

An Effective Index of Management Competence

by

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ABSTRACT

The aim of this paper is twofold: At first to construct an index to capture management competence in a continuously changing environment and secondly to test the validity of this index in the context of a sample of firms drawn from the Athens stock exchange.

The validation process will consist of two parts. Initially, will attempt to establish a relationship between the constructed index of management competence and firm economic performance. Actually, it will be shown through an econometric model that Management Competence contributes significantly:

- to sales growth of a firm operating in a distressed industry
- to an increase in the firm's share return
- to an increase in profitability

A unique aspect of the study is that it allows us to show that the constructed index has greater impact on highly leveraged firms than otherwise. This is an interesting result since it supports the general belief that not only the performance but the economic survival of highly leveraged firms depends primarily on management competence.

Keywords: Management Competence, leverage, panel data.

1. INTRODUCTION

Over the last decade, the management of firms has been undergoing a radical shift, brought about by drastic changes swiping the business environment worldwide. Globalization, demographic shifts, advances in information technology, the rise of knowledge –based activities and fierce competition, are among the driving forces for such changes. The management team or today’s CEO, faces uncertainties and complexities that demand entrepreneurial behavior.

Entrepreneurship has been defined as the pursuit of opportunity beyond resources currently controlled (Stevenson and Gumbert,1985). It can be argued that successful organizations will be those that have developed a core competence in entrepreneurship where a core competence refers to ‘a combination of complementary skills and knowledge bases embedded in a group or team that results in the ability to execute one or more critical processes to a world-class standard (Cayne, Hall and Clifford,1997).

The core competencies of the firm are shaped by the entrepreneur in a number of ways including:

- The way he designs the organization to maximize the potential for effective entrepreneurial behavior by all staff
- The way the entrepreneur shapes the capacity of the business to develop and innovate through time

- The degree to which the above are pursued in a socially responsible way thus laying the ground for wider acceptance of entrepreneurial ‘ways of doing things’ in business and society. (Gibb,A.A,2002)

Management competence is a multidimensional concept and a number of well documented attempts have been made in the literature to define it. More specifically, the popularity of the term competence can be attributed to Boyatzis (1982). In “*The Competent Manager*” Boyatzis (1982) defines competence as “an underlying characteristic of a person”, stating it could be, “motive, trait, skill, aspect of one’s self-image or social role, or a body of knowledge which he or she uses”. Woodruffe (1993) points out, that this definition leaves the term open to a multitude of interpretations and argues that the term ‘competence’ can be used to refer to a ‘set of behaviors, skills, knowledge and understanding which are crucial to the effective performance of a position’. Nordhaug and Gronhaug (1994) interpret competence as “work-related knowledge, skills and abilities” while Rees (2003) argues that there has been an enormous diversity of interpretation of the term, ‘competence’, and no agreed definition. Hamel and Prahalad (1994) define competence as a bundle of skills and technologies that enable company to provide benefits for customers rather than a single skill or technology. Lado and Wilson (1994) argue that managerial competences include the

unique capability of the organization's strategic leaders to articulate a strategic vision, communicate the vision throughout the organization and empower organizational members to realize that vision. Pavett and Lau (1983) found that the competence of an effective manager covers three areas, political, conceptual and human competence. Political competence includes the ability to enhance one's position, builds a power base and establishes the right connections. Conceptual competence is the mental ability to coordinate all of the organization's interests and activities. Human competence is the ability to work with, understand, and motivate other people, both individually and in groups. Westera (2001) gives two perspectives to competence: theoretical and operational. The theoretical perspective means that competence is conceived as a cognitive structure that facilitates specified behavior. The operational perspective covers a broad range of skills and behaviors that represent the ability to cope with complex unpredictable situations; this definition presupposes conscious and intentional decision-making and includes knowledge, skills, attitudes and strategic thinking.

The aim of this paper is twofold: At first to construct an index to capture management competence in a continuously changing environment and secondly to test the validity of this index in the context of a sample of firms drawn from the Athens stock exchange.

