CORPORATE PERFORMANCE MEASURES AND STOCKS' PRICES RETURNS: THE CASE OF GREECE, 1992 – 2001.

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ABSTRACT

This study aims first at examining the value relevance of traditional accounting (EPS, ROI, and ROE) and value-based (SVA and EVA®) performance measures, in explaining stock returns' variation in the Athens Stock Exchange (ASE). Pooled time-series, cross sectional data on 163 Greek companies listed in the ASE over the period 1992-2001 have been employed to examine this question. Relative information content tests revealed EPS, followed by EVA®, to be more closely associated with stock returns than ROI, ROE or SVA. However, the incremental information content tests suggested that EVA® adds more explanatory power to EPS than ROI, ROE and SVA. The significant role of ROI was also revealed.

Since the performance measures under examination could not explain more than 13 per cent of the variation in stock returns, the second aim of this study was to examine the perceptions and the investment strategies of market participants investing in the ASE. An empirical survey conducted from December 2003 to June 2004 asking from all user groups (Official Members of the ASE, Mutual Funds Management Companies, Portfolio Investment Companies, Listed Companies, Brokers, and Individual Investors) participating in the ASE to determine their investing practices. Data from 435 returned questionnaires revealed that although the professional investors follow the international practices (use fundamental analysis mostly), the individual investors and the brokers were more short-term focused. Additionally, individual investors showed that they rely more on their instinct/experience and information from rumours and from the newspapers/media. However, this empirical research revealed the dynamic that EVA® conveys and the increasing interest of market participants in Greece.

Overall, the contribution of his study comes from the fact that introduces the shareholder value added approach in the Greek capital market, and moreover, from its two unique samples, the methodology, and the revealed findings. Finally, it serves as a market paradigm both for the Greek context and for the emerging markets with the same market characteristics as Greece.

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In the end, of course, I am solely responsible for any shortcomings, errors or omission.

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LIST OF ABBREVIATION

ACC	Accruals
ACCR	Accruals
ADJ	Adjustments
AEVA	Adjusted EVA variant to inflation
AGSM	Australian Graduate School of Management
APT	Arbitrage Pricing Theory
AR_t	Abnormal Returns
ASE	Athens' Stock Exchange
ASX	Australian Stock Exchange
ATHEX	Athens' Exchange
ATI	After Tax Interest Expenses
ATIntEx	After Tax cost of Interest Expenses
B/M	Book-to-Market ratio
BCG	Boston Consulting Group
BR	Brokers
BSC	Balanced Scorecard
BV	Book Value
$c*$	Cost of Capital
CalPERS	California Public Employee Retirement System
CAP	Capital Employed
CapChrg	Capital Charge
CAPM	Capital Asset Pricing Model
CAR_{jt}	Cumulative Abnormal Returns
CC	Capital Charge
CCAPM	Consumption Capital Asset Pricing Model
CFO	Cash Flow from Operations
CFROI	Cash Flow Return On Investment
CI	Comprehensive Income
CIMNI	Comprehensive Income minus Net Income
CRSP	Center for Research in Security Prices
CSPI	Composite Security Price Index
CVA	Cash Value Added
DCA	Dollar Cost Averaging
DCF	Discounted Cash Flow
DDM	Dividend Discount Model
DGM	Dividend Growth Model
DVFA	Deutscher Vereinigung für Finanzanalyse und Anlageberatung [German Association for Financial Analysis and Investment Advisor]
DY	Dividend Yield
$E(R_j)$	Expected Returns
$E(R_m)$	Expected Market Returns

EBEI	Earnings Before Extraordinary Items
EBIT	Earnings Before Interest and Taxes
EBM	Expectation-Based Management
EBT	Earnings Before Taxes
EOIC	Earnings On Invested Capital
EP	Economic Profit
EPS	Earnings Per Share
EVA	Economic Value Added
EVAMRI	EVA minus Residual Income
EVAPS	EVA Per Share
EVM	Economic Value Management
FA	Fundamental Analysis
FCF	Free Cash Flows
FIFO	First In First Out
FM	Foreign Markets
FTA	Fundamental and Technical Analysis
FUT_{str}	Future Strategy
GAAP	Generally Accepted Accounting Principles
GCF	Gross Cash Flow
GGM	Gordon Growth Model
GI	General Index
GP	Government Policy
GROWTH	Average Annual Compound Rate of Capital Growth
H_0	Null Hypothseis
Ha	Alternative Hypothesis
HC	Human Capital
I	Investment
IC	Invested Capital
IC	Intellectual Capital
ICAPM	Intertemporal Capital Asset Pricing Model
IE	Instinct/Experience
IMP_{str}	Implemented Strategy
ININ	Individual Investors
IRR	Internal Rate of Return
L/T	Long Term
LC	Listed Companies
LIFO	Last In First Out
LRT	Linear Risk Tolerance
M&M	Miller & Modigliani
MAR_t	Compound Annual Stock Returns
MF	Mutual Fund management companies
MP	Models for setting up Portfolios
MV	Market Value

MVA	Market Value Added
MVE	Market Value Equity
NCF	Net Cash Flow from operations
NI	Net Income
NIMOI	Net Income minus Operating Income
NM	Noise in the Market
NOPAT	Net Operating Profit After Taxes
NPM	News Papers/Media
NPV	Net Present Value
NRC	National Research Council
NY	New York
NYSE	New York Stock Exchange
OCF	Operating Cash Flow
OCFD	Operating Cash Flow Demand
OI	Operating Income
OMOA	Official Members Of the ASE
OMR	Operating Margin on Revenues
P/B	Price to Book ratio
P/E	Price/Earnings ratio
PIC	Portfolio Investment Companies
PMS	Performance Management Systems
PV	Present Value
Q	Tobin's Q
r	Rate of Return
R&D	Research & Development
R^2	R square
RET_t	Annual Stock Returns
REVA	Refined Economic Value Added
R_f	Risk-free rate
RI	Residual Income
RIMOI	Residual Income minus Operating Income
R_{jt}	Return on a share of a firm j over a 12 months period
R_m	Return to market
ROA	Return On Assets
ROC	Return On Capital
ROCE	Return On Capital Employed
ROE	Return On Equity
ROI	Return On Investment
ROS	Return On Sales
ROTC	Return On Total Capital
SC	Structural Capital
S/T	Short Term
SHV	Shareholder Value

SPREAD	Average Spread between ROC and the Cost of Capital
SRT_{jt}	Annual Stock Returns
STDEVA	Standardised EVA
SVA	Shareholder Value Added
TA	Technical Analysis
TSR	Total Shareholder Returns
UK	United Kingdom
US	United States
V	Company's Market Value
VA	Value Added
VAIC	Value Added Intellectual Capital
VBM	Value-Based Management
VIF	Variance Inflation Factor
WACC	Weighted Average Cost of Capital
β_j	beta coefficient
Δ	Change
ΔCIMNI	Change in Comprehensive Income minus Net Income
ΔEPS	Change in Earnings Per Share
ΔEVAMRI	Change in EVA minus Residual Income
ΔNI	Change in Net Income
ΔNIMOI	Change in Net Income minus Operating Income
ΔNOPAT	Change in NOPAT
ΔOI	Change in Operating Income
ΔRIMOI	Change in Residual Income minus Operating Income
ΔRIMOI	Change in Residual Income minus Operating Income
ΔROE	Change in Return On Equity
ΔROI	Change in Return On Investment

Chapter One

INTRODUCTION

1.1. Scope of the Study

This study entitled *Corporate Performance Measures and Stocks' Prices Returns: The Case of Greece, 1992 – 2001*, aims to provide a comprehensive analysis and interpretation of both the value relevance of corporate financial performance measures (traditional and value-based) and the perceptions of the investment community about these measures and about their investment strategies in the Athens Stock Exchange (ASE). It utilises two approaches to achieve its objective. Firstly, by analysing the publicly available financial data for the listed companies in the ASE, and secondly, by analysing the data collected through a comprehensive questionnaire survey conducted among the members of the investment community in Greece.

Traditional accounting performance measures, such as Earnings per Share (EPS), Earnings on Invested Capital (EOIC), Return on Investment (ROI), Return on Assets (ROA) and Return on Equity (ROE), appeared in the late 1910s (Epstein, 1925; 1930; Sloan 1929) and have been used since then, in various forms, to measure the financial performance of corporations. Fisher (1930) and Hirschleifer (1958) introduced the discounted cash flow techniques, such as Net Present Value (NPV) and the Internal Rate of Return (IRR). Miller and Modigliani (1958; 1961) developed a more consistent determination of valuation. Gordon (1962) incorporated growth and the cost of capital in valuation models. In order to determine the cost of capital, Sharpe (1964), Lintner (1965), Mossin (1966), and Black (1972) developed the Capital Asset Pricing Model (CAPM). Solomons (1965) introduced the divisional performance and the adaptation of Residual Income (RI), while Tobin (1969) suggested the Tobin's Q as the proper valuation method, and Stern (1974) worked on Free Cash Flows (FCF). Lastly, over the 1980s, Rappaport (1986) and Stewart (1991) developed a new concept known as the Shareholder Value (SHV) approach.

The 'growing dissatisfaction with traditional accounting performance measures' (Francis and Minchington, 2002, p. 234) and the 'failure of these measures to capture the three fundamental determinants of value creation: the amount, the timing, and the risk of the future cash flows of a company' (Morin and Jarrell, 2001, p. 309) have led to the development of a whole new array of performance measures, the modern value-based, which are based on the fundamental principles of the SHV approach. Modern value-based performance measures, such as Shareholder Value Added (SVA), Economic Value Added (EVA®), Market Value Added (MVA), Economic Profit (EP), Cash Flow Return on Investment (CFROI) and Cash Value Added (CVA), have attempted to divert management focus away from earnings and towards cash flows. These measures recognise that capital invested in a corporation is not free, and make a charge for the use of the capital employed by the corporation in its operations (O'Hanlon and Peasnell, 1998).

According to Rappaport (1986) within a business, there are seven drivers that can be managed to create value. The theory suggests that improvement in these value drivers leads to an increase in shareholder value. A common theme of the value-based performance measures is that they take these drivers and summarise them into a single measure, be it SVA, EVA®, or any of the other value-based measures that have been developed (Francis and Minchington, 2002). Ehrbar (1998, p. 134) for instance states that 'the mandate under an EVA® management system is to increase EVA® as much as possible in order to maximise shareholder wealth'. Modern value-based performance measures gained their popularity since the late 1980s (Rappaport, 1986; Stewart, 1991; Stern, Stewart and Chew, 1995; Copeland, Koller and Murrin, 1996; Black, Wright and Bachman, 1998; Madden, 1999; KPMG Consulting, 1999), and thereby, the Value Based Management (VBM) approach became increasingly popular both as a decision making tool and as an incentive compensation system (Knight, 1998).

Many studies have been conducted in the last two decades, first in the US and later in the rest of the international market community to answer questions such as *whether it is really better to use modern value based measures than traditional performance measures to measure the corporate financial performance, or which performance measure best explains corporations' change in market value.* Reported results are quite mixed and controversial. This study is inspired by the controversial results of the previous studies and aims to investigate whether traditional and/or modern value-based performance measures are value relevant in the context of ASE.

Since there are many financial performance measures (traditional and modern value-based), which appear in different variations, this study is focused on the most popular of them, those that have been extensively mentioned in the literature. From the traditional accounting performance measures we selected the EPS, ROI and ROE, and from the modern value-based performance measures the EVA® and SVA. This study also aims to assess investors' perception concerning the investment strategy that they employ in the ASE and to answer the question as to what methods and/or measures they mostly prefer to use. Moreover, it aims to assess how traditional performance measures and modern value-based performance measures are specifically affecting their investment strategy. Finally, it aims at assessing the adopted investment strategies of various user groups (market participants) investing in the ASE with reference to the level of their reported performance.

The objective of this study is to provide an explanation on the utilisation of both traditional and modern value-based performance measures in the ASE. Firstly, the study interprets results obtained from an analysis carried out on the basis of secondary financial data relating to the period 1992-2001. Secondly, it interprets results derived from an analysis based on primary data collected through a questionnaire based survey, conducted from December 2003 to June 2004, to explore investors' perceptions and their investment practices in the ASE. The interpretation of results will provide a contribution to the investment community and academics to further examine and assess relevant research questions.

Moreover, since Greece was considered an emerging market during the examined period 1992-2001, it will provide an examination model to the countries with market characteristics similar to those of Greece and an investment example or guide to the markets that are intended to obtain market characteristics similar to those of the ASE. The reasons that led this study to examine this specific period were mainly: the fluctuation of the ASE's Composite Share Price Index (CSPI), the annual average rate of growth of the ASE's CSPI, the issuance of new companies in the ASE, the total number of companies in the ASE, the market capitalisation, the total raised capital and the issuance of New Investor Shares[1].

1.2. The Development of Corporate Performance Measurement

Corporate financial performance measurement has evolved during the 20th century. It has its origin in the theoretical and empirical work of academics,

[1] Appendix I gives a detailed presentation of the above-mentioned reasons.

managers and practitioners, economists and statisticians, who sought to better understand the functions of the US corporations and based on this understanding to improve their operations. According to Goetzmann and Garstka (1999) the comprehensive collection of financial data, which started in the late 1910s, supported the improvement of the research and performance measures such as earnings, EPS, dividend yield, net income and ROI started to appear.

Epstein (1925) carried out a study that can be considered as one of the first attempts to analyse summary data in order to compare companies' financial performance within and across industries. He used US government collected data of 1918, which was the first selection of comprehensive data for financial performance, to search the distribution of profits, the capital and the profitability of the US companies. Despite its biased and limited scope data since it included only companies that earned more than 15 per cent on their capital (ROE) in 1917, Epstein's findings did not confirm his tested hypothesis that profits to all industries should be equal in the long term. Nevertheless, his study motivated other scholars to work on how financial corporate performance should be measured.

Crum (1929) also using US government collected data, presented his *corporate earnings power*. He used net returns on sales and net returns on assets, to treat margin on sales as a key measure for corporate performance (Goetzmann and Garstka, 1999). The major contribution of Epstein (1925) and Crum (1929) studies was that they standardised measures of corporate financial performance across corporations and industries and reported summary statistics about them.

Sloan (1929) collected and used data from publicly available corporate accounting statements. He reported a comprehensive statistical analysis of 550 of the US's largest publicly traded corporations in 1926 and 1927. The main objective of Sloan's study was to transform accounting data into performance measures that should provide the basis for informed decision-making. Sloan popularised the Earnings on Invested Capital (EOIC) as the prime measure for corporate performance and considered it the key barometer of a company's future well-being. However, one thing that was missing from Sloan's study was the connection between his proposed performance measure, EOIC, and the goals and objectives of the firm. Unfortunately, he did not develop a theory as to how largest net returns should be gained by the company. In summary, even without an explicit theory, the studies of Epstein (1925), Crum (1929), and Sloan (1929) used a measure of yield, or return on investment as a pointer of financial performance. This yield is either explicitly or implicitly compared to interest rates (Goetzmann and Garstka, 1999).

One year later, Fisher (1930) introduced the rule of NPV for capital budgeting. His insight was that a mathematical equation allowed the future benefits and costs of investment to be transformed into cash flows, which, when discounted to the present and summed up, could determine the economic value of an investment decision. By comparing this net present value of the future cash flows with the initial cost of each investment, all investment choices could be subjected to his *Principle of Maximum Present Value*, i.e. 'Out of all options that one is selected which has the maximum present value reckoned at the market rate of interest' (Fisher, 1930, p. 175). He also argued that NPV is equivalent to *The Principle of Return over Cost*, i.e. 'Out of all options that one is selected, which, in comparison with any other, yields a rate of return over cost equal to or greater than the market rate of interest' (Fisher, 1930, p. 175). Thus, the goal he suggested for all firms was to maximise their net present value.

Hirschleifer (1958) contributed further to the acceptance of NPV by demonstrating that this model dominated all others, including the internal rate of return. The IRR is a measure that was introduced in the early 1950s and used as a tool for capital budgeting decisions. Hirschleifer (1958) proved that IRR was likely to lead to wrong investment choices and thereby, when NPV and IRR were applied to the same projects they would not necessarily lead to the same decisions.

Maximum Present Value became a breakthrough concept because it directly indicated how to make a capital budgeting decision or even how to value a division, a company or an organisation. However, Fisher's *Principle of Return over Cost* was still related closely to the financial performance measures in use at that time. A significant key variable largely ignored by Fisher in the development of his valuation model was the element of growth. This led to the development of growth valuation model by Gordon (1962). This model is known as the Gordon Growth Model (GGM) or as the Dividend Growth Model (DGM). It is an equation of four factors: stock price, current dividend, growth rate in future dividends, and cost of capital. Therefore, the need for the proper estimation of the cost of capital became more imperative.

Furthermore, Solomons (1965) introduced the residual income concept as the proper measure to both encourage value maximisation behaviour by managers and evaluate performance. In its generally accepted definition, RI is equal to the net operating profit after taxes (NOPAT) minus a charge for the capital invested (cost of capital multiplied by the capital invested), where the cost of capital is the weighted average cost of capital (WACC) on both equity and debt. Thus, a reasonable estimation of the cost of capital became more demanding. Although RI had been introduced in the mid 1960s, its origin lies far into the past. Hamilton (1777) and Marshall (1890) argued that for a firm to create wealth it must earn more than its cost of debt and capital. Since then, this concept has been operationalised under various labels including residual income (Biddle, Bowen and Wallace, 1997). Those labels include excess earnings (Canning, 1929; Preinreich, 1938), excess realised profits (Edwards and Bell, 1961), excess income (Kay, 1976; Peasnell, 1982), and abnormal earnings (Feltham and Ohlson, 1995).

After the introduction of residual income, questions on how to calculate the level of investment or the invested capital (accounting numbers fail to capture all the investment in the balance sheet, e.g. R&D, advertising, etc.) and how to calculate the WACC still remained unanswered. That brought up the vital question of whether and how much more accurate and reasonable the estimation of the cost of capital (or the required rate of return) could be performed. The need for an answer to this question led to the development of the asset pricing theory.

Asset pricing theory has its origin in the early 1960s with the development of the single period mean-variance CAPM, which is the other viable alternative to Gordon's model. The Capital asset pricing model is the milestone to approach the valuation process. This model originates from the work of Markowitz (1952) and was developed by Sharpe (1964) and Lindner (1965). Black (1972) tested and improved the model and suggested the main classifications. CAPM describes the relationship between risk and expected return, and it serves as a model for the pricing of risky securities. CAPM states that the expected return of an asset is a positive function of three variables: the *beta* (the covariance of asset returns and market returns divided by the variance of the market returns), the risk-free rate and the expected market return.

This model was enriched and appeared in many modified forms during the 1970s. Merton (1973) developed the Intertemporal Capital Asset Pricing Model

(ICAPM) and Rubinstein (1974) projected the single-period Linear Risk Tolerance (LRT) model. Ross (1976) proposed the alternative Arbitrage Pricing Theory (APT), and Rubinstein (1976), Lucas (1978), and Breeden (1979) popularised their intertemporal Consumption-based Model (CCAPM). Many empirical tests have been performed to examine which of the models holds, especially since Roll's (1977) critique. Among the many results of those tests and critiques are the development of APT by Ross (1976), the appearance of CAPM *anomalies* and the three-factor model Fama and French (1992; 1993; 1995; 1996). They identified three factors (market, size, and book-to-market) that were able to explain the expected returns more accurately.

Value Based Management gained recognition almost simultaneously with the recognition that accounting data were no longer providing sufficient information about the performance of the company. Stern (1974) was the first to present this recognition and to suggest that sophisticated investors should be focused on FCF. Later, academics and corporate managers, researchers and practitioners, based on NPV techniques, FCF, growth opportunities and CAPM, developed the SHV approach (Rappaport, 1986; Copeland, Koller and Murrin, 1996; 2000; Stewart, 1991; Black, Wright and Bachman, 1998) and consequently the modern value-based performance measurement.

According to the proponents of SHV approach, since the accounting data do not provide robust insight into the financial performance of the company, investors should look behind the headline figures (EPS, ROI, etc.) to find other numbers that can measure the long-term prospects of a company more informatively. Shareholder value analysis, based mainly on FCF and the cost of capital, can produce such numbers (Black, Wright and Bachman, 1998). Therefore, Rappaport (1986) proposed the Shareholder Value Added (SVA), while Stewart (1991) proposed the EVA® and the MVA as financial performance measurement and compensation systems that were able to inform all interested parties about the long-term prospects of a company and reward managers and employees according to their contribution to the process of value creation.

1.3. From Traditional Performance Measures to Shareholder Value Approach and Value-Based Performance Measures

Since the early 1980s there has been a global momentum in the economy. Capital markets – indeed, almost all financial institutions – are increasingly global in outlook. Investors are more sophisticated than ever and want to explore all possible details about a company. They want to know more than simply what dividends the company has been paying in the past. Financial statements, such as the balance sheet and profit and loss account, prepared in traditional ways are insufficiently informative. Cash flow has become a more crucial measure. Many consulting firms, academics and practitioners are particularly well placed to observe such global trends. They are moving forward from the traditional audit, on which they were focused for so many years, in order to keep pace with the new trends. Indeed, they consider that the essential objective of a firm is to create value: value for its shareholders, for its employees and for its communities (Black, Wright and Bachman 1998).

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) publication of *Creating Shareholder Value*. Moreover, accounting earnings were under attack. Rappaport (1981; 1986; 1998), consistent with Stern (1974), argued that earnings fail to measure changes in the economic value of the firm. Arguments such as alternative accounting methods, which may be employed, investment requirements exclusion and ignorance of the time value of money, brought earnings under hard critique. According to Rappaport (1986; 1998) with the globalisation of competition and capital markets and the rising trend of privatisations, shareholder value is capturing the attention of executives in the UK, continental Europe, Australia and even Japan.

Rappaport (1998, p. 32) defined the shareholder value approach stating that 'it estimates the economic value of an investment by discounting forecasted cash flows by the cost of capital'. These cash flows, in turn, serve as the foundation for shareholder returns from dividends and share-price appreciation. Moreover, he also showed how the basic valuation parameters or *value drivers*, which are sales growth, operating profit margin, income tax rate, working capital investment, fixed capital investment, cost of capital and forecasted duration, are developed and incorporated in shareholder value calculations.

In order to clarify the approach of estimating the shareholder value, Rappaport (1986; 1998) first determined the *total economic value* of a company or a business unit as the sum of the market values of its debt and its equity. He called this total economic value of the company *corporate value* and the value of the equity portion *shareholder value*. In other words, *corporate value* is equal to *debt* plus *shareholder value*, or, alternatively, *shareholder value* is equal *to corporate value* less *debt*.

To determine shareholder value Rappaport (1986, 1998) first defined the corporate value and then the debt portion. Corporate value consists of two components, the *present value of cash flows* from operations during the forecasted period, and the *residual value*, which is the present value of the business attributable to the period beyond the forecasted period. To determine the corporate value more accurately a third component is included. It is the *current value of* *marketable securities and other investments* that can be converted to cash and are not essential to operating business (Rappaport, 1998). Therefore, corporate value equals the present value of cash flows from operations during the forecasted period, plus residual value, plus marketable securities. The debt portion of corporate value consists of the *market value of debt*, the *unfunded pension liabilities*, and the *market value of other claims* such as preferred stock. Black, Wright and Bachman (1998) defined shareholder value in a similar way. They argued that a company's shareholder value is the net present value of future cash flows discounted at its weighted average cost of capital, less the value of debt.

Rappaport (1986) used SHV approach to develop and propose the Shareholder Value Added (SVA) measure, which is the *change* in value created from corporate investment at rates in excess of the cost of capital rate required by the capital market. The difference between SHV and SVA is that while the former is determined as the absolute economic value resulting from a forecasted scenario, the latter addresses 'the *change* in value over the forecasted period' (Rappaport, 1998, p. 49). Therefore, it becomes obvious that the SHV approach embraces all the fundamental financial concepts such as FCF, NPV, growth, and the cost of capital (Black, Wright and Bachman 1998).

The theory underlying FCF was first set forth by Miller and Modigliani (1961). They asked and answered the question "*what measures of corporate performance does the market capitalise*"*?* in arriving at a firm's market value. They considered four alternatives: earnings, cash flows, dividends, and investment opportunities. Miller and Modigliani (M&M) answered their question under the assumption of perfect market conditions (perfect capital markets, rational behaviour and perfect certainty) and they concluded that all four alternatives were equally important and identical. They first identified free cash flow as cash from operations that is available or attributable to both lenders and shareholders. In other words, it is the cash that is *free* for distribution to investors after all investments have been financed. Thus, when it is discounted to a present value at the firm's cost of capital, free cash flow is the foundation of any firm's market value. Since the M&M model is simplified to an all-equity-financed firm, free cash flow is also equal to dividends. And if earnings are not reinvested, cash flow can equal earnings too. Certainly, the value of investment opportunities is contained within the present value of expected future free cash flows. Therefore, there can be an equivalence between these competing measures, but it does not always hold (Stewart, 1999).

