

PROFITABILITY OF CONSTRUCTING SECTOR AND HOW MARKET STRUCTURE, COST STRUCTURE AND CONCENTRATION AFFECT IT: THE CASE OF GREECE

Athanasios Mandilas, Dimitrios Maditinos, Efstathios Dimitriadis and Michalis Nikolaidis

School of Business and Economics, Technological Educational Institute of Kavala, 654 04, Kavala, Greece

E-mail: smand@teikav.edu.gr

Abstract

This study considers market structure, cost structure and concentration and examines which of these factors affect the profitability of construction firms in Greece. The literature provides conflicting viewpoints on whether profitability is influenced by market structure, cost or capital structure or concentration and in what way. Concentration is considered as a factor that can either boost/reduce or even have weak or inexistent correlation with profitability (Kapopoulos and Siokis, 2002). As regards the market share, it is thought as being positively correlated with profitability (Kapopoulos and Siokis, 2002). However, other scholars (Fraering and Minor, 1994; Ailawadi et al., 1999), support that market share does not have significant impact on profitability. Statistical results showed that market structure and concentration seem not to have an impact on profitability. On the contrary, the cost structure, as well as the capital structure, influences the profitability of construction firms. Return on Equity (ROE) has negative correlation with Cost of Goods Sold (COGS) and positive correlation with book value to total assets (BVTA). The correlation with market share is positive, but rather weak. The regression analysis also shows the relationships of COGS and total liabilities to total assets (TLTA) on ROE. As observed, market share, concentration and liquidity do not impact ROE.

Key words: constructing sector, profitability, market structure, cost structure, concentration

1. INTRODUCTION

Construction, as defined by Callan and Rice (2002), is the process of organising materials, labour, and capital resources to build edifices, roads, bridges and the like. The construction industry includes general and specific constructions and repairs of buildings, roads, etc. Construction firms, characterised for high customisation of their products (Missbauer and Hauber, 2006), belong to the “project-based” firms, which use projects to provide services that are combinations of products and services (Blindenbach-Driesen and Ende, 2006). Not only because the proportion of the constructing sector to the Gross Domestic Product is high, but also because it provides all the facilities needed by the producers and the consumers in order for goods and services to be produced, the importance of this sector is considerable (Crostaite, 2000). Su et al. (2003) argue that it is often considered to be the leader of a country's economy. Dimitras (2001) claims that construction firms constitute an important and promising part of the Greek economy.

The constructing sector is one of the most important and growing sectors of the Greek economy and it is closely related to the economic growth of Greece as well as the national and international conditions. Notwithstanding that after the completion of the Olympic Games the sector went through a period of recession, over the last two years there have been signs of recovery and there is hopefulness for the future of the sector (ICAP, 2006; Hellastat, 2007). The appropriations of the A, B and C Community Support Framework and the Olympics of 2004 have rendered the sector an important part of the economy of Greece during recent years. In 2005, its contribution to the Gross Domestic Product (GDP) reached 6.7%.

The restructuring of the sector, realised in 2002, resulted in the reduction of the number of the firms and the creation of large corporations. At the upper (7th) grade there are 13 firms enrolled, instead of 60 previously. Forty-six (46) firms, instead of 165, belong to the 6th grade while 58 firms, instead of 157, belong to the 5th grade. Twenty (20) firms are listed as active in the Athens Stock Exchange

(ASE), 10 of them belong to the 7th grade and 9 and 1 belong to the 6th and 5th grade respectively. The construction activity is divided into construction of buildings (houses, hospitals etc.) and public constructions (roads, airports etc.). The construction of buildings followed a decreasing trend in the early 1990s, but after 1996 the construction activity was increased. After the year 2000, Greece accepted economic support from the European Union, through the Community Support Framework and other resources. The total cost of the 3rd Community Support Framework (CSF) is estimated as € 42,275 million, 75% of which corresponded to public expenditure while 25% related to private expenditure, with priority given to transportation and regional growth.

The factors that have boosted the constructing sector are: (a) the inflow of the European appropriations, (b) the need for public constructions due to the Olympic Games of 2004, (c) the new methods of funding and (d) the expansion of the sector in new markets. Nevertheless, after the completion of the Olympic Games, the growth rates were reduced and the assignment of new public construction projects had stopped for a long period. These have caused the firms to face financial problems, which had a negative impact on the Greek economy.

After the year 2002, the sector started a restructuring phase, because of the law 2940/2001, which resulted in mergers between the firms. This fact caused a reduction in the number of firms, but increased their size. The market consists of powerful groups with high turnover and great potentials within the domestic and foreign market on the one hand, and other firms that face solvency issues. The mergers that took place in 2002 increased the debt of some firms, worsening their liquidity and solvency (ICAP, 2006). Large construction companies or groups can follow a new and widely used method of construction with self-funding, which is called "Build Operate and Transfer". These projects are advantageous not only for the government as it is not burdened with the construction expenditure, but also for the firms as, additionally to the design and construction of the project, they are also responsible for its maintenance and operation.

The construction industry faces some basic problems. One of the most serious problems is related to the payment delays of the public construction contracts. The delays and the lack of new contracts, has led to an increase in total liabilities of the construction firms of 7th, 6th and 5th grade, by 25% during the years 2004 and 2005. Furthermore, the considerable discounts occasionally provided by the firms, due to intense competition, as well as the high amount letters of guarantee required, have created unfavourable conditions in the market (ICAP, 2006).

2. LITERATURE REVIEW

Before we discuss the past literature we present a financial analysis of the construction firms of 7th, 6th and 5th grade in Greece to give an overview on the issue.

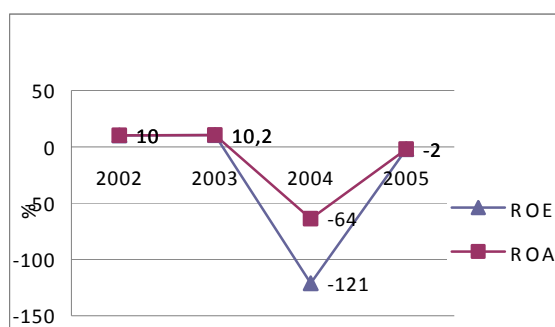
2.1.1 *Financial analysis of the construction firms of 7th, 6th and 5th grade in Greece*

The total turnover of the construction firms of 7th, 6th and 5th grade was € 2,987 million in 2002, with 17.3% decrease in comparison to the previous year. The listed covered 55% of the market's total size. According to a study conducted by Hellastat (2007), in 2006 the total turnover was improved after its reduction in 2005, reaching the amount of € 5,561.41 billion. Moreover, 58.5% of the construction firms had improved their sales in 2006.

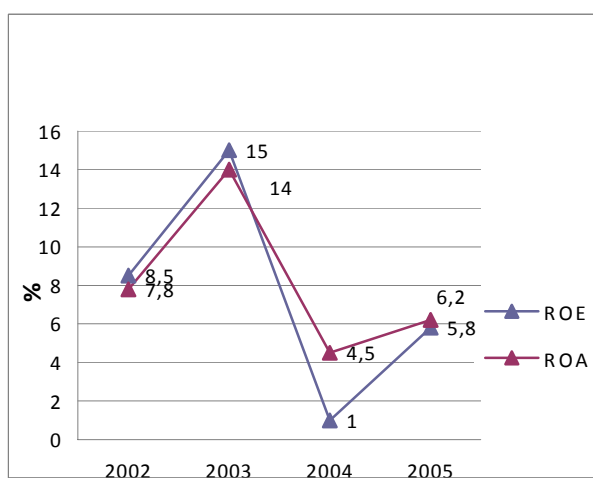
Considering the income before tax, 79.4% of the firms presented profits in 2006 and approximately half of them improved their results compared to 2005. However, in general, income before tax is less than 2004, because of the considerably increased borrowing. The greater variance in turnover was observed by the 13 largest firms (42.4%), as the small-medium ones had a variance of 21.8% while it was 18.9% for the medium firms. Smaller firms retained the turnover invariable, presenting an increase of only 1.9%, although, the largest firms had the lowest profit margins, which were decreased in relation to 2005. The rest of the firms improved their profit margins (Hellastat, 2007).

The average ROE and ROA for the listed firms was 2.49% and 4.99% respectively. On the other hand, the average ROE and ROA for non-listed firms reached 7.5% and 8.15%, significantly higher than that of the listed firms. However, it is observed that both the listed and non-listed firms seem to have profitability problems. With regard to the listed firms, the ROE, as well as ROA have a declining direction, which results in negative value in 2004. Non-listed firms have a more positive picture. Even though both ROE and ROA considerably decline in 2003, they do not take negative values and in all years are definitely greater than the values of the listed firms present (ICAP, 2006). Table 1 shows the ROE and ROA values both for the listed and the non-listed firms.

Table 1 – Profitability Ratios for listed firms



Profitability Ratios for non-listed firms



The liquidity of firms is measured with current ratio, quick ratio and cash ratio. Even though the liquidity is desired to be high, if it is too high, it could reflect inefficient capital allocation or unfavourable terms with suppliers or creditors. The average liquidity for the listed firms was 1.65 for the current ratio, 0.74 for the quick ratio and 0.14 for the cash ratio. As for the non-listed firms, the above ratios were 2.69, 1.57 and 0.61 respectively (ICAP, 2006).

The capital structure is measured with the total debt to equity ratio and debt to equity ratio. The average values for the listed firms were 1.76 and 0.24 for total debt to equity and debt to equity respectively. The non-listed firms the ratios were 1.10 and 0.20 respectively (ICAP, 2006).

2.1.2 Development and perspectives of the constructing sector

After the completion of the Olympic Games, the sector experienced a period of activity and financial recession, due to the reduction in the demand for new public constructions. However, according to Hellastat (2007) after 2006 it is at a period of recovery and the perspectives are encouraging. The oncoming 4th Community Support Framework of €20.1 billion was expected to be an important opportunity for the industry.