The validation process will consist of two parts. Initially, will attempt to establish a relationship between the constructed index of management competence and firm economic performance. Actually, it will be shown through an econometric model that Management Competence contributes significantly:

- to sales growth of a firm operating in a distressed industry
- to an increase in the firm's share return
- to an increase in profitability

A unique aspect of the study is that it allows us to show that the constructed index has greater impact on highly leveraged firms than otherwise. This is an interesting result since it supports the general belief that not only the performance but the economic survival of highly leveraged firms depends primarily on management competence.

More specifically, highly leveraged firms may confront aggressive strategies from their less leveraged rivals and lose market share in an oligopoly product market (Bolton and Scharfstein,1990). On the other hand, high leverage might also be beneficial, because it can improve managerial incentives and force them to invest optimally (Jensen,1986; Wruck,1990).

The theoretical work that provided the impetus for defining the concept of economic performance in this study was the paper by Opler and Titman (1994), where three different measures of firm performance were defined and used: growth in sales, growth in profitability and stock returns.

Furthermore, another interesting aspect of this study is that it focuses on distressed industries. Specifically, it investigates the impact of the constructed index on distressed industries. The rationale for selecting firms out of distressed industries is to create a homogeneous macroeconomic environment. Moreover, an economic distressed environment magnifies the need for management competence.

From our sample highly leveraged firms will be extracted and the following hypotheses will be tested

- H1: Highly leveraged firms in distressed industries retain their stock returns and sales growth
- H2: Highly leveraged firms in distressed industries retain their growth in profitability

Will argue that the results are due to management competence. In order to maintain profitability it takes on various business actions. One of them which is very popular is to reduce the various product lines and focus on maintaining those with high profitability. Will show that management competence as a variable has a greater impact on highly leveraged firms than otherwise.

The structure of this paper is as follows. The theoretical background of the research is given in section 2. Section 3 discusses the data used. Section 4 describes the empirical model

and the estimation method. Section 5 reports on the results of the analysis and section 6 concludes.

2. IDENTIFYING AND MEASURING MANAGEMENT COMPETENCE

Several methods have been used to measure competence in the literature. Some attempts (Snow and Hrebiniak 1980; Hambrick 1983; Hitt and Ireland 1985) try to define and assess distinctive competence using measurement scales to find the relative strength of an organization's functional activities. Distinctive competence, being the focus of numerous studies, refers to those things that an organization does especially well in comparison to its competitors (Selznick, 1957). Snow and Hrebiniak (1980) measured distinctive competence by having top managers rate 10 of their company's broad functions as a "weakness" or as a "strength". Hambrick (1983) examines the relationship between strategic types, distinctive competencies and organizational performance. Hitt and Ireland (1985) developed a detailed instrument that measured 55 distinctive competency activities and their relationship to the performance of large industrial firms. All the described scales considered activities that might be viewed as organization's strengths and as having a strategic relevance, they were grouped according to functional criteria. More recent attempts at the definition of competencies have followed strategies for the measurement process essentially based on several-item scales.

Droge, Vickery and Markland (1994) employed item distinctive competency scales to measure firm's competencies. McGrath, MacMillan, and Venkataraman (1995) developed a measurement of competencies by evaluating the fit between objectives and results. They measure competence by the degree to which firm can reliably meet or exceed objectives. Escrig-Tena and Bou-Llusar (2005) measure competencies by analyzing the consequences that the possession of these competencies have for a company. They measure competencies by seeking indicators that reflect the intermediate products or consequences derived from them.

There are several ways to identify competency on a management level. Whichever is used, the best starting point is to understand what the organization itself is trying to achieve, what success looks like for that organization and by extension what attributes and behaviors are likely (or have been shown) to lead to success for individuals and the organization as a whole.

Two techniques stand out:

- Critical incident technique (CIT)
- Behavioral event interviews (BEI)

CIT focuses on critical incidents in people's lives or careers as a guide to future behavior. As a technique it attempts to explore what people really do in given circumstances, rather than relying on what they say about their motives and skills (Duijm et.al, 2004)

The BEI technique was developed by McClelland, McBer and Co consulting firm. As part of the technique a 'job competence assessment' was developed to compare superior with average or inferior performance .

Various measures of competence have been introduced in the literature. A simple and useful measure is the total number of years that professionals have worked in the profession. It is a measure of the skill and experience of a company's whole body of professionals while professional experience per professional is found by dividing the sum total by the average number of professionals in the company. You get an index competence per professional.