Stern (1974) was motivated by M&M conclusions and, after a thorough examination of their theory, introduced the FCF valuation model. As previously mentioned, Rappaport (1986) was the first academic who adopted the FCF valuation model. This model has been used in different versions by many other scholars. However, 'only when FCF is defined as distributable cash from operations over a firm's life do we have all expected net returns from all current and expected future investment, which is the underpinning of any firm's market value' (Stewart, 1999, preface xxiii). Considering the FCF model as a vital measure of value, but as a useless measure of performance, Stern Stewart & Co. developed the EVA® Financial Management System.

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.

Residual income, as mentioned earlier, was introduced as a measure of wealth creation since the mid-1960s (Solomon, 1965). However, its basic principles were already known since the second half of the 18^{th} century when economists claimed that for a firm to create wealth it should earn more than its cost of debt and equity capital (Hamilton 1777; Marshall, 1890). On the other hand, EVA® has become popular as a decision making instrument especially for measuring financial performance and planning managers' strategies compensation over the last two decades. It is very important to notice that EVA® is not only a performance measure but also an integrated Financial Management System, which should be carefully implemented in any corporation (Stewart, 1991; 1999; Stern, Stewart and Chew, 1995; Ehrbar, 1998).

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 for this purpose (Stewart, 1991; Tully 1993; Stewart, 1994; Stern Stewart and Chew, 1995; O'Byrne, 1996; Ehrbar, 1998). Many other scholars, such as Stewart (1999), 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, while the value-based approach was gaining ground, further exploration of EVA®-related literature revealed studies carried out by a number of scholars, which claimed that there is no evidence of a clear relationship between EVA® and shareholder returns leading to a well-established superiority of this method compared to traditional accounting performance measures (Peterson and Peterson, 1996; Biddle, Bowen and Wallace, 1997; Chen and Dodd 1997; 2001; Kramer and Pushner, 1997; Clinton and Chen, 1998; De Villiers and Auret, 1998; Turvey *et al.* 2000; Keef and Roush, 2003, among others). As a consequence, these controversial aspects have opened the debate internationally on the usefulness of traditional and value-based performance measures in explaining variations in stock returns.

This study is focused only on traditional (EPS, ROI, and ROE) and value-based performance measures (EVA® and SVA). There is only little mention on risk-adjusted measures (e.g. beta, CAPM, APT) since they have been extensively examined both for international capital markets (see: Black, Jensen and Scholes, 1972; Fama and MacBeth, 1973; Ross, 1976; Fama and French, 1992, 1996; Jegadeesh, 1992; Pettengill, Sundaram and Mathur, 1995; Strong and Xu, 1997; Campbell, 2000; Fletcher, 2000; Tang and Shum, 2003), and for the Greek capital market (see: Koutmos, Negakis and Theodossiou, 1993; Demos and Parissi, 1998; Karanikas, 2001; Theriou, Maditinos and Aggelides, 2004a; Theriou *et al.*, 2005, 2005a).

Moreover, performance measures such as Tobin's Q, or measurement systems such as Balanced Scorecard (BSC) and Intellectual Capital (IC) are excluded from this study mainly for the following reasons: Tobin's Q is excluded since there is no confirmed view how it is calculated and moreover, no companies in Greece use it as performance metric; BSC is excluded since it is a multi-perspective measure, unique for each company, and moreover, financial statements do not include all the information needed for its calculations; finally, IC, although relatively new and of increasing interest internationally, it is excluded since it is something absolutely and peculiar to each and every company, and moreover, its calculation framework is relatively complicate.

1.4. Shareholders and Stakeholders

For many years it has been stated that the fundamental objective of all business was the maximisation of the returns for shareholders in terms of dividends and increases in share prices (Ackoff, 1970; Argentini, 1974). However, in the 1980s a new approach accepted that, apart from their shareholders, corporations have other *stakeholders* and that the relationships between corporation and all the stakeholders should be taken into consideration and treated properly by the management (Freeman, 1984). Moreover, Freeman (1984) suggested that the traditional picture of the corporation required a rethinking because of the emergence of numerous stakeholder groups. These are individuals or groups who have an interest in or are significantly influenced by an organisation's decisions and actions and who, in turn, can influence it. The stakeholders include both internal and external groups. The internal group consists of employees, managers and shareholders while the external group comprises customers, suppliers, banks, financial institutions, communities, governments, trade associations, and political and social action groups (Freeman, 1984).

The broad acceptance of stakeholders' existence changed the fundamental objective of the business. According to Freeman (1984) the main objective of the business should be the maximisation or satisfaction of the interests of all the stakeholders. Rappaport (1998) acknowledged that in the 1990s corporate governance discussions were replete with references to *balancing the interests of all stakeholders*. This led to the question as to which stakeholder group should be satisfied first. Kanter (1997) claimed that it did not matter which stakeholder group should come first when all are satisfied, however, it does matter as far as a group feels neglected and has the power to exert pressure in order to make its claims be taken into consideration.

According to Rappaport (1998) the stakeholder model that attempts to balance the interests of all the stakeholders of a company makes it easier for corporate managers to justify uneconomic decisions, such as overinvestment in a declining core business, since these decisions are likely to be endorsed by some interested parties other than the shareholders. Such decisions may result, for instance, in more jobs in the short term for employees, in additional traditional business opportunities for suppliers, and in a greater tax base deriving from the increased size of the company for the community. However, the side effects of these kinds of uneconomic decisions are to subordinate shareholders interests, to lead corporations to restructuring or to make them more vulnerable to takeovers.

Rappaport (1998, p. 7) claims that 'there is an alternative approach to stakeholders that is consistent with shareholders interests, competitiveness, and, in the final analysis, socially responsible business behaviour'. This approach acknowledges that to continue to satisfy all stakeholders, companies must be competitive if they want to survive, and that a company's long-term prospect depends on a financial relationship with each stakeholder that has an interest in the company. Employees look for competitive salaries and benefits, customers demand products and services of high quality at competitive prices, suppliers and bondholders ask for payment when their financial claims fall due. In order to satisfy these claims management must generate cash by operating its business as effectively as possible. This emphasis on the long-term cash flows is the essence of the shareholder value approach (Rappaport, 1998). To summarise, a value-creating company serves not only its shareholders but the value of all other stakeholders' claims. On the other hand, all stakeholders are in a particularly weak position when management fails to create shareholder value (Knight, 1998; Rappaport, 1998).

Since this study is focused on the shareholder value approach and the value relevance of both traditional and value-based performance measures, it serves as an informative tool for all stakeholder groups with regard to the usefulness of those particular performance measures.

1.5. Significance of the Study

As mentioned previously, traditional accounting performance measures such as EPS, ROI and ROE have for a long time been an important tool and widely used to assess corporations' performance. On the other hand, shareholder value analysis and the value-based performance measurement systems have become particularly popular in the last two decades in the US and have started to gain prominence in the UK, in continental Europe, in Australia and even in Japan over the last ten years. However, the reported results of studies on the usefulness of those competing performance measurement systems are still mixed and controversial. The present study carried out in the framework of ASE has been inspired by the still controversial status of the findings on EVA-related studies, the lack of any empirical study on the Greek capital market, and the suggestion that 'data on the information content of EVA® and RI provide potentially useful input to the normative policy debate on what performance measures should be reported in financial statements' (Biddle, Bowen and Wallace, 1997, p. 303).

As mentioned earlier, the main objectives of this study are to report some primary empirical results for the value relevance of both traditional and value-based performance measures and to reveal investors' behaviours and their investment practices in the ASE, from 1992 onwards. It is believed that the contribution of these results will motivate other scholars to consider our findings a starting point for further research and to extend this study in different directions. The debate on the issue should remain open both in the Greek context and in that of other international emerging markets with the same market characteristics as the ASE. Finally, Greek investors who recorded great losses during the period 1999-2000 should possibly find some alternative methods and new informative tools relevant to their investment practices.

1.6. Methodology and Organisation of the Study

This study makes use of research methods adopted in the past and are still popular among scholars, to explore the value relevance of both traditional and value-based performance measures in explaining stock returns, and to investigate investment perceptions and practices of the market participants in the ASE, from 1992 onwards. It refers to a large range of secondary sources of data, such as books, journals, annual financial statements, electronic archives of the ASE, and other sources of financial information such as banks, private consulting firms, as well as unpublished working papers and studies presented in recent conferences. Moreover, it refers to primary data collected through a questionnaire survey conducted among the members of the investment community in Greece.

The study incorporates both secondary and primary data of the year 1999. This is a particularly interesting period in the Greek context since in that year, although the CSPI of the ASE reached 6,848 units, its historical highest level, (2,829 units in 1998 and 5,875 in 2000), investors, especially individuals, recorded significant losses. It has been particularly challenging to examine investors' perceptions over this year and to analyse their investment practices. Moreover, this investing paradigm can attract considerable attention from the international capital markets, on how an extreme fluctuation of the CSPI can drive investors to record significant losses.

Following the introductory chapter, the second chapter, which addresses the literature review, aims to build the theoretical framework of the study. The chapter starts with a brief review of traditional accounting performance measures. This first section is followed by a comment on the criticism of traditional accounting performance measures and their shortcomings according to shareholder value approach advocates (Rappaport, 1986; 1998; Stewart 1991; 1999; Stern, Stewart and Chew, 1995; Ehrbar, 1998). After this criticism follows a presentation of the shareholder value approach and a further examination of its variants: EVA®, MVA and SVA. The important role of the capital invested and of the WACC is also addressed and discussed since, as mentioned earlier, the main principle of SHV approach is that for a company to create wealth it should earn more than its cost of capital.

Furthermore, results of the most important studies on the value relevance of both traditional accounting performance measures and value-based performance measures are reported and commented upon. These studies have been conducted in the international market while no relevant study has been published on the Greek stock market. The reported results of these studies are mixed and contradictory. A large number of studies, conducted mainly by shareholder value approach proponents, revealed a dominance of the value-based performance while other studies carried out by more independent scholars showed that the traditional accounting performance measures are still of high relevance in explaining stock returns. However, studies that examined the value relevance of the combination of earnings and measures based either on capital invested or/and on the cost of capital, revealed a significant increase in the value relevance in explaining stock returns.

Since the explanatory power of both types of performance measures could not fully explain the variation in stock returns, scholars tried to explore other factors beyond earnings and value-based performance measures that might influence investors' behaviour and their investment practices (Goldberg and Nitzsch, 2001; Warneryd, 2001). Finally, the second chapter presents the empirical results of research on how professional and individual investors are investing in emerging and developed financial markets (Blume and Friend, 1978; Carter and Van Auken, 1990; Taylor and Allen, 1992; Fisher and Statman, 1997; Naser and Nuseibeh, 2003; Clark-Murphy and Soutar, 2003). These findings raised our interest in exploring the investment practices of the market participants in the ASE through a questionnaire survey, as mentioned earlier.

Chapter three develops the methodology of the study. Firstly, it examines and explains how the selected methodologies of previous studies such as Easton and Harris (1991), Cheng, Cheung and Copalakrishnan (1993), Biddle, Bowen and Wallace (1997), Chen and Dodd (1997), Worthington and West (2001), Chen and Dodd (2001), Chen and Zhang (2003), have been carried out. These studies build various relationships between stock returns and performance measures (traditional and/or value-based) and make use of secondary financial data to test the value relevance of these measures. As dependent variable(s) they use the stock returns while as independent variable(s) they consider various performance measures either separately or in combination.

With reference to the methodologies and on the relations (models) of the previously mentioned studies, the study develops the relations (models) for the purposes of the present study. These models have been used to carry out the first part of the empirical research of the study. Furthermore, we presented the relative and the incremental information content approaches, which have been adopted to test the models. Secondly, it follows a discussion on the questionnaire development and the questionnaire survey (Payne, 1951; Runkel and McGrath, 1972; Belson, 1981; Fowler, 1993; Bean and Roszkowski, 1995; Zikmund, 2003). This survey, which is the second part of the empirical research of the study, has been conducted among all investors (institutional and individual) investing in the ASE, in order to reveal their investment behaviour over the period under examination.

Chapter four is devoted to the first part of our research and examines the value relevance of both traditional and value-based performance measures in explaining stock returns. It starts with a description of the sample and the data collection and goes further towards the development of variables' definitions and calculations. After the variables' development and the tests of reliability, the regression relations (models) are tested using both relative and incremental information content approaches. Regression analysis is employed using the pooled cross-sectional data. Results are then reported providing evidence of the superiority of EPS compared to all other performance measures (traditional and value-based) and the significant role of EVA® when it is incorporated in a model with EPS, among others.

Chapter five is devoted to the second empirical part of the study, namely the questionnaire survey. It is mainly conducted since the reported evidence from the first part of the study revealed that all performance measures under examination could not explain more than 13.1 per cent of the variation of stock returns. It is focused on the question as to what other measures/factors beyond traditional and value-based performance measures are affecting investors' behaviour and their investment practices in the ASE. From December 2003 to June 2004, a questionnaire distributed to a sample of 1,014 market participants.

From this sample, 435 completed questionnaires came back, providing a 42.90 per cent response rate, which represents the main source of information for our examination. The results showed that on the one hand, professional investors in Greece are most focused on fundamental analysis and less on technical and portfolio analysis, revealing a quite satisfactory financial performance in the ASE. On the other hand, individual investors utilise all investment methods at a lower degree and are mainly driven by factors such as noise in the market, information from press, and their experience/instinct, revealing a low financial performance. Moreover, it is also revealed the intrinsic dynamic and the potential significance of EVA® as a performance measure in the Greek capital market.

Chapter six is the concluding part of the study. It presents a summary of the empirical evidence found and an assessment of the outcome of the overall work in the light of the concluding sections of chapters two to five. Finally, at the end of this chapter the limitations of the research as well as the recommendations and directions for further research are underlined.

Chapter Two

LITERATURE REVIEW

2.1. Introduction

Historically, performance measurement systems were developed as a means of monitoring and maintaining organisational control, which is the process of ensuring that an organisation aims at strategies that lead to the achievement of its overall goals and objectives. Performance measures, the key tools for performance measurement systems, play a vital role in every organisation as they are often viewed as forward-looking indicators that assist management to predict a company's economic performance and many times reveal the need for possible changes in operations (Nanni, Dixon and Vollmann 1990; Otley, 1999; Simons, 1999).

However, the choice of performance measures is one of the most critical challenges facing organisations (Ittner and Larcker, 1998; Knight, 1998). Poorly chosen performance measures routinely create the wrong signals for managers, leading to poor decisions and undesirable results. There are enormous hidden costs in misused performance measures. Shareholders pay the bill each day in the form of overinvestment and acquisitions that do not pay off etc. It is not that management is poor. Simply, it is the wrongly chosen performance measures, which in turn push management to take improper decisions (Ferguson and Leistikow, 1998; Knight, 1998). Performance measures may be characterised as financial and non-financial. This study has tended to restrict itself to looking only at financial performance measures, both traditional accounting and value-based ones.

The perceived inadequacies in traditional accounting performance measures have motivated a variety of measurement innovations such as the *economic value* measures (Ittner and Larcker, 1998). Over the last few years an increasing number of consultants, corporate executives, institutional investors and scholars have taken part in the debate on the most appropriate way to measure performance (Rappaport, 1998). Consultants are willing to demonstrate the mastery of their recommended performance models. Corporate executives show clearly that the performance models adopted by their corporations are the most appropriate and successful. Institutional investors debate the advantages of alternative performance models for screening underperforming companies in their portfolios. Finally, scholars develop performance measurement models and test the extent to which existing performance evaluation and incentive compensation systems inspire management decisions and performance itself (Rappaport, 1998).

For a corporation, to develop, accept and adopt its performance standards is not a simple procedure at all. The performance standards must be accurately developed for corporate level executives, operating managers of divisions and business units, and employees. According to Rappaport (1998) at each level of organisational responsibility the following three issues need to be addressed: what is the most appropriate measure of performance, what is the most appropriate target level of performance, and how rewards should be linked to performance.

Traditional performance measurement systems were developed at a time when decision-making was focused at the center of the organisation and responsibilities for decision-making were very clearly defined. According to Knight (1998, p. 173) 'these performance measurement systems were designed to measure accountability to confirm that people *met their budget* and followed orders'. However, during the last two decades it was widely argued (see Rappaport, 1986; 1998; Stewart, 1991; 1999) that most of the performance measurement systems failed to capture and encourage a corporation's strategy, producing mostly poor information leading to wrong decisions. Knight (1998), in an attempt to explain why traditional performance measures were so misused, asserted that part of the answer lies in three myths surrounding performance measurement, which are: growing quarterly EPS is all that matters, accounting measures tell the whole story, and that you can manage anything only with financial reporting methods. These myths are all based on the common belief that accounting is the only means of measuring performance. He then discussed the shortcomings of these three myths and suggested that value-based performance measures such as EVA® and SVA, among others, could be considered as alternative options to measure a corporation's financial performance.

As discussed earlier, VBM approach, based mainly on NPV techniques, FCF, and cost of capital, has as its main objective the maximisation of shareholder value. In recent years, SHV approach and VBM became particularly popular both as a decision making tool and as an incentive compensation system as well. Thus, value-based performance measures, such as EVA®, MVA, SVA, CFROI[1], EP[2], CVA, and Economic Value Management (EVM)[3] have spread all over Europe gaining acceptance by many companies.

The rest of chapter two addresses the issue of the usefulness of both traditional and value-based performance measurement. Definitions, analysis and criticism of traditional performance measures are demonstrated in section two. Value-based performance measures are defined, analysed and discussed in section three. Moreover, this section deals with the details of EVA® calculations. Components of EVA® such as NOPAT, cost of capital, Invested Capital (IC) and the proposed adjustments by Stewart (1991; 1999) are further presented and

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[1] CFROI and CVA has been developed by Boston Consulting Group (BCG) / HOLT Planning Associates
[2] EP has been introduced by Marakon Associates
[3] EVM has been developed by KPMG Peat Marwick

discussed. The calculation of WACC using the CAPM model is also discussed. In section four there is a presentation of the empirical research to date and the relevant findings concerning the value relevance of traditional and value-based performance measures as explanatory variables of firm returns' performance. Investors' behaviour in capital markets is discussed in section five. Finally, concluding remarks are presented in section six.

2.2. Traditional Performance Measures

2.2.1. The Concept of Profitability

According to Chakravanty (1986) profitability is one of the three parts of the financial performance of the corporation. The other two parts are liquidity and solvency. Profitability is an essential and common concept in accounting, which is used on various levels of the economy. It is examined and measured for example at national, industry, corporate, investment, and even at product level. At each of these levels it is possible to consider profitability from many different perspectives. However, in the long run, profitability is a prerequisite for the continuation of a corporation's functioning. In this study the subject of interest is the profitability at the corporate level.

In the literature there are many different definitions of profitability. According to Solomon and Laya (1967) and Van Horne (2001) profitability, in general, is the ability of a corporation to provide incomes by sacrificing expenses. Van Horne (2001) also argues that the time lag between expenses and incomes should be considered in the definition of profitability. Profitability can be defined as the rate of discount by which the benefits (incomes) are as great as the sacrifice (expenses). In this case the definition of profitability corresponds to the concept of IRR. From the owners' point of view, profitability is defined as the ratio of income to capital employed. From this perspective, the definition of profitability corresponds to the concept of ROI (Tamminen, 1976; Brealey and Myers, 2003). After all, the basic idea in almost every definition of profitability is the ability of a corporation to produce profit, which in fact is what remains after subtracting the expenses from revenues (net income).

2.2.2. Profitability Measurement

The profitability of a corporation can be measured in many ways. The available data, however, and the specific needs for information determine the pattern of measurement. Admittedly, financial statement analysis through its financial ratios contributes to this measurement. However, financial ratio analysis did not appear until the 1800s. In 1919, the DuPont Company was the first to employ a ratio system to evaluate its operational performance. This system became known as the so-called 'triangle' system or the 'DuPont Chart'. According to Goetzmann and Garstka (1999), Donaldson Brown developed this 'triangle' system with the ROI ratio at the top (see Horrigan, 1968; Siegel and Shim, 1991). Some years later, in the early 1920s, Donaldson Brown joined General Motors where he implemented his new system. The 'DuPont Chart' was in fact an accounting framework for identifying the principal factors affecting ROI. The fundamentals of cost, sales and investment supported the development of ROI. The history of profitability forms an important part of the history of financial accounting and financial statement analysis. Publications of Horrigan (1968), Kaplan (1984) and Van Horne (2001) offer a comprehensive review in the issue.

Financial ratios based on financial statement analysis are the most often used measures of the profitability of a corporation. There are also various ratios based on the flows of money. There are two basic types of profitability measures:

absolute and relative measures. The absolute measures describe the profit or some margin as such. The relative measures proportion this profit or margin to some dimension, which describes the *resources* or *determinants* (revenues, expenses, total assets, etc.) of this profit or margin. In the literature there are many classifications of profitability measures. In financial accounting literature (see: Schilit, 1993; Griffiths, 1995; Watts, 1996; Smith, 1996; Wood and Sangster, 1999; Williams *et al.* 2003), in the financial statement analysis (see: Rees, 1995; Holmes and Sugden, 1999; Penman, 2001; White, Sondhi and Fried, 2003) and in the corporation finance and valuation (see: Foster 1986; Copeland, Koller and Murrin, 2000; Copeland and Weston 1988; Barker, 2001; Graham and Harvey, 2001; Brealey and Myers, 2003) there are detailed presentations of various forms of profitability measures. For example Foster (1986) presented three ratios, which were: Operating Margin on Revenues (OMR), ROE and ROI. Foster (1986) expressed those ratios as follow:

$$\text{OMR} = \frac{\text{Net Income}}{\text{Revenues}} \qquad (2\text{-}1)$$

$$\text{ROI} = \frac{\text{Net Income}}{\text{Total Assets}} \qquad (2\text{-}2)$$

$$\text{ROE} = \frac{\text{Net Income}}{\text{Shareholder equity}} \qquad (2\text{-}3)$$

According to Foster (1986) OMR indicates how much net income is earned from each monetary unit of revenues produced from sales. ROI assess how efficient the total assets are employed within the company, while ROE measures how efficient the shareholder equity capital is employed within the company.

White, Sondhi and Fried (2003) in their profitability analysis, argued that investors are concerned with the company's ability to generate, sustain and increase profits. They also remarked that profitability can be measured in several differing but interrelated dimensions and suggested the relationship of the company's profits to sales, the ROI and the ROE in various variants as the primary measures of profitability. Rappaport (1998, p. 22) presented as the most common formulas for ROI the following:

$$ROI = \frac{\text{Net Income}}{\text{Book Value of Assets}} \tag{2-4}$$

or

$$ROI = \frac{\text{Net Income} + \text{Interest} \times (1 - \text{Tax Rate})}{\text{Book Value of Assets}} \tag{2-5}$$

where the Book Value of Assets is in fact the average book value of assets for a specific year.

ROE measures the profitability relative to shareholders (White, Sondhi and Fried, 2003). Hence total debt is excluded from the denominator (book value of shareholder equity is employed) and as a numerator is used either pretax income or net income. The proposed formulas are:

$$ROE = \frac{\text{Pretax Income}}{\text{Average Book Value of Shareholders' Equity}} \tag{2-6}$$

or

$$ROE = \frac{\text{Net Income}}{\text{Average Book Value of Shareholders' Equity}} \tag{2-7}$$

Finally, Rappaport (1998, p. 29) defined ROE as follow:

$$ROE = \frac{\text{Net income}}{\text{Book Value of Shareholders' Equity}} \tag{2-8}$$

where Book Value of Shareholder' Equity is the average book value of shareholder equity for a specific year.

2.2.3. Criticism and Shortcomings of Traditional (Accounting) Measures of Profitability

Kothari (2001) underlined that research into the relationship between capital markets and financial statements has its origin in the publication of Ball and Brown (1968) where they first examined the relationship between earnings and stock prices. Since then many other publications have contributed to the field demonstrating a positive relationship between earnings and stock returns (Beaver, 1968; Easton and Zmijewski, 1989; Easton and Harris, 1991; Easton, Harris and Ohlson, 1992; Ohlson 1991; Ball, Kothari and Watts, 1993) for the US market. In the light of the previous studies a large amount of relevant research reported evidence for this relationship for markets other than the US market. To name some: Ali and Pope (1995) for the UK; Harris, Lang and Möller (1994) and Booth, Broussard and Daley (1997) for Germany; Barth and Clinch (1996) for the UK, Australia and Canada; Kousenidis, Negakis and Floropoulos (1998; 2000) for Greece; Vafeas, Trigeorgis and Georgiou (1998) for Cyprus; Cheung, Kim and Lee (1999) for Japan; Graham and King (2000) for Asian countries; Jindrichovska (2001) for Czech Republic; Chen, Chen and Su (2001) for China; Jermakowicz and Gornik-Tomaszewski (1998) for Poland; and Jarmalaite (2002) for the Baltic countries.