The powerful construction groups that have been created lately need to expand their operations abroad in order to develop and grow. Their interest is basically focused on the Balkans and Middle and Eastern Europe, where the lack of infrastructure makes it attractive for new investments. The strategy of the construction firms should focus on the adoption of new technologies, the capitalisation of the knowledge, reduction of the construction cost, vertical completion and high specialisation. Furthermore, they could develop powerful co-operations that would be able to compete at international level (ICAP, 2006).

The perspectives for the sector are considered encouraging. The funds from the European Union that are available for the constructing sector, during the years 2000-2008, are estimated to be €28.42

billion. It is expected that the absorption of the appropriations will be intensified, which is an important pillar for the development of the sector (www.iobe.gr). Furthermore, the resolution of some issues, such as the national land registry and the zoning plan are expected to have positive impact on the development of the sector (ICAP, 2006). According to the sectoral study conducted by the Foundation for Economic and Industrial Research (www.iobe.gr), until 2013, the construction industry will have an upward trend, as long as the country and the firms utilise these opportunities efficiently.

2.2 Theoretical Background

2.2.1. Constructing Accounting

In terms of financial reporting, construction firms face some serious difficulties and differentiate from the rest of the firms. Construction contracts, which are written agreements that define the relationships and obligations of the contracting parties (Zaghoul and Hartman, 2003), are long-term and, thus, they are not completed in one fiscal year. Therefore, it has to be decided whether the profits will be included at the end of the financial year, but before the completion of the project, or not. Here is where one major issue comes up, which is the problem of *revenue recognition* (Elliot and Elliot, 2007). There are two acceptable methods for the recognition of costs and revenues; (a) the method of completed-contract and (b) the method of percentage of completion.

According to the method of completed-contract, profits are recognised after the completion of the contract. All the costs incurred and revenues received during the production cycle are treated as deferred items in the Balance sheet. After the completeness of the contract, they are classified in the Income Statement. Interim Income Statements do not present revenue, cost and gross profit for the periods during which the contract progresses. This method has the advantage that the revenue reported is based on the final results and avoids the estimates that may not be totally dependable. However, it does not indicate the actual performance of the contract before that is completed and, therefore, it is not preferable unless the percentage-of-completion method cannot be applied (Miramontes and Rice, 2005).

According to the International Accounting Standards (IAS) and, more specifically, the IAS 11, which refers to construction contracts, the method of completed-contract should not be used and costs and revenues should be recognised under the percentage-of-completion method. Under the percentage-of-completion method, revenues are recognised in the period during which the contract progresses. Contract revenues and contract costs are recognised as revenue and expense and they are presented in the Income Statement in the accounting periods that the work is performed. The financial Statements reflect the performance of the firm on a timely basis, as the current activity and status of the contract is illustrated in the Income Statement and the Balance Sheet, respectively.

The percentage-of-completion method, although more reliable and preferable to the completed-contract method, requires careful estimates of the proportion of the progress towards the completion of the contract, contract revenue and contract cost. Determining the progress is not an easy task and it requires a combination of measures (Callan and Rice, 2002). According to IAS 11, the firm can use a variety of methods, so as to measure the stage of completion. These methods are either the proportion of the contract cost that has incurred to date towards the estimated total contract cost, surveys of the performed work finally, and the completion of part of the contract work. It has to be mentioned that prepayments and advance payments from customers often do not reflect the performed work (IASB, 2004).

The outcome of the contract may sometimes not be reliably estimated. In that case, revenue should be recognised only to the extent of the costs that are expected to recover. The recognition of contract costs as expenses should be made at the period in which they are incurred. When there is an expected loss, it should be immediately recognised in the Income Statement.

The International Accounting Standard 11, states that costs and revenues are recognised under the percentage of completion method. When the outcome of the contract can be estimated reliably,

contract costs and revenues should be presented in the Income Statement, in proportion to the stage of completion of the contract, at the Balance Sheet date. Contract revenue is matched with contract costs incurred upon the specific stage of completion and costs, revenues and the resulting gross profit are attributable to the part of the contract that has been completed. Contract revenue and contract cost are recognised as revenue and expense, respectively, in the Income Statement in the period during which the work progresses. If there is an expected excess of total costs over total revenue, it is recognised as expense immediately (IASB, 2004).

2.2.2 Cost Structure

One factor that, as observed, has strong impact on the profitability of construction firms in Greece is the cost structure. The construction process, due to the nature of the production, is influenced by variable factors. It is characterised for its non-standardised and diverse nature and the unavoidable and unpredictable complexities that may occur (Clough et al., 2000). Thus, the estimation of costs is a difficult task that demands careful approach.

Contract costs, as defined by IAS 11, include:

- (a) costs attributable to the contract which are: the costs of materials, the direct labour, plant and equipment depreciation, rental fees for plant and equipment, costs associated with the transfer of machinery, materials and equipment, design and technical support costs, reclamation and warrantee costs and claims from third parties.
- (b) attributable to the contract operations costs, in general, which can be allocated to construction contract. These costs include insurance costs, costs for design and technical support, not attributable to the contract and overhead costs.
- (c) any other costs that are related to the customer, according to the terms of the contract. These costs could include general administrative and development costs, which under the contract is chargeable to the customer (IASB, 2004).

2.2.2.1 Construction Contract Delays

Construction firms very often are not able to complete the contracts on time and face the problem of delays (Bordoli and Baldwin, 1998). Contract delays may be caused by many contract changes. For instance, inefficient design of the construction project or delays in the subcontract work may result in general contract delay. Furthermore, bad weather conditions, material shortage or delay of delivery and unexpected changes in the prevailing circumstances of the project are also some factors that may lead to delays (Callan and Rice, 2002). When contract delays occur, the consequences are cost overruns. The price of materials and labour rate are increased, the subcontracts are possibly renegotiated and equipment costs are increased. The cost of delays is the difference between the actual contract costs and the estimated contract costs.

2.2.2.2 Performance Measurement of the Construction Industry

Performance measurement has become a key factor for the strategy of almost all the organisations (O' Mara et al., 1998; Anaratunga and Baldry, 2002). Fawcett and Cooper (1998) claim that performance measurement is crucial, as it improves the competitiveness of firms. The development of performance measurement is the result of firms' need to improve their quality and better control their cost (Anaratunga and Baldry, 2002). Indeed, the performance of firms is improved if balanced and integrated measures are used (Nudurupati et al., 2007). Several models have been created which assist the design of the performance measures. One of the most well known frameworks is the balanced scorecard.

The balanced scorecard, introduced by Kaplan and Norton in 1992, is a concept of performance measures derived from the company's strategy (Garrison et al., 2006), and it has become the most

popular measurement framework (Neely, 2004). It is a tool that “translates strategy into action (Rouse and Puterill, 2003) and it explains what needs to be done in order for strategies effectiveness to be achieved (Parker, 2000). The balanced scorecard is introduced around four perspectives, which are: financial, customers, internal processes and innovation and improvement (Parker, 2000). Financial and customers perspective concern the needs of the stakeholders and include sales, profitability, market share and customers’ satisfaction. Internal processes aim to reach customers’ objectives and it includes cycle time, yield rates and cost data per unit. Finally, innovation and improvement, including “time to market”, reduce in defect rates and the “half-life” measure, deals with the improvement creation of value for its customers and stakeholders (Rouse and Puterill, 2003).

The balanced scorecard affects financial performance. It is not only a performance measurement system, but it is also a way to achieve long-term financial success (Davis and Albright, 2004). The implementation of the balanced scorecard results in improvement in financial performance of organisations, by identifying some key indicators of the desired financial performance, which basically are non-financial. They are derived from the relationship between improvement in non-financial measures and improvement in the performance of the selected financial measures, and they are viewed under the aforementioned perspectives of the balanced scorecard (financial, customers, internal processes and innovation and improvement). Improvement in those key indicators leads to improvement in the performance of the financial measures that have been selected (Davis and Albright, 2004).

The correct implementation of the performance measurement is crucial so as to have positive results and not mislead the management of the firm. Schneiderman (1999) identifies that many companies poorly define the performance measures, which leads to misunderstanding. In the case of construction firms, evaluating the production performance is not a simple process, as determining the quantity of the performance is difficult, but also because a variety of products exist that can be produced in many different ways (Proverbs and Holt, 2000). Many firms of the constructing industry use the traditional methods for the measurement of their performance, which, among others, are the profitability and Return on Investment (ROI) (Love and Holt, 2000). Construction firms, because of complex supply chains with different incentives, waste their resources in the projects (Nudurupati et al., 2007). As argued by Beetham et al. (2004) they face structure problems that inhibit their performance.

2.2.2.3 Market Concentration and Profitability

Market concentration indicates the level of the domination of firms within a specific industry. The degree of concentration depends on the number of the existing companies, as well as on their relative size (Boutsioli, 2007). There are two basic methods for the estimation of the degree of concentration. The first method is the *TOP5*, according to which the concentration is measured by the aggregation of the market share of the five biggest companies of the sector, based on total assets (Kapopoulos and Siokis, 2002).

$$TOP5_m = \sum_{i=1}^5 \mu_i \quad (1)$$

where m is the number of the largest firms of the sector and μ_i is the market share of each firm. Boutsioli (2007) slightly differentiates this method, using the concentration ratio (CR) for either four, eight or twenty firms.

$$CR_m = \sum_{i=1}^m \mu_i \quad (2)$$

The second method for the estimation of the concentration is the *Herfindahl - Hirschman (HHI)*, which measures the sum of the weighted market share of all the firms in the market (Pan, 2005).

$$HHI = \sum_{i=1}^n (\mu_i)^2 \quad (3)$$

where μ_i is the market share of each firm and n is the number of all the firms in the market. The HHI index moves in a range from zero to one. Higher values of HHI indicate that the market activities are in the control of a few large firms.

Both the concentration ratio and the *Herfindahl – Hirschman* index are useful measures for the estimation of the degree of concentration among a specific industry. The HHI index, however, could be regarded as more credible than the concentration ratio. Their difference lies on the fact that it includes all the firms of the market, whereas the concentration ratio depends only on the largest ones, ignoring the rest of the firms in the market.