Also the level of education of professionals affects the assessment of the quality of their competence and thus the company's ability to achieve future success. Three general classes can be distinguished: Primary, Secondary and Tertiary. An average can be calculated and the change in the average shows whether the company improves its average level.

Another key indicator, is the proportion of professionals in the firm which is found by dividing the number of professionals by the total number of employees in the firm. This measures how important professionals are to the firm. The construction of this quotient enables the leverage effect of the professionals to be calculated. The leverage effect shows how important is a

company's professionals in its ability to generate revenues. It can be calculated using the following formula (Sveiby,2001):

$$\text{profit per professional} = \frac{\text{profit}}{\text{revenue}} * \frac{\text{revenue}}{\text{no.employees}} * \frac{\text{no.employees}}{\text{no.professionals}}$$

Another measure which can be regarded as the purest measure of ability to produce economic value is value added per professional. It is the professionals by definition who bring in all the revenues. These revenues must then cover all costs incurred in keeping a professional in the field and he himself also commands a market price in the form of salary, pension etc. What is left over must suffice to finance equipment and depreciation of the same as well as maintenance of training. Large companies use this measure as an efficiency target.

3. DATA

We use data for firms listed on the Athens Stock Exchange during the period 2002-2004. Firms are assigned to an industry group if more than 60% of their annual sales are from activities within that industry.

Our initial sample consisted of 150 firms, rated above average, as far as their creditworthiness is concerned, by the ICAP data base. Creditworthiness is directly related to economic performance. These firms operated in distressed industries, a

distressed industry is defined according to the same criterion of creditworthiness used by the ICAP data base.

Firms involved in different activities were excluded as they could not be assigned to a particular industry. In addition, the following firms were excluded from the sample.

- Firms belonging to industries with too few firms listed at the stock market (less than four firms).
- Banks, other financial institutions, and insurance companies, because of their special financial structure.
- Investment companies, because their incomes mainly results from the value of their holding portfolios. This value depends on the financial structure and business conditions of the firms whose stocks are included in the portfolio rather than the financial structure of the investment companies.
- Nine firms were not listed in 2002 or 2003 or their shares were excluded from the ASE in 2004, so they were not included in the sample after all.
- Also some firms were excluded from the sample due to events such as bankruptcy or takeover.

Consequently, the resulting sample for the three year period 2002-2004 consists of 103 firms in 15 industries. The number of firms per industry is shown in the appendix of this study.

We collected data on the owner-entrepreneur and the manager/CEO for each firm from two sources. First from the ICAP national data base, second on the basis of a carefully

constructed questionnaire. Thirty of the CEOs were actually interviewed and the rest filled the questionnaire in, over a period of 16 months. Information was compiled on the following areas

- Level of education
- Shareholding percentage
- Innovation
- Years of experience
- Corporate Governance practices
- Owner-Manager
- Age

Actually, it appeared that over 65% of the owners – entrepreneurs are also managing their firms. This figure indicates the limited floated stocks of the public firms in the Greek stock exchange. The average age bracket of the CEO is 50-60 years old. An average of 45% of the CEO's hold a university degree in finance and about 40% hold a degree in technical education. CEO's hold on average 34% of the company's shares.

Innovation, according to Schumpeter (1934) and other more recent researchers (Lumpkin and Dess, 1996; West & Farr, 1990), refers to the introduction of a new product or a new technique in production or a new market or a new organization structure in the firm. If any of the above has taken place within the last four years our CEO is an innovator. The average number of experience of the CEO is twenty years, and finally the CEOs were asked if their company follows corporate governance practices, below 12%

answered positively. In the Appendix of this study a detailed account of the statistics is presented.

Next, we extracted data on the following variables from the published balance sheets of the sample firms:

- Firms total revenue,
- Profitability (defined as the operating income as a percentage of the total assets),
- Stock returns, (it was provided by the ASE, as the annual percentage change)
- Size of firms (as measured by total assets) and
- The ratio of net investment to total assets.
- Leverage (the ratio of total debt over the book value of equity)

4. METHODOLOGY

This section first presents the construction of the index for management competence, then it presents the empirical model and the included variables and then describes the estimation method applied.