According to Rappaport (1998) there is an obsessive fixation on EPS as the scorecard of corporate performance in both corporate reports and the financial press. Quarterly and annual earnings are reported in the *Wall Street Journal* and other leading financial publications. Analyses of corporate strategies by *Business Week*, *Fortune* and *Forbes* magazines are replete with references to EPS growth rates and P/E multiples. Moreover, Rappaport (1998, p. 13) underpins that 'the broad dissemination of accounting earnings figures fuels the business community's belief that stock prices are strongly influenced, if not totally determined, by reported earnings'. It is commonly assumed that if a company produces satisfactory growth in EPS then the market value of its shares will increase. However, as a growing number of executives now recognise, EPS growth does not necessarily lead to an increase in the market value of stock (Rappaport, 1998).

Stewart (1991; 1999) and Ehrbar (1998) in answering the question of what the engine is that drives share prices demonstrated two alternative models: the accounting model and the economic model. The former relies on two distinct financial statements which are the income statement and the balance sheet, while the latter relies on two concerns that investors care mostly about: the cash that a company expects to generate over its life and how risky the receipt of this cash is. After the examination of past research in the field they concluded that the economic model (cash flow model) is the one that better explains the change in stock prices while the accounting model is simply wrong.

Up to now, it has been shown that the essential objective of a corporation is to provide maximisation returns for shareholders. It has been also established that this return is generated through an increase in share prices and dividends. The issue to be addressed now is whether earnings (accounting earnings) as a base to measure performance and to assess alternative strategies are consistent with the objective of shareholders' returns. In other words, the issue is whether earnings can reliably measure the change in the present value of a company. However, the fact that earnings and to a larger extent the ensuing measures like ROI and ROE have not been developed for the measurement of corporate value, lead many scholars to characterise them as inadequate and misleading when they are used for monitoring corporation's performance. Moreover, there are several other reasons that cause earnings to be considered as inadequate measures. These reasons are presented and discussed in the following section.

2.2.3.1. Shortcomings of Earnings

Many shareholder value proponents such as Rappaport (1981; 1986; 1998), Stewart (1991; 1999), Stern, Stewart and Chew (1995), Ehrbar (1998), Knight (1998), and Stern (1974; 2001) have strongly criticised earnings since they fail to measure changes in the economic value of a company. Their critique was mainly based on three reasons: alternative accounting methods may be employed to calculate earnings, investment requirements are excluded from earnings calculation, and the time value for money is ignored in earnings calculation.

Earnings may be computed using *alternative* and equally acceptable *accounting methods*. This can cause a company to produce different accounting earnings according to the method employed. Characteristic examples are the use of FIFO or LIFO approaches to compute the cost of sales, the different methods of depreciation, the amortisation of goodwill and the R&D treatment (Rappaport, 1986; 1998; Stewart, 1991; 1999; Stern, Stewart and Chew, 1995). Moreover, with the National accounting principles varying from country to country, it is possible for the same company, using the same accounting figures, to declare a profit in one country and a loss in another. However, even if a change in accounting method can materially impact earnings it does not change a company's cash and therefore it does not affect its economic value. This assumes that the change in an accounting method is for financial reporting purposes and does not affect the calculation of income taxes. Many times it is also possible that an accounting change is seen as a signal for some more fundamental changes in the company's prospects. For example, the market may view a change to an earnings-increasing accounting method as a signal for a company's downturn. In this case the accounting change may cause a decrease in share price. However, the price decrease is not due to the accounting method change but rather due to the information inferred from management's decision to make an accounting change (Rappaport, 1998).

The relationship between earnings and change in economic value is further disturbed by the fact that *investments* in working capital and fixed assets are excluded from the earnings calculation. Consider *working capital* first. It is accepted that as a company and its business grows, there will normally be a related growth in the company's levels of accounts receivable, inventory, and accounts payable. The case where the level of receivables at the end of the year are higher than the level at the beginning of the year (increase in receivables), means that the cash flow from sales is lower than the revenue figure reflected in the income statement. The reason for this is the fact that cash is received after revenues have been recognised. Thus, for companies with increasing receivables the sales figure on the income statement will exceed the current period's cash flow generated from sales (Rappaport, 1998).

Inventory investment is another component of working capital that contributes to differences between earnings and the cash flow valuation approach. An upward change (increase) in the level of inventory clearly involves payments for material, labour, and overheads. However, for accrual accounting purposes, the investment in additional inventory is treated as an asset on the balance sheet whilst it is not included in the cost of sales figures appearing in the income statement. Therefore, for companies with increasing inventory levels, the current period's cash outflow will overstate the cost of sales figures for inventory expenditures. In brief, for expanding firms, increases in accounts receivable and inventories will cause the earnings figure to be greater than cash flow. The third component of working capital, accounts payable, acts in an inverse way compared to accounts receivable and inventory causing the inverse results (Rappaport, 1998).

An essential parameter for review is the investment in *fixed assets*. Assets, which are depreciable, such as property, plant and equipments are initially recorded at cost and are included in the fixed asset section on the balance sheet. This cost, in accrual accounting, is then allocated over the estimated useful life of the asset through depreciation. Accountants often underline that depreciation is not a process of valuation but is only a process of allocating the initial cost. Depreciation on fixed assets is a deduction to arrive at net income. However, while depreciation is an expense, it does not involve any disbursement of cash. On the other hand, the capital expenditures made during the year are not included in earnings calculation. Thus, two adjustments are needed to shift from earnings to cash flow. First, the depreciation must be added back to earnings and capital expenditures must be deducted from earnings (Rappaport, 1998).

The third important reason why earnings fail to measure change in economic value is that the earnings calculations *ignore the time value for money*. It is generally accepted that the economic value of an investment is the discounted values of its anticipated cash flows. Moreover, the economic value calculation incorporates the idea that a monetary unit of cash received today is worth more than the same monetary unit received a year from now. This happens because today's monetary unit can be invested and in turn earn a return over the next year. Thus, the discount rate used to calculate economic value incorporates both compensation for bearing risk and also compensation for expected rates of inflation. Earnings cannot include those considerations in their calculation. Finally, according to economic value proponents and under the apparent existence of fundamental differences between the calculation of economic value and earnings, it should not come as a surprise that earnings growth does not necessarily lead to economic value creation for shareholders. Shareholder value will increase only if the company earns a rate of return on new investments greater that the rate investors can expect to earn by investing in alternative, equally risky, securities. On the other hand, to achieve earnings growth it is not necessary to invest above the cost of capital. Earnings growth can be achieved when management invests below the cost of capital and thereby decreases the value of shares (Rappaport, 1998; Stewart, 1999).

Earnings per share is one of the earnings' reflections in financial reporting. It is the portion of a company's profit allocated to each outstanding share of common stock and is calculated by dividing earnings by the number of shares outstanding. EPS increases simply by investing more capital in the business process. In cases where the additional capital is cash flow (in the form of equity capital), EPS will increase if the rate of return of invested capital is positive. In cases where the additional capital is debt, EPS will increase if the rate of return of the invested capital is greater than the cost of the debt. Since the additional invested capital is a mix of equity and debt, EPS will increase if the rate of return on this additional capital is somewhere between zero and the cost of debt. However, this is completely wrong from the economic value point of view and makes EPS an inappropriate measure of corporate performance. This inference is in accordance with Stewart (1999) arguments about earnings, EPS and earnings growth. Following the suggestion of (Stern, 1974; Stewart, 1999) it is concluded that all earnings' related measures should be abandoned as performance measurement tools.

2.2.3.2. ROI and its Shortcomings

The recognition that an increase in earnings does not necessarily cause an increase in shareholder value, particularly in high inflationary periods, led to the popularity of ROI and ROE as financial performance standards. Although ROI remains a frequently used measure of divisional performance, it has been strongly criticised by the economic value proponents. However, taking an unreliable numerator (i.e. earnings) and relating it to an investment denominator, which is generated by the same accounting process, does not solve the problem. Moreover, Ehrbar (1998) and Stewart (1991; 1999) argued that measures such as ROI and ROE are just as bad as earnings concluding that since both the numerator (earnings) and the denominator (assets or shareholder equity capital) are distorted by accounting practices, there is no reason to expect that a ratio of the two will convey any meaning at all.

Hurdle rates or minimum acceptable rates for ROI are often based on an estimate of the business unit's cost of capital or the corporate cost of capital. The assumption is that if ROI is greater than the cost of capital, then SHV is created. The fundamental problem with this relationship is that ROI is an *accrual accounting return* and is being compared to a cost of capital measure, which is an economic return, demanded by investors. Thus, comparing ROI with cost of capital is a clear example of comparing two different and unrelated entities (Rappaport, 1998).

Trying to align ROI to the true rate of return, which is the IRR, is a challenging procedure. As discussed earlier, every project that a company undertakes should have positive NPV in order to be accepted from the shareholder point of view. This means that the IRR will be greater than the cost of capital. With practical performance measuring, the internal rate of return cannot be measured and some accounting rate of return is used instead to estimate the rate of return to capital. Typically this rate of return is some form of ROI. However, any accounting rate of return cannot on average produce an accurate estimation of the underlying true rate of return. An example is the phenomenon of *wrong periodising* that does not permit ROI to be consistent with IRR.

Wrong periodising means that it can be the case where ROI underestimates IRR at the beginning of the period and overestimates it at the end of the period. The inverse can also be true. This inconsistency between ROI and IRR is dependent on factors such as the kind of assets the company employs (old and new assets), the level of past and new investments, the kind of company (high technology, drug company, knowledge companies), etc. Thus, if a company has a lot of new investments at the beginning of the period it is possible to report low ROI, lower than its sufficient IRR. Inversely, if a company has little new investment the ROI figure can be high, higher than IRR, although the IRR might be even lower than the cost of capital. This situation can tempt management by wrong indicators of the true profitability of the companies. Therefore, those ROI figures might lead to either under-investments in profitable companies or in over-investments in mature companies, which in turn destroy the shareholder value.

In addition to wrong periodising, ROI is also a poor measure of a company's true rate of return. The difference between the accounting rate of return and the true rate of return has been studied by Harcourt (1965), Solomon and Laya (1967), Livingston and Salamon (1970), Fisher and McGowan (1983), Fisher (1984), and De Villiers (1989) who concluded that the differences between the two are so large that the former cannot be used as an indicator of the latter (De Villiers, 1997). The effect of inflation on the discrepancy has been addressed by Solomon and Laya (1967), Kay (1976), Van Breda (1981), Kay and Mayer (1986) and De Villiers (1989) who showed that inflation exacerbates the discrepancy between ROI and true return (De Villiers, 1997). Although inflation strengthens the discrepancy, it should be pointed out that ROI is not, on average, equal to the IRR, even with no inflation.

De Villiers (1989) studied the relationship between ROI and true rate of return with different asset structures. Typically companies can have three different types of assets: current assets, depreciable assets and non-depreciable assets. He found that if a company had only current assets, ROI on average, would equal IRR. However, the more a company has depreciable assets (ceteris paribus), the more ROI overstates IRR. On the other hand, the more a company has non-depreciable assets (e.g. land) the more ROI understates IRR. A third factor presented by De Villiers (1997) affecting the discrepancy between ROI and IRR was the length of investment period. He concluded that the longer the investment period (or the economic life of assets) the bigger the discrepancy between ROI and IRR. This is obvious since a long investment period gives inflation time to distort asset values.

Solomon (1966) and Rappaport (1982) also concluded that ROI is not an accurate or reliable estimate of the true rate of return. They demonstrated four factors affecting this gap: the length of project life, the capitalising policy, the rate at which depreciation is taken on the books, and the lag between investment outlays and recoupment of these outlays from cash flows.

According to Rappaport (1998, p. 28) 'the use of ROI as a standard for evaluating strategies and performance at the business unit or corporate level can lead to a substantial misallocation of resources'. He presented three essential reasons for this, beyond those discussed earlier. Firstly, while the economic rate of return from a project or an entire strategy depends only on prospective cash flows, accounting ROI depends not only on prospective investment and cash flows, but also on undepreciated investments of past periods. Therefore, if two companies have identical strategies and expectations, but one of them has a bigger opening investment, then it will have lower ROIs during the planning period. This is consistent with the wrong periodising phenomenon. In any case, such differences in ROI in the face of identical DCF returns might give wrong signals to management as far as the profitability of the company is concerned.

Another important shortcoming of using ROI for assessing strategies and performance is 'its neglect of the post-planning period residual value of the business unit or company, which typically accounts for more than 50 per cent of a company's market value' (Rappaport, 1998, p. 28). The third limitation in using ROI for financial planning and control involves the sometimes countereconomic effect of changes in financial policy on ROI. Consider a company is operating at what it believes to be its optimal capital structure. Stated concretely, the target proportions of equity and debt to finance the business are designed so that the WACC is minimised. Any change of this target financing would cause the cost of capital to increase and, holding everything else constant, it would reduce the value of the company.

2.2.3.3. ROE and its Shortcomings

ROE is another measure, which is widely used to measure a company's performance. It continues to be cited as one of the most important benchmarks of corporate performance. While ROI relates net income to total assets, ROE applies book value of shareholder equity as the denominator. ROI is more used to measure performance at business unit or divisional level, while ROE is more popular in measuring performance at corporate level. One of the main reasons that management focuses on ROI instead of ROE at business unit level is its reluctance to allocate debt to individual units. The focus on ROE at the corporate level is often explained on the grounds that it is a measure of primary concern to investors (Rappaport, 1998).

Since ROE is so similar to ROI, it shares all the shortcomings of ROI (e.g. discrepancy between ROI and true rate of return) enumerated earlier. Thus, the level of ROE does not inform the shareholders if a company is creating or destroying wealth. Stewart (1999) and Ehrbar (1998) highlighted that ROE suffers from both accounting and financial distortions. Rappaport (1998) also mentioned that ROE is particularly sensitive to leverage. He argued that if gains from debt financing can be invested at a rate of return greater than the borrowing rate, this will in turn increase earnings, which consequently will increase ROE. Thus, ROE will increase with greater amounts of leverage. ROE will, in fact, increase as more than optimal debt is issued and the value of the company decreases due to the increase in financial risk and thus the increase of the cost of capital. Therefore, once again, it is apparent that an accounting based performance measure might conflict with shareholder value creation. According to SHV proponents, consistent with ROI and IRR, ROE might be considered as an informative tool but it should neither affect the management strategy nor guide the operations.

Knowledge companies (e.g. software development companies) are usually directing their investments towards intangible assets such as R&D, information and training rather than tangible fixed assets. Since only a small percentage of this kind of investment is capitalised for accounting purposes, ROI and ROE for knowledge-based companies cannot be compared significantly with those companies, which invest principally in fixed assets. This fact has a significant affect on the usefulness of ROI and ROE as valuation benchmarks. While the debate on whether the intangible assets such as R&D, customer satisfaction and brand names will be capitalised or not on the balance sheet is still open, an important observation needs to be emphasised. Rappaport (1998, p. 31) observes that 'accounting numbers and traditional financial ratios will be affected by the movement from industrial companies to knowledge companies. Shareholder value calculations will not'.

However, the fact that accounting-based numbers and ratios are not considered as reliable indicators of SHV should not be seen as the failure of accounting. In the final analysis the principal problem is the inappropriate use of historical accounting numbers by managers and investors for expectations-based valuation.

2.3. Value Based Measures

2.3.1. Shareholder Value Approach and the Development of Modern Value-Based Performance Measures

As discussed earlier, traditional performance measures suffer from accounting distortions. Moreover, they do not take into account the cost of capital and the risk of a company's operations. Therefore, they cannot be considered as accurate and reliable measures for corporate value. It is not then a surprise that the investment community was looking to find other measures, which could be more informative concerning the long-term prospective of the companies. To overcome problems associated with earnings-based measures many scholars proposed alternative theories and new (modern) value-based performance measures. As a consequence, the SHV approach was developed in the late 1980s and early 1990s.

As presented in the introductory chapter, the SHV approach estimates the economic value of an investment by discounting forecasted cash flows by the cost of capital (Rappaport, 1998). Proponents of the SHV approach, either academics or consulting firms, relied for their analysis on NPV, FCF and the cost of capital, and they produced a variety of value based performance measures. The most common referred variants of those measures are: SVA by Rappaport and LEK/Alcar Consulting group (Rappaport, 1986; 1998), CFROI®[4] by Boston Consulting Group (BCG) and HOLT Value Associates (Black, Wright and Bachman 1998; Madden, 1999), CVA by Boston Consulting Group (BCG) and the Swedes Ottoson and Weissenrieder (Ottoson and Weissenrieder, 1996; Madden, 1999), Tobin's Q (Tobin, 1969) and, EVA®[5] and MVA by Stern Stewart & Co. (Stewart 1991; 1999; Ehrbar, 1998; Stern, 2001).

As has been presented in the introductory chapter, this study aims firstly at assessing the value relevance of both traditional and value-based performance measures such as EVA® and SVA because they are considered as the measures which are most closely tied to the traditional performance measures. In other words, it is the next step for performance measurement that leads from traditional accounting performance measures to SHV metrics since they take into account the NOPAT, the investment and the cost of capital. For limitation purposes several performance measures have been excluded from this study either because they are so close to EVA® and SVA (e.g. CFROI, CVA) or because it is difficult to calculate them for the Greek listed companies (e.g. Tobin's Q). Moreover, the variety and the complexity of procedures used to estimate Tobin's Q and the existing calculation frameworks are flawed in design, unstable in application, produce downward-biased measures, and most of the times rank incorrectly and thereby misclassify companies by their Q's (Lewellen and Badrinath, 1997).

The risk-adjusted measures (e.g. *beta*, CAPM, APT) have also been excluded from this study mainly since they have been extensively examined both in the international capital markets (see: Black, 1972; Black, Jensen and Scholes,

[4] CFROI® is a registered trademark of Holt Value Associates, LLP
[5] EVA® is a registered trademark of Stern Stewart & Co.

1972; Fama and MacBeth, 1973; Ross, 1976; Fama and French, 1992, 1996; Jegadeesh, 1992; Pettengill, Sundaram and Mathur, 1995; Strong and Xu, 1997; Campbell, 2000; Fletcher, 2000; Tang and Shum, 2003) and that of Greece (see: Koutmos, Negakis and Theodossiou, 1993; Demos and Parissi, 1998; Karanikas, 2001; Theriou, Maditinos and Aggelides, 2004a; Theriou *et al.* 2005, 2005a). Results are mixed and controversial. However, promising facts about interest rates, aggregate stock prices, and cross-sectional patterns in stock returns have stimulated new research on optimal portfolio choice, intertemporal equilibrium models, and behavioural finance (Campbell, 2000).

Thus, in the following sections we discuss the SVA, the EVA® and the MVA.

2.3.2. Shareholder Value Added

In the introductory chapter we discussed how the *economic value* of an investment, the *shareholder value* and the *corporate value* are determined. We also referred to the basic valuation parameters, the *value drivers*, which are of essential importance for the SHV calculations. To calculate the corporate value, Rappaport (1998) adds the residual value and the marketable securities to the Present Value (PV) of cash flows from operations during the forecasted period. Subtracting debt from the corporate value he produces the *Shareholder Value*. In this section, we will explain how the SVA is calculated through the SHV approach.

First the *Cash Flow from Operations* (CFO) is determined. CFO represents the difference between Operating cash inflows and Operating cash outflows. According to Rappaport (1998) these cash flows are relevant for estimating corporate value because they represent the cash available to compensate stakeholders. After the cash flow from operations is calculated for each year in the forecasted period, they are then discounted to present value using the WACC as the discount rate. The sum of the discounted cash flows for all years, then, is called 'cumulative present value of cash flows'. To arrive at cash flows for each year, Rappaport incorporates in the calculations value drivers as follow. Starting from cash flow equation, which is:

$$\text{Cash Flow} = \text{Cash inflow} - \text{Cash outflow} \qquad (2\text{-}9)$$

he replaces Cash inflow and Cash outflow as follows:

Cash inflow = (Sales in prior year) X (1 + Sales growth rate) X (Operating profit margin) X (1 – Cash income tax rate), and

Cash outflow = (Incremental fixed capital investment) + (Incremental working capital investment) (2-10)

To calculate the Incremental fixed capital investment, he subtracts depreciation expenses from capital expenditures. Thus, if depreciation were added back to operating profit (to convert it to a cash flow) and the same amount of depreciation were added back to the incremental fixed capital investment figure (to convert it to total capital expenditures) the cash flow from operations should remain unchanged. Often management conducts the analysis not of its own company but of a competitor. In such cases, only past information is available. Thus, it is preferred to forecast investments as a percentage of incremental sales. The incremental fixed capital investment rate (%) can then be expressed as follow:

$$\text{Incremental fixed capital invest. rate }(\%) = \frac{\text{Incremental fixed capital invest.}}{\text{Incremental sales}} \times (100) \qquad (2\text{-}11)$$

The incremental working capital investment concerns the net investment in inventory, accounts receivable, accounts payable and accruals. The incremental working capital investment is also included in the calculation of cash flow from operations and can be expressed as a percentage (%) of incremental sales (Rappaport, 1998).

$$\text{Incremental working capital rate (\%)} = \frac{\text{Incremental working capital invest.}}{\text{Incremental sales}} \times (100) \qquad (2\text{-}12)$$

The appropriate rate for discounting the company's cash flow streams is the weighted average of the cost of debt and equity capital. Details of this calculation will be discussed later in this chapter.

While CFOs and the WACC have been employed to calculate the discounted cash flow value attributable to the forecasted period, *residual value* refers to the value that is attributable to the period after the forecasted period. Rappaport (1998) made two important observations concerning the residual value. Firstly, while residual value is an important component of corporate value, its size depends directly upon the assumptions made for the forecast period, and secondly, there is no unique formula for residual value. Among the several methods for estimating residual value Rappaport (1998) proposed the perpetuity method where the basic assumption is that after the forecasted period the business will earn, on average, the cost of capital on new investment. Using this method, the PV (at the end of the forecast period) is calculated by dividing operating cash flow before new investment by the WACC:

$$\text{Perpetuity residual value} = \frac{\text{Cash flow}_{t+1}}{\text{Cost of capital}} \qquad (2\text{-}13)$$

After the calculations of the cumulative present value and the present value of residual value for each year, the two sums are reported for each year. Those sums when added create a figure, which represents the corporate value (after adding the marketable securities and investments). Subtracting the market value of debt from the total corporate value, the *Shareholder Value* is produced (see: Rappaport, 1998, p. 49).

SVA is the amount of value created by the forecasted scenario. It is important to note that while SHV represents the absolute economic value generated from the forecasted scenario, SVA addresses the *change* in value over the forecasted period. It is worth remembering here that value creation results from corporate investment at rates in excess of the cost of capital rate required by the capital market. Using the previous calculations of SHV, the SVA for each year can be calculated by the annual change in the sum of Cumulative Present Value of Cash Flows plus the Residual Value. By adding the annual SVAs we produce the SVA for the forecasted scenario (Rappaport, 1998).

An alternative calculation proposed by Rappaport (1998) is based on the use of change in NOPAT, the cost of capital and the PV of the Incremental investment. The formula is expressed as follows:

$$SVA = \frac{\text{Change in NOPAT}}{K \times (1+K)^{t-1}} - \text{Present Value of Incremental Investment} \qquad (2\text{-}14)$$

where K is the cost of capital.

The change in NOPAT is capitalised for every year and is discounted to present value. SVA is calculated after subtracting the present value of incremental investment from the capitalised change in NOPAT. The SVA, which is produced using this alternative calculation, is identical to the SVA produced using the cash flow scenario. The SHV approach is best summarised by the shareholder value network (see Rappaport, 1998, p. 56).

2.3.3. The EVA® Financial Management System

EVA® is considered as the centerpiece of a completely integrated financial framework for financial management and incentive compensation (Stewart, 1994; Stern, Stewart and Chew, 1995). It is a technique for value creation measurement and has been developed and trademarked by the New York consultant group Stern

Stewart & Co. (Stern, 1985; Stewart 1991). Stern Stewart & Co. (established by Joel Stern and Bennett Stewart), promoted the EVA® technique not only as a simple performance measure but as an integrated Financial Management System as well, which associates the value creation with incentive compensations (Stewart 1991; 1994; 1999; Stern, Stewart and Chew, 1995; Ehrbar 1998).

Stewart (1999, p. 2) determined EVA® as 'operating profits less the cost of all of the capital employed to produce those earnings'. He also claimed that EVA® is the financial performance measure that comes closer than any other measure to capturing the true economic profit of an enterprise. As mentioned in chapter one, EVA® 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). Therefore, the formula for EVA® calculation becomes as follows:

$$\text{EVA} = (r - c^*) \times \text{capital} \qquad (2\text{-}15)$$

or

$$\text{EVA} = (\text{rate of return} - \text{cost of capital}) \times \text{capital} \qquad (2\text{-}16)$$

where r is the rate of return, and c^* is the cost of capital, or more correctly stated, the WACC.