Market concentration affects the profitability of firms in several ways, while there are contradicting theories on whether the effects are positive or negative. Kapopoulos and Siokis (2002) argue that concentration can either boost or reduce profitability. Mergers and acquisitions allow firms to provide products and services that are more profitable, and increase the profitability. According to Xing (2004) higher amounts of concentration result in a less diversified market portfolio and, thus, more volatile market.

The concentration level measures the oligopolistic structure of the market. Firms in such a market may cooperate, turning the market to monopolistic. They could also follow an antagonistic route or totally ignore each other and operate independently. Therefore, market structure and the degree of interaction for a specific level of concentration can vary and the correlation between concentration and profitability is possibly weak or even non-existent (Kapopoulos and Siokis, 2002). Indeed, as indicated by the statistical results, in the case of the construction sector in Greece the concentration level does not affect the profitability of firms.

2.2.2.4 Market Share and Profitability

As argued by Kapopoulos and Siokis (2002) the most important indicator of the degree of the monopolistic power that firms may have is the market share. It is calculated by dividing the sales revenue of the firm (or total assets) by the total sales revenue (or total assets respectively) of all the firms in the market. Thus, the market share could be pictured as:

$$\mu = \frac{q_i}{\sum q_i} \quad (4)$$

where μ is the market share, q_i is the amount of the sales (or assets) of each firm and $\sum q_i$ is the amount of the sales (or assets) of all the firms in the market.

The greater the market share, the greater the strength of the firm. The market shares, as well as the market conditions in general, determine firms' profitability. According to Armstrong and Green (2007), business school academics argue that market share is positively correlated with profitability.

Fraering and Minor (1994), however, argue that the relationship between market share and profitability is rather weak than important. Ailawadi et al. (1999) claim that market share by itself does not have significant impact on profitability, but there are more variables that, along with market share, can play a role in firms' returns. In this study, it has been observed that, as far as the Greek constructing sector is concerned, market share seems to have very weak and almost inexistent effects on profitability.

3. METHODOLOGY

3.1 Sample selection

The sample consists of all the construction firms listed in the ASE, twenty in total. All firms are in the form of Societe Anonyme or Limited Company. Data were drawn from the annual reports and financial statements, as published in the ASE (www.ase.gr). Seven financial ratios are calculated for the years from 1999 till 2006. One more ratio was also used, which is the sales expenses to sales ratio, however, it was noted that most of the firms do not have sales expenses and the ratio was zero for the majority of firms, and thus, it was not considered useful.

3.2 Model Description

The aim of this study is to examine the effects that market structure, concentration, cost structure and capital structure may have on the profitability of the construction firms in Greece. For this reason, an econometrical model is used. The model consists of seven independent variables, five of which are financial ratios (Current Ratio, Cost of Goods Sold to Sales ratio, Total Liabilities to Total Assets ratio, Administrative Expenses to Sales ratio, Fixed Assets to Total Assets ratio), market share and one dummy variable that measures the concentration level of the industry. The dependent variable, a profitability measure, is ROE.

The model is based on the study conducted by Kapopoulos and Sofoklis (2002) examining the factors influencing profitability of banks and was developed as follows:

$$\pi_{it} = \alpha + \beta \cdot MS_{it} + \gamma \cdot C_t + \delta y_{it} + \sum_{k=1}^K \beta_k E_{kt} + \sum_{\lambda=1}^L \zeta_{\lambda} Z_{\lambda t} \quad (5)$$

Where π_{it} is a measure of profitability (ROE or ROA), MS_{it} is each firm market share, C_t is the concentration level, E_{kt} is firm specific variables and ζ_{λ} are the country's specific variables.

The firm specific variables are:

- (a) Liquidity ratio: Total Debt to Total Assets,
- (b) Capital adequacy: Market Value to Total Assets and
- (c) Operating efficiency: Administrative expenses to Total Income
- (d) The country specific variables are the real interest rate and the increasing rate of real GDP (Gross Domestic Product).

The above model has been adjusted for the purpose of our study thus, the proposed model to test our questions has the following structure:

$$ROE_{i,t} = a_{0,t} + a_{1,t} CACL_{i,t} + a_{2,t} COGS_{i,t} + a_{3,t} TLTA_{i,t} + a_{4,t} ADM_{i,t} + a_{5,t} MS_{i,t} + a_{6,t} FATA_{i,t} + a_{7,t} DUM_{i,t} + \varepsilon_{i,t} \quad (6)$$

where $ROE_{i,t}$ is the Return on Assets of the i^{th} firm at time t , α is the intercept, $CACL_{i,t}$ is the Current Assets to Current Liabilities ratio of the i^{th} firm at time t , $COGS_{i,t}$ is the Cost of Goods Sold to Sales ratio of the i^{th} firm at time t , $TLTA_{i,t}$ is the Total Liabilities to Total Assets ratio of the i^{th} firm at time t , $ADM_{i,t}$ is the Administrative expenses to Sales ratio of the i^{th} firm at time t , $MS_{i,t}$ is the Market Share of the i^{th} firm at time t , $FATA_{i,t}$ is the Fixed Assets to Total Assets ratio of the i^{th} firm at time t , $DUM_{i,t}$ is the dummy variable of the i^{th} firm at time t and $\varepsilon_{i,t}$ is the error variable.

To examine the industry concentration, we use the TOP5 method and we consider a dummy variable, which takes the value 1 if the firm is one of the five largest firms, with regard to their sales, and the value 0 if the firm does not belong to the five largest firms. In this way we can see if the constructing sector is concentrated and whether the concentration level affects profitability and in what way. Market share is measured with regard to sales of each firm in comparison to the total sales of the sample.

4. EMPIRICAL RESULTS

4.1 Ratio Analysis for the Greek Constructing Industry

The following diagrams present the route of the ratios that are used in the model (Cost of Goods Sold to Sales, Administrative Expenses to Sales, Book Value to Total Assets, Total Liabilities to Total Assets, Current Assets to Current Liabilities, ROE and Fixed Assets to Total Assets), for the Greek constructing sector, during the years 1999-2006.

Cost of Goods Sold to Sales (COGS)

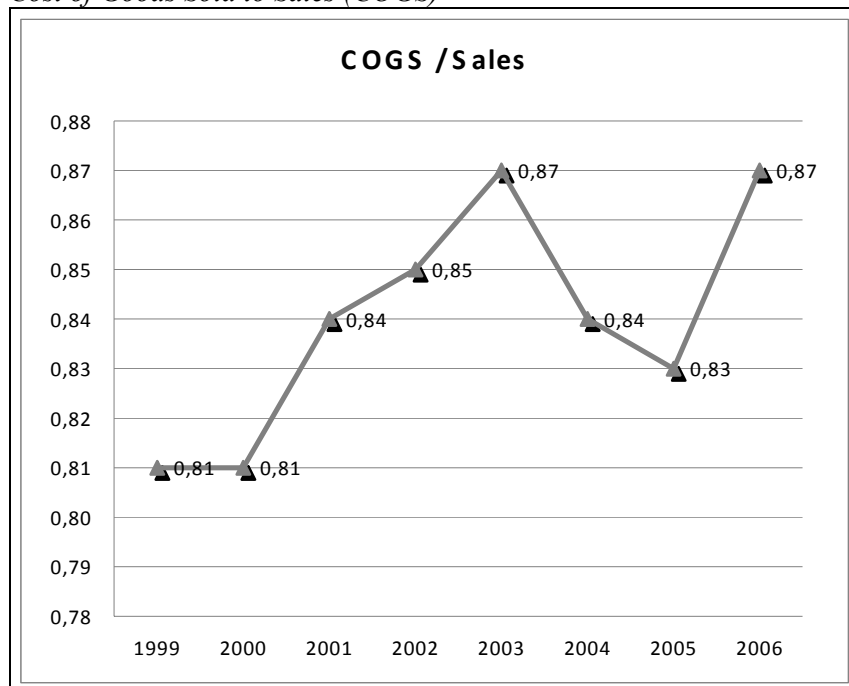


Figure 1. Cost of Goods Sold to Sales

As indicated by the above figure, the COGS to Sales ratio remains at the same level for the years 1999-2000 (0.81). At this period, the cost of goods sold is 81% of sales, a fairly high percentage, which generally increases. In 2001, COGS to Sales increases to 84%, and in 2003 it reaches a remarkable 87%. In 2001 Greece replaced its national currency and adopted the Euro. After this, a great increase in the prices of almost all products in the market was observed, which may have caused an increase in the cost of goods sold and, thus, the COGS to sales ratio. After 2003, it decreases until 2005, but it also increases in 2006 once again, when it reaches the highest level of 87%, as in 2003. The evolution of COGS, as it is revealed, is not encouraging enough. While the desire is for the COGS to Sales ratio to be low, in this case, it appears to be high and increasing over time.

Administrative Expenses to Sales

Administrative Expenses to Sales ratio provides information about the control of administrative expenses that the firm has under the sales generated and how efficiently it spends the cash flow. This ratio should be low, showing that the firm is able to generate sales, keeping the expenses at low levels.