4.1 An Index for Management Competence

On the basis of the existing literature on behavioral finance (Malmendier, 2005) we constructed a dummy reflecting the above mentioned criteria in the following manner.

If at least 4 out of the seven factors outlined above are met (within these factors should be included shareholding greater than 20%, university education and innovation) then our index is assigned the value of 1, otherwise it assumes the value of 0.

Furthermore, if among those CEOs that fulfill at least 4 factors we have any that:

- Continue their professional advancement
- They have increased their shareholding
- They have been accredited with more than one innovation within the last four years,

we assign our index the value of 2.

Some of the literature on Corporate Governance, considers inappropriate the inclusion of 'shareholding' as a factor in the formation of an index for management competence. It treats shareholding rather as an incentive. In our study though, we decided to include it because, given that we construct a qualitative variable, shareholding is considered as a part of the factor payment to good management. It also signifies the commitment of the CEO given that the majority of managers in our sample and in the Greek owned firms in general, are also the owners.

4.2 Model and Included Variables

The empirical model is designed to measure the effects of the index for management competence on firm performance. The variables that measure firm performance are:

- Sales growth: the percentage change in firm's total revenue between time t and $t-1$, where $t=2001, 2002, 2003$ and 2004 .
- Growth in profitability: the difference in profitability between time t and $t-1$, where profitability is the profit before tax. Since some firms may have a negative profit, the difference between two years profitability is used rather than the percentage change in profitability.
- Stock returns: the percentage change in a firm's market prices of the stocks between time t and $t-1$. Prices are adjusted for events such as new issues or splits.

The model consists of three regressions, one for each variable of the firm's performance. The main interest is in the coefficient of management competence index in these three regressions.

The explanatory variables of the model include:

- Leverage which is measured by the ratio of total debt to book value of equity. Book value of equity is preferred, because the market value of equity may reflect the market's anticipation of the future sales performance and result in an endogeneity problem.
- Size: The natural logarithm of the total assets at time t is used as a measure of firm size. Large firms are expected to be more leveraged and less vulnerable to economic downturns.
- Investment Ratio: The ratio of the net investment to the total assets.

- Management Competence Index: A Dummy which assumes the values 0, 1 and 2 according to the aforementioned definition.

4.3 Estimation Method

The regression model consists of three separate regressions on the same set of explanatory variables. The regression model is

$$Y_t = \beta_0 + \beta_1 L_t + \beta_2 S_t + \beta_3 I_t + D_t + u_t \quad (1)$$

where Y_t is the measure of firm performance, i.e. Δr , Δpr , or Δs , L_t stands for leverage, S_t stands for firm size and I_t stands for the net investment ratio, D_t stands for the management competence index.

We used panel data estimation for a number of reasons widely discussed in the literature and specifically relevant to our study. Hsiao(2003) and Klevmarken (1989) list the following:

- Controlling for individual heterogeneity. Panel data suggests that firms are heterogenous and therefore do not run the risk of obtaining biased results.
- Panel data gives more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency.
- Panel data are able to identify and measure effects that are simply not detectable in pure cross section or pure time-series data.

In our case we chose the fixed effects model as an appropriate specification as we are focusing on a specific set of firms and our inference is restricted to this set of firms. In fact the fixed versus random effects issue has generated a hot debate in the biometrics and statistics literature which has spilled over into the panel data econometrics literature. The way the issue is resolved is by testing the restrictions implied by the fixed effects model derived by Chamberlain (1984) and check whether a Hausman and Taylor (1981) specification might be a viable alternative.

So we proceeded as follows: First we tested the impact of the management competence index on the economic performance of firms for the whole sample of the 103 firms.

Next, we extracted from our sample 55 firms with leverage greater than 1. During this procedure the following points had to be dealt with:

- Two of the firms with high leverage have a three year average below 1, nevertheless in 2004 their leverage exceed by far unity i.e the leverage of NIKAS was 1.66 and the leverage of KATSELIS was 1.26 that is why they were both included in the highly leveraged sub-sample.
- The leverage of the firm TERNA is at the margin (0.98-0.99-0.99) for the three years but it was included under the highly leveraged firms.
- In 14 firms the average leverage during the three years under consideration exceeds 1, that is why they have been classified

as highly leveraged even though in one or two years they might show leverage below 1.