The rate of return, r, is computed by dividing a company's NOPAT by the total capital employed in operations:

$$r = \frac{\text{NOPAT}}{\text{Capital}} \qquad (2\text{-}17)$$

According to Stewart (1991; 1999) the rate of return measures the productivity of capital employed without taking into consideration the method of financing, and it is free from accounting distortions that arise from accrual bookkeeping entries, from the conservative bias in accounting statements, and from the tendency to understate capital by writing off unsuccessful efforts. It may be compared directly to the company's overall cost of capital employed and therefore it is able to indicate whether value has been created or destroyed. Stern Stewart & Co. has proposed up to 164 adjustments in order to eliminate financing distortions in a company's NOPAT and Capital (Stewart, 1991; 1994; 1999). Some of the most commonly used adjustments will be discussed later in this chapter, and since c^*, the WACC, is a seminal component of EVA's calculation, it will also be more extensively presented in this chapter.

Rearranging equation (2-15), EVA® becomes: EVA =(r X capital)-(c^* X capital) and rearranging equation (2-17), NOPAT becomes: NOPAT = r X capital

Thus, replacing the (r X capital) in formula (2-15) with NOPAT, EVA® becomes:

$$EVA = NOPAT - (c^* \times \text{capital}) \qquad (2\text{-}18)$$

where NOPAT is operating profits and (c^* X capital) is the capital charge. Therefore, we can define EVA® as operating profits less a capital charge.

EVA® is based on accounting items such as net income, interest bearing debt and capital. Compared to the other traditional accounting measures, EVA® differs to the degree that it includes the cost of capital in its calculation. Additionally, Stewart (1991, p. 3) argued that 'algebraically EVA® produces the same results in valuation as DCF or NPV', valuation methods that are widely accepted as the theoretically best valuation mechanisms from the shareholders' point of view (Hirschleifer, 1958; Miller and Modigliani, 1961; Stern, 1974; Gordon, 1962). DCF and NPV take into account the time value for money, use the opportunity cost of equity capital and moreover, they do not suffer from any sort of distortions caused from accounting. However, since they are alone in being based on forecasted cash flows, they do not match in performance evaluation, while EVA® seems to fit quite satisfactorily in measuring the performance (Stewart, 1999).

2.3.3.1. How to Increase EVA®

As Stewart (1991; 1999) noticed, in any company there are many individual things that people can do in order to create value. However, in the final analysis, all those things must fall into one of the three categories measured by an increase in EVA®. EVA® will rise if operating efficiency is enhanced, if the company undertakes value added new investments and if capital is withdrawn from uneconomic activities.

More specifically, the three ways for a company to increase EVA® are: to increase the rate of return *r* earned on the basis of the existing capital, that means the operating profits are increasing without having to tie up more capital, to invest additional capital in projects that return more than the cost of obtaining the new capital and to liquidate capital from business, or cut back on new investments, when they fail to earn more than the cost of capital. According to Stewart (1999, p. 137) 'these are the only ways in which value can be created and EVA® captures them all'.

The main idea behind EVA® is that shareholders must earn a return that compensates the risk undertaken. That means that equity capital must earn at least the same return as equally risky investments at the stock market. From the shareholders' point of view, if it does not hold, there is no real profit and actually the company operates at a loss. Alternatively, even if EVA® is zero, the ultimate scope is considered successful since shareholders have earned a return that compensates the risk undertaken.

2.3.3.2. Residual Income as the Origin for EVA® Development

EVA® is neither a new concept nor a new discovery. In fact, it is a modified version of the RI. Residual income is an accounting performance measure that is defined as operating profits less capital charges. Thus, EVA® is a modified variant of RI with adjustments in calculations of operating profit and invested capital.

According to Solomons (1965) residual income is the excess of net earnings over the cost of capital. The proposed formula for calculating the residual income was:

$$RI = NI - r \times I \qquad (2\text{-}19)$$

where NI is the accounting net income, r is the cost of capital and, I is the level of investment. Actually, EVA® corresponds closely to RI since it is, in fact, the company's NOPAT minus the capital charge. However, to go over from an RI figure to an EVA® figure, many accounting adjustments are required. These accounting adjustments (up to 164) have been designed to convert accounting income to economic income and accounting capital to economic capital (Stewart, 1991; Young, 1997; 1999; Anderson, Bey and Waver, 2004). Therefore, EVA® can be presented as follows:

$$EVA = NI + (\text{adjustments}) - r \times (I + (\text{adjustments})) \qquad (2\text{-}20)$$

Where r is the required rate of return.

However, the EVA® explanation according to (2-20) is not complete at all. It only tries to give a simple schematic presentation for the relation between RI and EVA®.

The origins of RI and EVA® can be traced to Hamilton (1777) and Marshall (1890) who reasoned that for firms to create wealth, they must earn more than their cost of debt and equity capital. In the 1920s, General Motors under Sloan applied this concept in terms of 'economic profit' and in the 1950s General

Electric labeled it 'residual income' and used it as a performance measure to assess the performance of its decentralised divisions (Stewart, 1994). However, as Biddle, Bowen and Wallace (1997) and Goetzmann and Garstka (1999) remarked, RI did not gain much attention before being recommended by Solomons (1965) as an internal measure of business unit performance and by Anthony (1973; 1982a and 1982b) as an external performance measure. The usefulness of RI has been examined and presented through several studies. Some of the best known studies are those carried out by Emmanuel and Otley (1976), Mepham (1980), Horngren, Foster and Datar (1997), Bromwich and Walker (1998), Dechow, Hutton and Sloan (1999) and Plenborg (2002).

Throughout the 20^{th} century, RI has been appearing under different labels. However, it did not gain wide publicity, and more, it did not succeed in being considered and used by the majority of companies as a prime performance measure. In the early 1990s however, EVA®, which in fact is the same concept as RI, succeeded in gaining much greater popularity than RI. EVA® has been adopted by a small but rapidly increasing number of companies as a means to help align the interest of managers with those of the shareholders (Wallace, 1997; Goldberg, 1999). Some of the possible reasons why EVA® gained such great popularity are perhaps the pertinent marketing by Stern Stewart & Co. or the fact that EVA® was marketed with the concept of MVA. MVA is an important concept for market valuation and will be discussed in more detail later in this chapter.

2.3.3.3. The Introduction of EVA® in Corporate World

In 1991, Stern Stewart & Co. revised the computation of RI through a series of accounting adjustments and the result was the trademarked variant of RI, the

EVA®. They recommended EVA® as a measure that could be used instead of earnings or cash from operations in order to capture both internal and external performance. Stewart (1991, p. 66) as a principal advocate of EVA® argued: 'Earnings, earnings per share and earnings growth are misleading measures of corporate performance. Earnings are diminished by bookkeeping entries that have nothing to do with recurring cash flow, and are charged with such value-building capital outlay as R&D, all in an attempt to placate lenders' desires to assess liquidation value. EPS at best measures only the quantity of earnings, but the quality of earnings reflected in the P/E matters too'. Moreover, Stewart (1999) presented the findings of his research on EVA® revealing clear evidence for the relationship between EVA and the market value added.

Many other important studies contributed to the increasing interest in EVA®. For example, Peterson and Peterson (1996) and Copeland, Koller and Murrin (1996; 2000) provided details for EVA® calculation (or variations of EVA®, since Copeland refers to economic profit). O'Hanlon and Peasnell (1998) and Young (1997; 1999) discussed and explained the applicable *use* and *cost* of the potential accounting adjustments for EVA®calculation. McConville (1994), Jackson, Mauboussin and Wolf (1996), Dierks and Patel (1997), Stewart (1998), Prober (2000), Ray (2001), and Grant (2003) promoted the usefulness of EVA® as a financial reporting tool and described it as a vital measure of total factor productivity, one that reflects all the dimensions by which management can increase value. Managers of leading companies such as Coca Cola, Sprint Corporation, and Quaker Oats have also presented their encouraging aspects for the effectiveness of the EVA® financial management system. Besides, there has been a widespread adoption of EVA® by security analysts such as Credit Suisse, First Boston's and Goldman Sachs'. They prefer this model instead of the dividend discount approach (Abate, Grant and Stewart, 2004).

What makes EVA® challenging and interesting to study, is its adoption as a performance measure and/or incentive compensation system of hundreds of companies in the US. Moreover, in recent years the EVA® concept/system crossed oceans and made sense in many other countries. EVA® figures have been largely promoted in countries such as the UK, Australia, Canada, Brazil, Germany, Mexico and France among others (Günther, Landrock and T. Muche, 2000; Worthington and West, 2001). Ehrbar (1998) refers to the adoption of EVA® by New Zealand state owned companies in order to be invigorated, while Worthington and West (2001) discuss the adoption of the EVA® financial management system by companies in Australia.

Despite all positive and encouraging comments about EVA®, emphasised by Stewart (1991; 1994; 1999), Sheehan (1994), Walbert (1994), Stern, Stewart and Chew (1995) and other proponents such as Tully (1993; 1994; 1998; 1999), O'Byrne (1996), Ehrbar (1998), Stern (1995; 2001) and Grant (2003) among others, the empirical literature which came out provided mixed results for the usefulness of EVA® in explaining stock returns. Studies focused on whether EVA® is more highly associated with stock returns than other performance measures provided mixed and controversial results. For example, O'Byrne (1996), Uyemura, Kantor and Petit (1996), Milunovich and Tsuei (1996), Lehn and Makhija (1997), Bao and Bao (1998), Herzberg (1998) and Forker and Powell (2004) provided positive results for the value relevance of EVA®. Their findings supported the Stewart's (1991; 1999) claim for the superiority of EVA® as a financial performance measure.

On the other hand, studies carried out by Peterson and Peterson (1996), Biddle, Bowen and Wallace (1997), Chen and Dodd (1997; 2001), Clinton and Chen (1998), Turvey *et al.* (2000) and Copeland (2002) did not provide encouraging results for the superiority of EVA® compared to traditional accounting performance measures such as EPS, ROI and ROE. Many other studies have been conducted examining other parameters of EVA®. Bacidore *et al.* (1997) examined an alternative option of invested capital (they used market values instead of book values to estimate the capital invested) and proposed the Refined EVA (REVA) as the proper representative of economic value added. Although their findings proved that REVA is preferable than EVA®, a study carried out by Ferguson and Leistikow (1998) proved that it does not hold. Finally, Wallace (1997) and Lovata and Costigan (2002) examined the consequences of the adoption of the EVA® financial management system.

2.3.3.4. Market Value Added

Stewart (1991) evaluated whether a company creates or destroys shareholders' wealth and developed and proposed the MVA, which is a measure most closely related to EVA®. This measure captures the difference between the market value of a company (both equity and debt) and the capital contributed by investors. Stewart (1991, p. 153) defined MVA as 'the absolute dollar spread between a company's market value and its capital', while Young (1997, p. 336) defined it as 'the difference between the total value of the firm and the total capital (including equity and debt) contributed to the firm'. From the above definitions it is inferred that the MVA is a company's total market value less the total capital invested, or simply:

$$\text{MVA} = \text{Total Market Value} - \text{Total Capital} \qquad (2\text{-}21)$$

Total market value is considered to be the market value of shares plus debt, which is expressed as: [(share price X No of shares outstanding) + market value of debt], while total capital is considered to be the total equity plus debt and leases, which is expressed as: debt + leases + total equity. Under the simplified assumption that market and book value of debt are equal, formula (2-21) can be re-arranged as follows:

$$\text{MVA} = \text{Total Value of Equity} - \text{Book Value of Equity} \qquad (2\text{-}22)$$

So, under the logic of value creation, the scope of the company now becomes to maximise MVA. It is important to notice that the objective is not to maximise the value of the company, which can be easily achieved by pouring more capital into the business, but to maximise the MVA. MVA increases only when invested capital earns a rate of return greater than the cost of capital. When newly raised capital is invested in value-creating projects, MVA increases. Reversely, when new capital is invested in value-destroying projects (i.e. projects with a negative NPV), MVA decreases (Young, 1997).

Stewart (1991, p. 153) related EVA® to MVA. First he claimed that EVA® 'ties in directly with the intrinsic market value of any company'. He then argued that when EVA® is projected and discounted to present value, it accounts for the market value that management adds to, or subtracts from, the capital employed. Therefore, MVA is equal to PV of all future EVAs (Stewart, 1991; 1999; Grant, 2003; Abate, Grant and Stewart, 2004). Thus it is:

$$\text{MVA} = \text{Present Value of all future EVAs} \qquad (2\text{-}23)$$

or

$$\text{MVA} = \text{PV}(\text{EVA})_1 + \text{PV}(\text{EVA})_2 + \text{PV}(\text{EVA})_3 + \text{PV}(\text{EVA})_4 + \ldots + \text{PV}(\text{EVA})_n \qquad (2\text{-}24)$$

or

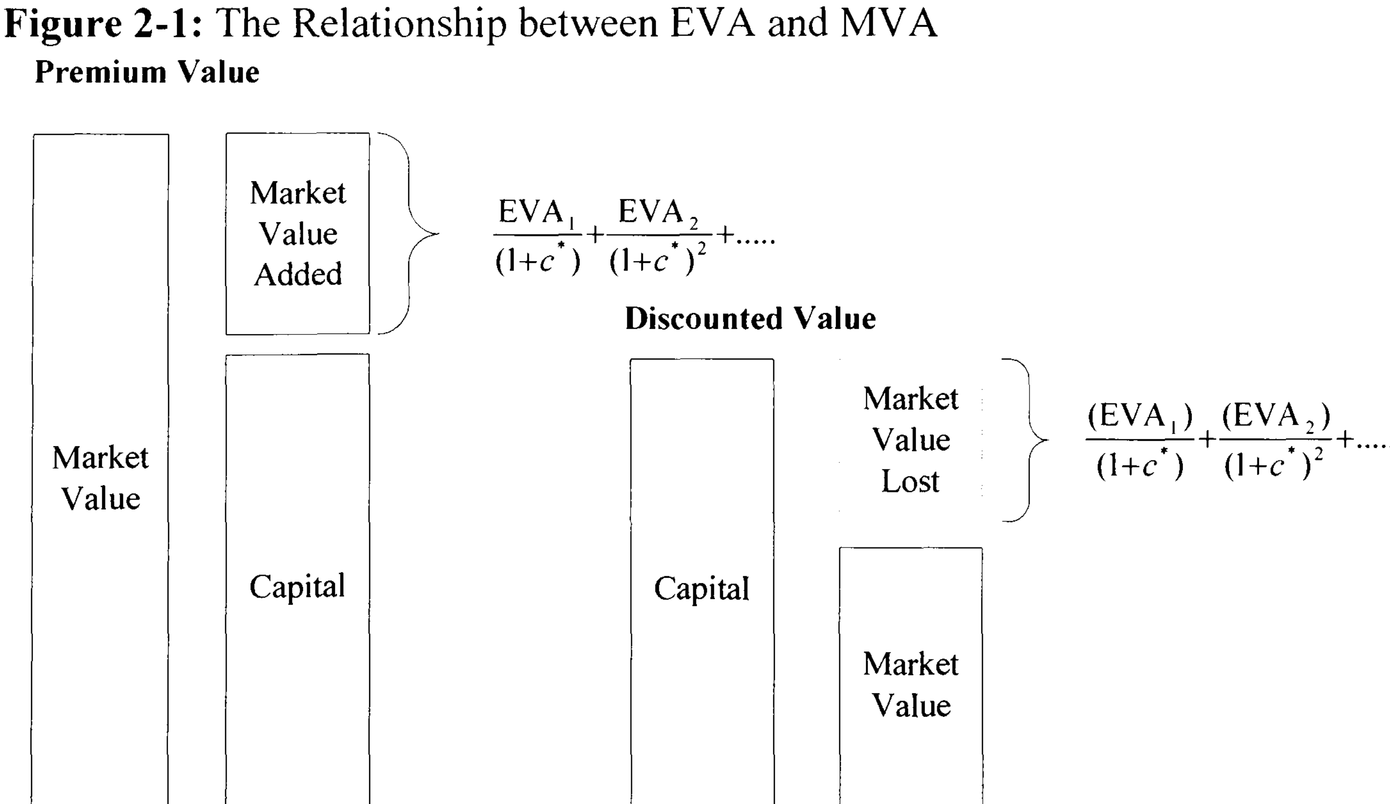
$$MVA = \sum_{t=1}^{n} PV(EVA)_t \qquad (2\text{-}25)$$

This means that maximising EVA® is crucial for maximising MVA and shareholder wealth.

According to Stewart (1999, p. 153), EVA® 'is the fuel that fires up MVA' and since EVA® 'is defined to be operating profits less the capital charge, implicitly subtracts the cost of the existing capital and a new capital investment when it is projected and discounted to a present value. What is left over from the operating cash flow is the NPV of all capital projects, past and future. Thus, EVA® is the internal measure that leads to the external consequence of building a premium (or discount) into the market value of a company'. Figure (2-1) exhibits the relationship between EVA and the MVA.

Positive EVAs increase MVA and thus the market value of the company, which in fact is a wealth creation to shareholders', while negative EVAs (in parenthesis) decrease MVA and accordingly the total market value of the company, which in turn causes destruction in shareholders' wealth.

Figure 2-1: The Relationship between EVA and MVA



Source: (Stewart, 1999)

In summary, MVA is the spread between the company's market value and its capital, is a cumulative corporate performance measure, it reflects the stock markets' assessment of a company's past and projected capital projects, and it illustrates how successfully a company has invested capital in the past and how successful it is likely to be in the future. In comparison with EVA®, it can be argued that EVA® tempts more interest than MVA. EVA® measures performance annually while MVA reports on the sum of a company's total value creation from its beginning to the date the MVA is calculated. That makes EVA® more practical than MVA for evaluating and rewarding performance. Another advantage of EVA® is that it can be implemented for every company while MVA can be calculated only for listed companies. Finally, an important merit of EVA® is that it can be used for performance measurement at any level of a business while MVA is suitable only at group or corporate level (Young, 1997).

2.3.3.5. Components of EVA® (CFO, Earnings, NOPAT and RI)

In this section there will be a presentation on how cash flows from operations, earnings before extraordinary items (EBEI), NOPAT and RI are related to EVA®. This relationship has been discussed and presented by Biddle, Bowen and Wallace (1997) and Worthington and West (2001).

EBEI is considered the most basic indicator for the value of a company. It can be portioned into two components, which are the CFO and the accruals (ACCR), thus:

$$EBEI = CFO + ACCR \qquad (2\text{-}26)$$

where CFO is the operating cash flows, and ACCR is defined as total accruals related to operating (as opposed to investing and financing) activities and is composed of: depreciation, amortisation, change in non-cash current assets, change in current liabilities and change in the non-current portion of deferred taxes.

The next step is to identify NOPAT by adding the after tax cost of interest expense (ATIntEx) to EBEI, thus:

$$NOPAT = EBEI + ATIntEx = CFO + ACCR + ATIntEx \qquad (2\text{-}27)$$

where ATIntEx is the after tax equivalent of book interest expense.

NOPAT differs from EBEI. The major difference is that NOPAT separates operating activities from financing activities by adding back the after tax effect of debt financing charges (interest expense) included in EBEI. As a measure of operating profit, no allowance is made in (2-27) for the financing activities of the company, in terms of debt and equity. Residual income differs from EBEI since it measures operating performance (NOPAT) net of charge for the cost of all debt and equity capital employed:

$$RI = NOPAT - (c^* \times CAP) \qquad (2\text{-}28)$$

$$RI = CFO + ACCR + ATIntEx - (c^* \times CAP) \quad (2\text{-}29)$$

where c^* is the WACC and CAP is the capital employed, which according to Stern Stewart's definition, is defined as assets (net of depreciations) invested in going-concern operating activities, or equivalently, contributed and retained debt and equity capital, at the beginning of the period.

Naming the ($c^* \times$ CAP) as capital charge (CapChrg), the formula (2-29) becomes as follows:

$$RI = CFO + ACCR + ATIntEx - CapChrg \quad (2\text{-}30)$$

To arrive from RI to EVA®, Stewart (1991) proposed a series of accounting adjustments both for NOPAT and the capital employed. Those adjustments (an amount up to 164 in terms of inventory treatment, depreciation, R&D, goodwill, deferred taxes, etc.) are focused on eliminating accounting distortions and producing more economic than accounting data. Therefore, in terms of EVA®, formula (2-28) can be expressed as follow:

$$RI = NOPAT - (c^* \times CAP) \quad (2\text{-}28)$$

$$EVA = NOPAT + AcctAdjst_{NOPAT} - c^* \times (CAP + AcctAdjst_{CAP}) \quad (2\text{-}31)$$

where

$AcctAdjst_{NOPAT}$ are Stern Stewart's adjustments to accounting measures of operating profits, and

$AcctAdjst_{CAP}$ are Stern Stewart's adjustments to accounting measures of capital.

Biddle, Bowen and Wallace (1997) express those adjustments as follow:

$$AcctAdjst_{in\ total} = AcctAdjst_{NOPAT} - (c^* \times AcctAdjst_{CAP}) \quad (2\text{-}32)$$

And consequently formula (2-31) becomes:

$$EVA = NOPAT - (c^* \times CAP) + AcctAdjst_{in\ total} \quad (2\text{-}33)$$

$$EVA = CFO + ACCR + ATIntEx - CapChrg + AcctAdjst_{in\ total} \quad (2\text{-}34)$$

Specification (2-34) gives a clear image of EVA® components. However, since the accounting adjustments are of vital importance in EVA® calculation, there will be a short discussion about them in the following section.

2.3.3.6. Adjustments in EVA® Calculation

According to Young (1997) EVA® is not bound by accounting conventions. If National accounting principles distort the measurement of operating income or capital, adjustments are made as necessary. Most of the adjustments are in the form of what Stern Stewart & Co. call 'equity equivalents'. The reasoning behind these adjustments is that when companies apply generally accepted accounting principles or National accounting principles, certain items are charged to operating income, such as R&D, goodwill, provisions, and deferred taxes, that misleadingly reduce stated capital. Unless these charges are restored to equity, capital charges will be understated. Additionally, operating income will also be mis-stated.

Young (1999, p. 8), based on the arguments that accounting numbers are not an appropriate proxy for value creation, and managers who are evaluated and compensated on the level of earnings may take action that increases earnings but destroys value, or fail to take actions that may reduce earnings but create value, summarised the adjustment processing as follows:

'adjustments aim to (1) produce an EVA® figure that is closer to cash flows, and therefore less subject to the distortions of accrual accounting, (2) remove the arbitrary distinction between investments in tangible assets, which are capitalised, and intangible assets, which tend to be written off as incurred, (3) prevent the amortisation, or write off, of goodwill, (4) eliminate the use of

successful efforts accounting, (5) bring off-balance sheet debt into the balance sheet and (6) correct biases caused by accounting depreciation'.

As mentioned earlier, to define and refine its EVA® measure, Stern Stewart & Co. has identified a total of 164 performance measurement issues, including methods of addressing shortcomings in conventional accounting such as: inventory costing and valuation, seasonality, depreciation, revenue recognition, the write off of bad debts, the capitalisation and amortisation of R&D, intangibles, mandated investments in safety and environmental compliance, valuation of contingent liabilities and hedges, special issues for taxation, inflation, currency translation, etc. (Stewart, 1994). However, the number of accounting shortcomings or adjustments needed appears differently in the literature. For example Stern, Stewart and Chew (1995, p. 41) stated: 'Stern Stewart has identified over 120 shortcomings in conventional GAAP accounting'. Ehrbar (1998, p. 164) quoted 'Stern Stewart has identified more than 160 potential adjustments to GAAP and to internal accounting treatments, all of which can improve the measure of operating profits and capital', while other scholars (for instance, Young, 1999; Worthington and West, 2001) are referring to *120-150 possible adjustments*[6].

Nevertheless, because of the great number of possible adjustments, no company is intended to apply all of them (Stewart, 1994; Stern, Stewart and Chew, 1995; Ehrbar 1998). In general, they found it necessary to address only 20 to 25 key measurement issues in detail and as few as 5 to 10 key adjustments to be actually made in practice. Young (1999)[7] also observed that a figure of no more

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[6] Most common adjustments are referred on: Recognising non-recurring gains and losses, R&D, deferred taxes, intangibles (goodwill), depreciation, provisions, restructuring changes and other macroeconomic conditions.

[7] In our days special software packages have been developed, e.g. FINANSIER from Stern Stewart and Company, that can very easily apply all proposed adjustments for the exact measurement or the refined EVA®.

than fifteen adjustments to published accounts has progressively decreased in recent years. Moreover, Stewart (1994) and Stern, Stewart and Chew (1995) recommended that adjustments are necessary to be made only in those cases where companies pass the following tests: is it likely to have a material impact on EVA?, can managers influence the outcome?, can operating people readily grasp it?, and is the required information relatively easy to track or derive?. They finally concluded that, for any company the definition of the implemented EVA® is highly customised with the aim of striking a practical balance between simplicity and precision.

