EARNINGS AS AN EXPLANATORY TOOL IN EXPLAINING STOCK MARKET RETURNS AND THE USE OF EASTON AND HARRIS (1991) MODEL: THE CASE OF GREECE.

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Abstract: *Previous research in mature capital markets, such as US and UK, proved that stock market returns and earnings per share (EPS) are correlated. However, research in emerging capital markets to this correlation is not as extensive. The purpose of this paper is to investigate whether the level of EPS and EPS changes, the level of return on investment (ROI) and ROI changes, and the level of return on Equity (ROE) and ROE changes, divided by stock price at the beginning of the stock market period (nine months prior to fiscal year end) are relevant to explain stock market returns in Greece. To explore the correlation/association between EPS, ROI and ROE with stock market returns, this study adopts the Easton and Harris (1991) formal valuation model, which clearly proved the association of earning levels and earnings changes with stock market returns in the US market. The sample period spans 10 years, from 1992 to 2001. There are 163 companies in the sample with different numbers of participating years for each of them. These companies gave a total of 984 year observations, while after excluding the outliers the final sample consisted of 977 year-observations. We used both relative and incremental information content approaches to test this association. For the relative information content approach (to test separately each of the EPS, ROI and ROE with stock market returns) and consistent with the Easton and Harris (1991), we developed a set of three equations (regression models 1-3) linking EPS, ROI and ROE respectively with stock market returns. For the incremental information content approach we developed another set of three equations (regression models 4-6) where in each of them we combined two of the EPS, ROI and ROE with stock market returns. Relative information content approach examined separately each of the three regression models (1-3) using the individual year cross-sectional sample and the pooled cross-sectional and intertemporal (all years) sample. Revealed results provided evidence that there is an association between EPS and stock market returns (although low explanatory power) while results concerning ROI and ROE are not encouraging. In incremental information content approach we tested the three regression models(4-6) using only the pooled cross-sectional and intertemporal (all years) sample. Revealed results showed that the combination of EPS and ROI best explains stock market returns in Greece, compared to the results provided by the combinations of EPS and ROE, and ROI and ROE.*

KEY WORDS: EARNINGS PER SHARE (EPS), RETURN ON INVESTMENT (ROI), RETURN ON EQUITY (ROI), STOCK MARKET RETURNS, EASTON AND HARRIS.

1. INTRODUCTION

The review of research on the relationship between capital markets and financial statements is a wide area of research that originates with the seminal publications of Ball and Brown (1968) and Beaver (1968). Their major motivation was to provide evidence to ascertain whether accounting figures contained or conveyed information about a company's financial performance (Kothari, 2001). They found that there is information content in accounting earnings announcements.

Inspired by Ball and Brown (1968) and Beaver (1968) several scholars have investigated the relationship between various measures of accounting profitability and stock returns or abnormal stock returns. Those studies have been conducted within a framework where stock returns (or stock prices) are the dependent variable while contemporaneous accounting data is the independent variable. Some of the most representative studies are those carried out by Beaver, Lambert and Morse (1980), Thomas and Lipson (1985), Collins and Kothari (1989), Easton and Harris (1991), Easton, Harris and Ohlson (1992), Cheng, Cheung and Copalakrishnan (1993), and Shroff (1995)[4].

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[4] Lev (1989) makes a systematic review on the great number of studies on earnings research, while Kothari (2001) discusses the studies on capital market research.

In the absence of formal valuation models linking accounting earnings to stock returns, most scholars followed Ball and Brown (1986) methodology and focused on investigating the relationship between abnormal returns and unexpected earnings. A great number of studies suggested that there is information content in earnings. However, the relationship between abnormal returns with unexpected earnings has been weak as reflected in low R^2 statistics. In order to provide an alternative model for the returns / earnings relation, Easton and Harris (1991) used a formal valuation model linking both current earnings levels (earnings deflated by price) and earnings change (earnings change deflated by price) to raw stock returns. They fitted the model to the pooled cross-section and time-series sample of 19,996 US firm data as well as for each of the 19 years of available data. In general, they concluded that both the current earnings levels variable and the earnings change variable are relevant in explaining stock returns, and the two variables are not just substitutes (Easton and Harris, 1991).

The objective of this study is to investigate whether the level of EPS and EPS changes, the level of ROI and ROI changes, and the level of ROE and ROE changes, divided by stock price at the beginning of the stock market period (nine months prior to fiscal year end) are relevant to explain stock market returns in Greece.. The study interprets results obtained from an analysis carried out on the basis of secondary financial data relating to the period 1992-2001. The rest of the paper is as follows: Section two presents a summary of the empirical evidence on earnings, section three gives a theoretical background of Easton and Harris (1991) formal valuation model, section four describes the methodology followed, section five presents the analysis and the results, and section six concludes the paper.