5. Empirical Analysis

We run a panel least squares regression with total panel (balanced) observations 309. The cross sectional observations were 103. Table I shows the estimated coefficients with their standard errors.

>>INSERT TABLE I

For the three regressions the column with the F-statistic presents, the Chow test for fixed effects. One tests for the joint significance of the dummies of the initial model.

If $y = a + i_{NT} + Xb + Z_{\mu}\mu + v$ where is the matrix of individual dummies

$$H_0: \mu_1 = \mu_2 = \dots = \mu_{N-1} = 0$$

The observed statistic in all cases is distributed as $F(102,305)$. The restricted (RRSS) being that of OLS on the pooled model and the unrestricted (URSS) being that from the within regression. The test statistic is given by

$$F = \frac{(RRSS - URSS)/(N - 1)}{URSS/(NT - N - K)} \approx F_{N - 1, N(T - 1) - K}$$

In all cases the null hypothesis would be rejected.

In all models to take care of heteroskedasticity the models were estimated by EGLS Roy(2002).

It appears that our variable of interest, the index of management competence is significant in all three regressions and has the correct sign. More specifically:

- It is shown that a CEO who processes all the attributes we specified, with the help of the literature above, influences positively the company's share return, the growth in the profitability of the company and the growth in sales.
- Moreover, another interesting result, which triggered off further investigation, is the positive impact that an increase in the leverage of the firms has on their economic performance.
- We claim that it is the result of effective management, that through an increase in leverage the economic performance of a firm that operates in a distressed industry improves.

Next, we extracted from our sample the highly leveraged firms. So we run a panel regression for the three years 2002-2004 on the 55 firms with leverage greater than 1 in our sample. The objective was to test the following hypotheses:

- H1: Highly leveraged firms in distressed industries retain their stock returns and sales growth
- H2: Highly leveraged firms in distressed industries retain their growth in profitability.

>>INSERT TABLE II

Testing for fixed effects in this case we compare with $F(102,305)$ and again we reject the null hypothesis.

Again the method of estimation is EGLS.

We argue that the results are due to management competence which might decide to decrease the activity of product lines with low profitability. It appears that management competence as a variable has a stronger impact on profitability for highly leveraged firms than otherwise.

6. CONCLUSION

The study tests the hypothesis that firms operating in distressed industries with high leverage due to Management competence maintain a good economic performance. The analysis is related to the empirical study of Opler and Titman(1994) but the econometric approach allows the data to determine both the functional relationship and the impact of leverage, and firm size on economic performance, while taking into account the heterogeneity among firms. Summarizing the results, it is found that the index for management competence positively influences, as expected the economic performance of firms .Furthermore, highly leveraged firms operating in distressed industries can continue to improve their performance due to management competence.

7. REFERENCES

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8. APPENDICES

TABLE I: PANEL REGRESSION RESULTS

	C	L _t	I _t	S _t	D _t	R ²	F
Coeff.	-0.47	0.03	0.06	-0.38	0.35	0.72	1.32
Δr	0.05	0.002	0.004	0.03	0.006		
Std.Error							
Coeff.	-0.01	0.01	0.003	-0.006	0.005	0.59	1.24
Δp	0.005	0.003	0.007	0.003	0.001		
Std.Error							
Coeff.	-2.14	2.95	-0.53	-0.007	0.35	0.61	1.5
Δsl	1.10	0.92	0.42	0.0007	0.02		
Std.Error							

TABLE II: PANEL REGRESSIONS ON HIGHLY LEVERAGED FIRMS

	C	L _t	I _t	S _t	D _t	R ²	F
Coeff.	-0.46	0.06	0.26	-0.006	0.30	0.76	2.04
Δr	0.05	0.03	0.04	0.003	0.01		
Std.Error							
Coeff.	-0.01	0.01	-0.01	-0.007	0.008	0.40	1.22
Δp	0.01	0.003	0.001	0.007	0.002		
Std.Error							
Coeff.	-2.03	3.37	-7.7	-2.96	0.95	0.70	1.19
Δs Std.Error	0.76	0.92	0.36	0.11	0.43		