This stimulated Ehrbar (1998, p. 165) to distinguish EVA® as: basic EVA®, disclosed EVA®, tailored EVA®, and true EVA®. Then he considered basic EVA® and true EVA® as basic or extreme cases respectively, and recommended the adoption of tailored EVA® for any company. He did that since tailored EVA® takes into account the specific characteristics of each company where implemented while disclosed EVA® does not reach this specificity. Finally, he provided evidence that the disclosed EVA® explains about 50 per cent on changes in MVA while tailored EVA® or custom-tailored EVA® as he called it, typically explain from 60 per cent to as much as 85 per cent of changes in MVA. This happened since according to Ehrbar (1998) what each company needs is a custom-tailored definition, peculiar to its organisational structure, business mix, strategy, and accounting policies. A custom-tailored definition that optimally balances the trade-off between simplicity (the ease with which it can be calculated and understood) and precision (the accuracy with which it captures true economic profit).

Stewart (1991; 1994; 1999), Young (1997; 1999), and Young and O'Bryne (2001) have illustrated with examples the impact of the accounting adjustments on a company's NOPAT and invested capital. Rennie (1997) summarised and proposed that the modifications to a company's conventional accounts may be meaningfully grouped as adjustments to: recognising non-recurring gains and losses, R&D, deferred taxes, intangibles (goodwill), depreciation, provisions for warranties and bad debts, restructuring changes and macroeconomic conditions. Those grouped adjustments have been analytically presented in various studies and extensively examined and discussed by Young (1997; 1999), Worthington and West (2001), Young and O'Bryne (2001).

Despite the large amount of possible EVA® adjustments Young (1997; 1999) suggested that companies adopting this method should limit the number of implemented adjustments to fewer than ten. Otherwise, they face the risk of making the system very complicated and costly as well. Young (1999) argued that many of the adjustments are of little importance to the company level, and some may be difficult, if not impossible, to replicate at the security level. Finally, Young (1997, p. 338) summarising the critique on the adjustment processing suggested as a rule that 'adjustments should be made only if the amounts are significant, the required information is readily available, and no finance professionals can understand them'. The last point is very important, since it is the basis for truthful communication between managers and the company's finance persons. Zimmerman (1997) has also discussed the costliness of deviations from accounting numbers to EVA® figures. He concluded that: EVA® is neither more or less effective than traditional financial performance measures in deterring divisional managers from taking actions that increase divisional profits at the expense of corporate value, companies should not choose a performance measure merely because of its high correlation with stock returns, and EVA® adoption has potential costs in form of increased auditing requirements.

Although EVA® proponents are considering the adjustments as a crucial process to produce the equity equivalence and consequently the correct EVA®, a number of scholars in line with Zimmerman (1997) discussed in detail their usefulness. Anderson, Bey and Waver (2004) asserted that there is no theoretical or empirical evidence that the EVA® adjustments convert *wrong* accounting numbers into *correct* estimates of value, and moreover, there is no economic theory to guide the selection of the most relevant accounting variables that will be adjusted. They also found that the impact of the primary adjustments is inconsistent from year to year and, in general, insignificant. This led them to believe that the use of EVA® as a basis for compensation or a measure of corporate wealth creation is limited. According to Chen and Dodd (1997, p. 331) this result can be supported since they argued that a company could 'implement performance measures, based on the computationally simpler RI, which will likely provide them with most of the practical benefits promised by the EVA® system'.

The EVA® calculation as proposed by Stern Stewart & Co. is not an easy process at all. However, there are only a few studies that discuss the particular difficulties in EVA® calculation. Keys, Azamhuzjaev and Mackey (2001) presented a critical analysis for the calculation of EVA®. They examined step-by-step EVA® calculations, and concluded that EVA® has several weaknesses, especially in calculation of NOPAT and Capital, EVA® has eight general limitations and EVA® is identical to RI, an older financial measure largely abandoned by US companies' years ago. Concerning the weaknesses in calculation of NOPAT and capital, they were mainly focused on the proposed accounting adjustments by EVA® proponents, which they have criticised in detail. As for the general limitations they summarised them as follows: managers will have fewer choices in financing operations, risky projects will be accepted and moderate ones will be rejected, EVA® is too complex, EVA® is easy to manipulate, EVA® is a short term measure, EVA® is a single performance measure that includes no measures for quality or time, EVA® terminology is misleading, and EVA® should not be used for capital budgeting (Keys, Azamhuzjaev and Mackey, 2001).

Moreover, Goldenberg (2000) characterised shareholder value approach as invalid and dangerous. He argued that it mis-allocates resources, revives old fallacies, and debases the reputation of economics as a useful business discipline. Finally, he underlined that shareholder-value proponents misinterpret the free-enterprise[8] model. Consequently, the shareholder-value proponents mis-define and mis-measure such basic economic variables as price, cost, revenue, profit, capital, and investment.

In summary, the demerits and shortcomings of EVA® are the following: EVA® is based on financial accounting methods that can be manipulated by managers. EVA® is an integrated financial management system, and thus, if a company just measures EVA® without adapting it as its main incentive compensation system, results will not probably be satisfactory. The proposed EVA® adjustments, although limited to less than ten, are not clear, and missing theoretical background. EVAs® estimated through Stern Stewart's and Co. completed calculation framework should differ from those EVAs® estimated based only on a few adjustments. EVA® focus on immediate results and, thus, diminishes the importance of innovation investments. EVA® provides information that is obvious but offers no solutions in much the same way as historical financial statements do. Given the emphasis of EVA® on improving business-unit

[8] Free enterprise model's three most stronger promises are: market prices reflect economic value, profit maximisation is each business's sole aim, and the market system efficiently process information.

performance, it does not encourage a collaborative relationship between business unit managers. EVA® is not free of accounting distortions, is a static metric and short-term measure. EVA® is not a reliable signal for value maximisation. EVA® is not appropriate measure to estimate change in value. EVA® is too complex. EVA® is a single performance measure that includes no measures of quality or time. EVA® terminology is misleading Start-ups and true venture companies are not suitable for EVA® analysis. These results bring EVA® under hard critique and open the debate about its usefulness as a financial performance measure.

2.3.3.7. The WACC

The WACC, or otherwise c^*, is the blended cost of the company's equity and debt. It is an opportunity cost, one that is equal to the total return a company's investors could expect to earn by investing in a portfolio of securities of comparable risk (Stewart, 1999). Also, it is the appropriate rate to discount operating cash flows to their present value, to rank capital investment projects and to judge returns on capital employed (Stewart, 1991; 1999; Rappaport, 1986; 1998).

The WACC is the weighted cost of both equity capital and interest bearing debt, taking into account the tax benefit of debt. More precisely, it is equal to the cost of equity times the ratio of equity to total capital, plus the cost of debt times the ratio of debt to total capital (benefited by tax shield). The following formula (2-35) presents the WACC, or c^*, as it is broadly accepted in financial literature.

$$c^* = \left(\text{cost of equity} \times \frac{\text{Equity}}{\text{Equity} + \text{Debt}}\right) + \left(\text{cost of debt} \times \frac{\text{Debt}}{\text{Equity} + \text{Debt}}\right) \times (1 - \text{Tax rate}) \quad (2\text{-}35)$$

where $\text{Equity} + \text{Debt}$ is the Total Capital.

To calculate the WACC some elements need to be identified first. These are: the solvency ratio, the cost of equity, the cost of debt and the tax rate.

The solvency ratio usually changes according to business cycles and other factors. According to financial theory (Copeland and Weston, 1988), when solvency changes the cost of the equity and debt change to the degree that the WACC itself does not change (considering the tax treatment of debt and equity unchanged). This suggestion gives a procedure for calculation of the WACC using the actual solvency and the actual cost of equity and debt. However, this method might be too complicated and time-consuming. Instead of actual solvency, Rappaport (1986; 1998) and Stewart (1991; 1999) strongly recommended the use of target solvency in calculating the WACC. This method does not recognise that costs of equity and debt increase with leverage but on the other hand only the average cost of capital is usually of importance.

The cost of debt is the rate that a company has to pay in the current market to obtain new long-term debt capital (Stewart, 1999). To measure it, is a relatively straightforward procedure since it has been proved that what is appropriate is the cost of new debt and not the cost of all previously outstanding debt. This happens because the economic desirability of a prospective investment depends upon the future costs and not on the past costs (Rappaport, 1998). However, Stewart (1999, p. 434) proposed as the best indicator for the cost of debt 'the prevailing yield to maturity on the firm's outstanding and publicly traded debt'. On the other hand, Rappaport (1998, p. 38) proposed that 'the relevant rate of the cost of debt is the long-term rate or yield to maturity, which reflects the rate currently demanded by debt holders'. In other words, his definition does not take into consideration the company's outstanding debt, as Stewart does. However, we may say that both definitions are only the same if we assume that the cost of outstanding debt is the same as the one currently demanded by debt holders. Finally, the interest on debt, since it is tax deductible has been treated in the same way from both Rappaport

(1986; 1998) and Stewart (1991; 1999). They both considered that the rate of return that has to be earned on debt financed investments is the after tax cost of debt. The second part of the WACC formula captures the calculation of cost of debt.

$$\left(\text{cost of debt} \times \frac{\text{Debt}}{\text{Equity} + \text{Debt}}\right) \times (1 - \text{Tax rate}) \qquad (2\text{-}36)$$

The cost of equity is another component of the cost of capital and is more difficult to estimate. While in the case of cost of debt, the company can identify the specific rate to pay for the use of debt capital, in the case of cost of equity there is no explicit agreement to pay common shareholders any particular rate or return. According to Rappaport (1998, p. 38) 'there is some implicit rate of return required to attract investors to purchase the firm's stock and to induce shareholders to hold their shares'. This rate is the relevant cost of equity capital. Stewart (1999, p. 434) determines the cost of equity capital as 'an opportunity cost equal to the total return that a company's investor could expect to earn from alternative investments of comparable risk'. That means that rational risk-averse investors expect to earn a rate of return that will reward them for accepting higher investment risk. Thus, to determine the company's cost of equity capital, or the minimum expected return that will persuade investors to buy and hold company's shares, it is logical to assume that shareholders will request a risk free rate as is represented in the current yields offered in government bonds, plus an additional return or equity risk premium for investing in the company's more risky shares (Rappaport, 1998). In this case the cost of equity can be expressed as follow:

$$\text{Cost of equity} = \text{Risk-free rate} + \text{Equity risk premium} \qquad (2\text{-}37)$$

This expression of cost of equity is in fact based on CAPM. CAPM is the model which describes the relationship between risk and expected return. Moreover, it serves as a model for the pricing of risky securities. As has been discussed earlier, CAPM says that the expected return of a security or a portfolio equals the rate of the risk-free security plus a risk premium. If this expected return does not meet or beat the required return then the investment should not be undertaken (Markowitz, 1952; Sharpe, 1964; Lintner, 1965; Black, 1972). This relationship can be expressed as follow:

Required (or expected) Return = RF rate + Beta X (Expected Market return - RF rate)

and might be presented through the following formula:

$$E(R_j) = R_f + \beta_j \times [E(R_m) - R_f] \qquad (2\text{-}38)$$

Where

$E(R_j)$ is the expected return on security or portfolio j

R_f is the risk free rate

β_j is the risk (beta factor) of security or portfolio j

$E(R_m)$ is the expected rate of return of the market portfolio

$[E(R_m) - R_f]$ is the market risk premium

$\beta_j \times [E(R_m) - R_f]$ is the risk premium of security or portfolio j

Comparing formulas (2-37) and (2-38) one can realise that they are identical. Thus, based on CAPM, both Rappaport (1986; 1998) and Stewart (1991; 1999) developed the estimation of cost of equity capital. Going back to formula (2-37), there are a few more things to discuss. These are the risk-free rate and the equity risk premium. According to Stewart (1991; 1999) the risk-free rate is the government bonds. Rappaport (1998) went further and proposed the rate on long-term Treasury bonds as the best estimator for the risk-free rate. Also he noticed that this rate captures expected inflation too. Thus, his proposition for the risk-free rate is:

$$\text{Risk-free rate} = \text{`Real' interest rate} + \text{Expected inflation rate} \qquad (2\text{-}39)$$

Another component of the cost of equity, according to formula (2-37), is the equity risk premium. Consistent with CAPM, one could estimate the equity risk premium for a specific stock by calculating the product of the *market* risk premium for equity and the individual security's systematic risk. Market risk premium is the excess of the expected rate of return on a representative market index such as Standard & Poor's 500 stock index over the risk-free rate, while security's systematic risk is measured by its beta coefficient (Rappaport, 1998). This can be expressed as follow:

Equity risk premium = Beta X (Expected return on Market – Risk free rate) (2-40)

CAPM expresses this specification as: $\beta_j \times [E(R_m) - R_f]$

where

β_j is the systematic risk of security or portfolio *j*

$[E(R_m) - R_f]$ is the market risk premium

The market risk premium represents the additional compensation, which is expected by investors for investing in stocks, rather than in risk-free government bonds. Rappaport (1998) argued that the market risk premium should be based on the expected rate of return rather than on average historical rates. This approach is crucial because with the increased volatility of interest rates over the past three decades the relative risk of bonds has increased, thereby lowering risk premiums to a range from 3 to 5 per cent. On the other hand, those who estimate the market risk premium as the long run average excess of stock returns over government bond returns, will normally typically obtain a figure in the 7 to 9 percentage range (Rappaport, 1998). Furthermore, he claimed that to estimate the expected rate of return, analysts' projections for earnings and payout ratios should be combined to generate near-term as well as long-term dividend forecasts. The discount rate that equates the forecasted dividend stream to the current stock price is the implied or expected return. Stewart (1999) has also contributed to the market risk premium by comparing the returns of stocks and bonds for a period of 65 years (1925 to 1989) and found that an average of 6 per cent may represent the market risk premium.

Beta coefficient (β), or systematic risk, is the final factor for the calculation of cost of equity capital. Beta represents the risk of the stock, in other words it is the volatility of its return in relation to returns of market portfolio. Market portfolio's beta is by definition equal to 1. Therefore, stocks with betas greater than 1 are more volatile than the market, and thus should carry a risk premium greater than the risk premium of the overall market. For example, a stock with a beta of 1.3 means that when the market moves up or down 1 percent, then the stock moves up or down 1.3 percent. Beta coefficient for a stock is calculated by running a linear regression between past returns of the stock and past returns on a market index. The product is historic beta telling how risky the stock was in the past (Rappaport, 1998; Stewart, 1999). The regression model can then be formed as follow:

Company's returns= a + beta (returns on a market index) + c (2-41)

Stewart (1999) became more specific for the beta estimation by proposing to regress monthly return to returns on market index over the past five years.

In summary, the cost of equity equals to risk-free rate plus the product of beta and the market risk premium. In the Greece case however, this study will not adopt the risk premiums as proposed by Rappaport (1986; 1998) and Stewart (1991; 1999) since the market characteristics of the US are different to those of Greece.

2.3.3.8. Relation between SVA, RI, EVA® and Changes in RI and in EVA®

Theoretically, and from the shareholders' point of view, EVA® is considered superior to traditional accounting performance measures since it incorporates risk. Moreover, Stewart (1991; 1999) suggested EVA® as a measure both for value and performance measurement. He proposed the abandonment of cash flows and the adoption of the discounted EVAs instead. On the other hand, Rappaport (1998) compared SVA with absolute RI and EVA®[9] by addressing the following three questions: do the two approaches yield identical valuations for business? do the two approaches distribute value-added identically over the forecast period?, and do the two approaches yield consistent answers as to whether the business has created or destroyed value? Rappaport (1998) calculated the value added using the two approaches (SVA and RI/EVA®) and answered the above three questions as follow: yes, no and no respectively. Therefore, while the two approaches yield identical valuation for business, they do provide different answers about the value created in each year.

Rappaport (1986; 1998) considered the absolute values of RI and EVA® as misleading indicators since they do not distribute the value added identically over the forecasted period, and they do not give identical answers to SVA on whether value is created or destroyed over a period. This discouraged him in suggesting the absolute values of RI and EVA® either as performance evaluation measures or as incentive compensation system. Instead he suggested the *change* in RI or the *change* in EVA® as proper performance measures. On the other hand, although Stern Stewart & Co. popularised EVA® as *simply the best metric*, they draw the same conclusions as Rappaport (1998). Stewart (1994, p. 78) stated 'The second reason we use book values is that we found a way of circumventing the problem

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[9] Residual income and EVA were examined by Rappaport as one concept

of historical costs, namely, by tying management rewards not to absolute measures of EVA®, but to year-to-year *changes* in EVA®. Just as total quality management focuses on continuous improvement in products and processes, an EVA® system focuses on continuous improvement in financial performance. If you reward management for improving EVA®, it really doesn't matter what value you assign to the assets'. Stern, Stewart and Chew (1995) also supported this claim demonstrating the advantages of *changes* or *improvements* in EVA®.

How then is RI/EVA related to SVA? Let's recall the EVA® formula (2-18), EVA = NOPAT – c^* X capital

When considering the *changes*, the above formula becomes as follow:

$$\text{Change in EVA} = (\text{Change in NOPAT}) - c^* \times (\text{Change in capital}) \qquad (2\text{-}42)$$

According to Rappaport (1998) change in capital, *if properly calculated*, will be identical to incremental investment in the SVA formula. Therefore, dividing the above formula by the cost of capital it becomes:

$$\frac{\text{Change in EVA}}{c^*} = \frac{(\text{Change in NOPAT})}{c^*} - \frac{c^* \times (\text{Change in Capital})}{c^*}$$

$$\frac{\text{Change in EVA}}{c^*} = \frac{(\text{Change in NOPAT})}{c^*} - \text{Change in Capital}$$

$$\frac{\text{Change in EVA}}{c^*} = \frac{(\text{Change in NOPAT})}{c^*} - \text{Incremental Investment}$$

$$\frac{\text{Change in EVA}}{c^*} = \text{SVA} \qquad (2\text{-}43)$$

and thus,

$$\text{Change in EVA} = c^* \times \text{SVA} \qquad (2\text{-}44)$$

Change in EVA® , as shown above, is equal to SVA multiplied by the cost of capital. Therefore, since *change* in EVA® is a simple multiple of SVA, companies that choose to maximise *change* in EVA® have in principle made the same decision as to maximise SVA. The choice between these two models rests on which is likely to gain greater acceptance and therefore become easier to successfully implement in the company. Mills and Print (1995) published a detailed presentation on the differences between SVA and EVA®, while Mills (1999) analytically discussed the principles and issues related to SHV analysis.

Summarising the relationship among all those performance alternatives, it is concluded that SVA and *change* in RI or *change* in EVA® are the most appropriate performance valuation alternatives. SVA has an additional advantage since it yields the best estimate of change in value. Absolute values of RI or EVA® are improvements on traditional accounting measures since they incorporate risk. However, while they are based on historical accounting, they have the same shortcomings as traditional accounting measures. Rappaport (1998) summarised the relation of all those performance alternatives, including some of the accounting ones, as it is shown in table (2-1).

Table 2-1: Attributes of Alternative Performance Evaluation Models

	Earnings	ROI or ROE	RI and EVA®	Change in RI and EVA®	SVA
Accounts for investment	No	Yes	Yes	Yes	Yes
Accounts for risk	No	No	Yes	Yes	Yes
Free of accounting distortions	No	No	No	Yes	Yes
Reliable signal for maximising value	No	No	No	Yes	Yes
Best estimate of change in value	No	No	No	No	Yes

Source: (Rappaport, 1998)

It is likely that SVA and *change* in RI or *change* in EVA® do not always capture the near-term accomplishment required to achieve long-term value creation. In this case it is proposed to use leading indicators of value as supplements to SVA, *change* in RI or *change* in EVA®. Examples of those leading indicators of value are: measures of customer satisfaction, quality improvement, on-time new product launches, timely opening of new stores, productivity improvements, intellectual capital, etc. Consequently the question of the usefulness of the new alternative performance measurement systems, such as the Balanced Scorecard and the Intellectual Capital is more that crucial.

2.3.3.9. Balanced Scorecard and Intellectual Capital

The *Balanced Scorecard* developed by Kaplan and Norton (1992, 1996). It consists of an integrated set of performance measures that are derived from the company's strategy and support the company's effort to implement successfully this strategy. A company's strategy is essentially a statement of actions (or a raw map) of its stated goals. Under the balanced scorecard approach, top management translates its strategy into performance measures that employees can understand and successfully attain them. Performance measures used in the balanced scorecard tend to fall into four perspectives (groups): financial performance, customer satisfaction, internal business processes, and learning and growth. Up to now, it is an accepted framework by many relatively big companies, especially in US, but not from many others, especially small and medium ones. Moreover, we could notice the following: very few firms in Greece calculate and use the BSC as their major performance management system (PMS); in essence, it reflects the logic of a hierarchical, linked, multi-perspective measures system, and it is unique for each company since it reflects its overall strategy. Since the four perspectives are differently used and estimated by each company and since the disclosed information from the financial statements is not enough to perform the calculations, the BSC is excluded of this study.

Intellectual Capital (IC) is a topic of increasing interest to companies that drive their profits from innovation and knowledge-intensive services. Edvinsson and Sullivan (1996) defined IC as knowledge that can be converted into value. Statements from other scholars (Bontis, 1998, 1999, 2001, 2002; Edvinsson, 1997; Stewart, 1997) suggested that traditional measures of corporate performance may be unsuitable in the new economic world where competitive advantage is driven by IC. However, even though the term has been used in the literature before, only a few companies, such as Skandia, Dow Chemicals and the Canadian Imperial Bank of Commerce, use IC to measure and manage intangible assets. Bontis *et al.* (1999) argued that IC is very much a practitioner-created concept, and only more recently did scholars' contribution appear to analyse its use and dynamic.

IC is something absolutely and peculiar to each and every company: what the company can and cannot influence depends on many factors, which make one company include in IC something that another company would not. In other words, IC is context specific. IC consists of two categories of capital: human capital (HC) and structural capital (SC). However, when we try to get into the IC concept, the idiosyncratic situation of each company should take precedence, and guide the selection of specific categories. HC is a collection of intangible resources (competencies, attitude, and intellectual agility) that are embedded in the members of the organisation. SC (relationships, organisation, and renewal and development) is the knowledge embedded within the routines of an organisation. IC comprises all the intangible resources that are the property of the company (Bontis *et al.* 1999).

Mouritsen (1998) compared and contrasts EVA® and IC as two technologies of managing oriented towards encouraging growth. He revealed that

EVA® and IC contrast greatly, and moreover, they are diametrically opposed in terms of the role of calculation. He considered IC as a different control system concerned to encourage endogenous growth implemented via loosely coupled sets of non-financial measurements that become strong via stories and metaphors about the post-modern firm in the post-modern world. While EVA® looks to managers as the movers of change, IC seems more systematically to promote the creativity possessed by employees. EVA® and IC utilise different drivers of growth and value. They are both intellectual technologies oriented towards the future, but they capture future in two different ways. EVA® tries to calculate it, while IC tries to hope for it and visualise it. EVA® is directly concerned with cash flows, while IC is directly concerned with competence enhancement (Mouritsen, 1998).

Research on the value relevance of IC is limited. Firer and Williams (2003) investigated the association between the efficiency of value added by the major components of a company's resource base (physical capital, HC and SC) and three traditional dimensions of corporate performance (profitability, productivity, and market valuation). Their findings suggested that physical capital remains the most significant underlying resource of corporate performance. The Value Added Intellectual Coefficient (VAIC™), developed by the Austrian IC Research Center, formed the underlying measurement basis for the three major independent variables (physical capital, HC and SC). However, the way VAIC™ is calculated[10] makes it impossible to be calculated for the Greek listed companies since a few components cannot be found in the disclosed financial statements. For example, HC, calculated as total investment salary and wages for the company,

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[10] $VAIC^{TM}{}_j$= VA_j intellectual coefficient for firm j;
$VA_j = I_j + DP_j + D_j + T_j + M_j + R_j$; ($I_j$): Interest expenses; ($DP_j$): Depreciation expenses; (D_j): Dividends; (T_j): Corporate taxes; (M_j): Equity of minority shareholder in net income of subsidiaries; (R_j): Profits retained for the year.

cannot be found in the financial statements. That makes it difficult then to estimate the SC, since it the VAIC™ less the HC. All those reasons made us to exclude IC of the purpose of the present study.

2.4. Empirical Evidence on Financial Performance Measures

In the broad market efficiency literature, a great number of studies have investigated the relationship between accounting numbers and stock returns. This kind of research is important because a high correlation between accounting based information (or measures) and market returns (stock returns) implies that the variable under consideration would provide a precise indicator of a company's value. Accordingly, the increase of a company's value or the acknowledgement of market under-pricings could be done exclusively on that basis. Traditionally, most of the studies were focused on accounting profits, earnings and accruals. However, in the last two decades cash flows, residual income and value-based measures such as EVA® also draw researchers' attention (Worthington and West, 2001).

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), Shroff (1995), Dhaliwal, Subramanyam and Trezevant (1999) and Rajan (2000)[11].