2. EMPIRICAL EVIDENCE ON EARNINGS

Using different methodologies, a considerable number of studies have been conducted investigating the relationship between accounting earnings and stock returns. To refer to some: Ball, Kothari and Watts (1993) using annual earnings and return data from 1950 to 1988 for the US market, documented that changes in earnings have systematic economic determinants that are likely to be associated with variation in securities' expected returns, particularly since earnings is the accounting ROE. Cheng, Cheung and Copalakrishnan (1993) evaluated the usefulness of operating income (OI), net income (NI) and comprehensive income (CI). They measured the usefulness in terms of relative information content and incremental information content. Based on a sample that averaged 922 firms a year for 18 years, they found that OI weakly dominated NI, and that both OI and NI dominated CI in information content.

Booth, Broussard and Loistl (1997) focused on the German market and investigated the relationship between stock returns, earnings, and a variant of earnings called DVFA[5]. They concluded that both types of earnings were associated with stock returns with the latter being more significant. Vafeas, Trigeorgis and Georgiou (1998) provided evidence for the Cyprus stock market and suggested that earnings levels as well as changes in earnings are important in explaining stock returns in an emerging stock market. King and Langli (1998) examined accounting figures across Germany, Norway and the UK. They found, among others, that accounting book value and EPS were significantly related to current stock prices across all three countries with Germany scoring the lowest relation and UK reaching the highest one.

Cheung, Kim and Lee (1999) examined the impact of ownership characteristics on return-earnings association in Japan. They found that this association is positively affected by the extent to which a company's shares are owned by foreign investors. They also provided evidence that reported earnings were less value relevant in Japan than in the US. Graham and King (2000) examined the relationship between stock prices and accounting earnings and book values in six Asian countries: Indonesia, South Korea, Malaysia, the Philippines, Taiwan, and Thailand. They found differences across the six countries in the explanatory power of book values per share and residual earnings per share for firm values. Explanatory power for Korea and the Philippines was relatively high while that for Taiwan and Malaysia was relatively low. They also provided evidence suggesting that in all six

[5] DVFA earnings are a metric jointly constructed by the Deutscher Vereinigung für Finanzanalyse und Anlageberatung [German Association for Financial Analysis and Investment Advisor]

countries residual earnings per share has less explanatory power than book value per share in most years.

Chen, Chen and Su (2001) provided an empirical examination of whether domestic investors in the Chinese stock market perceive accounting information based on Chinese GAAP to be value relevant. Using data from the Shanghai and Shenzhen Stock Exchanges from 1991 to 1998, and based on return and a price model, they provided evidence that accounting information is of value relevance according to both the pooled cross-section and time series regressions or year-by-year regressions.

Jindrichovska (2001) reported a statistically significant relationship between returns and accounting data for the developed Czech stock market, supporting the evidence from previous studies such as Kothari and Zimmerman (1995) that stock prices lead earnings. Jarmalaite (2002) examined the relationship between accounting numbers and returns in the Baltic stock markets. The stock markets of three countries were investigated: Lithuania, Latvia, and Estonia. Evidence from this study suggested that the association between returns and earnings differs substantially among the three countries. Estonia shows the highest value relevance while Lithuania shows the lowest. The association in Latvia seems to be very similar to Estonia but it has high standard errors making the results less acceptable. Jermakowicz and Gornik-Tomaszewski (1998) studied the association between accounting earnings and stock market returns in the emerging stock market of Poland. They also found a significant association between accounting earnings and stock market returns.

Chen and Zhang (2003) relied on prior studies that were focused on earnings (earnings levels and earnings change) to explain returns and developed a theoretical model to explain how balance sheet information can be introduced into a return model to supplement earnings information. They modelled earnings as a product of two underlying factors, capital base and profitability and showed that returns are more appropriately viewed as a function of profitability change and capital base change (capital investment), rather than a function of earnings change. Using a sample of the COMPUSTAT and CRSP database for the period 1966 to 2001, they found results consistent with their proposed theoretical model. Their main finding was that capital investment is an additionally important variable in explaining returns beyond earnings levels and profitability change (or earning change) and leads to a significant improvement of the model's explanatory power.