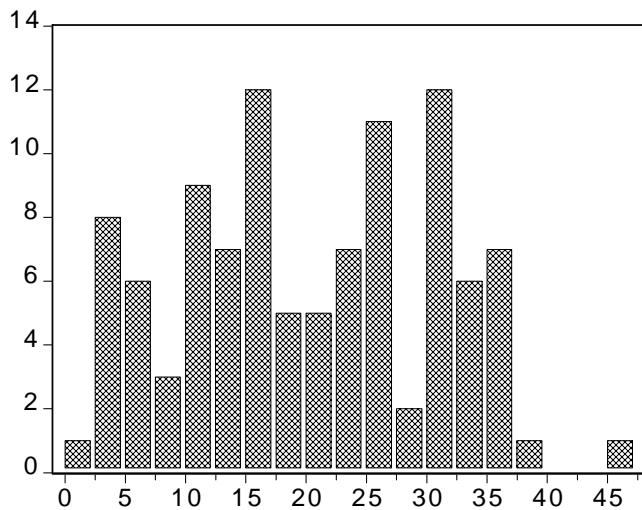
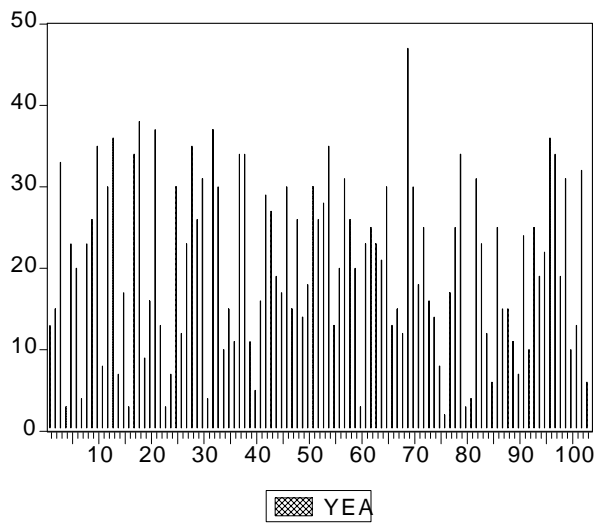
TABLE III: THE FIRMS IN THE SAMPLE BY INDUSTRY

<u>INDUSTRY</u>	<u>No. OF FIRMS</u>
CONSTRUCTION	13
PRINTING-PUBLISHING	6
COMPUTERS	7
TRANSPORT	3
RETAILING	7
FOOD AND DRINK	16
BASIC METALS	10
ELASTICS& PLASTICS	5
NON-METALLIC ORE &CEMENT	5
CLOTHING	2
MACHINES-EQUIPMENT	3
METALLIC PRODUCTS	2
REFINERIES	1
PRIVATE HOSPITALS	1
WHOLESALE	22

SUMMARY STATISTICS FOR THE FOUNDER OF THE COMPANY:

• **YEARS OF CEO IN THE COMPANY**

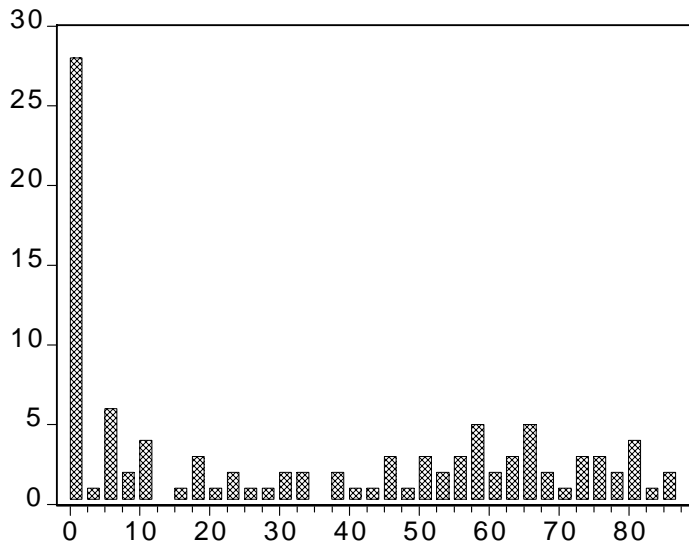
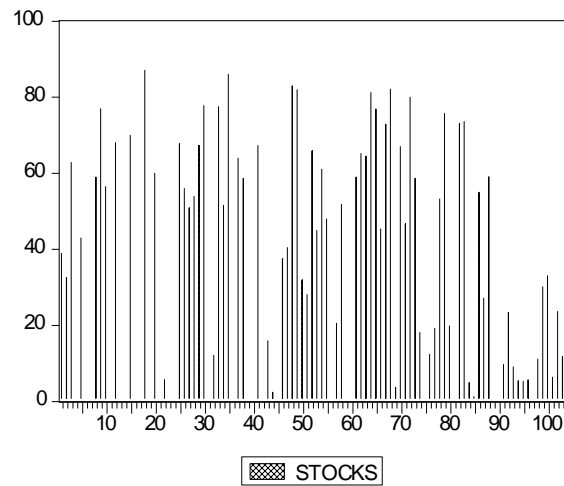
Sample 1 103	
Mean	20.14563
Median	20.00000
Maximum	47.00000
Minimum	2.000000
Std. Dev.	10.49034
Skewness	0.080293
Kurtosis	2.078586
Jarque-Bera	3.754310
Probability	0.153025