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).

2.4.1. Empirical Evidence on Earnings

Using different methodologies, a considerable number of studies have been conducted investigating the relationship between accounting earnings and stock

[11] 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.

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[12]. 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

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

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 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. Finally, Theriou *et al.* (2004) 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.

2.4.2. Empirical Evidence on Value-Based Performance Measures

The overall results of the value relevance literature suggest that accounting-based information can potentially influence stock prices. The empirical literature also claims that earnings generally dominate most other measures in explaining stock returns. However, the more recent literature (Stewart, 1991; 1999; Stern, Stewart and Chew, 1995; Rappaport, 1986; 1998; Grant, 2003; Abate, Grant and Stewart, 2004) suggested that earnings should not be relied upon, since they have little direct relationship to wealth creation. Thus, research into information content of other variables such as cash flows, has increased largely for two reasons: the apparent limitations in earnings numbers, and the increased need and demand for analysts and investors to correctly identify the value of the companies.

As has been explained in previous sections, while traditional accounting performance measures are popular measures for financial performance measurement, they are often under severe critique since they do not take into consideration the cost of capital and moreover, they are influenced by accrual based accounting conventions. On the other hand, modern value based measures are promoted as the measures of a company's real profitability. Since value became of primary concern to investors, proponents of value based measures claim that those measures are the only performance measures tied directly to stock's intrinsic value (Stewart, 1991; 1999; Grant, 2003). Especially, EVA® proponents have argued that EVA® and stock prices appear to have a trend to move together. Moreover, they have asserted the superiority of information contained in EVA® when it is compared to traditional accounting figures. Those claims have been empirically tested by many scholars but with contradictory and mixed results. The most important of those studies are reported here.

Stewart (1991) first provided evidence of the correlation between EVA® and MVA. Using a sample of 613 US companies over the period 1987-1988 and examining both levels and changes in EVA® and MVA, he found that there is a striking relationship between both levels of EVA® and MVA, and even more pronounced, between changes in these levels. Since the correlation between changes in EVA® and MVA was high, he suggested that adopting the goal of maximising EVA® and EVA® growth would in fact build a premium into the market value of the company.

Lehn and Makhija (1996) examined EVA® and MVA as measures of performance and as signals for strategic change. Their sample consisted of 241

US companies over the years 1987, 1988, 1992, and 1993. Firstly, hey first found that both EVA® and MVA correlated positively with stock returns and that this correlation was slightly better than with traditional performance measures such as ROA, ROE and ROS. Secondly, they suggested that both EVA® and MVA were effective performance measures containing information about the quality of strategic decisions and that they can serve as signals for strategic changes.

Milunovich and Tseui (1996) examined the computer service industry for the period 1990-1995. They found that MVA is more highly correlated with EVA® than with EPS, EPS growth, ROE, FCF or FCF growth. O'Byrne (1996) challenged the suggestion of other scholars (e.g. Easton, Harris and Ohlson, 1992) that earnings, without regard to the amount of capital employed to generate those earnings are sufficient to explain differences in stock returns. He 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 when indicator variables for 57 industries and the logarithm of capital for each firm were included as additional explanatory variables. However, since O'Byrne (1996) did not make similar adjustments to the NOPAT model, it was impossible to compare results using the different measures.

Uyemura, Kantor and Petit (1996) using ten years data (1986-1995) studied the relationship between EVA® and MVA. They also 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. Bao and Bao (1998) examined the usefulness of value added and abnormal economic earnings of 166 US companies. They found that value added is a significant explanatory factor in stock returns, and more, its explanatory power is higher than that of earnings. Bannister and Riahi-Belkaoui (1991), Riahi-Belkaoui (1993), Riahi-Belkaoui and Fekrat (1994), Riahi-Belkaoui and Picur (1994), Karpik and Riahi-Belkaoui (1994) and Worthington and West (2001) clearly suggested the superiority of EVA® compared to earnings and other accounting performance measures in explaining stock returns.

Other scholars found that EVA® is predictive of stock returns, but it is not the only performance measure that ties directly to a stock's intrinsic value, which is one of the primary assertions of EVA® proponents (Stewart, 1991; 1999). Among others, they suggested that EVA® is not a superior measure of company's performance. Dodd and Chen (1996) and Chen and Dodd (1997) based on a ten years (1983-1992) sample of 566 US companies obtained from the 1992 Stern Stewart Performance[13] 1,000 and the Compustat database, provided important evidence concerning the implementation of EVA®. Dodd and Chen (1996) found that stock returns and EVA® per share are correlated as advocated by EVA® adopters. However, the correlation was far from perfect. On the other hand they found that ROA explained stock returns slightly better than EVA®. Their findings also suggested that if a company wants to adopt the philosophy of EVA® as a corporate performance measure, it might want to consider using RI instead. Finally, since nearly 80 per cent of their sample's stock returns could not be

[13] Stern Stewart Performance[13] 1,000 is a database containing EVA® figures produced by Stern Stewart & Company.

explained by EVA®, they concluded that EVA® is neither the only performance measure to tie with stock returns nor a very complete one. This is consistent with other stock market research suggesting that to explain more completely the variability in stock returns, multiple determinants are required.

Chen and Dodd (1997), using more complete models and multiple regression analysis, extended the previous research and examined the explanatory power of EPS, ROA, ROE, RI, and four EVA® related measures. Firstly, they found that improving EVA® performance is associated with higher returns. However this association is not as strong as suggested by EVA® proponents. No single EVA® measure was able to account for more than 26 per cent of the variation in stock returns. Secondly, the EVA® measures provided relatively more information than the traditional accounting measures in terms of the strength of their association to the stock returns. Moreover, the findings of this study suggested that the accounting earnings provided significant incremental explanatory power above EVA®. Thus, Chen and Dodd (1997) concluded that companies should not follow the suggestions of EVA® advocates where traditional accounting measures should be completely replaced with EVA® and suggested that along with EVA®, companies should continue monitoring the traditional measures of accounting profits such as EPS, ROA and ROE. Finally, consistent with their previous results, they found that RI provided almost identical results to EVA®, without the need of accounting adjustments advocated by Stern Stewart & Co.

Bacidore *et al.* (1997) suggested a refinement of EVA®, the REVA. REVA assesses a capital charge for a period equal to WACC times the market (rather than book) value of the company at the beginning of the period. Their sample was based on 600 companies randomly selected from the Stern Stewart

Performance 1,000 database, and on accounting and financial data selected from Standard and Poor's Compustat and University of Chicago CRSP database respectively. They compared EVA® to REVA and found that although both measures were statistically related to abnormal stock returns, REVA outperformed EVA®.

Biddle, Bowen and Wallace (1997) provided the most comprehensive study of EVA's value relevance to date. They used a sample of 773 US companies from Stern Stewart & Co. database, resulting in a 6,174 year-observations over the period 1984-1993. Using relative and incremental information content tests and constructing models based on Easton and Harris (1991) methodology, they examined the power of accounting measures (earnings and operating profits) in explaining stock market returns, in direct comparison with EVA® and five components of EVA® (CFO, operating accruals, ATIntEx, capital charge, and accounting adjustments). In contrast to studies supporting the superiority of EVA®, they found that traditional accounting measures, generally, outperformed EVA® in explaining stock returns. They also found that capital charges and adjustments for accounting 'distortions' had some incremental explanatory power over traditional accounting measures, but the contribution from these variables was not economically significant.

Some scholars applied Biddle, Bowen and Wallace (1997) methodology into their own countries (e.g. Worthington and West, 2001) and found similar results. Worthington and West (2001), using pooled time-series, cross-sectional data on 110 Australian companies over the period 1992-1998, proved that relative information content tests reveal earnings to be more closely associated with returns than NCF, RI and EVA®. However, consistent with the construction of EVA-type measures, incremental information content tests suggested that EVA®

adds more explanatory power to earnings than either NCF or RI. The pairwise combination of EVA® and earnings indicated that the explanatory power has increased by 10.26 percent, higher than any other pairwise combination.

Other scholars (e.g. Forker and Powell, 2004; Worthington and West, 2004) using different methodologies provided totally different results than those reported by Biddle, Bowen and Wallace (1997). Worthington and West (2004) using the same sample but changing the methodology found that EVA® is more associated with stock returns than earnings. Forker and Powell (2004) also, using Shiller (1981) methodology revisited Biddle, Bowen and Wallace (1997) study and provided reverse results. They showed that investors' factor of cost of capital into equity pricing and residual-based metrics, such as EVA®, are superior to traditional accounting metrics in providing a basis for investors to confirm or revise their expectations in the valuation process.

Kramer and Pushner (1997) evaluated EVA® and NOPAT as explanatory determinants of MVA and found that market value was better explained by NOPAT than EVA® under several scenarios. De Villiers (1997) studied the inability of EVA® to explain at least as much variation in stock returns as traditional accounting earnings and proposed a variant called AEVA[14]. De Villiers and Auret (1998) found that EPS had more explanatory power than EVA® in explaining stock prices in South Africa over the period 1977-1995.

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 both theoretically and empirically the link between EVA®

[14] AEVA is in fact an adjusted EVA variant to inflation. AEVA is calculated by firstly restating the capital base in current values, then determining the asset structure of the company and finally calculating the required accounting return. As a final step, the product of required accounting return and current value of capital is subtracted from NOPAT.

and stock price reaction. They found the results of Turvey *et al.* (2000) as expected, but moreover, they considered the EVA® concept as an enigma. In light of the findings and the arguments of Turvey *et al.* (2000) and Keef and Rush (2003), Sparling and Turvey (2003) examined the relationship of EVA® and shareholder returns and found an extremely weak correlation.

Chen and Dodd (2001) based on the valuation models used in previous studies from Easton and Harris (1991) and Chen and Dodd (1997) examined the value relevance of three profitability measures: OI, RI and EVA®. For a ten year period they used only those companies from 1992 Stern Stewart 1,000 database that were also available in Standard and Poor's Compustat PC Plus database with relevant data for the operating income and residual income variables. The final combined data set consisted of 6,683 observations. Relative and incremental information content tests were then conducted according to previous studies Relative information content test revealed that OI outperformed RI and EVA®. This result suggested that the new information provided by EVA® is less value relevant, at least from stock returns perspective, a finding consistent with Biddle, Bowen and Wallace (1997). The incremental information content tests revealed that RI measures contain significant information that is not available in OI. Thus including both the cost of debt and equity in a profitability measure seems to be a promising practise in terms of increasing value relevance. While their results support the incremental information value of EVA® in addition to RI and OI, the reported increase of the explanatory power is marginal from a practical point of view. Thus Chen and Dodd (2001) concluded that since RI and EVA provide almost the same results and since they differ only in the Stern Stewart adjustments, companies should implement the less costly RI measure.

Finally, the fact that only 10 per cent could be explained by accounting-based information, led Chen and Dodd (2001) to conclude that the remaining 90 per cent of the variation in stock returns is attributable to the other non earnings based information. Therefore, if a company intends to align organisational measures with stock returns, an alternative measure other than EVA® should be employed. Clinton and Chen (1998) obtained similar results. Finally, Copeland (2002) provided evidence that earnings, EPS growth, EVA®, and EVA® growth are all uncorrelated with total shareholder returns (TSR). This prompted Copeland (2002) to investigate the correlation between TSR and the difference between expected and actual performance, called 'Expectation-based Management' (EBM). Since he found a significant correlation, he suggested the EBM as a better tool for performance measurement.

Many other studies reported the weak correlation of RI metrics with stock returns. Peterson and Peterson (1996) provided evidence that EVA® type measures do not provide much more information than stock prices. Stark and Thomas (1998) examined the UK market and concluded that the relationship between RI and market value is by no means perfect. Günther, Landrock and Muche (1999; 2000) in examining the Germany stock market, could not prove that value-based measures (EVA®, CVA, DCF and Tobin's Q) outperform traditional accounting-based measures (ROS, ROI, and ROE). Goetzmann and Garstka (1999) found that long-term survival of companies may be related to accounting earnings, and more, simple EPS does as well or better than EVA® at explaining differences across companies and at predicting future performance. Finally, Kramer and Peters (2001) also reported the weak correlation between EVA® and MVA.

As for the Greek capital market, there is almost no evidence concerning the relevance of value-based measures on performance measurement. Only Kousenidis, Negakis and Floropoulos (1998) studied the analysis of divisional profitability using the RI profile. They reported results indicating that in addition to the question of whether RI and ROI were useful in divisional performance evaluation, both measures had an important role to play as a means of approximating actual cash flow. Their study was an expansion of the study carried out by Frigo and Ciecka (1995).

2.4.2.1. Empirical Research of EVA® Adopters

Ittner and Larcker (1998; 2001) argued that even though the value based performance measures might have a statistical relationship with stock returns, it is not obvious that these measures are preferable for management planning and control purposes. Paul (1992) claimed that an information system that is useful for companies' valuation does not imply that it would be useful for assessing managerial performance too. Paul (1992) and Zimmerman (1997) provided evidence on how *divisional* EVA® measures can be misleading indicators of value creation and perhaps provide the wrong incentives, even if *corporate* EVA® closely tracks changes in stock prices. On the other hand, Garvey and Milbourn (2000) developed a model to show that the correlation between EVA® and stock returns is a relevant factor in the choice of performance measures. They examined whether the adoption of EVA® as an incentive compensation tool was positively related to the statistical association between the company's EVA® and stock returns. Since the results supported their hypothesis, they concluded that the correlation between performance measures and stock returns was a useful input into the choice of internal objectives.

Those controversial results and the claim of shareholder value proponents that the implementation of shareholder value approach should be based on incentive compensation plans led to part of the value-based research to investigate the adopters' performance. Therefore, some studies focused on the examination of whether companies achieve superior performance when they adopt the value-based approach as their primary objective for planning and control. The results are also mixed and contradicting.

Wallace (1997) found that after the adoption of RI compensation plans, a significant increase in RI appeared in the treatment companies (adopters) compared to the control companies (non-adopters). He also found that companies that adopted RI based compensation plans, relative to non-adopters: decreased their new investment and increased their disposition assets, increased their payouts to shareholders through share repurchases, and more intensively utilised their assets. These actions were consistent with the strong rate of return discipline associated with the explicit capital charge in RI-based measures. Wallace (1997) also found weak evidence to suggest that market participants generally reported favourably to the adoption of RI-based compensation plans, in terms of increased stock returns.

There are very few studies examining the performance of actual EVA® adopters. Ehrbar (1999) found EVA® adopters outperformed non-adopters for up to five years after adoption. Kleiman (1999) concluded that EVA® adopters, for the four-year period, earn more than their median competitors. Dodd and Johns (1999) examined 88 companies where there were 37 EVA® adopters and 51 non-adopters. They concluded that EVA® adoption might foster an environment in which pursuit of higher EVAs may overshadow pursuit of quality and fulfilment of customer need. Cordeiro and Kent (2001) did not find any relationship between

EVA® adoption and future EPS, while Tortella and Brusco (2002) observed that on average companies do not experience significant abnormal reactions, either positive or negative, before or after EVA® adoption. Several other studies carried out by Askren, Bannister and Pavlik (1994), Riahi-Belkaoui (1996), Rogerson (1997), Bowen and Wallace (1999), Weaver (2001), Coles, McWilliams and Sen (2001), Lovata and Costigan (2002), Fatemi, Desai and Katz (2003), and Malmi and Ikäheimo (2003) examined the relevance of the adoption of the EVA® financial management system. Their findings are also mixed and contradictory.

As has been shown, the empirical evidence concerning the use of SHV approach and especially EVA® has been mixed and controversial. These controversial results suggest further research on the issue. Moreover, there is an increasing need to search for other factors influencing investors beyond traditional and value based performance measures. Shefrin (2000), Shleifer (2000), Warneryd (2001), Goldberg and Nitzsch (2001) revealed that behavioural, microeconomic and macroeconomic factors could influence investors. Therefore, the need for the examination of investors' financial behaviour became an additional area of research.

2.5. Investors' Behaviour in Stock Markets

Investors have the opportunity to choose among a wide range of investment products, but up to now research on how they express their investment behaviours is still very limited. The exploration and understanding of these behavioural patterns and consistent and specific education and training are regarded as of high importance in order to assist them and their successful financial future. Since financial decisions have become increasingly complex and risky, investors have to protect themselves from all possible difficulties in the stock markets.

Additionally, they have to be informed and trained on how all other investment groups are performing in capital markets (Clark-Murphy and Soutar, 2003).

A great deal of financial theory assumes investors are rational wealth maximisers (Peirson *et al.* 1998). They are acting following the basic financial rules and base their investment strategies on the risk-return consideration. However, the level of risk that investors are willing to undertake is not the same, depending mainly on their personal attitudes towards risk. Research in behavioural finance has been of high interest in recent years providing evidence that investors' financial decisions are also affected by internal and external behavioural factors (Shefrin, 2000; Shleifer, 2000). As an internal behaviour factor somebody can consider investors' knowledge of themselves while as an external behaviour factor somebody can consider the way an investment decision is presented or framed.

A common analysis of companies' financial statements examines fundamentals to explain and predict their growth and value added potential, but in many cases, current fundamental-based models fail to explain the past adequately, or predict the future reliably. Largely as a result of these failures, researchers have started to look beyond fundamentals to the role of other 'non-fundamentalist' influences on financial and stock markets including the approach to forecasting taken by practitioners. Goodhart (1998) found that the interaction between professional analysts relying for their views on fundamental analysis and those using the chartist approach influences the market outcome. Shiller (1989) explained excess bond and market volatility by 'irrational' patterns of investors' behaviour and suggests that technical analysis is one of the most important factors that gave rise to the October 1987 international stock market crash. However, despite the increasing interest in 'non-fundamental' analysis, there is little evidence on the prevalence and importance of such techniques in the stock markets (Lui and Mole, 1998).

2.5.1. The Empirical Evidence

Empirical evidence suggests that investment professionals may have different practices in different markets and may use different techniques for market forecasting in different time horizons. Therefore, it is most likely that the practice of market forecasting and stock valuation in Greece may be different from that of other developed stock markets, such as the US or the UK market.

On the other hand, more than 20 per cent of Greeks own shares either directly or through managed funds. Government policy is encouraging individuals to take responsibility for their own retirement income, suggesting this figure is likely to rise in the long term. However, according to Coval, Hirshleifer and Shumway (2002) despite the importance of the individuals' investment practices, we know little about the factors that influence them. Many studies have developed, exploring how decisions to sell or buy financial assets are made and how investors (individuals as well as investment professionals) choose between financial assets and it is also to this that the current study seeks to add. Consequently, the review of the literature concentrates on work involving individual and professional investors, since they are the focus of the present study.

2.5.1.1. Individual Investors – The Empirical Evidence

A number of studies have explored individuals' investment strategies. Green and Maheshwari (1969, p. 442) examined whether 'mean and variability of return represent salient attributes in respondent's perceptions of similarities and differences among a group of common stocks'. They provided evidence that mean and variance were significant and this was consistent regardless of how much other information was supplied. Potter (1971) identified six factors: dividends, rapid growth, investment for saving purposes, quick profits through trading, professional investment management and long-term growth, affecting the individual investors' attitudes towards their investment decisions.

Baker and Haslem (1973) argued that investors are primarily concerned with expectations about the future, considering earnings projection and historical data to be of high interest to investors in implementing their investment strategies. Blume and Friend (1978) provided evidence that both price and earnings volatility were the primary measures of risk undertaken by individual investors in the US. Schlarbaum, Lewellen and Lease (1978) in exploring individual investors' investment performance in the US compared to that of professional fund managers, found that they showed considerable skill in their investment decisions.

Lease, Lewellen and Schlarbaum (1974) described individual investors as 'investors' rather than 'traders', since they are long term focused and show little interest in short term yields. Further, Lewellen, Lease and Schlarbaum (1977) revealed that investors' main sources of information are the fundamental and technical analysis. Antonides and Van Der Sar (1990, p. 236), exploring the individual investors' characteristics in the Dutch stock market, argued that 'the perceived risk of an investment is lower the more the stock price has increased recently', which is consistent with Blume and Friend's (1978) findings.

Nagy and Obenberger (1994), searching the extent to which a listing of 34 variables influences shareholders' perception in Fortune 500 companies, provided evidence of a mix of financial and non-financial variables. They also found that each shareholder considers the seven factors arising from their factor analysis in a different way. Fisher and Statman (1997) relying on the general agreement that investment decision is a complex one, revealed that investors are not only concerned about risk and return when buying shares since there are other parameters to take into consideration. Clark-Murphy and Soutar (2003) in their study of what individual investors value in Australia, suggested that the vast majority of individual investors have little interest in speculation and are by nature long term investors.

2.5.1.2. Professional Investors – The Empirical Evidence

There are several studies examining the way that various investor groups are taking their investment decisions, especially in developing countries with a moderately sophisticated capital market. Nassar and Rutherford (1996) have conducted one for Jordan while Naser and Nuseibeh (2003) one for Saudi Arabia. They asked the different user groups to explain their attitudes towards annual reports and the usage of these reports in supporting their investment decisions. Evidence showed that investors employ annual reports in about the same way as those in developed countries with sophisticated capital markets, but they rely more on information obtained directly from the companies (Nassar and Rutherford, 1996) and they do not consult intermediary sources of corporate information in order to make informed decisions (Naser and Nuseibeh, 2003). Overall, investors seem to mainly use fundamental analysis (financial statements and ratios) and to a lesser degree, portfolio analysis (mean-variance analysis).

Other studies concerning mainly professional investors in developed capital markets, such as Hong Kong (Lui and Mole, 1998; Wong and Cheung, 1999), the UK (Allen and Taylor, 1989; Taylor and Allen, 1992; Collison, Grinyer and Russell 1996) and the US (Frankel and Froot, 1986; 1990; Carter and Van Auken, 1990) revealed that these groups of investors relied more on fundamental and technical analysis and less on portfolio analysis. From their findings we realise that professional investors use methods and techniques different from those proposed by academics (e.g., CAPM, APT, and market value based measures).

Additionally, many scholars contributed to the areas of fundamental analysis, technical analysis, portfolio analysis and noise in the market. Black (1986) found that noise in the market is an important factor, which influences many investors. Campbell and Shiller (1988) discussed how expected dividends drives stock prices while Fama and French (1989) explored the business conditions and expected returns on stocks and bonds. Shiller (1989) focused on market volatility, while Shleifer and Summers (1990) revealed the importance of noise trader approach to finance. Theodossiou (1991) and Bromwich (1992) discussed the usefulness of financial reporting and alternative models for assessing the financial condition of businesses respectively. Finally, Van der Hart, Slagter and Van Dijk (2001) discussed the stock selection strategies in emerging markets.

The revealed evidence from the above studies indicated that the extended use of fundamental or technical analysis depends on many factors. For instance, analysts from large firms in Hong Kong, especially those in top positions and with a lot of experience, rely more on fundamental analysis and less on technical analysis. On the other hand, analysts in brokerage firms rely more on technical and less on fundamental analysis and portfolio analysis (Wong and Cheung, 1999). They also provided insights that investment professionals may have different practices in different markets and may use different techniques for market forecasting in different time horizons. For example, at shorter horizons, technical analysis is more frequently used than fundamental analysis while the opposite occurs when the time horizon tends to increase (Lui and Mole, 1998; Wong and Cheung, 1999).

From the above findings we conclude that the traditional approaches, including both fundamental and technical analysis, are still dominant in some developing and most of the developed financial markets. The findings also suggest that investment professionals and individuals may have different practices in different markets and may use different techniques for market forecasting in different time horizons.

2.6. Conclusion

This chapter explored the theoretical and empirical research in the areas of performance measurement and behavioural finance. Traditional accounting performance measures on one side, and modern value-based performance measures on the other, have been examined and discussed. The research on traditional accounting measures started in the late 1960s stimulated by the publications of Ball and Brown (1968) and Beaver (1968), while the research on SHV approach started in the early 1990s influenced by the publications of Rappaport (1986) and Stewart (1991).

Although the research on traditional accounting performance measures has shown that these measures, and especially earnings, convey significant information for the company's performance, they have been strongly criticised by the proponents of SHV approach. The main reasons for their weaknesses were that: alternative accounting methods can be employed to calculate them, investment requirements are excluded from earnings calculations, and the time value for money is ignored. These reasons, accompanied by the fact that earning figures are easily manipulated, led to the development of the modern value-based performance measures.

Rappaport (1986; 1998) popularised the SVA as the proper measure, or evaluation system, for the measurement of value creation. He criticised RI and

EVA® and argued that since those measures are calculated from conventional accounting figures they convey all the shortcomings of the traditional performance measures. This means that in some cases EVA® can give misleading information as with other traditional performance measures. However, he showed that the *changes* in RI or *changes* in EVA® are identical to SVA (Rappaport, 1998). This is consistent to the claims of EVA® proponents (Stewart, 1991; 1999; Stern, Stewart and Chew, 1995) that 'it is only *changes* in current levels of EVA® that are likely to be correlated with changes in stock price' (Stern, Stewart and Chew, 1995, p. 43).

