiveness. Management development interventions can yield desired results only when management development is effective. A model of training evaluation is developed and tested to measure the dimensions that are influenced by the training and identified ways in which the benefits of training process can be reported. The findings of the

study are similar to the results from past research on training and development, which found that effectiveness of training evaluation impacts on transfer of training (Chiaburu & Marinova, 2005; Gordon, 1991; Ostroff, 1991). What is of great interest in this analysis for training evaluation criteria (dimensions), is the fact that three statistical ways are presented which verify the positive results of training. Summarizing, in this particular research, some useful results have emerged. That is, the training evaluation is a measurement technique that examines the extent to which the training programs meet the goals intended. The evaluation measures used, depend on goals and can include evaluation of training content and design, changes in learners, and organizational payoffs (job performance, transfer climate and attitude, results).

The analysis of the items in this current research exhibited that training contributes positively and the variables Training course Content, Knowledge, Self-actualization, Safety play a leading role in the explanation of the effectiveness of management training (because they are produced and are repeated by the most presented models).

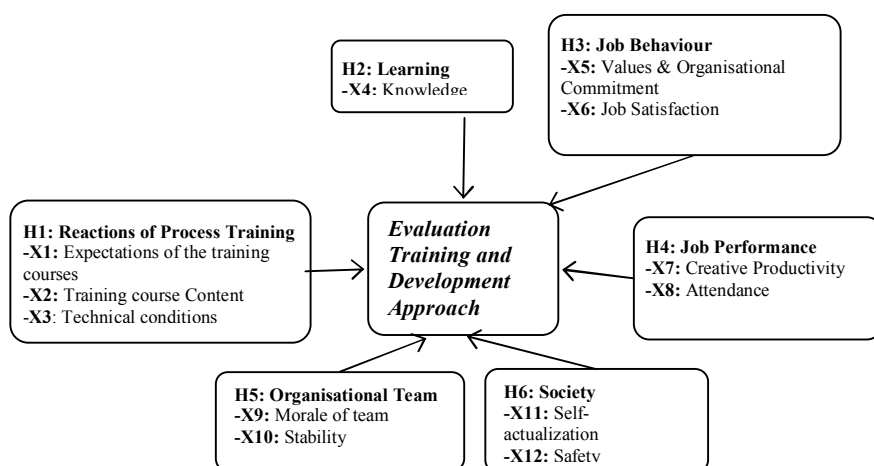
It should be noted that the study limited its analysis to variables which practitioners and researchers have a reasonable amount of control. Other criteria should be subjects of future research in relation to managers' training evaluation, are their participation in training-related decisions, organizational climate and diversity of training methods. The comparison of the effects of training interventions tactics of mid-level managers in large and small organizations, in state-owned and private companies in countries with different economies should also be studied.

In a shrinking labor market, management development will increasingly be used as a method of attracting and retaining talent employees. As organizations increase their investments in management development,, it is believed that researchers need to focus a lot more on evaluation of managers development. Only effective programs will justify a significant investment. Additional research can help to improve management development effectiveness and enable organisations and individuals to achieve their desired goals.

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Figure 1. Evaluation Influences on Training and development**Table 1:** Means, standard deviations (SD), reliabilities and intercorrelation matrix

		Mean	S.D.	1	2	3	4	5	6
Levels/ Dimensions	Variables								
1. REACTION TOWARDS THE TRAINING PROCESS	X1= Expectations of the training courses	4,56	0,87	(0,86)					
	X2= Training course content	4,27	1,03	(0,91)					
	X3= Technical conditions	4,43	0,75	(0,84)					
2. LEARNING	X4= Knowledge	4,55	1,09	0,35**	(0,87)				
3. JOB BEHAVIOUR	X5=Values and Organizational Commitment	5,05	1,002	0,38**	0,63**	(0,70)			
	X6= Job Satisfaction	3,53	0,766	0,22**	0,38**	(0,77)			
4.JOB PERFORMAN CE	X7= Creative productivity	4,35	1,14	0,42**	0,70**	0,60**	(0,83)		
	X8= Attendance	4,03	0,94	0,32**	0,45**	0,53**	(0,68)		
5. ORGANISATI ONAL TEAM	X9= Morale of team	4,55	1,09	0,51**	0,63**	0,63**	0,69**	(0,83)	
	X10= Stability	3,956	1,10	0,44**	0,48**	0,70**	0,70**	(0,95)	
6. SOCIETY	X11= Self-actualization	4,05	1,03	0,24**	0,36**	0,34**	0,30**	0,32**	0,80
	X12= Safety	4,43	0,82	0,32**	0,36**	0,48**	0,53**	0,53**	0,69