Series: YEA Sample 1 103 Observations 103	
Mean	20.14563
Median	20.00000
Maximum	47.00000
Minimum	2.000000
Std. Dev.	10.49034
Skewness	0.080293
Kurtosis	2.078586
Jarque-Bera	3.754310
Probability	0.153025

• STOCK OWNERSHIP OF CEO

Sample 1 103	
Mean	34.34296
Median	32.00000
Maximum	87.08000
Minimum	0.000000
Std. Dev.	30.22189
Skewness	0.189510
Kurtosis	1.479249
Jarque-Bera	10.54180
Probability	0.005139



Series: STOCKS Sample 1 103 Observations 103	
Mean	34.34296
Median	32.00000
Maximum	87.08000
Minimum	0.000000
Std. Dev.	30.22189
Skewness	0.189510
Kurtosis	1.479249
Jarque-Bera	10.54180
Probability	0.005139

- **CEO AND CHAIRMAN (dummy)**
1= CEO and chairman, 0=CEO

Sample 1 103	
Mean	0.407767
Median	0.000000
Maximum	1.000000
Minimum	0.000000
Std. Dev.	0.493822
Skewness	0.375374
Kurtosis	1.140906
Jarque-Bera	17.25188
Probability	0.000179

- **FINANCE EDUCATION OF CEO (dummy)**
1=finance, 0=other

Sample 1 103	
Mean	0.446602
Median	0.000000
Maximum	1.000000
Minimum	0.000000
Std. Dev.	0.499571
Skewness	0.214821
Kurtosis	1.046148
Jarque-Bera	17.17581
Probability	0.000186

- **HIGHER EDUCATION OF CEO (dummy)**
1= higher, 0=secondary

Sample 1 103	
Mean	0.786408
Median	1.000000
Maximum	1.000000
Minimum	0.000000
Std. Dev.	0.411846
Skewness	-1.397649
Kurtosis	2.953423
Jarque-Bera	33.54307
Probability	0.000000

- **TECHNICAL EDUCATION OF CEO (dummy)**
1= technical, 0=other

Sample 1 103	
Mean	0.398058
Median	0.000000
Maximum	1.000000
Minimum	0.000000
Std. Dev.	0.491891
Skewness	0.416516
Kurtosis	1.173485
Jarque-Bera	17.29583
Probability	0.000175

- **FOUNDER OF THE COMPANY (dummy)**
1= ceo/family of ceo, 0=other

Sample 1 103	
Mean	0.647059
Median	1.000000
Maximum	1.000000
Minimum	0.000000
Std. Dev.	0.480245
Skewness	-0.615457
Kurtosis	1.378788
Jarque-Bera	17.60979
Probability	0.000150

- **AGE OF THE CEO (dummy)**
0= 30-50 years old, 1= 50-60 years old, 2= 60 + years old

Sample 1 103	
Mean	1.038835
Median	1.000000
Maximum	2.000000
Minimum	0.000000
Std. Dev.	0.684883
Skewness	-0.048459
Kurtosis	2.151344
Jarque-Bera	3.131246
Probability	0.208958