

The Introduction of Economic Value Added (EVA®) in the Greek Corporate Sector

Dimitrios I. Maditinos*

Technological Educational Institute of Kavala Business School
Agios Loukas, 654 04, Kavala, Greece
Tel. ++30-2510-462219
Fax. ++30-2510-462219
E-mail: dmadi@teikav.edu.gr

Željko Šević

The University of Greenwich Business School
Old Royal Naval College
30 Park Row, Greenwich
London SE10 9LS
England, UK
Tel. +44-20-8331-8205
Fax. +44-20-8331-9924
E-mail: Z.Sevic@gre.ac.uk

Georgios N. Theriou

Technological Educational Institute of Kavala Business School
Agios Loukas, 654 04, Kavala, Greece
Tel. ++30-2510-462156
Fax. ++30-2510-462156
E-mail: therioungeorgios@gmail.com

*Dimitrios Maditinos is the corresponding author

Abstract

The objective of this study is to introduce the concept of Economic Value Added (EVA[®]) in the Greek context and to provide an explanation on the utilization of both earnings and EVA[®] in the ASE. The study interprets results obtained from an analysis carried out on the basis of secondary financial data relating to the period 1995-2001.

Proponents of EVA[®] provided evidence to establish this method as a superior performance measurement and incentive compensation system and claimed that it is really better to use EVA[®] than traditional accounting performance measures such as earnings, EPS, ROI or ROE (see: Stewart, 1991; Tully 1993; Stern *et al.*, 1995; Ehrbar, 1998). Many other scholars, such as Milunovich and Tseui (1996), Lehn and Makhija (1996; 1997), and Forker and Powell (2004) have published studies in support of the superiority of EVA[®].

However, studies focused on whether EVA[®] is more highly related with stock returns than other performance measures provided mixed and controversial results. This study employs pooled time-series, cross sectional data of listed companies in the ASE over the period 1995 – 2001 to examine whether EVA[®] or earnings per share (EPS) is associated more strongly with stock returns. Both relative and incremental content approaches have been tested. Relative information content tests revealed that stock returns are more closely associated with EPS than EVA[®]. On the other hand, incremental information content tests provide evidence that EVA[®] adds significant explanatory power to EPS in explaining stock returns.

Key words: Performance measures, EPS, EVA[®]

Jel Classification: L25

1. Introduction

The idea that the primary responsibility for management is to increase value gained prominence and became widely accepted in the US after the Rappaport's (1986; 1998) publication of *Creating Shareholder Value*. Moreover, accounting earnings were under attack. Rappaport (1986), consistent with Stern (1974), argued that earnings fail to measure changes in the economic value of the firm. Arguments such as: (a) alternative accounting methods, which may be employed, (b) investment requirements exclusion and (c) ignorance of the time value of money, brought earnings under hard critique.

EVA[®] was originally defined by Stewart (1991) as the measure that properly accounts for all the complex trade-offs involved in creating value. It is calculated as the product of the economic book value of the capital committed to the business multiplied by the spread between the rate of return on capital, defined as r , and the cost of capital, defined as c^* (Stewart, 1991). It differs from the traditional accounting performance measures since it takes into account the cost of all capital employed. Although EVA[®] is popularised as the only true indicator of business and management performance, it is in fact, one of the many variants of residual income.

2. Literature review

Stewart (1991) first provided evidence of the correlation between EVA[®] and Market Value Added (MVA). Lehn and Makhija (1996) examined EVA[®] and MVA and found that both EVA[®] and MVA are correlated positively with stock returns and that this correlation was slightly better than with traditional performance measures such as ROA, ROE and ROS.

Milunovich and Tseui (1996) found that MVA is more highly correlated with EVA[®] than with EPS, EPS growth, ROE, FCF or FCF growth. O'Byrne (1996) examined the association between market value and two performance measures: EVA[®] and NOPAT. He found that both measures had similar explanatory power when no control variables were included in the regression

models, but that a modified EVA[®] model had greater explanatory power than NOPAT.