Research for the Greek stock market is limited. Niarchos and Georgakopoulos (1986) provided evidence that the prices in the ASE respond very slowly to new information and concluded that the Greek stock market is not efficient. Kayha, Meggina and Theodossiou (1993) found that earnings growth rates were highly associated to future profitability and documented that earnings possessed an information content that explained unexpected changes in Greek stock prices. Ballas (1999) investigated the information content of the components of a clean surplus definition of income with respect to stock prices and found a significant association between OI and market values. Diacogiannis, Glezakos and Segredakis (1998) examined the effect of the P/E ratio and the Dividend Yield (DY) on expected returns of the common stocks in ASE during 1990-1995. They provided evidence suggesting that P/E ratio is a statistically significant variable in explaining the cross-section variation of expected returns. The explanatory power of DY reported rather weak.

Karanikas (2000), provided evidence on the role of size, book-to-market ratio and dividend yields on average stock returns in the ASE for the period 1991-1997. He reported a statistically significant positive relationship between the book-to-market ratio (B/M), DY and average stock returns. Kousenidis, Negakis and Floropoulos (2000), examined the size and B/M factors in the relationship between average stock returns and the average book returns for the ASE. They provided evidence suggesting that ROI is associated to stock returns especially when portfolios are formed based on B/M ratio. Kousenidis (2005) examined the association between stock returns and accounting earnings for a sample of Greek firms listed on the ASE over the period from 1992 to 1999. In particular, he tested whether deflated earnings and deflated changes in earnings contain information for contemporaneous stock returns. Moreover, he tested the hypothesis that the addition of further explanatory variables in the model, which account for size and for life-cycle stages, improves the information content of earnings for stock returns. He proved that (a) the explanatory power of earnings for contemporaneous stock returns is very poor, and (b) improved information content is reported

when the regressions are adjusted to account for size, supporting the hypothesis that firm-size is a strong factor in explaining the returns/earnings relation. However, the results are unable to sustain the hypothesis that the information content of earnings for stock returns differentiates according to the stage of the firm's life-cycle. Finally, Theriou *et al.* (2005) provided evidence on the role of size and B/M ratio on average stock returns in the ASE for the period 1993-2001. They reported a statistically significant positive relationship between size and average stock returns.

3. THEORETICAL BACKGROUND - Easton and Harris (1991) model

Easton and Harris (1991) investigated whether the level of earnings divided by the stock price at the beginning of the stock return period (9 months prior to the fiscal year-end) is relevant for evaluating the earnings/returns association. The primary model (book value valuation model) that gave incentive to their research relied on the idea that book value and market value are both 'stock' variables that indicate the wealth of a firm's equity. The related variables were, respectively, earnings divided by stock price (adjusted for dividends) at the beginning of the return period (A_t /P_{t-1}) and market returns (R_{jt}) (Easton and Harris, 1991). Several other models based on a relation between market value and book value had also been used in the accounting literature before the Easton and Harris (1991) study (see: Landsman, 1986; Harris and Ohlson, 1987).

Another model that has been frequently used in the empirical literature expresses stock price as a multiple of earnings (earnings valuation model). This model has been used in empirical studies to examine the relationship between stock returns and change in earnings or between abnormal returns and unexpected earnings (see: Beaver, Clarke and Wright, 1979; Collins and Kothari, 1989). However, Easton and Harris (1991) proved that the assumption that stock price is a multiple of earnings also implies that earnings level variable (A_t/P_{t-1}) is a relevant explanatory variable for returns. Although the valuation models developed by Easton and Harris (1991) indicated the potential relevance of the level of current earnings divided by the beginning of period stock price, they did not exclude the relevance of change in earnings divided by the beginning of period stock price ($\Delta A/P_{t-1}$). Thus, while the primary objective of their empirical analysis was to evaluate the relevance of the earnings level variable (A_t/P_{t-1}), they also considered and tested the relevance of change in earnings variable ($\Delta A/P_{t-1}$) in explaining stock returns.

To explore the association between earnings and returns, Easton and Harris (1991) theoretically developed and empirically examined three different formal valuation models: the levels model, the changes model and the model that comprises the combination of both previous valuation perspectives. The results from univariate regressions provided evidence that earnings level variable (A_t/P_{t-1}), and change in earnings variable ($\Delta A/P_{t-1}$), are associated, each one separately, with stock returns. The multivariate analysis, incorporating the two variables (A_t/P_{t-1}) and ($\Delta A/P_{t-1}$) in the regression model, revealed an increase in explanatory power, in terms of R^2, compared to R^2s obtained from the univariate analysis.