Stewart (1991) introduced the EVA® Financial Management System. This system is based on EVA®, which is defined as net operating profits after taxes less the cost of capital employed to operations. EVA® is based on the RI approach formally introduced by Solomons (1965). What makes EVA® differ from RI is the adoption of the potential accounting adjustments proposed by Stern Stewart & Co. in order to produce an earnings figure that is closer to cash flows and to correct the potential biases from the accrual based accounting principles and limitations, such as the intangible assets and depreciation treatments. However, those adjustments have often been criticised for having little importance, are difficult to understand, and in most cases are costly to implement (Chen and Dodd, 1977; 2001; Zimmerman, 1997; Keys, Azamhuzjaev and Mackey, 2001; Goldenberg, 2000; Anderson, Bey and Waver, 2004).

The empirical research for the value relevance of traditional accounting performance measures and modern value-based performance measures is extensive but with contradictory results. Several studies showed the significant value relevance of EVA® as a performance measure (Stewart, 1991; O'Byrne, 1996; Uyemura, Kantor and Petit, 1996; Milunovich and Tseui, 1996; Bao and

Bao, 1998; Forker and Powell, 2004; Worthington and West, 2004) while others (Biddle, Bowen and Wallace, 1997; Chen and Dodd, 1997; 2001; de Villiers and Auret 1998; Turvey *et al.* 2000; Worthington and West, 2001; Copeland 2002; Sparling and Turvey, 2003) provided discouraging results for the usefulness of EVA®. As for the SVA there was no study reported on the empirical literature, perhaps because it demands more complicated calculations and assumptions than EVA®.

In general, SHV proponents argued that the success or the failure of a company should be based on the measured ultimate creation of shareholder value added. It is also argued that maximising traditional performance measures is not theoretically in line with maximising the shareholder wealth. That makes EVA® and SVA seem superior as performance measures. However, those measures measure only the changes in wealth and at best they help in the evaluation of different strategies. Wealth cannot be generated only from the implementation of those measurement systems. Shareholder value increases and success is achieved mainly through the leading indicators of value, such as customer satisfaction, quality improvement, new ideas, customer retention rates, productivity improvements, etc. and in general, through an outstanding strategy and good prediction of the future. Therefore, companies should also rely on other performance measures.

On the other hand, it has been revealed that there are other factors such as macroeconomic, microeconomic and behavioural that can influence market returns (Shefrin, 2000; Shleifer, 2000; Goldberg and Nitzsch, 2001; Warneryd, 2001; Van der Hart, Slagter and Van Dijk, 2001). Several studies have been conducted exploring how decisions to sell or buy financial assets are made and how investors choose between financial assets. The reported results provided evidence for the dominance of fundamental and technical analysis in developing and most of the developed stock markets. The results also suggest that investors (individual and professionals) may have different practices in different markets and may use different techniques for markets forecasting in different time horizons.

No study has been yet conducted for the Greek stock market concerning the value relevance of performance measures and techniques discussed above. This fact and the increasing interest in SHV approach internationally, stimulated us to design the present study and implement it in the ASE. This study has two objectives. The first is to empirically examine the value relevance of traditional and value-based performance measures. The methodology is presented in chapter three, while the results are reported and discussed in chapter four. The second objective is to explore the alternative measures or factors that can drive investors' decisions in the context of the Greek capital market. The questionnaire design is discussed in chapter three, while the results are reported and commended in chapter five. Chapter six summarises and concludes the study.

Chapter Three

METHODOLOGY

3.1. Introduction

The review of literature presented in chapter two suggested that traditional accounting earnings play an important role in the stock market from an institutional perspective, and there is consistent empirical evidence for earnings information content from an academic viewpoint (Ball and Brown, 1968; Beaver, 1968; Easton and Harris, 1991; Lev, 1989; Biddle, Bowen and Wallace, 1997; Chen and Dodd, 2001). Proponents of the modern value based measures, however, criticised accounting earnings as imperfect and incorrect performance measures. The main reasons for this critique were that traditional accounting earnings failed to include the total cost of capital and that they were influenced by accrual-based accounting conventions (Rappaport, 1986; 1998; Stewart, 1991; 1999). Thus, they introduced the SVA and EVA®, respectively, as the most recent and exciting innovative measures of corporate performance with the claim that these measures were able to correct both types of errors in accounting earnings. Moreover, Tully (1993) maintained that since EVA® corrects the errors in accounting earnings, it should replace them in both security analysis and performance evaluation.

In response to these claims, during the last two decades, an emerging literature has addressed the empirical issue as to whether EVA® is more highly associated with stock returns and firm values than any other of the traditional accounting ratios such as EPS, ROI and ROE among others. In chapter two, the empirical research reported mixed and controversial results. EVA® proponents argued that EVA® is a philosophical change in how companies conduct their businesses, and more, it is the only measure that companies need (Stewart, 1991; Stern, Stewart and Chew, 1995). Consistent with those claims a body of empirical studies suggested the superiority of EVA® compared to the traditional accounting measures in explaining market values (Stewart, 1991; O'Byrne, 1996; Uyemura, Kantor and Petit, 1996; Milunovich and Tseui, 1996; Bao and Bao, 1998; Forker and Powell, 2004; Worthington and West, 2004). While the reported evidence from the above-mentioned studies supported the supremacy of EVA® as a performance measure, there are many other studies revealing that accounting earnings convey more explanatory power than EVA® (Biddle, Bowen and Wallace, 1997; Chen and Dodd, 1996; 1997; de Villiers and Auret 1998; Günther, Landrock and Muche, 1999; Turvey *et al.* 2000; Chen and Dodd, 2001; Worthington and West, 2001; Copeland 2002; Sparling and Turvey, 2003).

Examining the existing empirical research it was realised that most of these studies have been conducted for the US stock markets. Although EVA® figures are readily available in the UK, Australia, Canada, Brazil, Germany, Mexico and France (Worthington and West, 2000) only a few studies have been reported for these markets (e.g. Günther, Landrock and Muche, 1999; 2000; Worthington and West, 2001; 2004; Sparling and Turvey, 2003; Forker and Powell, 2004). As far as the Greek stock market is concerned, there are neither any EVA® figures readily available nor any empirical study examining the usefulness of EVA® compared to traditional accounting performance measures.

Thus, the objectives of this study are focused on (a) using secondary financial data to empirically examine the usefulness of EVA® and SVA, compared to the traditional accounting performance measures such as EPS, ROI, and ROE, for the Greek stock market and (b) using primary data collected through a questionnaire survey, to examine the perceptions of all user groups investing in the Greek stock market, about the performance indicators they are using for portfolio analysis and company valuation purposes. For the successful completion of these objectives, the present study will, firstly, describe and explain the most important methods adopted by other scholars, in order to develop the adopted methodology and, secondly, will develop the questionnaire that will be used for the collection of primary data.

3.2. Empirical Methods Adopted from other Scholars

Because of the important role of accounting earnings in security analysis, assessing the usefulness of earnings to investors has become a particularly interesting research area (Chen and Dodd, 2001). Since the Ball and Brown (1968) study, accounting researchers have produced numerous studies investigating the empirical relationship between stock returns and accounting earnings (Thomas and Lipson, 1985; Lev, 1989). However, due to the lack of a formal valuation model linking accounting earnings to stock prices, most researchers focused on Ball and Brown's (1968) model examining the relationship between abnormal returns and unexpected earnings. Despite the encouraging results concerning the information content of earnings, the association of abnormal returns with unexpected earnings has been weak as reflected in low R-squared statistics (Chen and Dodd, 2001).

Easton and Harris (1991) provided an alternative specification for the returns/earnings association. They used a formal valuation model linking both earnings levels and earnings changes to raw stock returns. Furthermore, they demonstrated an empirical association of earnings levels and earnings changes to raw stock returns by fitting their model for the pooled cross-section and time-series sample of 19,996 firm-year data as well as for each of the 19 years of available data. Consequently, from both a theoretical and an empirical perspective, the Easton and Harris (1991) model became the appropriate one for many scholars to examine the association between stock returns and the various financial performance measures.

Cheng, Cheung and Gopalakrishnan (1993) used the Easton and Harris (1991) model to examine the usefulness of three earnings definitions: operating income, net income and comprehensive income. Biddle, Bowen and Wallace (1997) used the Easton and Harris (1991) model to examine the assertion that EVA® is more highly associated with stock returns and firm values than accrual earnings, and evaluated which components of EVA® contribute to these assertions. Chen and Dodd (1997; 2001) also used the Easton and Harris (1991) model to examine the superiority of EVA® versus traditional accounting performance measures.

Cheng, Cheung and Gopalakrishnan (1993), Biddle, Bowen and Wallace (1997), and Chen and Dodd (1997; 2001) employed two approaches for their research. The relative information content and the incremental information content approach. The former compares which performance measure under examination is superior in terms of association with stock returns, while the latter addresses whether one measure adds to the information provided by the other. That is, the two approaches have different practical implications. The knowledge of relative information content usefulness can guide someone to choose the single best performance measure among competing ones, while the incremental information content usefulness will assist one in deciding whether to adopt multiple measures in financial reporting (Kmenta, 1986; Bowen, Burgstahler and

Daley, 1987; Lev, 1989; Ali and Pope, 1995; Biddle, Seow and Siegel, 1995; Chen and Dodd, 2001).

Worthington and West (2001; 2004) also based their research on the relative and the incremental information content approach. Since this methodology conveys important considerations in the choice of performance measures, we will employ it for the purpose of the present study. Finally, Chen and Zhang (2003) utilised the Easton and Harris (1991) model and employed the incremental information content approach to prove that profitability change and capital investment, when incorporated in the earnings model, have a significant incremental explanatory power. The fact that the incorporation of profitability change and the capital investment in the Easton and Harris (1991) model adds explanatory power to accounting earnings, inspired us to incorporate in this model, variations of profitability change and capital investment which are reflected in ROI, ROE ratios and EVA®, SVA concepts respectively.

3.2.1. Easton and Harris (1991) Methodology

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

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

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).

3.2.1.1. The Relationship between Earnings and Returns (Book Value Valuation Model)

Levels model (3-1) is based on book value valuation model. In order to develop it, Easton and Harris (1991) formally expressed the price and the book value as follows:

$$P_{jt} = BV_{jt} + u_{jt} \quad (3\text{-}1a)$$

Where P_{jt} is the price per share of firm j at time t, BV_{jt} is the book value per share of firm j at time t, and u_{jt} is the difference between the price per share P_{jt} and book value per share BV_{jt}.

According to Easton and Harris (1991) this difference (u_{jt}) can emanate from many different factors including the choice of conservative accounting practices and other information incorporated in price but they are not yet reflected in accounting values. The relationship between accounting earnings and stock returns can be obtained by first taking differences of the variables in equation (3-1a). This produces the following:

$$\Delta P_{jt} = \Delta BV_{jt} + u'_{jt} \qquad (3\text{-}1b)$$

But since in general it is:

$$\Delta BV_{jt} = A_{jt} - d_{jt} \qquad (3\text{-}1c)$$

Where, A_{jt} is the accounting earnings per share of firm j over time period $t\text{-}1$ to t, and d_{jt} is the dividends per share of firm j paid over the same time period.

Easton and Harris (1991) substituted (3-1c) into (3-1b), rearranged, and divided by the price at the beginning of stock period (P_{jt-1}). The result is as follows:

$$(\Delta P_{jt} + d_{jt}) \, / \, P_{jt-1} = A_{jt}/P_{jt-1} + u''_{jt} \qquad (3\text{-}1d)$$

where $(\Delta P_{jt} + d_{jt}) \, /P_{t-1}$ represents stock returns and $A_{jt} \, /P_{jt-1}$ represents earnings divided by the beginning of the period stock price.

That means that if stock price and book value are related, as might be expected, then earnings divided by the beginning of period price should be an appropriate variable for explaining stock returns. Equation (3-1d) then, $(\Delta P_{jt} + d_{jt}) \, /P_{jt-1} = A_{jt}/P_{jt-1} + u''_{jt,}$ is the basis for the development of levels earnings regression model (3-1), $R_{jt} = \alpha_{t0} + \alpha_{t1} \, A_{jt}/P_{jt-1} + \varepsilon^{1}_{jt}$. Since from the theoretical relation (3-1d) the presence of an intercept is not implied, the omitted variables that may explain stock returns (incorporated in u''_{jt}) may have, on average, a non-zero effect implying non-zero intercept term, which here is α_{t0} (Easton and Harris, 1991).

3.2.1.2. The Relationship between Earnings and Returns (Earnings Valuation Model)

The fact that some of the empirical literature focuses on an earnings based valuation model, drove Easton and Harris (1991) to consider an alternative model, which expresses stock price as a multiple of earnings. The relationship is the following:

$$P_{jt} = \rho A_{jt} + u_{jt} \tag{3-2a}$$

Where P_{jt} is the stock price, A_{jt} is the accounting earnings per share of firm j for period t, and ρ is the multiple of earnings.

Ohlson (1991; 1995) demonstrates that the Miller and Modigliani (1961) dividend irrelevance proposition requires that if a dividend is paid on security j at time t, then equation (3-2a) can be expressed as follows:

$$P_{jt} + d_{jt} = \rho A_{jt} + u_{jt} \tag{3-2b}$$

Taking the changes in price and earnings variables and dividing by the price of the beginning of period (P_{jt-1}), equation (3-2b) becomes as follows:

$$(\Delta P_{jt} + d_{jt}) / P_{jt-1} = \rho(\Delta A_{jt} / P_{jt-1}) + u'_{jt} \tag{3-2c}$$

where $(\Delta P_{jt} + d_{jt}) / P_{jt-1}$ represents the returns while $(\Delta A_{jt} / P_{jt-1})$ represents the change of earnings. The assumption in equation (3-2c) is that dividends are paid at time t but there is no dividend paid at time $t-1$.

Therefore, equation (3-2c) reveals that there is a linear relationship between change in earnings divided by the beginning of period stock price and stock returns over that period. Thus, equation (3-2c) has been used as the basis for the development of change earnings model (3-2), $R_{jt} = \varphi_{t0} + \varphi_{t1} \Delta A_{jt} / P_{jt-1} + \varepsilon^2_{jt}$. The presence of the intercept φ_{t0} in this model is explained in a similar way as the presence of intercept α_{t0} in the model (3-1) (Easton and Harris, 1991).

3.2.1.3. The Combination of both Valuation Models

Easton and Harris (1991) based the development of this model, which combines the levels and changes valuation models, on the Ohlson (1989a) study. Ohlson (1989a) developed a model that suggested that the variable u_{jt} in equation (3-1a) is partly a function of earnings. Thus, for most companies the stock price is likely to be a function of both book value and earnings. He combined a 'book value only' model (similar, in principle, to equation (3-1d)) and an 'earnings only' model (similar, in principle, to equation (3-2c)) and proposed a valuation relation where price is a weighted function of book value and earnings. In the same way Easton and Harris (1991) combined their levels and changes valuation models and expressed the combined model as follow:

$$(\Delta P_{jt} + d_{jt}) / P_{jt-1} = \kappa\rho[\Delta A_{jt} / P_{jt-1}] + (1\text{-}\kappa)\ [A_{jt} / P_{jt-1}] + \omega_{jt,} \qquad \text{(3-3a)}$$

where

P_{jt} is the price per share of firm j at time t,

d_{jt} is the dividends per share of firm j over the time period t,

P_{jt-1} is the price per share of firm j at time t-1,

ΔP_{jt} is the change in price per share of firm j from time period t-1 to t,

$(\Delta P_{jt} + d_{jt}) / P_{jt-1}$ is the return variable of firm j from time period t-1 to t,

ΔA_{jt} is the change in earnings per share of firm j from time period t-1 to t,

A_{jt} is the earnings per share of firm j over time period t,

κ is a factor for weighting the contribution of ΔA_{jt} versus A_{jt} in the explanation of stock returns.

This relationship (3-3a) has been considered as the basis for the development of the model (3-3). Easton and Harris (1991) then used the regression models (3-1), (3-2) and (3-3) in the empirical analyses of their study to examine the relationship between earnings and returns.

3.2.1.4. The Empirical Analysis of Easton and Harris (1991)

Easton and Harris (1991) selected a sample of US stocks from the period 1969-1986 using the following criteria: (a) annual earnings per share and the factor to adjust for stock splits and stock dividends were available on the *1987 Compustat Primary, Secondary, Tertiary and Full Coverage Annual Industrial File*; (b) security prices and the factor to adjust for stock splits and stock dividends were available on the Center for Security Prices *(CRSP) Daily Returns File* for the first trading day of the ninth month prior to the fiscal year-end; and (c) monthly security return data was available on the *CRSP Monthly Returns File* for 69 months prior to and 3 months after the fiscal year-end. The selection procedure resulted in a sample of 20,188 firm-year observations. A number of 192 firm-year observations (outliers) were deleted because either A_{jt}/P_{jt-1}, $\Delta A_{jt}/P_{jt-1}$, or A_{jt-1}/P_{jt-1} were not between +1.5 and –1.5. Earnings and price variables were adjusted to stock splits and stock dividends. The analysis was based on a return period extending from 9 months prior to 3 months after the fiscal year-end, corresponding roughly with the period between earnings announcements (Easton and Harris, 1991).

To investigate the empirical validity of their models and the role of the current level of earnings, they considered first the correlations between stock returns and each of the earnings variables. The correlation was described using univariate regressions to facilitate a comparison with the multivariate regression which empirically estimated the relationship as expressed in equation (3-3a) (Easton and Harris, 1991). The analysis proved the incremental explanatory power of the levels and changes variables and the extent to which overall explanatory power can be improved by the incorporation of the levels variable (Lev, 1989; Easton and Harris, 1991).

Easton and Harris (1991) started their empirical analysis with univariate regressions of returns and the earnings levels and changes variables. The regression models were the following:

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

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

As have presented in the beginning of this chapter, these regression models were estimated for the pooled cross-section and time-series sample as well as for each year of available data. The results from the regressions of models (3-1) and (3-2) using the pooled sample of all 19,996 firm-year observations as well as in the annual cross-sectional regressions revealed that the coefficients α_{t1} and φ_{t1} were significantly different from zero at the 1 per cent level. Moreover, the reported R^2 (explanatory power) from the pooled regression based on the levels model in equation (3-1) was 0.075 compared to the R^2 of 0.040 from the regression for the changes model in equation (3-2).

For the year-by-year regressions, the levels model reported higher R^2s than those of changes model in 14 of 19 years and they were at least two times higher in 7 of these years. On the other hand, the R^2s from the changes model were higher than those of levels model in 5 of the years but there was no year in which they were twice as high. Easton and Harris (1991) findings are in line with the results of Bernard (1987) and Lev (1989) who suggested that R^2 has been consistently low in earnings/returns association studies.

In summary, the results from the univariate regressions suggested that current earnings level variable, A_{jt}/P_{jt-1}, is correlated with stock returns, and moreover, it can be expected that both levels and changes variables be associated with stock returns (Easton and Harris, 1991).

Based on the relation:

$$A_{jt}/P_{jt-1} = \Delta A_{jt}/P_{jt-1} + A_{jt-1}/P_{jt-1} \qquad (3\text{-}4)$$

and accepting that any of each of the three variables has explanatory power, they also considered the association between prior period earnings, A_{jt-1}/P_{jt-1}, and stock returns by estimating the following regression model:

$$R_{jt} = \theta_{t0} + \theta_{t1}\ [A_{jt-1}/P_{jt-1}] + \varepsilon^4_{jt} \tag{3-5}$$

where A_{jt-1}/P_{jt-1} is the prior period earnings. This model has empirically tested via univariate regression and the reported results revealed the coefficients from pooled regression to be statistically significant at the 1 per cent level. However, the reported R^2 of 0.003 revealed a low explanatory power of this variable compared to R^2 of 0.075 for the levels model and to R^2 of 0.040 of the changes model.

Multivariate analysis has been conducted using the model of returns that incorporated the earnings levels and changes as it was summarised by equation (3-3a) and expressed via regression model (3-3):

$$R_{jt} = \gamma_{t0t} + \gamma_{t1}\ A_{jt}\ /\ P_{jt-1} + \gamma_{t2}\ \Delta A_{jt}/P_{jt-1} + \varepsilon^3_{jt} \tag{3-3}$$

The two chosen variables, A_{jt}/P_{jt-1} and $\Delta A_{jt}/P_{jt-1,}$ are justified via earnings valuation model and the theoretical model in Ohlson (1989b; 1991).

This model was also estimated for the pooled cross-section and time-series sample as well as for each year of available data. The regression using the pooled sample revealed the coefficient γ_{t1} to be significant at the 5 per cent level or better in all 19 years. The coefficient γ_{t2} is significant in the pooled regression and in 8 of the 19 years. The R^2 in the pooled regression reported equal to 0.077. Comparing the R^2s from the multivariate regressions and the univariate regressions, they obtained a similar picture. When the change variable $\Delta A_{jt}/P_{jt-1}$ is added to the regression model (3-1), the change in R^2 is insignificant in 11 of the years. On the other hand, the inclusion of levels variable A_{jt}/P_{jt-1} in the regression model (3-2) yields a significant improvement in R^2 for every year (Easton and Harris, 1991).

In summary, the results provided evidence suggesting that: both current earnings levels variable and the earnings change variable are relevant for explaining stock returns, and the two variables are not just substitutes. That means, 'for the pooled sample and for several individual years, significantly more of the cross-sectional variation in returns is explained by both earnings levels and earnings changes than is explained by either variable considered alone' (Easton and Harris, 1991, p. 31). These considerable findings inspired us to adopt Easton and Harris (1991) earnings levels and changes model (3-3) as the basic model for the purposes of the present study.

Additionally, Easton and Harris (1991) examined whether the earnings level and earnings changes are relevant as explanatory variables for unexpected returns. They used the regression model (3-3) replacing the raw returns with cumulative abnormal returns as dependent variable. Thus, the regression model became as follows:

$$CAR_{jt} = \psi_{0t} + \psi_{t1} \, [A_{jt} / P_{jt-1}] + \psi_{t2} \, [\Delta A_{jt} / P_{jt-1}] + \varepsilon^{5}_{jt} \qquad (3\text{-}6)$$

Where CAR_{jt} is the cumulative abnormal return calculated over 12 months extending from 9 months prior to 3 months after the fiscal year-end. To calculate the cumulative abnormal returns, Easton and Harris (1991) first estimated the unexpected returns as the residuals from the market model:

$$R_{jt} = \beta_{0j} + \beta_{1j} \, R_{mt} + z_{jt} \qquad (3\text{-}7)$$

Where R_{mt} is the *CRSP* equally weighted market index for month t and the specification (3-7) is estimated over the 60 months prior to the month of the accumulation of returns. Regressions have also been conducted for the pooled sample and for each year of available data. Results provided evidence that the coefficients ψ_{t1} on the earnings level variable were significantly different from zero, at the 1 per cent level, in 12 of 19 years while the coefficients ψ_{t2} on the earnings change variable were significant in 15 of the 19 years at the same significance level. The adjusted R^2 of 0.078 for the pooled data was quite similar to the R^2 of 0.077 reported from regression model (3-3). That means that earnings levels and earnings changes are associated both with raw returns and with unexpected returns.

3.2.2. Cheng, Cheung and Gopalakrishnan (1993) Methodology

Cheng, Cheung and Gopalakrishnan (1993) evaluated the usefulness of three earnings definitions (operating income, net income and comprehensive income) in explaining residual security returns. They defined operating income as operating revenues less operating expenses. Net income is the so-called 'bottom line' reported by firms under the existing US accounting standards, and comprehensive income is the net change in equity during a period excluding investments by and distributions to stockholders (Cheng, Cheung and Gopalakrishnan, 1993). They adopted the basic model of Easton and Harris (1991) cross-sectional regression of abnormal returns on both level of earnings and change in earnings (3-6). Their model was presented as follows:

$$AR_t = \Theta_0 + \Theta_1 A_t / P_{t-1} + \Theta_2 (A_t - A_{t-1})/P_{t-1} + \varepsilon_t \quad (3\text{-}8)$$

Where AR_t is the abnormal returns (as estimated by Easton and Harris, 1991), A_t and A_{t-1} represent each time one of the three earnings measures (OI, NI and CI) at time t and $t-1$ respectively, while P_{t-1} represents the security price at the beginning-of-year (9 months prior the fiscal year-end).

Cheng, Cheung and Gopalakrishnan (1993) empirical analysis was based on 18 years of annual data from the US stock market. The sample period spanned from 1972 to 1989 with an average of 922 firms in each of the 18 years, giving a total of 16,604 observations. The sample was selected using the following criteria: (a) data for calculating the three earnings measures, for adjusting for stock splits and stock dividends, for the number of shares outstanding, and for beginning-of-year stock prices were available on the 1991 *Compustat* tapes, and (b) monthly return data were available from the *CRSP Monthly Return File* for 69 months prior to and three months after the fiscal year-end. All three measures of earnings were calculated on a per-share basis using the number of common shares outstanding, adjusted for stock splits and stock dividends. Each earnings per share variable was then scaled by the beginning-of-year common stock price. In order to remove outliers in the earnings variables, they excluded from the selected data the highest 1 per cent and the lowest 1 per cent of observations.