Uyemura *et al.* (1996) studied the relationship between MVA and four traditional performance measures: EPS, NI, ROE and ROA. They provided evidence suggesting that the correlation between MVA and those measures are: EVA[®] 40 per cent, ROA 13 per cent, ROE 10 per cent, NI 8 per cent and EPS 6 per cent. Lehn and Makhija (1997) also found that stock returns over a ten-year period were more highly correlated with average EVA[®] over the period than with the average of ROA, ROS or ROE.

Biddle *et al.* (1997) provided the most comprehensive study of EVA's value relevance to date. In contrast to studies supporting the superiority of EVA[®], they found that traditional accounting measures, generally, outperformed EVA[®] in explaining stock returns. The same results came from Worthington and West (2001) for the Australian context.

Turvey *et al.* (2000) studied the relationship between EVA[®] and stock market returns for a sample of 17 publicly traded food companies in Canada. The key finding was that no relationship could be found between the two. Keef and Rush (2003) examined the link between EVA[®] and stock price reaction. They found similar results with Turvey *et al.* (2000).

3. Methodology of the study

3.1. Sample and the data collection

Our sample period is from 1995 to 2001. There are 163 Greek companies listed on the ASE with different number of participating years for each of them. These companies gave a total of 821 year-observations. After excluding the extreme observations (3 standard deviations), the final sample was reduced to that of 814 year-observations.

The research used daily closing prices of the sample's common stocks for the period from January 1994 to April 2002. They are raw prices in the sense that

they do not include dividends but they are adjusted for capital splits and stock dividends. It also included the closing stock prices 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; Biddle *et al.*, 1997; Chen and Dodd, 2001). From the daily closing prices of the common stocks the daily returns for each stock was calculated using the logarithmic approximation. Except from the daily closing prices for each stock, it was also collected the daily General Index of the ASE and the three-month Government Treasury Bill rate, which is considered to be the short-term interest rate (risk free interest rate). All data was acquired directly from the ASE data bank.

3.2. The Model

This research is based on Easton and Harris (1991) formal valuation model, which has been used by a number of scholars who conducted similar studies (Biddle *et al.*, 1997; Chen and Dodd, 1997 and 2001; and Worthington and West, 2001) and which is actually the only model supported theoretically by their proponents and, up to now, according to our knowledge, remains without any sound criticism by academia. The model links stock returns to earnings levels and earnings changes as below:

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

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 $t-1$.

Both relative and incremental information content approaches were employed to answer our questions. The relative information content approach is used to explore whether EVA[®] outperforms EPS, while the incremental information content approach is employed to answer whether EVA[®] adds explanatory power to EPS. Two equations were developed based on Easton and Harris (1991) adopted model to explore the explanatory power of EPS and EVA[®],

while one equation were developed to explain the added value of EVA[®] on EPS. Thus, the following equations were finally developed:

Equation (1): $R_{et} = a_0 + a_1 \text{EPS}/P_{t-1} + a_2 \Delta\text{EPS}/P_{t-1} + u_1$

Equation (2): $R_{et} = b_0 + b_1 \text{EVA}/P_{t-1} + b_2 \Delta\text{EVA}/P_{t-1} + u_2$

Equation (3): $R_{et} = c_0 + c_1 \text{EPS}/P_{t-1} + c_2 \Delta\text{EPS}/P_{t-1} + c_3 \text{EVA}/P_{t-1} + c_4 \Delta\text{EVA}/P_{t-1} + u_3$

Where, for all equations:

R_{et} are the annual compounded returns extending nine months prior to current fiscal year end to three months after the current fiscal year end

EPS is the earnings per share of 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

EVA is the economic value added of firm at time t

ΔEVA is the change in EVA over period $t-1$ to t and

While u_1 , u_2 , u_3 are the disturbance terms.

The equations have been estimated cross-sectionally by years as well as using pooled cross-sectional and intertemporal data (Easton and Harris, 1991; Chen and Dodd, 2001). This design facilitates 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 coefficients' significance, F-statistics, and adjusted R^2 s will be examined.