The models that were empirically tested were the following:

The levels model: $$R_{jt} = \alpha_{t0} + \alpha_{t1} A_{jt}/P_{jt-1} + \varepsilon^1_{jt} \quad (3\text{-}1)$$

The changes model: $$R_{jt} = \varphi_{t0} + \varphi_{t1} \Delta A_{jt}/P_{jt-1} + \varepsilon^2_{jt} \quad (3\text{-}2)$$

The model that combines both levels and changes perspectives:

$$R_{jt} = \gamma_{t0} + \gamma_{t1} A_{jt} / P_{jt-1} + \gamma_{t2} \Delta A_{jt}/P_{jt-1} + \varepsilon^3_{jt} \quad (3\text{-}3)$$

Where R_{jt} is the return on a share of firm *j* over the 12 months, extending from 9 months prior to fiscal year-end to 3 months after the fiscal year-end, A_{jt} is the accounting earnings per share of firm *j* for period *t*, ΔA_{jt} is the earnings change, and P_{jt-1} is the price per share of firm *j* at time *t-1*. All models are demonstrated here as they have been developed and presented by Easton and Harris (1991, p. 25 and p. 29).

4. METHODOLOGY

Both relative and incremental information content approaches will be employed to answer whether EPS, ROI or ROE are associated with Greek stock market returns. Relative information content approach will be employed to answer the first research question (e.g. which of the EPS, ROI or ROE best explains stock market returns) while incremental information content approach will be employed to answer the second one (e.g. which pairwise combination of EPS and/or ROI and/or ROE best explains stock market returns). To explore the first research question, a system of equations (three regression models) was developed based on the Easton and Harris (1991) model. The system of equations (hereafter models) was the following:

Relative Information Content Approach

Model (1): $Returns = a_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + u_1$

Model (2): $Returns = b_0 + b_1 ROI + b_2 \Delta ROI + u_2$

Model (3): $Returns = c_0 + c_1 ROE + c_2 \Delta ROE + u_3$

Where, for all models, *Returns* are the annual compounded stock returns extending nine months prior to current fiscal year end to three months after the current fiscal year end, corresponding roughly with the period between earnings announcements. EPS is the earnings per share of the firm at time *t*, ΔEPS is the change in earnings per share over period *t-1* to *t*, P_{t-1} is the market value per share at the first trading day of the ninth month prior to fiscal year end, ROI is the return on investment of firm at time *t*, ΔROI is the change in ROI over period *t-1* to *t*, ROE is the return on equity of firm at time *t*, ΔROE is the change in ROE over period *t-1* to *t*. The valuation models will be estimated cross-sectionally by years as well as using pooled cross-sectional and intertemporal data (Easton and Harris, 1991; Chen and Zhang, 2003, among others). This design will facilitate the use of testing procedures that are common in the information content literature and, therefore, will ease the comparison of the present study with those in the literature. In order to reveal the explanatory power of the variables under examination, the F-statistics, the R^2s, and the coefficients' significance are examined. Through this approach, the study investigates which performance measure under examination is superior in terms of association with stock returns for the Greek context.

To explore the second research question the present study employs the incremental information content tests (Cheng, Cheung and Gopalakrishnan, 1993; Biddle, Seow and Siegel, 1995; Francis, Schipper and Vincent, 2003). The purpose is to examine whether one measure adds to the information provided by another one or a combination of other measures. That is, $R^2_{p/q}$ denotes the increase in R^2 due to the variable *p*, conditional on variable *q*, and $R^2_{p.q}$ denotes the R^2 due to *p* and *q* (Cheng, Cheung and Gopalakrishnan, 1993, p. 197). Pooled time-series cross sectional data (all years) will be employed to reveal the information usefulness of each regression model. For this reason the study extends Easton and Harris (1991) model incorporating in it one measure after the other. Thus, the following system of equations (hereafter models) was developed:

Incremental Information Content Approach

Model (4) : $Returns = f_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + b_1 ROI + b_2 \Delta ROI + u_{4t}$

Model (5) : $Returns = g_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + c_1 ROE + c_2 \Delta ROE + u_{5t}$

Model (6) : $Returns = h_0 + b_1 ROI + b_2 \Delta ROI + c_1 ROE + c_2 \Delta ROE + u_{6t}$

5. ANALYSIS AND RESULTS

The Sample and the Data Collection

The sample period spans 10 years, from 1992 to 2001. There are 163 companies in the sample with different numbers of participating years for each of them. These companies gave a total of 984 year observations. To reduce the potential influence of outliers, we applied the following elimination rule separately for each of the ten years: an observation was identified as extreme and deleted if any variable was more than 3 standard deviations from the median. The final sample consisted of 977 year-observations.

We began our sample selection using daily closing prices of the common stocks, which were trading in the ASE from April 1991 to April 2002. They were raw prices adjusted for capital splits and stock dividends. We extended the closing prices' selection to three months after the fiscal year end 2001 since the return period for each year spans nine months prior to three months after the fiscal year end (Easton and Harris, 1991). All data was purchased directly from the ASE.