Note: Alpha coefficients are on the diagonal in parentheses

N= 190

* p<0,05; **p< 0,01

Table 2: Results of univariate regression analysis

		R-sq , per linear relation $Y = \alpha + \beta\chi_1$	R-sq, per quadratic relation $Y = \alpha + \beta\chi_1 + \gamma\chi_1^2$	R-sq, per cubic relation $Y = \alpha + \beta\chi_1 + \gamma\chi_1^2 + \delta\chi_1^3$
Levels/ Dimensions	Variables			
1. REACTION TOWARDS THE TRAINING PROCESS	X1= Expectations of the training courses	R²= 13.8 %	R²= 28.5 %	R²= 31.1 %
	X2= Training course content	R ² = 0.4 %	R ² =5.6 %	R ² =7.8 %
	X3= Technical conditions	R²= 12 %	R²= 18 %	R²= 21 %
2. LEARNING	X4= Knowledge	R²= 16.5 %	R²= 29.7 %	R²= 39.3 %
3. JOB BEHAVIOUR	X5=Values and Organizational Commitment	R ² = 0.1 %	R ² = 0.4 %	R ² = 0.6 %
	X6= Job Satisfaction	R ² = 1.4 %	R ² = 1.4 %	R ² = 3%
4. JOB PERFORMANCE	X7= Creative productivity	R ² = 0 %	R ² = 1 %	R ² = 2,1 %
	X8= Attendance	R ² = 1.1 %	R ² = 2 %	R ² = 4,3 %
5. ORGANISATIONAL TEAM	X9= Morale of team	R²= 8.6 %	R²= 13,2 %	R²= 16,6 %
	X10= Stability	R ² = 0.6 %	R ² = 12,2 %	R ² = 18,4 %
6. SOCIETY	X11= Self-actualization	R ² = 0 %	R ² = 8,1 %	R ² = 15,6 %
	X12= Safety	R²= 7.7 %	R²= 20,1 %	R²= 21.2 %

Note: Standardized regression coefficients are shown in each equation. N=190

Table 3: Multivariate Model Summary

Model 1 (12 variables)	[enter method]
$Y = \alpha_0 + \alpha_1 \chi_1 + \dots + \alpha_{12} \chi_{12}$	→ R ² = 28 %
Model 2 (12 variables)	[stepwise]
$Y = \alpha_0 + \alpha_1 \chi_4 + \alpha_2 \chi_{11} + \alpha_3 \chi_{12}$	→ R ² = 23.2 %
Model 3 (24 variables)	[enter method]
$Y = \alpha_0 + \alpha_1 \chi_1 + \alpha_{12} \chi_{12} + \beta_1 \chi_1^2 + \dots + \beta_{12} \chi_{12}^2$	→ R ² = 49,7 %
Model 4 (24 variables)	[stepwise]
$Y = \alpha_0 + \alpha_1 \chi_4 + \alpha_2 \chi_1 + \alpha_3 \chi_4^2 + \alpha_4 \chi_{11}^2 + \alpha_5 \chi_2^2 + \alpha_6 \chi_3^2 + \alpha_7 \chi_6^2 + \alpha_8 \chi_1$	→ R ² = 46.4 %
Model 5 (36 variables)	[enter method]
$Y = \alpha_0 + \alpha_1 \chi_1 + \dots + \alpha_{12} \chi_{12} + \beta_1 \chi_1^2 + \dots + \beta_{12} \chi_{12}^2 + \gamma_1 \chi_1^3 + \dots + \gamma_{12} \chi_{12}^3$	→ R ² = 60.4 %
Model 6 (36 variables)	[stepwise]
$Y = \alpha_0 + \alpha_1 \chi_4 + \alpha_2 \chi_4^3 + \alpha_3 \chi_{11} + \alpha_4 \chi_{11}^2 + \alpha_5 \chi_{11}^3 + \alpha_6 \chi_2^2 + \alpha_7 \chi_6^2 + \alpha_8 \chi_3^3 + \alpha_9 \chi_9 + \alpha_{12} \chi_{12}$	→ R ² = 54,8 %

CAN ALTMAN Z-SCORE MODEL PREDICT BUSINESS FAILURES IN GREECE?

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Abstract

This paper analyses whether Altman Z-score models, can predict correctly company failures. The empirical analysis examines all listed in the Athens Exchange companies, during the period 2002-2008 and discontinuations of operation for these companies during the same period. It is investigated whether Z-score models can predict bankruptcies for a period up to three years earlier. Our study shows that Altman model performs well in predicting failures. This is in line with other findings. The empirical results are interesting since they can be used by company management for financing decisions, by regulatory authorities and by portfolio managers in stock selection.

Keywords: Valuation, Altman, Regulation, Share price, Capital markets, bankruptcy
JEL Classification: G33:G14

1. Introduction

1.1 Examined issues

In the study we examine if z-score alone can predict business failure for the examined companies in the examined period. To examine this we investigate whether z-scores one up to four years before bankruptcy can predict business failures or financial problems. Our study is interesting because if discriminant analysis is useful, then financial analysts and portfolio managers can use it for stock picking and asset allocation. Discriminant analysis can also be a valuable tool for investors. Companies that have high probabilities to bankrupt should trade at a discount to their value. If this is correct, then our paper makes an interesting contribution to bankruptcy literature, by linking z-score with business failure prediction and asset allocation in Greece.

1.2 Previous research

Multivariate prediction of bankruptcy as established by using univariate analysis of bankruptcy predictors was initially developed by Beaver (1967, 1968) who found that a number of indicators could discriminate between matched samples of failed and nonfailed firms for as long as five years prior to failure. Altman (1968) defines five predicted factors and sets the base for other researchers to examine the validity of multivariate models. Following to the Beaver and Altman research seems to verify the validity of Altman models, but their prediction ability is found gradually lower. Begley et.al (1996) examines the altman z-model and concludes that the model performs better in US data during the 1980s than during the 1990-1995 period. Similar are the findings of Grice and Ingram (2001), who also find better performance for manufacturing companies.

2. Data Issues and Methodology

2.1 Data

In order to test the credit risk of the construction companies in Greece, we examine two Z-score models, in particular the z-score model developed in Altman (1993) .