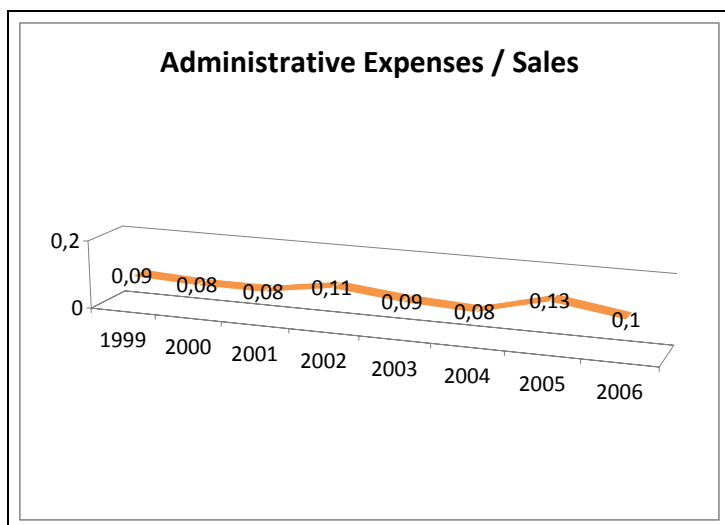


Figure 2. Administrative Expenses to Sales

Administrative Expenses to Sales ratio has a progress with no major fluctuations. In 1999, expressed as a percentage, the proportion of the administrative expenses over sales is 9%, slightly reduced in 2000 and 8% in 2001. In 2002, it is increased to 11%, but thereafter, in 2003 and 2004 it declines to 9% and 8% respectively. The higher value that it is observed is in 2005, when 13% of the cash flow is wasted in administrative expenses. Finally, in 2006 it is 10%.

Book Value to Total Assets

Book Value to Total Assets ratio is indicative of the capital structure of the firm, and it is an index of the extent to which the firm can depend on its shareholders' equity in order to continue its operation, without having to take loans. The higher this ratio is, the more positive for the firm.

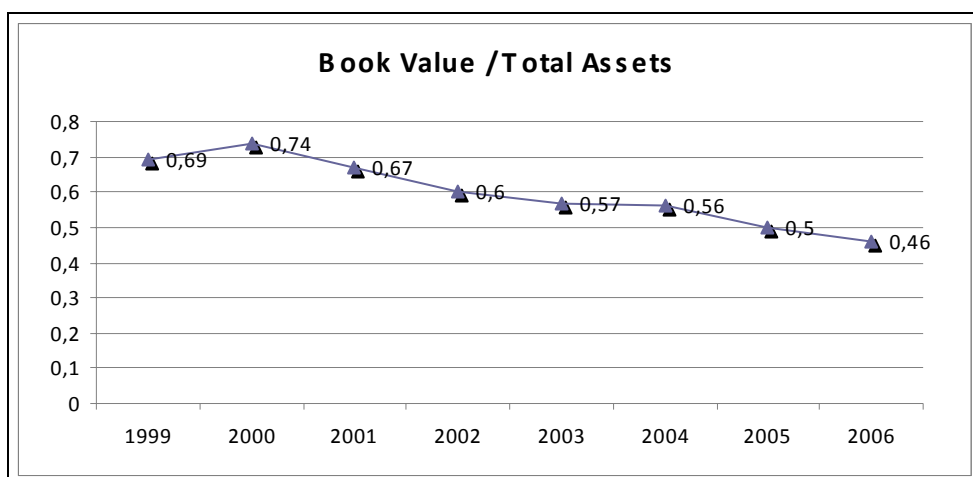


Figure 3. Book Value to Total Assets

Book Value to Total Assets ratio follows a generally decreasing trend. In 1999 it is 0.69 and it slightly increases in 2000, reaching the value 0.74. Throughout all the following years, though, it is continuously reduced. Obviously, firms cannot depend on their own capital and loaning is necessary.

Because of the Olympic Games of 2004, many important construction projects were undertaken. The importance and the demands of these projects probably raised the rate of loaning.

Total Liabilities to Total Assets

Converse to the Book Value to Total Assets ratio is the Total Liabilities to Total Assets ratio, which shows the level of loaning that a firm has. This ratio is preferred to be low, meaning that the firm keeps its debt low, without having many loans.

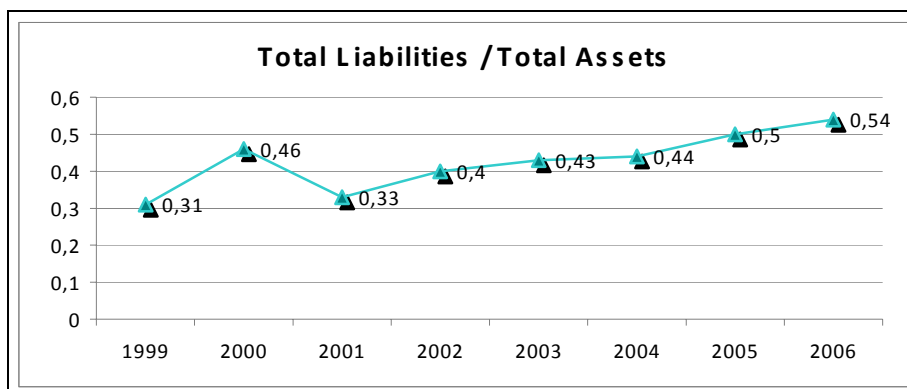


Figure 4. Total Liabilities to Total Assets

Total Liabilities to Total Assets ratio has the expected picture, considering the previous figure. There is a rapid increase from the year 1999 to 2000. It is interesting that in the same period the capital adequacy of firms has been improved, as the Book Value to Total Assets is increased. Thus, the increase in the specific ratio is not due to long term, but probably due to a rise in current liabilities or a decrease in total assets. Only in 2001 the ratio is decreased and afterwards it increases again. This is an expected movement, as loaning has been raised this period.

Current Assets to Current Liabilities

Current Assets to Current Liabilities ratio measures the liquidity of firms at a short-term basis. It should range between 1.5 and 2.0, so as the firm not to face liquidity problems (Garrison et al., 2006).

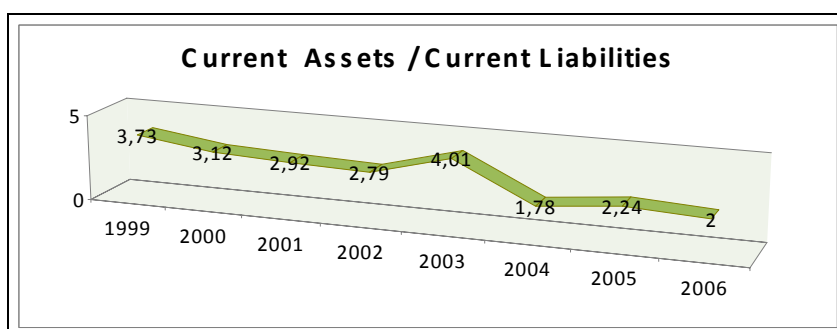


Figure 5. Current Assets to Current Liabilities

The results are not encouraging as the liquidity of construction firms seems to deteriorate over time. Only in 2003 is it slightly improved, but in 2004 it falls to the lowest level. In 2005 it is also improved, although remaining lower than the years before the recovery in 2003. In 2006 it is further reduced. By inference, it could be said that firms face liquidity problems that seem to be worsening. On the other hand, however, it could not be said that the liquidity of the firms faces serious problems, as it is over 2 in almost all the years. Considering the fact that this ratio should vary between 1.5 and 2, it could be claimed that even haven worsened over the years, it is still at good levels.

Fixed Assets to Total Assets

Fixed Assets to Total Assets ratio measures the extent to which fixed assets are financed with the firm's capital. It is preferable to be below five, so that the amount of current assets are higher than fixed assets. Otherwise, it is indicated that the firm faces problems with working capital, which in turn causes problems with low inventory maintenance and cash reserves.

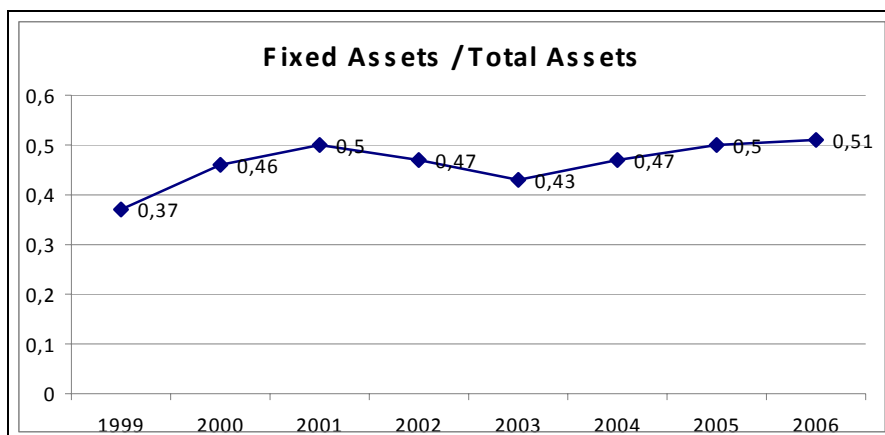


Figure 6. Fixed Assets to Total Assets

Fixed Assets to Total Assets ratio could be regarded as having a generally increasing evolution. In 1999, 37% of firms' assets are fixed, a percentage that increases to 50 per cent in 2002 (47%). In the next two years a minor decline is observed, but afterwards, it increases again and in 2006 the amount of fixed assets over total assets reaches fifty per cent. The proportion of fixed assets is high, which probably means that the firms do not use their working capital efficiently.

ROE

Return on Equity (ROE) is a measure of firms' profitability, revealing how much profit has been generated with the money that the shareholders have invested. It is calculated as Net Income / Shareholders' equity. It is preferable that the ROE be as high as possible.

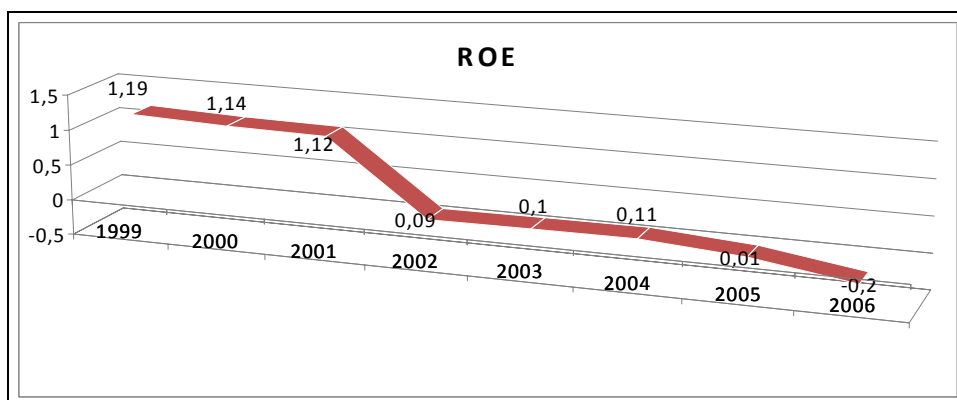


Figure 7. ROE

As it appears in figure 7, Greek construction industry seems to face serious problems with profitability. ROE has a continually declining route and especially in 2002, when it falls to 0.09 from 1.12 in the previous year. The following two years it slightly improves but in 2005 it falls dramatically again. Indeed, in 2006 not only is it decreased but it becomes negative. That is not an unexpected fall, taking into account that in 2005 and 2006, many firms at the end of the fiscal year, disclose losses.