From the daily closing prices of the common stocks we calculated the daily stock return for each stock using the logarithmic approximation since it is the most common practice in finance (Benninga, 2001):

$$R_{i,t} = \log\left(P_{i,t} \Big/ P_{i,t-1}\right) \qquad (5\text{-}1)$$

where $R_{i,t}$ is the return of stock *i* at time *t*, while $P_{i,t}$ and $P_{i,t-1}$ are the prices of stock *i* at time *t* and *t-1* respectively.

Daily returns were then aggregated to compose the monthly returns, which are the primary inputs for our investigation. From the above sample, we retained only those stocks/companies with sufficient public data (balance sheet and income statement data) as reported by the PROFILE Company, a consulting company in Greece dealing with the collection, processing and reporting of financial data. In some cases, where balance sheet or income statement information was unavailable, we collected them either from the ICAP, a private Greek data branch, or through direct contact with the concerned firms. Thus, the sample of the 984 year observations was developed.

5.1. EMPIRICAL RESULTS / Relative Information Content Approach

We begin with the relative information content approach, testing the models (1) to (3). Tables 1, 2, and 3 contain the results of the relative information usefulness of EPS, ROI, and ROE. The Easton and Harris (1991) model was fitted in each of the three tables using each of the three measures under examination. Following the Easton and Harris (1991) model, we estimated the model using both the pooled cross-sectional and intertemporal (all years) sample and the individual year cross-sectional sample.

An investigation of these three tables reveals several results. Firstly, concerning the results of the intertemporal sample (all years), we notice the following (table 4): Firstly, there is a significant difference between the three models in relative information content. Model (1) is significant at 1% level; model (2) is significant at 10% level; while model (3) is not statistically significant. Secondly, comparing the reported R^2s of the three pooled regressions results show that EPS ($R^2 = 0.019$) provide more information in explaining stock market returns in Greece.

Table 4: The Summary (all Years) Results from the Three Models (1) to (3)

All Years	Model (1) EPS	Model (2) ROI	Model (3) ROE
R^2	0.019	0.004	0.000
F	(9.577)***	(2.781)*	(0.005)
Significance	[0.000]	[0.062]	[0.995]

* significance at 10% level, ** significance at 5% level, *** significance at 1% level

Examining separately each of our three regression models (1 to 3) and using the individual year cross-sectional sample, results are largely consistent with those reported for the pooled cross-sectional and intertemporal (all years) sample. Table 1 shows the results (all years and annually) of the regression model (1), which represents earnings levels and earnings changes. What we mainly examine are: the F statistics of the model, the coefficients' t-statistics of the independent variables and the reported R^2s. Firstly, for the pooled cross-sectional and intertemporal (all years) sample, the model is significant at 0.01 level (F=9.577 and sign.=0.000), suggesting that the Easton and Harris (1991) model provides a satisfactory description of the relation between stock returns and the EPS. Secondly,

the coefficients a_1 and a_2 are statistically significant at the 0.01 and 0.05 level respectively suggesting that both EPS levels and EPS changes are associated with stock returns. The reported R^2 is 0.019, relatively low to be considered as the main explanatory factor for stock returns. Results from the individual year cross-sectional sample revealed the following: nine out of the ten regressions (except the year 1993) are significant according to F statistics, and six of them (years 1992, 1994, 1995, 1999, 2000, 2001) are significant at the 0.01 level, two are significant at the 0.05 level (years 1996 and 1998), while one is significant at the 0.1 level (year 1997). This suggests that Easton and Harris (1991) model provides a satisfactory description of the relationship between stock returns and the EPS. Moreover, most of the co-efficients in annual regressions are statistically significant according to t-statistics, suggesting that EPS is associated with stock returns. What is important to notice in these annual regressions is the relatively high R^2s, ranging from 0.286 in year 1992 to 0.149 in year 2001.

Table 2 shows the results (all years and annually) of the regression model (2), which represents ROI levels and ROI changes. Firstly, for the pooled cross-sectional and intertemporal (all years) sample, the model is significant at the 0.1 level (F=2.781 and sign.=0.062), suggesting that the Easton and Harris (1991) model provides a relatively good description of the relationship between stock returns and the ROI. Secondly, only the coefficient b_2 is statistically significant at the 0.05 level suggesting that change in ROI is associated with stock returns. Results from the individual year cross-sectional sample are not encouraging. Only two out of the ten regressions (years 1997 and 1998) are significant at the 0.01 level according to F statistics. This suggests that the Easton and Harris (1991) model does not provide a good description of the relationship between stock returns and the ROI for the specific years. Most of the coefficients in annual regression are not statistically significant according to t-statistics, suggesting that ROI is not associated with stock returns. What is important to notice in these annual regressions is the relatively low R^2s. Only in years 1997 and 1998 are the reported R^2s 0.089 and 0.071 respectively.