4. Results

4.1. Relative information content approach

Relative information content is assessed by comparing R^2 s from the two separate regressions (1 and 2), one for each performance measure, EPS and EVA. Adjusted R^2 s from these regressions are provided in Table 1.

Table 1: Summary (all years) results from the two (1 and 2) regressions

	Regression	
	(1)	(2)
All Years	EPS	EVA
Adjusted R ²	0.015	0.006
F	(8.293)***	(4.052)***
Significance	0.000	0.018

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

The results show that EPS (adjusted R² = 0.015) provide more information in explaining stock returns than EVA[®] (adjusted R² = 0.006). Comparing the reported adjusted R²s of the two pooled regressions, it is noticed that both are largely consistent to those of Biddle *et al.* (1997), Worthington and West (2001), and Chen and Dodd (2001) who found that EVA does not outperform EPS. Thus, the results of our study suggest that for the Greek capital market, the new information provided by the EVA[®] measure is less value relevant than EPS, at least from a stock return perspective. Similar results are obtained when examining cross-sectional equations (1) and (2) year by year.

4.2. Incremental information content approach

To test the incremental information power, we formed equation (3). An assumption of a linear relationship between these variables was made. All regression models were tested for multicollinearity using the variance inflation factor (VIF). According to Neter *et al.* (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 regression are less than 5 (VIF for EPS=1,833, for Δ EPS=1,004, for EVA=1,823 and for Δ EVA=1,006). Examination of residual plot and normality plot reveal no serious violations of the regressions' assumptions. There was an attempt to correct these minor violations, but the outcome was either produced regressions with insignificant coefficients or regressions with similar explanatory power to the initial ones.

Results from the combination of EPS and EVA[®] represent a satisfactory explanation for stock returns in the Greek stock market.

Table 2: Summary (all years) results from regression (3)

	Regression (3)
All Years	
Adjusted R ²	0.058
F	(16.023)***
Significance	0.000

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

Adjusted R² increased to 0.058, with an F statistics of 16.023 significant at 1% level. However, the contribution of the EPS in the explanatory power of this regression is higher than that of EVA[®], since the R² of EPS alone is 1.5 per cent (regression 1) while that of EVA[®] alone is 0.06 per cent (regression 2). These results are close to those of Chen and Dodd (1997; 2001) and Worthington and West (2001).

5. Conclusions

Relative information content approach revealed that in the Greek stock market earnings levels and earnings changes are associated with stock returns and outperform EVA[®] in explaining stock returns. These results are consistent to those reported for various international markets. Easton and Harris (1991), for example, found that earnings levels and earnings changes are associated with stock returns for the US market. Also, Biddle *et al.* (1997) and Chen and Dodd (2001) found that earnings outperform EVA[®] and residual income in the US stock market. On the other hand, the results of the present study do not support the claims of Stewart (1991) and the advocates of EVA[®] financial system that EVA[®] alone is the best performance measure.

On the other hand, incremental information content approach provided interesting results. When EVA[®] is incorporated in an EPS model its explanatory power increases from 1.5 to 5.8 per cent. This suggests that the

new information provided by the EVA[®] is of some value relevance in explaining stock returns. The relative low explanatory power of performance measures under examination is, in large, consistent with the reported results of several relevant studies conducted for the US market. Chen and Dodd (1997) found that EVA[®] variables and accounting profit variables could not explain more than 47 per cent of the variation of stock returns. Moreover, a recent study of Chen and Dodd (2001) provided evidences that EPS and EVA[®] could not explain more than 23.49 per cent of stock returns.

This study can be further extended in examining the relative and incremental information content not only of EPS and EVA[®] but also from other traditional or value-based performance measure. More years in the sample would be also appreciated. The examination of EVA[®] adopters should also provide interesting results. Another important suggestion for further research is to explore the value relevance of other factors beyond the above examined performance measures in explaining stock returns. Behavioural finance provides a good ground for this. Moreover, comparative studies within stock markets with similar market characteristics as these of Greece should add value to this kind of research.

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