In general, the construction industry does not present a positive picture. Even though liquidity is kept at good levels, it seems to face problems with its cost structure, as the cost of goods sold absorbs a high proportion of the sales. Construction firms obviously cannot depend on their own capital and they need to increase loaning in order to continue their operation. These factors have affected profitability, which is also confirmed by the statistical analysis, causing ROE to decrease dramatically.

4.2. Descriptive Statistics

Table 2 shows descriptive statistics. It is indicated that BVTA and TLTA follow almost normal distribution. In order for a distribution to be characterised as Gaussian (normal), it should have skewness at the value of zero and kurtosis at the value of three. In this case, BVTA has -0.28 skewness and 2.46 kurtosis and TLTA has 0.11 skewness and 2.41 kurtosis. Furthermore, the mean and the median are almost the same (the mean is 0.58 and the median is 0.59 for BVTA and for TLTA the mean is 0.45 and the median is 0.43), which is another characteristic of normal distribution.

According to the “68-95-99.7 rule”, when the distribution is normal, 68% of the values move within the area of $m-1sd$ and $m+1sd$, 95% of the sample is between $m-2sd$ and $m+2sd$ and finally, almost the whole sample (99.7%) covers the area of $m-3sd$ and $m+3sd$ (where m is the mean and sd is the standard deviation). Following this rule, 65% of the values of BVTA are between 0.36 ($0.58 - 0.22$) and 0.80 ($0.58 + 0.22$), 95% of the values are between 0.14 ($0.58 - 2 \cdot 0.22$) and 1.02 ($0.58 + 2 \cdot 0.22$) and 99.7% of the values are between -0.08 ($0.58 - 3 \cdot 0.22$) and 1.24 ($0.58 + 3 \cdot 0.22$). Similarly, TLTA ranges at 68% between 0.24 ($0.45 - 0.21$) and 0.66 ($0.45 + 0.21$), at 95% ranges between 0.03 ($0.45 - 2 \cdot 0.21$) and 0.87 ($0.45 + 2 \cdot 0.21$) and, finally, 99.7 per cent ranges between -0.18 ($0.45 - 3 \cdot 0.21$) and 1.08 ($0.45 + 3 \cdot 0.21$).

ADM presents high kurtosis at 14.34 and positive skewness at 3.07. CACL also appear to have high leptokurtic distribution. Skewness is 6.29 and kurtosis is 48.43. Even higher kurtosis is observed at ROE and FATA, with -9.70 skewness and 86.83 kurtosis and 9.55 skewness and 92.53 kurtosis respectively. High leptokurtic distributions indicate that there is homogeneity within the industry, as the values of the ratios range near the mean. Return on Equity (ROE) seems to range near 0.03 and FATA near the value 0.87. However, standard deviation denotes that there are some firms that considerably deviate from the mean.

Table 2 – Descriptive Statistics

	ADM	BVTA	CACL	COGS	TLTA	MS	ROE	FATA	DUMMY
Mean	0.114316	0.582526	2.871579	0.826211	0.446947	0.046526	0.029789	0.874526	0.294737
Median	0.080000	0.590000	1.950000	0.850000	0.430000	0.040000	0.060000	0.490000	0.000000
Maximum	0.690000	0.990000	39.26000	1.200000	0.900000	0.210000	0.350000	39000000	1.000000
Minimum	0.000000	0.100000	0.620000	0.280000	0.010000	0.000000	-4.310000	0.080000	0.000000
Std. Dev.	0.112719	0.218583	4.479427	0.144349	0.2148301	0.043068	0.457819	3.958285	0.458343
Skewness	3.065705	-0.280986	6.284095	-1.242693	0.113918	1.593696	-9.102227	9.554536	0.900426
Kurtosis	2.457154	2.457154	48.42727	5.870162	2.412757	5.404376	86.82105	92.53416	1.810768

Table 3 – Correlation Matrix

	ADM	BVTA	CACL	GOGS	TLTA	MS	ROE	FATA
ADM	1.00							
BVTA	0.31	1.00						
CACL	0.56	0.35	1.00					
COGS	-0.53	-0.33	-0.49	1.00				
TLTA	-0.37	-0.79	-0.36	0.39	1.00			
MS	-0.36	0.01	-0.21	0.29	0.09	1.00		
ROE	-0.03	0.25	0.05	-0.29	-0.24	0.07	1.00	
FATA	-0.08	0.13	0.03	0.01	-0.04	0.06	0.03	1.00

The maximum value of 0.99 that BVTA takes indicates that there is a firm that operates almost with 100 per cent of its shareholders' equity. On the contrary, the minimum value of 0.10 reveals the existence of one firm that operates with 90% loans. The TLTA ratio is the opposite of the BVTA ratio. Indeed, its maximum and minimum value show that there is actually one firm operating with 90% loaning and one more firm operating with 1% loaning. These results signify high differentiation at the capital structure of the firms within the industry.

4.3. The Correlation Matrix

Observing the correlation matrix (Table 3), ADM correlates significantly with CACL, presenting positive correlation 0.56 and negative correlation -0.53 with COGS. Furthermore, it has negative correlation with TLTA (-0.37) and market share (-0.36). Larger firms with greater market share manage to reduce their administrative expenses and, thus, the ADM to sales ratio. The correlations with ROE and FATA are very weak (-0.03 and -0.08 respectively).

BVTA strongly positively interrelates with CACL (0.35). That is a reasonable result, as when the liquidity of a firm is improved, its capital adequacy is also improved, and conversely, better use of a firm's capital can improve its liquidity. It shows negative correlation of -0.33 with COGS and significant correlation of -0.79 with TLTA. If the cost of goods sold is increased, the gross margin is reduced and the firm may face liquidity problems, probably resulting in boost of loans, and therefore the BVTA is decreased. Compared to the other variables, BVTA and TLTA have the strongest correlation. They are two opposite ratios and it is expected that when BVTA is high, the firm operates with its own capital and it does not have to take loans. As a result, it does not have long-term liabilities and, thus, TLTA ratio is decreased. If, in contrast, a firm cannot continue its operation based on its capital and it has long-term debt, TLTA is increased and BVTA is decreased. Market share seems not to interrelate with BVTA, as their correlation is considerably weak (0.01). ROE presents moderate correlation with BVTA, indicating that an improvement of the capital adequacy of firms can result in improvement of their profitability. Finally, FATA and BVTA are interrelated but not to a great extent, showing positive correlation of 0.13.

CACL strongly correlates with COGS, with negative (-0.49) correlation. As aforementioned, a rise in cost of goods sold can have negative effects on the liquidity of firms, which is clearly shown in the correlation matrix. Likewise, it has considerable negative correlation with TLTA. When liquidity is improved, loaning is not necessary and long-term liabilities are reduced. Liabilities are generally less than assets and TLTA is obviously decreased. Interesting is the correlation of CACL with MS. It would be expected that firms with greater market share would have more liquidity than smaller ones. However, according to the statistical results, market share and current ratio seem to have negative correlation, although not very strong. Weak correlation is observed with ROE and FATA, presenting 0.05 and 0.03 correlation respectively. Hence, liquidity does not improve profitability, nor does the use of fixed assets affects liquidity.

COGS and TLTA are closely interrelated with strong positive correlation. High cost of goods sold possibly leads to higher long-term liabilities and, conversely, high current liabilities can cause higher cost of goods sold. Market share (MS) is moderately positively correlated to COGS, while negative correlation would be more reasonable. It could be said that larger firms can achieve more advantageous purchase prices, reduce their expenses and have lower cost of goods sold. Nevertheless, as presented in the correlation matrix, greater market share results in higher cost of goods sold. Overall, COGS and ROE show negative correlation, though not very strong (-0.29). Higher cost of sales reasonably reduces profitability. FATA has almost no correlation with COGS, revealing that the use of fixed assets does not have any effects on cost of goods sold. MS seems to have significantly weak correlation both with ROE and FATA. That indicates that market share does not affect profitability.

4.4. Regression Analysis

Regression analysis (table 4) of ROE on market share, concentration, cost structure and capital structure presents various interesting results. When t-statistic is high and p-value is less than 0.05, then the variable is significant. According to these criteria, the variables that are significant are COGS, which has -2.43 t-statistic and 0.93 p-value, TLTA with -3.64 t-statistic and 0.02 p-value, ADM with -3.32 t-statistic and 0.001 p-value and finally FATA with 2.58 t-statistic and 0.01 p-value. CACL, MS and DUMMY are not the variables of non major significance, as they are observed to have 0.94, 0.59 and 0.54 p-value, respectively. The above results reveal that neither market share, concentration nor liquidity seem to affect the profitability of construction firms. What appears to affect ROE is COGS, TLTA, ADM and FATA. Profitability has a negative relationship with cost of goods sold to sales ratio, Total liabilities to total assets ratio and administrative expenses to sales ratio. Its relationship with fixed assets to total assets ratio is positive, though with no significance.