Table 3 shows the results (all years and annually) of the regression model (3), which represents ROE levels and ROE changes. For the pooled cross-sectional and intertemporal (all years) sample, the model is not significant according to F statistics suggesting that the Easton and Harris (1991) model does not provide a satisfactory description of the relationship between stock returns and the ROE. Moreover, the coefficients c_1 and c_2 are also statistically insignificant according to t-statistics, suggesting that ROE is not associated with stock returns, at least for our sample. Results from the individual year cross-sectional sample are not encouraging. Only four out of the ten regressions (years 1994, 1995, 1996 and 1997) are significant at the 0.01 level according to F statistics. This suggests that the Easton and Harris (1991) model does not provide a good description of the relationship between stock returns and the ROE for the rest of the years. Most of the coefficients in annual regression are not statistically significant according to t-statistics, suggesting that ROE is not associated with stock returns. Compared to ROI, the reported R^2s are higher but still lower than those of EPS. Significant high R^2s are those of the years 1994, 1995, 1996 and 1997, which are 0.140, 0.122, 0.119 and 0.091 respectively.

In summary, the relative information content approach revealed that model (1), which represents EPS, is more significant in explaining stock returns than the two other competing models. Next to EPS model, comes model (2), the representative of ROI model. However, the reported F statistics, the R^2s and the coefficients are lower than those of EPS model, suggesting that although ROI is an acceptable measure for returns variation it has less explanatory power compared to EPS.

5.2. EMPIRICAL RESULTS / Incremental Information Content Approach

Results from the incremental information content approach are revealed by testing the models (4) to (6). Table 5 contains the detailed results concerning the significance of the estimated coefficients, the F statistics and the reported R^2s of the various regression models developed from the combinations of EPS, ΔEPS, ROI, ΔROI, ROE, and ΔROE. An assumption of a linear relationship between these variables is made.

Moreover, all regression models are tested for multicollinearity using the variance inflation factor (VIF). According to Neter, Wasserman and Kunter (1985) a VIF in excess of 10 is often taken as an indicator of severe multicollinearity, while mild multicollinearity exists when the VIF is between 5 and 10. A VIF lower than 5 indicates that multicollinearity does not exist. The reported VIF from our regressions are almost less than 5.

Results are commented upon according to the F statistics, the R^2 and the t-statistics of the coefficients. According to F-statistics models (4) and (5) are significant at 5% level or better. These models represent the pairwise combinations of EPS and ΔEPS with ROI and ΔROI, and EPS and ΔEPS with ROE and ΔROE respectively. Model (6) is reported as insignificant. From the significant models, the pairwise combination of EPS, ΔEPS with ROI, ΔROI, model (4), reveals the highest R^2 (0.025). However, in this case the coefficient of ROI is not statistically significant.

6. CONCLUDING REMARKS

This study firstly explored the value relevance of traditional accounting performance measures (EPS, ROI, ROE) in explaining stock return variations in the Greek stock market. The main findings are the following. Firstly, both EPS levels and changes are associated with stock returns in the Greek capital market consistent with Easton and Harris (1991) and the most of the relevant studies. Secondly, EPS levels and changes outperform ROI levels and changes and ROE levels and changes in explaining stock returns. Thirdly, when EPS and ROI are incorporated in one research model (regression model) the explanatory power of the model increases. Finally, all performance measures under examination (pairwise) cannot explain more than 2.5 per cent of the variation in stock returns.

These findings can be explained as follow. The association of earnings with stock returns is expected since earnings are a traditional measure of performance and are the most common tool for analysts and investors in the Greek capital market. The similar behaviour of ROI stems from the fact that it is a measure close to EPS. Earnings per share outperform ROI and ROE. This is also expected since investors are more focused on the already known and used EPS and not in more complicated measure such as ROI and ROE. Moreover, EPS is announced quarterly in Greece while ROI and ROE still seems to be unfamiliar performance measure to the investors.

To close, first of all we believe that this study provided clear evidence for the value relevance of traditional accounting performance measures for the Greek capital market. The obvious advantage of EPS compared to the other performance measures was clear. However, the evidence that the combination of EPS with ROI revealed a higher degree in explaining the variation in stock returns, that alone suggests a need for either a combined use of these measures or the adoption of other strategic managerial tools for performance measurement to explain stock market returns.