Table 4 – Regression Analysis

Variable	Coefficient	Std. Error	t-statistic	p-value
α	0.340036	0.075086	4.528598	0.0000
CACL	-0.000136	0.001675	-0.081437	0.9353
COGS	-0.205798	0.084564	-2.433627	0.0170
TLTA	-0.168722	0.046325	-3.642114	0.0005
ADM	-0.381661	0.114938	-3.320579	0.0013
MS	0.161005	0.300964	0.534966	0.5940
FATA	0.001225	0.000475	2.579177	0.0116
DUMMY	0.013691	0.022468	0.617606	0.5384
Weighted		Statistics		
<i>R-squared</i>	0.338628	<i>Mean</i>	<i>dependent var</i>	0.215890
<i>Adjusted R-squared</i>	0.285414	<i>S.D.</i>	<i>dependent var</i>	0.308906
<i>S.E of regression</i>	0.261128	<i>Sum</i>	<i>-squared resid</i>	5.932357
<i>F-statistic</i>	6.363526	<i>Durbin</i>	<i>-Watson stat</i>	1.182415
<i>Prob(F-statistic)</i>	0.000005			

Moreover, table 4, among others, includes the R-squared, the Adjusted R-squared, F-statistic, prob (F-statistic) and the Durbin-Watson statistics, which show the interpretative power of the model. They indicate to what extent the variations of ROE make the other variables construe. As reflected by the results of R-squared (0.338), Adjusted R-squared (0.285) and F-statistic (6.363), the explanatory power of the model is quite satisfactory. Durbin-Watson statistics measures the serial correlation of the model. The 1.182 value shows that there is no serial correlation in the model. The method that was used for the estimation of the sample was the “weighted list squares”. This method takes into account the probability that affects both in the time series and in the existing cross-section data. Considering the above, it could be arguably maintained that the research outcome is reliable.

5. CONCLUDING REMARKS

This paper examined profitability of the construction industry in Greece and how this is affected by market structure, concentration, cost structure and capital structure. An econometrical model was used, which consisted of seven variables (five financial ratios, market share and a dummy variable measuring the concentration of the industry). The sample consisted of twenty listed construction firms and the financial data were derived from their published financial statements in the ASE.

As it arises from the statistical results, market share does not have impact on profitability and neither does market concentration. What determines profitability is cost structure and capital structure. ROE, which is our measure of profitability, has negative correlation with COGS and positive correlation with BVTA. The correlation with market share is positive, but very weak. The regression analysis also

shows the impression of COGS and TLTA on ROE. Moreover, as observed, market share, concentration and liquidity do not have any significant impact on ROE. On the contrary, the reduction of COGS, as well as the reduction of debt can boost the firms' profitability.

As for the limitations of the study, we could come to conclusions more safely if the sample was larger. However, we preferred to include only the listed firms in the sample, which could be regarded as the most indicative paradigms of the sector and to extend the study in the future by incorporating the non-listed constructing firms. Moreover, we are going to conduct this study in other capital markets in the Balkans such as Romania and Bulgaria, which recently joined the EU and are going, in a way, to follow the Greek development paradigm under the EU regulations.

REFERENCES

- Ailawadi K., P. Farris and M. Parry (1999), Market share and ROI: Observing the effect of unobserved variables, *International Journal of Research in Marketing*, Vol.16, pp.17-33.
- Amaratunga D. and D. Baldry (2002), Moving from performance measurement to performance management, *Facilities*, Vol.20, No. 5/6.
- Armstrong J. S and K. G. Green (2007), Competitor-oriented Objectives: The Myth of Market Share, *International Journal of Business*, Vol.12, No.1.
- Beetham S., C. Anumba, T. Thorpe and I. Hedges (2004), A critical appraisal of their use in construction: Benchmarking, *An International Journal*, Vol.11, No.1, pp.93-117.
- Blindenbach-Driesen F. and J. Ende (2006), Innovation in project-based firms: The context dependency of success factors, *Research Policy*, Vol.32, pp. 345-561.
- Bordoli D. and A. Baldwin (1998), A methodology for assessing construction project delays, *Construction Management and Economics*, Vol.16, pp.327-337.
- Boutsoli Z. (2007), Concentration in the Greek private hospital sector: A descriptive analysis, *Health Policy* Vol.82, pp. 212-225.
- Callan J. and H. Rice (2002), *Construction Accounting Deskbook, Financial, Tax, Accounting, Management and Legal Answers*, Aspen Law & Business, New York.
- Clough R., G. Sears and S. Keoki Sears (2000), *Construction Project Management*, John Wiley & Sons, Inc., New York.
- Cooper R. and R. Kaplan (1991), *The design of cost management systems*, Prentice-Hall, Englewood Cliffs, New Jersey.
- Crostwaite D. (2000) The global construction market: a cross-sectional analysis, *Construction Management and Economics*, Vol.18, pp. 619-627.
- Davis S. and T. Albright (2004), An investigation of the effect of the Balanced Scorecard implementation on financial performance, *Management Accounting Research*, Vol.15, pp. 135-153.
- Dimitras A. (2001), Multicriteria evaluation of Greek construction companies' securities, *Working Paper Series*.
- Drury C. (2002), *Management & Cost Accounting*, Thomson, New York.
- Elliot B. and J. Elliot (2007), *Financial Accounting and Reporting*, Pearson Education, London.
- Fawcett S. F and M. B. Cooper (1998), Logistics performance measurement and customer successes, *Industrial Marketing Management*, Vol.27, pp.341-357.
- Fennema M. G, J. S. Rich and K. Krumwiede (2005), Asymmetric effects of Activity-based costing system cost reallocation, *Advances in Accounting Behavioral Research*, Vol.8, pp.167-187.
- Feurer R. and K. Chaharbaghi (1995), Performance measurement in strategic change, *Benchmarking*

for *Quality Management & Technology*, Vol.2, No.2, pp.64-83.

Fraering J. and M. Minor (1994), The Industry-specific Basis of the Market Share-Profitability Relationship, *Journal of Consumer Marketing*, Vol.11, No.1, pp.27-37.

Garrison, R., E. Noreen and P. Brewer (2006), *Managerial Accounting*, McGraw Hill Irwin, New York.

Gosselin M. (1997), The effect of strategy and organisational structure on the adoption and implementation of activity-based costing, *Accounting, Organisations and Society*, Vol.22, No.2, pp.102-122.

Gupta M. and K. Galloway (2003), Activity-based costing/management and its implications for operations management, *Technovation*, Vol.23, pp.

Hellstat (2007), Market Analysis 2007 – Constructions. www.hellstat.eu

ICAP (2006), *Construction firms of 7th, 6th, 5th grade*, Athens, ICAP.

Innes J. and F. Mitchell (1990), Activity-based costing research, *Management Accounting*, Vol. 68, No.5, pp.28-29.

International Accounting Standards Board (IASB) (2004), *International Financial Reporting Standards (IFRSsTM) including International Accounting Standards (IASsTM) and Interpretations as at 31 March 2004*, London, Kluwer.

Ittner C., W. N. Lanen and D. F. Larcker (2002), The association between activity-based costing and manufacturing performance, *Journal of Accounting Research*, Vol.40, No.3, pp.711-726.

Kaplan, R. S. and D. P. Norton (1992), The balanced scorecard- measures that drive performance, *Harvard Business Review*, Vol.70, No.1, pp. 71-90.

Kapopoulos P. and F. Siokis (2002), Market structure, concentration and profitability in the European banking sector: An econometrical investigation, *Greek Banks Union, Index of the Greek banking system* (in Greek).

Kennedy T. and J. Affleck-Graves (2001), The impact of activity-based costing techniques on firm performance, *Journal of Management Accounting Research*, Vol.13, pp.19-45.

Love P. E. D and G. D. Holt (2000), Construction business performance measurement: The SPM alternative, *Business Process Management Journal*, Vol.6, No.5, pp.408-416.

Maiga A.S. and F. A. Jacobs (2007), Activity-Based Cost management and manufacturing, operational and financial performance: A structural equation modeling approach, *Advances in Management Accounting*, Vol.16, pp.217-260.

Miramontes L. and H. Rice (2005), *Construction Accounting Deskbook, Financial, Tax, Accounting, Management, and Legal Answers*, Chicago, CCH.

Missbauer H. and W. Hauber (2006), Bid calculation for construction projects: Regulations and incentive effects of unit price contracts, *European Journal of Operational Research*, Vol.171, pp.1005-1019.

Neely A. (2004), The challenges of performance measurement, *Management Decision*, Vol.42, No.8, pp.1017-1023.

Nudurupati S., T. Arshad and T. Turner (2007), Performance measurement in the construction industry: An action case investigating manufacturing methodologies, *Computers in Industry*, Vol.58, pp. 667-676.

O' Mara C., P. Hyland and R. Chapman (1998), Performance measurement and strategic change, *Managing Service Quality*, Vol.8 No.3

- Pan C. (2005) Market structure and profitability in the international tourist hotel industry, *Tourist Management*, Vol. 26, pp. 845-850
- Parker C. (2000) Performance measurement, *Work Study*, Vol.49, No. 2, pp.63-66.
- Proverbs D. and G. Holt (2000), Reducing construction costs: European best practice supply chain implications, *European Journal of Purchasing & Supply Management*, Vol.6, pp.149-158.
- Rouse, P. and M. Puterill (2003), An internal framework for performance measurement, *Management Decision*, Vol.41, No.8.
- Schneiderman A. M. (1999), Why balanced scorecards fail, *Journal of Strategic Performance Measurement*, pp.6-11 (special edition).
- Su C-K., C-Y. Lin and M-T. Wang (2003), Taiwanese construction sector in a growing “maturity” economy, 1964-1999, *Construction Management and Economics*, Vol.21, pp.719-728.
- Xing X. (2004) A note on the time – series relationship between market industry concentration and market volatility, *Journal of International Financial Markets, Institutions & Money*, Vol.14, pp. 105-115.
- Zaghloul R. and F. Hartman (2003), Construction contracts: the cost of mistrust, *International Journal of Project Management*, Vol.21, pp.419-424.

Appendix A

1999	Cost of sales/sales	Administrative expenses/sales	Book value/total assets	Total liabilities/total assets	Current assets/current liabilities	ROE	Fixed assets/total assets	Market share
J. & P AVAX Ltd.	0.71	0.09	0.80	0.20	1.20	0.15	0.76	0.06
AEGEK. Ltd.	0.98	0.08	0.78	0.22	2.99	0.09	0.39	0.08
ATHENA Ltd.	0.87	0.02	0.57	0.43	1.62	0.35	0.42	0.11
ATTI-KAT Ltd.	0.98	0.28	0.70	0.30	1.84	0.15	0.45	0.02
BIOTER Ltd.	0.79	0.06	0.75	0.25	3.35	0.08	0.15	0.03
GENER Ltd.	0.78	0.07	0.38	0.62	2.11	0.10	0.10	0.05
DIEKAT Ltd.	0.78	0.05	0.82	0.18	4.01	0.12	0.32	0.07
DOMIKI KRITIS Ltd.	0.74	0.06	0.65	0.35	1.95	0.19	0.35	0.02
EDRASSIS-PSALLIDAS Ltd.	0.82	0.10	0.80	0.20	3.36	0.04	0.35	0.04
EKTER Ltd.	0.72	0.21	0.86	0.14	5.50	0.04	0.23	0.02
ELLINIKI TECHNODOMIKI Ltd.	0.89	0.04	0.87	0.13	2.02	0.12	0.75	0.16
ERGAS Ltd.	0.42	0.13	0.50	0.50	2.25	0.16	0.14	0.03
I.KLOUKINAS-ILAPPAS Ltd.	0.79	0.04	0.29	0.71	0.49	0.62	0.66	0.04
INTRAKOM CONSTRUCTIONS Ltd.	0.75	0.06	0.48	0.52	1.57	0.70	0.20	0.05
MESOCHORITIS BROS CORPORATIONS	0.95	0.03	0.79	0.21	3.89	0.08	0.17	0.03
MICHANIKI Ltd.	0.84	0.12	0.97	0.03	24.67	0.02	0.25	0.07
MOCHLOS Ltd.	0.68	0.07	0.60	0.40	0.74	0.42	0.71	0.02
PANTECHNIKI Ltd.	0.81	0.05	0.88	0.12	6.35	0.06	0.22	0.04
PROODEFTIKI BROS CORPORATIONS	0.91	0.06	0.59	0.41	1.59	0.15	0.35	0.03
TERNA Ltd.	0.92	0.07	0.78	0.22	3.05	0.14	0.39	0.04

2000	Cost of sales/sales	Administrative expenses/sales	Book value/total assets	Total liabilities/total assets	Current assets/current liabilities	ROE	Fixed assets/total assets	Market share
J. & P AVAX Ltd.	0,80	0.09	0.87	0,73	2,06	0,06	0,73	0,06
AEGEK. Ltd.	0.84	0.06	0.85	0.43	5.94	0.05	0.43	0.11
ATHENA Ltd.	0.85	0.02	0.82	0.39	3.76	0.15	0.39	0.07
ATTI-KAT Ltd.	0.89	0.15	0.59	0.35	1.58	0.14	0.35	0.04
BIOTER Ltd.	0.77	0.10	0.81	0.71	1.51	0.05	0.71	0.02
GENER Ltd.	0.65	0.12	0.58	0.08	2.47	0.06	0.08	0.02
DIEKAT Ltd.	0.83	0.04	0.72	0.61	1.60	0.15	0.61	0.08
DOMIKI KRITIS Ltd.	0.72	0.08	0.82	0.41	3.60	0.13	0.41	0.02
EDRASSIS-PSALLIDAS Ltd.	0.89	0.06	0.80	0.69	1.62	0.06	0.69	0.06
EKTER Ltd.	0.64	0.22	0.88	0.32	5.93	0.07	0.32	0.01
ELLINIKI TECHNODOMIKI Ltd.	0.95	0.06	0.91	0.81	2.29	0.07	0.81	0.13
ERGAS Ltd.	0.61	0.10	0.49	0.13	2.25	0.15	0.13	0.04
I.KLOUKINAS-ILAPPAS Ltd.	0.82	0.03	0.34	0.97	0.04	0.49	0.97	0.04
INTRAKOM CONSTRUCTIONS Ltd.	0.77	0.05	0.40	0.26	1.24	0.86	0.26	0.07
MESOCHORITIS BROS CORPORATIONS	0.96	0.05	0.89	0.22	7.26	0.03	0.22	0.02
MICHANIKI Ltd.	0.78	0.12	0.94	0.44	9.50	0.01	0.44	0.05
MOCHLOS Ltd.	0.90	0.03	0.72	0.49	1.82	0.05	0.49	0.04
PANTECHNIKI Ltd.	0.90	0.05	0.78	0.48	2.39	0.10	0.48	0.05
PROODEFTIKI BROS CORPORATIONS	0.84	0.05	0.77	0.22	3.46	0.07	0.22	0.04
TERNA Ltd.	0.79	0.07	0.77	0.54	2.09	0.12	0.54	0.04

2001	Cost of sales/sales	Administrative expenses/sales	Book value/total assets	Total liabilities/total assets	Current assets/current liabilities	ROE	Fixed assets/total assets	Market share
J. & P AVAX Ltd.	0.79	0.08	0.86	0.14	1.86	0.11	0.74	0.04
AEGEK. Ltd.	0.96	0.07	0.82	0.18	3.33	0.05	0.56	0.05
ATHENA Ltd.	0.91	0.02	0.76	0.24	2.50	0.16	0.41	0.06
ATTI-KAT Ltd.	0.91	0.08	0.63	0.37	2.76	0.11	0.33	0.02
BIOTER Ltd.	0.74	0.11	0.60	0.40	0.69	0.04	0.83	0.01
GENER Ltd.	0.79	0.12	0.19	0.81	2.44	0.16	0.29	0.01
DIEKAT Ltd.	0.84	0.05	0.59	0.41	1.41	0.13	0.53	0.04
DOMIKI KRITIS Ltd.	0.83	0.07	0.66	0.34	4.94	0.05	0.39	0.01
EDRASSIS-PSALLIDAS Ltd.	0.84	0.07	0.64	0.36	1.59	0.07	0.63	0.03
EKTER Ltd.	0.75	0.17	0.84	0.16	4.30	0.06	0.32	0.01
ELLINIKI	0.88	0.04	0.87	0.13	1.73	0.09	0.78	0.09
TECHNODOMIKI Ltd.								
ERGAS Ltd.	0.98	0.30	0.53	0.47	2.58	0.03	0.11	0.01
I.KLOUKINAS- I.LAPPAS Ltd.	0.81	0.05	0.30	0.70	1.21	0.66	0.52	0.02
INTRAKOM CONSTRUCTIONS Ltd.	0.71	0.07	0.42	0.58	1.39	0.20	0.48	0.48
MESOCHORITIS BROS CORPORATION	0.87	0.07	0.83	0.17	4.43	0.03	0.34	0.01
MICHANIKI Ltd.	0.80	0.11	0.95	0.05	10.66	0.02	0.63	0.02
MOCHLOS Ltd.	0.91	0.02	0.74	0.26	1.35	0.07	0.65	0.02
PANTECHNIKI Ltd.	0.92	0.05	0.70	0.30	2.21	0.16	0.58	0.03
PROODEFTIKI BROS CORPORATIONS	0.85	0.03	0.85	0.15	5.50	0.07	0.22	0.02
TERNA Ltd.	0.80	0.07	0.61	0.39	1.57	0.14	0.62	0.02

2002	Cost of sales/sales	Administrative expenses/sales	Book value/total assets	Total liabilities/total assets	Current assets/current liabilities	ROE	Fixed assets/total assets	Market share
J. & P AVAX Ltd.	0.88	0.09	0.79	0.21	2.05	0.15	0.58	0.07
AEGEK. Ltd.	1.12	0.17	0.72	0.28	2.38	0.04	0.42	0.02
ATHENA Ltd.	0.90	0.03	0.65	0.35	1.99	0.09	0.41	0.08
ATTI-KAT Ltd.	0.98	0.08	0.58	0.42	1.65	0.06	0.50	0.04
BIOTER Ltd.	0.73	0.14	0.58	0.42	1.36	0.05	0.52	0.02
GENER Ltd.	0.83	0.12	0.17	0.83	2.10	0.13	0.20	0.01
DIEKAT Ltd.	0.79	0.08	0.36	0.64	0.85	0.17	0.59	0.03
DOMIKI KRITIS Ltd.	0.95	0.06	0.47	0.53	3.36	0.06	0.40	0.01
EDRASSIS-PSALLIDAS Ltd.	0.84	0.06	0.50	0.50	1.81	0.07	0.61	0.03
EKTER Ltd.	0.85	0.10	0.71	0.29	2.48	0.08	0.29	0.01
ELLINIKI TECHNODOMIKI Ltd.	0.52	0.39	0.91	0.09	10.60	0.04	0.93	0.00
ERGAS Ltd.	0.94	0.30	0.39	0.61	2.42	-0.03	0.12	0.00
IKLOUKINAS- ILAPPAS Ltd.	0.84	0.04	0.34	0.66	1.57	0.38	0.47	0.01
INTRAKOM CONSTRUCTIONS Ltd.	0.64	0.11	0.46	0.54	2.01	0.15	0.50	0.34
MESOCHORITIS BROS CORPORATIONS	0.86	0.06	0.85	0.15	3.65	0.01	0.50	0.01
MICHANIKI Ltd.	0.85	0.13	0.93	0.07	7.61	0.02	0.62	0.02
MOCHLOS Ltd.	0.98	0.01	0.70	0.30	1.64	0.07	0.52	0.14
PANTECHNIKI Ltd.	0.85	0.13	0.50	0.50	1.42	0.08	0.48	0.05
PROODEFTIKI BROS CORPORATIONS	0.73	0.07	0.80	0.20	3.16	0.04	0.39	0.01
TERNA Ltd.	0.82	0.09	0.51	0.49	1.65	0.20	0.39	0.08