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Table 1 – Relative - Raw Returns

Model (1) Returns = $a_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + u_1$

All Years	**a_0**	**a_1**	**a_2**	**R^2**	**F**	**No of Obs**
Coef	0.0441	0.0950	0.0058	**0.019**		977
t	(2.003)**	(3.748)***	(2.478)**		(9.577)***	
sign	0.045	0.000	0.013		0.000	
2001						
Coef	-0.5220	2.6550	0.0003	**0.149**		163
t	(-18.662)***	(5.242)***	(0.140)		(13.993)***	
sign	0.000	0.000	0.889		0.000	
2000						
Coef	-0.7120	3.3080	-0.2630	**0.067**	(5.090)***	144
t	(-20.269)***	(3.187)***	(-1.243)		0.007	
sign	0.000	0.002	0.216			
1999						
Coef	0.7480	0.0288	0.2430	**0.178**		130
t	(16.860)***	(0.473)	(4.763)***		(13.724)***	
sign	0.000	0.637	0.000		0.000	
1998						
Coef	0.8150	0.2370	-0.0030	**0.071**		118
t	(16.825)***	(2.899)***	(-0.358)		(4.394)**	
sign	0.000	0.004	0.721		0.014	
1997						
Coef	0.0697	0.1820	0.0009	**0.046**		106
t	(1.256)	(2.231)**	(0.119)		(2.505)*	
sign	0.212	0.028	0.906		0.087	
1996						
Coef	-0.2040	0.0030	0.0418	**0.094**		80
t	(-5.186)***	(0.162)	(2.750)***		(3.977)**	
sign	0.000	0.872	0.007		0.023	
1995						
Coef	0.1120	0.0480	0.0068	**0.165**		73
t	(3.339)***	(1.756)*	(3.249)***		(6.902)***	
sign	0.001	0.083	0.002		0.002	
1994						
Coef	-0.2610	0.0350	0.0611	**0.200**		71
t	(-7.630)***	(1.097)	(4.114)***		(8.476)***	
sign	0.000	0.277	0.000		0.001	
1993						
Coef	0.4740	-0.0326	0.0216	**0.053**		55
t	(7.210)***	(-0.445)	(1.666)*		(1.463)	
sign	0.000	0.658	0.100		0.241	
1992						
Coef	-0.2860	0.2410	0.0082	**0.286**		37
t	(-5.006)***	(2.847)***	(3.681)***		(6.814)***	
sign	0.000	0.007	0.001		0.003	

* significance at 10% level, ** significance at 5% level, ** * significance at 1% level

Table 2 – Relative – Raw Returns

Model (2) Returns = $b_0 + b_1 ROI + b_2 \Delta ROI + u_2$

All Years	**b_0**	**b_1**	**b_2**	**R^2**	**F**	**No of Obs**
Coef	0.0535	0.0145	0.0032	**0.004**		977
t	(2.429)***	(0.562)	(2.175)**		(2.781)*	
sign	0.015	0.574	0.030		0.062	
	2001					
Coef	-0.4640	-0.0213	0.0158	**0.025**		163
t	(-17.143)***	(-1.584)	1.605		(2.028)	
sign	0.000	0.115	0.110		0.135	
	2000					
Coef	-0.6570	0.0316	0.0073	**0.007**		144
t	(-21.803)***	(0.324)	(0.927)		(0.501)	
sign	0.000	0.746	0.355		0.607	
	1999					
Coef	0.8540	0.0267	-0.0001	**0.001**		130
t	(19.206)***	(0.308)	(-0.080)		(0.054)	
sign	0.000	0.758	0.938		0.947	
	1998					
Coef	0.8060	-0.6800	0.1270	**0.071**		118
t	(11.802)***	(-1.601)	(2.691)***		(4.399)***	
sign	0.000	0.112	0.008		0.014	
	1997					
Coef	0.0398	0.8250	0.0020	**0.089**		106
t	(0.722)	(3.169)***	(0.565)		(5.048)***	
sign	0.472	0.002	0.573		0.008	
	1996					
Coef	-0.1710	0.2900	-0.0137	**0.018**		80
t	(-3.503)***	(1.072)	(-0.497)		(0.708)	
sign	0.001	0.287	0.621		0.496	
	1995					
Coef	0.0912	0.3930	-0.0080	**0.038**		73
t	(2.033)**	(1.537)	(-0.611)		(1.395)	
sign	0.046	0.129	0.543		0.255	
	1994					
Coef	-0.2790	0.3100	0.0287	**0.035**		71
t	(-5.936)***	(1.163)	(0.902)		(1.223)	
sign	0.000	0.249	0.370		0.301	
	1993					
Coef	0.5310	-0.7570	0.0067	**0.032**		55
t	(4.969)***	(-0.918)	(0.539)		(0.853)	
sign	0.000	0.363	0.592		0.432	
	1992					
Coef	-0.1590	0.0677	-0.0298	**0.007**		37
t	(-1.943)*	(0.092)	(-0.457)		(0.122)	
sign	0.060	0.927	0.651		0.885	

* Significance at 10% level, ** significance at 5% level, ** * significance at 1% level.