2003	Cost of sales/sales	Administrative expenses/sales	Book value/total assets	Total liabilities/total assets	Current assets/current liabilities	ROE	Fixed assets/total assets	Market share
J. & P AVAX Ltd.	0.82	0.06	0.65	0.35	1.27	0.20	0.57	0.12
AEGEK. Ltd.	0.93	0.27	0.67	0.33	2.09	0.05	0.37	0.02
ATHENA Ltd.	0.92	0.03	0.56	0.44	1.53	0.08	0.39	0.11
ATTI-KAT Ltd.	0.83	0.06	0.48	0.52	1.98	0.04	0.45	0.05
BIOTER Ltd.	0.85	0.05	0.59	0.41	1.16	0.06	0.57	0.05
GENER Ltd.	0.87	0.08	0.14	0.86	2.25	0.16	0.12	0.03
DIEKAT Ltd.	0.81	0.05	0.48	0.52	1.20	0.11	0.57	0.04
DOMIKI KRITIS Ltd.	0.89	0.06	0.45	0.55	2.54	0.07	0.55	0.01
EDRASSIS-PSALLIDAS Ltd.	0.81	0.07	0.47	0.53	1.40	0.08	0.61	0.04
EKTER Ltd.	0.79	0.11	0.72	0.28	2.16	0.18	0.40	0.02
ELLINIKI TECHNODOMIKI Ltd.	0.43	0.33	0.86	0.14	39.26	0.11	0.84	0.01
ERGAS Ltd.	0.89	0.10	0.30	0.70	2.46	-0.12	0.10	0.01
IKLOUKINAS-LLAPPAS Ltd.	0.79	0.06	0.51	0.49	1.57	0.19	0.30	0.01
INTRAKOM CONSTRUCTIONS Ltd.	0.79	0.09	0.54	0.46	1.93	0.21	0.36	0.03
MESOCHORITIS BROS CORPORATIONS	0.89	0.06	0.69	0.31	2.15	0.02	0.39	0.01
MICHANIKI Ltd.	0.83	0.06	0.89	0.11	6.78	0.05	0.56	0.04
MOCHLOS Ltd.	0.97	0.01	0.63	0.37	1.58	0.08	0.42	0.19
PANTECHNIKI Ltd.	0.86	0.06	0.54	0.46	1.72	0.07	0.44	0.06
PROODEFTIKI BROS CORPORATIONS	1.61	0.16	0.76	0.24	3.55	0.02	0.31	0.01
TERNA Ltd.	0.84	0.05	0.47	0.53	1.63	0.31	0.38	0.15

2004	Cost of sales/sales	Administrative expenses/sales	Book value/total assets	Total liabilities/total assets	Current assets/current liabilities	ROE	Fixed assets/total assets	Market share
J. & P AVAX Ltd.	0.88	0.08	0.71	0.29	1.06	0.19	0.55	0.13
AEGEK. Ltd.	0.94	0.15	0.61	0.39	1.78	0.02	0.32	0.03
ATHENA Ltd.	0.96	0.03	0.50	0.50	1.39	0.03	0.40	0.10
ATTI-KAT Ltd.	0.78	0.10	0.48	0.52	3.07	0.01	0.45	0.03
BIOTER Ltd.	0.81	0.05	0.49	0.51	1.24	0.07	0.42	0.04
GENER Ltd.	0.87	0.09	0.59	0.41	2.57	0.03	0.16	0.02
DIEKAT Ltd.	0.85	0.04	0.25	0.75	0.94	0.30	0.49	0.05
DOMIKI KRITISLtd.	0.88	0.07	0.36	0.64	1.58	0.04	0.66	0.01
EDRASSIS-PSALLIDAS Ltd.	0.87	0.08	0.46	0.54	1.42	0.05	0.61	0.04
EKTER Ltd.	0.85	0.05	0.69	0.31	1.95	0.27	0.46	0.02
ELLINIKI TECHNODOMIKI Ltd.	0.28	0.35	0.93	0.07	1.58	0.07	0.90	0.01
ERGAS Ltd.	0.77	0.09	0.16	0.84	4.18	0.20	0.09	0.01
I.KLOUKINAS-ILAPPAS Ltd.	0.82	0.08	0.49	0.51	0.96	0.19	0.52	0.01
INTRAKOM CONSTRUCTIONS Ltd.	0.73	0.14	0.57	0.43	2.45	0.22	0.39	0.02
MESOCHORITIS BROS CORPORATIONS	0.91	0.04	0.65	0.35	1.81	0.02	0.38	0.01
MICHANIKI Ltd.	0.83	0.06	0.86	0.14	0.56	0.06	0.92	0.21
MOCHLOS Ltd.	0.97	0.01	0.51	0.49	1.35	0.08	0.45	0.21
PANTECHNIKI Ltd.	0.80	0.02	0.56	0.44	1.42	0.06	0.45	0.05
PROODEFTIKI BROS	1.26	0.11	0.72	0.28	2.90	0.00	0.25	0.01

CORPORATIONS TERNA Ltd.	0.79	0.06	0.51	0.49	1.41	0.30	0.42	0.16
--	------	------	------	------	------	------	------	------

2005	Cost of sales/sales	Administrative expenses/sales	Book value/total assets	Total liabilities/total assets	Current assets/current liabilities	ROE	Fixed assets/total assets	Market share
J. & P AVAX Ltd.	0.85	0.12	0.57	0.43	1.09	0.10	0.54	0.12
AEGEK. Ltd.	0.98	0.16	0.38	0.62	1.15	-0.10	0.41	0.04
ATHENA Ltd.	1.06	0.08	0.40	0.60	1.08	-0.17	0.40	0.06
ATTI-KAT Ltd.	0.86	0.09	0.40	0.60	4.46	0.01	0.55	0.05
BIOTER Ltd.	0.86	0.05	0.45	0.55	1.01	0.04	0.51	0.04
GENER Ltd.	0.80	0.13	0.48	0.52	2.08	-0.01	0.27	0.01
DIEKAT Ltd.	0.81	0.11	0.10	0.90	0.65	0.26	0.57	0.04
DOMIKI KRITIS Ltd.	0.88	0.00	0.46	0.54	0.89	0.00	0.63	0.01
EDRASSIS-PSALLIDAS Ltd.	0.91	0.09	0.39	0.61	1.15	0.02	0.58	0.05
EKTER Ltd.	0.92	0.09	0.63	0.37	1.42	0.21	0.49	0.02
ELLINIKI TECHNODOMIKI Ltd.	0.43	0.66	0.99	0.01	16.71	0.05	0.83	0.01
ERGAS Ltd.	0.50	0.27	0.40	0.60	2.79	0.01	0.25	0.01
I.KLOUKINAS-ILAPPAS Ltd.	0.58	0.09	0.53	0.47	1.28	0.21	0.56	0.04
INTRAKOM CONSTRUCTIONS Ltd.	0.81	0.21	0.53	0.47	1.54	0.01	0.46	0.02
MESOCHORITIS BROS CORPORATIONS	0.96	0.05	0.64	0.36	0.90	0.01	0.68	0.01
MICHANIKI Ltd.	0.72	0.08	0.67	0.33	1.77	0.11	0.52	0.00
MOCHLOS Ltd.	1.04	0.01	0.42	0.58	1.27	-0.33	0.38	0.25
PANTECHNIKI Ltd.	0.84	0.15	0.48	0.52	1.22	0.05	0.44	0.08
PROODEFTIKI BROS CORPORATIONS	0.95	0.05	0.54	0.46	0.96	-0.11	0.57	0.02
TERNA Ltd.	0.85	0.11	0.55	0.45	1.35	0.06	0.42	0.11

2006	Cost of sales/sales	Administrative expenses/sales	Book value/total assets	Total liabilities/total assets	Current assets/current liabilities	ROE	Fixed assets/total assets	Market share
J. & P AVAX Ltd.	0.88	0.10	0.51	0.49	1.22	0.05	0.49	0.21
AEGEK. Ltd.	0.92	0.08	0.14	0.86	0.82	-0.34	0.33	0.19
ATHENA Ltd.	0.95	0.04	0.47	0.53	1.62	0.00	0.38	0.11
ATTI-KAT Ltd.	0.88	0.06	0.36	0.64	0.80	0.03	0.49	0.15
BIOTER Ltd.	0.84	0.05	0.47	0.53	0.92	0.03	0.51	0.06
GENER Ltd.	1.20	0.12	0.12	0.88	0.65	-4.31	0.54	0.01
DIEKAT Ltd.	0.87	0.10	0.13	0.87	0.62	0.07	0.58	0.04
DOMIKI KRITISLtd.	0.90	0.00	0.50	0.50	1.81	0.01	0.57	0.01
EDRASSIS-PSALLIDAS Ltd.	0.97	0.04	0.35	0.65	1.34	0.01	0.54	0.11
EKTER Ltd.	0.66	0.19	0.61	0.39	1.81	0.04	0.57	0.01
ELLINIKI TECHNODOMIKI Ltd.	0.51	0.69	0.99	0.01	14.66	0.05	0.83	0.01
ERGAS Ltd.								
I.KLOUKINAS-ILAPPAS Ltd.	0.60	0.06	0.61	0.39	2.39	0.29	0.59	0.06
INTRAKOM CONSTRUCTIONS Ltd.	0.93	0.12	0.43	0.57	1.71	0.00	0.35	0.09
MESOCHORITIS BROS CORPORATIONS	0.92	0.03	0.51	0.49	1.11	0.01	0.57	0.03
MICHANIKI Ltd.	0.80	0.05	0.65	0.35	1.55	0.16	0.55	0.00
MOCHLOS Ltd.	0.98	0.01	0.43	0.57	1.22	0.01	0.39	0.42
PANTECHNIKI Ltd.	0.95	0.03	0.47	0.53	1.13	-0.01	0.45	0.17
PROODEFTIKI BROS CORPORATIONS	0.86	0.00	0.49	0.51	1.13	-0.09	0.55	0.02
TERNA Ltd.	0.86	0.12	0.44	0.56	1.45	0.10	0.38	0.21