Table 3 – Relative – Raw returns

Model (3) Returns = $c_0 + c_1$ ROE + c_2 ΔROE + u_3

All Years	**c_0**	**c_1**	**c_2**	**R^2**	**F**	**No of Obs**
Coef	0.0599	-0.0040	0.0001	**0.00**		977
t	(2.710)***	(-0.074)	(0.063)		(0.005)	
sign	0.007	0.941	0.950		0.995	
	2001					
Coef	-0.4530	-0.0001	-0.0007	**0.016**		163
t	(-17.335)***	-0.051	(-1.614)*		(1.305)	
sign	0.000	0.959	0.100		0.274	
	2000					
Coef	-0.6920	0.1160	0.0021	**0.027**		144
t	(-19.878)***	(1.933)**	(0.274)		(1.968)	
sign	0.000	0.055	0.784		0.144	
	1999					
Coef	0.8560	-0.0657	0.0316	**0.019**		130
t	(14.996)***	(-1.096)	(1.311)		(1.234)	
sign	0.000	0.275	0.192		0.295	
	1998					
Coef	0.8400	0.0493	-0.0021	**0.013**		118
t	(15.058)***	(0.713)	(-1.061)		(0.735)	
sign	0.000	0.477	0.291		0.482	
	1997					
Coef	0.0353	0.1480	0.0088	**0.091**		106
t	(0.638)	(2.707)***	(0.522)		(5.146)***	
sign	0.525	0.008	0.603		0.007	
	1996					
Coef	-0.2230	0.1430	-0.0102	**0.119**		80
t	(-5.018)***	(2.355)**	(-2.369)**		(5.189)***	
sign	0.000	0.021	0.020		0.008	
	1995					
Coef	0.1060	0.0473	0.0032	**0.122**		73
t	(2.524)**	(0.691)	(2.897)***		(4.853)***	
sign	0.014	0.492	0.005		0.010	
	1994					
Coef	-0.2600	0.0047	0.0566	**0.140**		71
t	(-6.378)***	(0.076)	(3.176)***		(5.546)***	
sign	0.000	0.940	0.002		0.006	
	1993					
Coef	0.5570	-0.1910	-0.0053	**0.072**		55
t	(7.397)***	(-1.910)*	(-0.878)		(2.011)	
sign	0.000	0.062	0.384		0.144	
	1992					
Coef	-0.2050	0.0252	0.0099	**0.094**		37
t	(-3.325)***	(0.398)	(1.853)*		(1.755)	
sign	0.002	0.693	0.073		0.188	

* Significance in 10% level, ** significance in 5% level, ** * significance in 1% level.

Table 5: B. Incremental Information Content Approach

Model (4) : $Returns_t = f_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + b_1 ROI + b_2 \Delta ROI + u_{4t}$
Model (5) : $Returns_t = g_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + c_1 ROE + c_2 \Delta ROE + u_{5t}$
Model (6) : $Returns_t = h_0 + b_1 ROI + b_2 \Delta ROI + c_1 ROE + c_2 \Delta ROE + u_{6t}$

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	R^2	F	No of Obs
4	Coef.	0.0381	0.0967	0.0055	0.0098	0.0033			**0.025**		977
	t	(1.719)*	(3.817)***	(2.332)**	(0.383)	(2.225)**				(6.181)***	
	Sign.	[0.086]	[0.000]	[0.020]	[0.702]	[0.026]				[0.000]	
	VIF		1.008	1.008	1.028	1.032					
5	Coef.	0.0443	0.0955	0.0061			-0.0013	-0.0004	**0.020**		977
	t	(1.997)**	(3.761)***	(2.528)*			(-0.236)	(-0.504)		(4.859)***	
	Sign.	[0.046]	[0.000]	[0.012]			[0.813]	[0.614]		[0.001]	
	VIF		1.006	1.051			1.002	1.047			
6	Coef.	0.0520			0.0373	0.0031	-0.0003	-0.0009	**0.006**		977
	t	(2.328)**			(0.896)	(2.035)**	(-0.062)	(-0.697)		(1.511)	
	Sign.	[0.020]			[0.371]	[0.042]	[0.951]	[0.486]		[0.197]	
	VIF				2.663	1.051	1.001	2.598			

* Significance in 10% level, ** significance in 5% level, ** * significance in 1% level