The analysis consisted of two approaches. One approach investigated the relative information content of the three earnings measures, by comparing the adjusted R^2s from the three regressions. The other approach investigated the incremental information content of those earnings components that are not part of operating income, by assessing the increase in adjusted R^2s resulting from having such components as additional explanatory variables in the regression (Cheng, Cheung and Gopalakrishnan, 1993). They considered R^2 as an appropriate measure of usefulness since it has been established in the literature (Campbell and Shiller, 1988; Roll, 1988; Lev, 1989).

To evaluate the relative information content, they used the base of specification (3-8) and developed the following regression models:

$$AR_t = \Theta_0 + \Theta_1 \, \mathrm{OI}_t + \Theta_2 \, \Delta\mathrm{OI}_t + \omega_t \tag{3-8a}$$

$$AR_t = \Theta'_0 + \Theta'_1 \, \mathrm{NI}_t + \Theta'_2 \, \Delta\mathrm{NI}_t + \omega'_t \tag{3-8b}$$

$$AR_t = \Theta''_0 + \Theta''_1 \, \mathrm{CI}_t + \Theta''_2 \, \Delta\mathrm{C1}_t + \omega''_t \tag{3-8c}$$

Where OI_t and $\Delta\mathrm{OI}_t$ are operating income levels and changes variables, NI_t and $\Delta\mathrm{NI}_t$ are net income levels and changes variables, and CI_t and $\Delta\mathrm{CI}_t$ are comprehensive income levels and changes variables. All variables were scaled by the beginning-of- year price (P_{t-1}). Then, they compared the adjusted R^2s of the three regressions testing the following related null hypotheses:

$$H1_0 : R^2_{\text{OI}} - R^2_{\text{NI}} = 0$$

$$H2_0 : R^2_{\text{OI}} - R^2_{\text{CI}} = 0$$

$$H3_0 : R^2_{\text{NI}} - R^2_{\text{CI}} = 0$$

Where R^2_{OI} is the adjusted R^2 of the regression using OI as the definition of earnings, R^2_{NI} is the adjusted R^2 of the regression using NI as the definition of earnings, and R^2_{CI} is the adjusted R^2 of the regression using CI as the definition of earnings.

In the relative information content, models (3-8a), (3-8b), and (3-8c) were estimated in two ways producing two sets of adjusted R^2s. Firstly, they were estimated year by year, pooling all sample firms available for each year. The result was 18 adjusted R^2s for each model. Secondly, for each year they separated the sample firms into seven industry categories and the regressions were run by industry category. This had been done for each of the 18 years resulting in a total of 126 regressions for each model. Cheng, Cheung and Gopalakrishnan (1993) comparing the mean adjusted R^2s revealed that OI ($R^2 = 0.132$) weakly dominated NI ($R^2 = 0.102$), and that both OI and NI dominated CI ($R^2 = 0.072$) in information content. Those results were roughly higher than those reported by Easton and Harris (1991) where R^2 was 0.078. Using the adjusted R^2s from the regressions based on industry separation they also found the same results but they noticed a remarkable increase in R^2s for the three earnings variables. The increase for the OI, N1, and CI models was, respectively, 13 per cent, 28 per cent, and 47 per cent by controlling industry (Cheng, Cheung and Gopalakrishnan, 1993). From this, one could infer that a proper classification by industry would further reduce specification errors of the regression models.

To evaluate the incremental information content of the three earnings variables, they calculated the increase in adjusted R^2 starting from model (3-8a). Thus, they developed the following regression model:

$$AR_t = \gamma_0 + \gamma_1 \mathrm{OI}_t + \gamma_2 \Delta\mathrm{OI}_t + \gamma_3 \mathrm{NIMOI}_t + \gamma_4 \Delta\mathrm{NIMOI}_t + \mu_t \qquad (3\text{-}9)$$

Where NIMOI_t represents NI minus OI, and $\Delta\mathrm{NIMOI}_t$ represents the change in NI minus the change in OI. From the (3-9) then, they developed one more regression model that incorporated the comprehensive income:

$$AR_t = \lambda_0 + \lambda_1 \mathrm{OI}_t + \lambda_2 \Delta\mathrm{OI}_t + \lambda_3 \mathrm{NIMOI}_t + \lambda_4 \Delta\mathrm{NIMOI}_t + \lambda_5 \mathrm{CIMNI}_t + \lambda_6 \Delta\mathrm{CIMNI}_t + \mu'_t \qquad (3\text{-}10)$$

Where CIMNI_t represents CI minus NI, and $\Delta\mathrm{CIMNI}_t$ represents the change in CI minus the change in NI. Thus, they developed the two related null hypotheses as follows:

$$H4_0 : R^2_{\mathrm{NIMOI/OI}} \equiv R^2_{\mathrm{OI.NIMOI}} - R^2_{\mathrm{OI}} = 0$$

$$H5_0 : R^2_{\mathrm{CIMNI/OI.NIMOI}} \equiv R^2_{\mathrm{OI.NIMOI.CIMNI}} - R^2_{\mathrm{OI.NIMOI}} = 0$$

Where $R^2_{p/q}$ denotes the increase in adjusted R^2 due to variable p, conditional on variable q, and $R^2_{p.q}$ denotes the adjusted R^2 due to p and q (Cheng, Cheung and Gopalakrishnan, 1993). For more detailed explanation (see Kmenta, 1986, pp. 593-595). In the incremental information content, models (3-9) and (3-10), were estimated in two ways as in the relative information content (year by year, pooling all sample firms available for each year, and through regressions based on industry separation). Largely, model (3-10) produced better results than model (3-9), which in turn produced better results than model (3-8). The mean adjusted R^2s for models (3-8), (3-9), and (3-10) were respectively, 0.132, 0.146, and 0.148. This means that those items that account for the difference between NI and OI (model, 3-9) have incremental information content (R^2 = 0.146 compared to R^2 =0.132 of model 3-8) while those items that account for the difference between

NI and CI (model, 3-10) do not reveal any further incremental information content ($R^2 = 0.148$ compared to $R^2 = 0.146$ of model 3-9).

Consequently, the methodology of Cheng, Cheung and Gopalakrishnan (1993) gave us the incentive to adopt the Easton and Harris (1991) basic model, to incorporate into the model various variables (performance measures) in order to examine their explanatory power beyond earnings, and to use the relative and the incremental information content approach for our analysis.

3.2.3. Biddle, Bowen and Wallace (1997) Methodology

Biddle, Bowen and Wallace (1997) tested the assertion that EVA® is more highly associated with stock returns and firm values than accrual earnings, and evaluated which components of EVA®, if any, contribute to these associations. They used the 'levels and changes' specification proposed by Easton and Harris (1991) and conducted their empirical analyses using both relative and incremental information content approach. Relative information content tests revealed earnings to be more highly associated with returns and firm values than EVA®, RI, or CFO. On the other hand, incremental information content tests suggested that EVA® components add only marginally to information content beyond earnings. These findings do not support the claim that EVA® dominates earnings in relative information content, and suggest that earnings, in general, outperform EVA®.

Two empirical questions were addressed from Biddle, Bowen and Wallace (1997) as follows:

Research question 1: Do EVA® and/or RI dominate currently mandated performance measures, earnings and CFO, in explaining contemporaneous annual stock returns?

Research question 2: Do components unique to EVA® and/or RI help in explaining contemporaneous annual stock returns beyond that explained by CFO and earnings?

To answer the research questions 1 and 2, Biddle, Bowen and Wallace (1997) used the relative information content approach for the first one and incremental information content approach for the second one. Before the hypotheses development, they described the linkage between CFO, EBEI, RI and EVA®. This linkage has been discussed in chapter two, section 2.3.3.5 and expressed through the specification (2-34).

$$EVA = CFO + ACCR + ATIntEx - CapChrg + AcctAdjst_{\text{in total}} \quad (2\text{-}34)$$

To develop the hypotheses for their research, Biddle, Bowen and Wallace (1997) assumed that equity markets are (semi-strong) efficient, forward looking and can form estimates of performance measures. Thus, they used stock market returns to compare the information content, or value relevance, of CFO, EBEI, RI, and EVA®. They followed Bowen, Burgstahler and Daley (1987) and Biddle, Seow and Siegel (1995) methodologies to draw a distinction between relative and incremental information content. In general, relative information content comparisons are appropriate when one desires a ranking of performance measures by information content or when making mutually exclusive choices among performance measures i.e., when only one measure can be chosen. In contrast, incremental information content comparisons assess whether one measure provides value-relevant data beyond that provided by another measure and apply when assessing the information content of a supplemental disclosure or the information of a component measure (Bowen, Burgstahler and Daley, 1987; Biddle, Seow and Siegel, 1995; Biddle, Bowen and Wallace, 1997). To test the research question 1, they considered a neutral position as to which measure is more value relevant and conducted two-tails tests of the null hypothesis that CFO, EBEI, RI and EVA® have equal relative information content. The hypothesis then developed as follows:

> H_R: The information content of measure X_1 is equal to that of X_2

Where X_1 and X_2 represent pairwise combinations from the set of performance measures under examination: CFO, EBEI, RI and EVA®. Rejection of H_R is considered as evidence of a significant difference in relative information content.

Biddle, Bowen and Wallace (1997) investigated the incremental value relevance of EVA® components as they were expressed in equation (2-34). They tested the null hypothesis that individual components of EVA® do not provide incremental information content beyond other components that also comprise CFO and EBEI. The hypothesis then developed as follows:

> H_I: Component X_1 does not provide information content beyond that provided by the remaining components X_2-X_5

Where X_1-X_5 are components of EVA® (i.e. CFO, ACCR, ATIntEx, CapChrg and $\text{AcctAdjst}_{\text{intotal}}$). Rejection of H_I is considered as evidence of incremental information content.

The basic model for the development of Biddle, Bowen and Wallace (1997) models was the Easton and Harris (1991) 'levels and changes' specification (3-3). To perform the relative information content tests they then structured the 'one lag' version model and expressed it as follows:

$$D_t = b_0 + b_1 X_t / MVE_{t-1} + b_2 X_{t-1} / MVE_{t-1} + e_t \qquad (3\text{-}11)$$

Where D_t is the dependent variable, a measure of abnormal or unexpected returns for time period t, X_t and X_{t-1} represents each performance measure (i.e. CFO, EBEI, RI and EVA®) at time t and $t-1$ respectively while MVE_{t-1} is the deflator measured 3 months after the prior year-end to be consistent with the start of the returns period measured by the dependent variable. This 'one lag' version (3-11) has been proved to be equivalent to the 'levels and changes' specification (3-3) proposed by Easton and Harris (1991), (see Biddle, Bowen and Wallace, 1997, p. 310). To assess the relative information content, they employed a statistical test from Biddle, Seow and Siegel (1995), which allows a test of the null hypothesis of no difference in the ability of two competing sets of independent variables to explain variation in the dependent variable. They first conducted the four regressions (one for each performance measure: CFO, EBEI, RI and EVA®) and they then made six pairwise comparisons of the results from those regressions. The tests were based on the comparisons of the reported R^2s.

To perform the incremental information content tests, Biddle, Bowen and Wallace (1997) used the standard methodology of Bowen, Burgstahler and Daley (1987). The information content was then assessed, by examining the statistical significance of regression slope coefficients. The model they used was the one-lag specification generalised with two accounting performance measures X and Y and was expressed as follows:

$$D_t = b_0 + b_1 X_t / MVE_{t-1} + b_2 X_{t-1} / MVE_{t-1} + b_3 Y_t / MVE_{t-1} + b_4 Y_{t-1} / MVE_{t-1} + e_t \qquad (3\text{-}12)$$

Incremental information content is assessed using t-tests on individual coefficients and F-tests of the joint null hypotheses:

H_{0X}: $b_1 = b_2 = 0$

H_{0Y}: $b_3 = b_4 = 0$

Where b_1, b_2, b_3 and b_4 are the coefficients from (3-12).

Moreover, Biddle, Bowen and Wallace (1997) employed the White (1980) corrections to control the potential effects of heteroskedastic errors, in both relative and incremental information content tests.

Data used in their study was purchased directly from Stern Stewart & Co. This data concerned the US stock market and included up to eleven annual observations for EVA®, capital, and cost of capital for firms with fiscal years ending June 1983 to May 1994. The initial sample of 1,000 firms (8,524 firm-year observations) was reduced by 219 firms (2,271 observations) due to either missing Compustat or CRSP (Center for Research in Security Prices) data or to provide a lagged observation for each variable. They also deleted 79 extreme outlier observations defined as more than 8 standard deviations from the median. Also, both the dependent and the independent variables were winsorised to ± 4 standard deviations from the median. The final sample consisted of 6,174 firm-year observations for 773 firms.

The dependent variable was the market adjusted return, a variable commonly used in information content studies to measure unexpected returns (Bowen, Burgstahler and Daley, 1989; Biddle, Seow and Siegel, 1995). It was computed from CRSP data as a firm's 12-month compounded stock return less the 12-month compounded value-weighted market-wide return. A 12-month non-overlapping period ending three months following the firm's fiscal year-end was chosen to allow time for information contained in the firm's annual report to be incorporated in stock market prices. For the relative information content tests the independent variables were CFO, EBEI, RI and EVA®. To reduce the heteroscedasticity in the data, they deflated all independent variables by the market value of equity three months after the beginning of the fiscal year (MVE_{t-1}). For the incremental information content tests the variables were the five components of EVA® (i.e. CFO, ACCR, ATIntEx, CapChrg and $AcctAdjst_{in\ total}$).

Results for the relative information content usefulness were based on equation (3-11). Each of the six pairwise differences in R^2 were revealed to be significant at conventional levels. The reported adjusted R^2s for the four performance measures were 0.0904, 0.0624, 0.0507 and 0.0238 for EBEI, RI, EVA® and CFO respectively. This reveals that in relative information content, EBEI outperforms RI, RI outperforms EVA® and all three measures outperform CFO. Incremental information content revealed an adjusted R^2 of 0.0907. This result suggests that EVA® components add only marginally to information content beyond earnings.

The study of Biddle, Bowen and Wallace (1997) inspired our study in the following directions: to adopt the Easton and Harris (1991) 'levels and changes' model, to test with the usefulness of EVA® and SVA in explaining stock returns, to use the relative information content tests to assess the superiority of performance measures under examination (EPS, ROI, ROE, EVA® and SVA), and to compare the results from the relative information content test with those from other studies. The part of the incremental information content tests, where the components of EVA® were examined, is out of the objectives of the present study and hence is not discussed in detail.

3.2.4. Chen and Dodd (1997) Methodology

The incentive for the Chen and Dodd (1997) study emanated from the considerable attention received in the popular press, and the adoption of the newly coined measure of corporate performance, EVA®, by an increasing number of companies, and from an obvious question that is of great importance to investors, managers and business researchers and which is stated as follows: 'is there a single measure of corporate performance enabling investors to identify investment opportunities and motivate managers to make value-added business decisions?' (Chen and Dodd, 1997, p. 318). Thus, they designed a study to empirically examine the increasingly acclaimed information usefulness of EVA® in comparison to other traditional performance measures including EPS, ROA, ROE and RI. Their primary findings were that EVA® was a useful measure of corporate performance. However, they concluded that EVA® was neither as perfect as claimed by its proponents, nor was is the only performance measure that suggested a way to achieve superior stock returns. This conclusion was consistent with Foster (1986) who suggested that there was no single determinant on which one can rely to profitably predict the market.

To conduct their research, Chen and Dodd (1997) addressed the following three research questions:

Research question 1: Is the correlation between a company's EVA® and stock returns as perfect as claimed by EVA® advocates?

Research question 2: How does EVA® compare to accounting profit in terms of association with stock returns?

Research question 3: Does EVA® provide more information than residual income in explaining the variation of stock returns? (Chen and Dodd, 1997, p. 321-322).

They selected the sample for their research using a two-step method: firstly, they identified the companies in the 1992 *Stern Stewart 1,000* database that had complete data from 1983 to 1992, and secondly, they retained only those companies with sufficient public data as reported by *Compustat*. The 1992 Stern Stewart Performance 1,000 is an EVA® database complied by Stern Stewart Management Service and contains EVA® performance on 1,000 leading US companies. Stern Stewart & Co. developed this database using information provided by Standard and Poor's Compustat Services. According to Stern Stewart (1993) the purpose of this database was to provide a product of benchmarking performance, assessing business and financial risk, and spotting investment opportunities. The database is published every year and includes data from the 1,000 US leading publicly traded companies. Chen and Dodd (1997) obtained the variables for their analysis either directly from the 1992 Stern Stewart database or calculated them using data from this database. In order to reduce short-term fluctuations, they calculated each variable using as a basis the ten-year averages.

The study of Chen and Dodd (1997) had some similarities with some of the previously reported studies, i.e. the use of returns as depended variable and earnings as explanatory variables (Foster, 1986; Lev, 1989; Easton and Harris, 1991; Cheng, Cheung and Gopalakrishnan, 1993). However, the investigated variables in total and the regression models used in this study were significantly different. A number of the 605 US companies out of the 1,000 had complete information for the variables under examination.

Specifically, the variables were: RETURNS, as the dependent variable, and EVA® variables as the independed variables. The EVA® variables were: EVA® per share (EVAPS), change of standardised EVA® (STDEVA), average return on capital (ROC), average spread between ROC and the cost of capital (SPREAD), and average annual compound rate of capital growth (GROWTH). The above variables constructed the EVA® system and were used to test the first research question. The second research question used the previous variables plus the accounting variables: EPS, ROA, and ROE. The third research question examined the variables from the first research question (EVA® system variables) plus their five accounting counterparts that were the variables related to residual income. The latter five variables followed the same definitions as the EVA®

system variables in the first research question but were not adjusted for the equity equivalent reserves. Chen and Dodd (1997) characterised those variable as follows: EVAPS2, STDEVA2, ROC2, SPREAD2, and GROWTH2.

To investigate the first research question, Chen and Dodd (1997) developed the following regression model:

$$\text{RETURNS} = a_0 + a_1\,\text{EVAPS} + a_2\,\text{STEDVA} + a_3\,\text{ROC} + a_4\,\text{SPREAD} + a_5\,\text{GROWTH} + e_1 \quad (3\text{-}13)$$

but since the correlation matrix revealed a perfect correlation between ROC and SPREAD (r = 0.976), they excluded variable ROC from the regression model and it became as follows:

$$\text{RETURNS} = a_0 + a_1\,\text{EVAPS} + a_2\,\text{STEDVA} + a_3\,\text{SPREAD} + a_4\,\text{GROWTH} + e_1 \quad (3\text{-}13a)$$

Where: RETURNS is the annualised compound rate of return to shareholders over the ten-year period. This variable had been provided directly from Stern Stewart 1,000. Chen and Dodd (1997) used stock returns as dependent variable since it has been accepted in the literature as the criterion for studying the information usefulness of profit measures (Campbell and Shiller 1988; Lev, 1989; Easton and Harris, 1991; and Cheng, Cheung and Gopalakrishnan, 1993). The independent variables were the followings: EVAPS, which is the average EVA® per share. STDEVA, which is the change in standardised EVA®. STDEVA is calculated following the procedures proposed by Stern Stewart (1993). Firstly, EVAs from years 1992 and 1983 were divided by 1983 opening capital and then multiplied by 100. Secondly, the difference was taken between the two standardised EVAs to create STDEVA. In fact, this variable shows the EVA® change in 100 monetary units (i.e. dollars, pounds, euros) invested ten years ago. ROC is the average return on capital. It is defined as operating profits after taxes divided by the opening capital of the year. SPREAD is the average spread between ROC and the cost of capital. Chen and Dodd (1997) motivation for this variable emanated from the EVA's equation, which can be formed as follow:

$$\text{EVA} = (\text{Return on Capital} - \text{Cost of Capital}) \times \text{Total Capital} \qquad (3\text{-}14)$$

This equation (3-14) is consistent to equation (2-16) as explained in chapter two, section 2.3.3. Since EVA® is calculated by multiplying the SPREAD by the total capital, this variable is then considered to be one of the EVA® drivers representing the profitability dimension (Chen and Dodd, 1997). Finally, GROWTH is the average annual compound rate of capital growth. This variable is calculated using the opening capital of 1983 and the ending capital of 1993. Since capital growth contributes significantly towards increasing EVA®, it is considered to represent another important EVA® driver. The four independent variables represent different dimensions of an EVA® system. Analytically, EVAPS measures the level of, STDEVA measures the change of, while SPREAD and GROWTH represent the primary drivers of EVA® performance.

Results from the first research question were reported as follows: Firstly, the correlation matrix revealed that there is a significant association of stock returns with all of the EVA® variables, suggesting that EVA® measures yield information perceived important by the stock market, a result consistent with the claims of EVA® proponents. However, the relationship between stock returns and EVA® measures was far from perfect. The correlation ($r = 0.449$) between RETURNS and EVAPS suggested that an increase in EVA® alone was not the only thing that mattered in the stock market (Chen and Dodd, 1997). Secondly, reported results from the regression model (3-13a) were as follows: $R^2 = 0.415$, F-statistics (99.56) and p-value (0.0000). Those results suggested that the model was highly significant with 41.5 per cent of the variation in stock return explained by the four EVA® variables. The examination of the variance inflation factor (VIF), residual plot, and normality plot suggested no serious violations of the regression assumptions such as multicollinearity and heteroscedasticity. According to Neter, Wasserman and Kantor (1985) a VIF in excess of 10 is often considered as an indicator of severe multicollinearity. The reported VIF from the regression was less than 1.6 for each of the four variables. Moreover, from the coefficients of partial determination, Chen and Dodd (1997) could assess the relative importance of each EVA® variable. Reported partial r^2s were as follows: $r^2_{EVAPS} = 0.110$, $r^2_{STDEVS} = 0.074$, $r^2_{SPREAD} = 0.050$, $r^2_{GROWTH} = 0.077$, which suggested that EVAPS has more explanatory power than the other EVA® metrics. As a general conclusion of the results for this research question, one could summarise that since the model could not explain more than 41.5 per cent of the variation in stock returns, companies should eliminate their expectations of an increase in their returns from the implementation of an EVA® system.

The second research question compares EVA® and the accounting profit variables. In order to perform this examination Chen and Dodd (1997) developed the following two models:

$$RETURNS = c_0 + c_1\ EPS + c_2\ ROA + c_3\ ROE + e_2 \quad (3\text{-}15)$$

Where EPS is earnings per share, ROA is return on assets, and ROE is return on equity, and

$$RETURNS = d_0 + d_1\ EVAPS + d_2\ STEDVA + d_3\ SPREAD + d_4\ GROWTH + d_5\ EPS + d_6\ ROA + d_7\ ROE + e_3 \quad (3\text{-}16)$$

The reported results from the two regression models were: (a) from the model (3-15): R^2 (0.365), F-statistics (107.86), and p-value (0.0000), and (b) from the model (3-16): R^2 (0.470), F-statistics (70.64), and p-value (0.0000). The incremental information usefulness then, could be quantified by comparing the R^2s from the two regressions. Thus, the EVA® variables contributed an absolute increase of 0.105 (0.470-0.365) in explaining stock returns in addition to accounting measures. The absolute increase of 0.105 could be translated to a relative increase of 28 per cent in explanatory power of the accounting based model. The above findings suggested that (a) accounting profit variables are important performance measures (R^2 = 0.365), and (b) EVA® measures are more useful than accounting measures (R^2 = 0.470). However, Chen and Dodd (1997, p. 329) summarised: 'the evidence does not suggest that companies should completely replace accounting measures with EVA® as prescribed by EVA® advocates. The accounting variables are still useful measures of corporate performance even though a large amount of information has been captured in the EVA measures'.

Finally, to answer the third research question Chen and Dodd (1997) constructed two more regression models. The first one (3-17) included as independended variables all residual income variables:

$$RETURNS = f_0+f_1\ EVAPS2 + f_2\ STEDVA2 + f_3\ SPREAD2 + f_4\ GROWTH2 + e_4 \quad (3\text{-}17)$$

Where EVAPS2, STEDVA2, SPREAD2, and GROWTH2 are the accounting counterparts of EVAPS, STEDVA, SPREAD, and GROWTH. EVAPS2, STEDVA2, SPREAD2, and GROWTH2 are not adjusted for the equity equivalent reserves and are served as the variables that construct the residual income system.

The second one (3-18) included as independent variables both EVA® and RI variables:

$$RETURNS = g_0 + g_1\ EVAPS + g_2\ STEDVA + g_3\ SPREAD + g_4\ GROWTH +$$
$$g_5\ EVAPS2 + g_6\ STEDVA2 + g_7\ SPREAD2 + g_8\ GROWTH2 + e_5 \quad (3\text{-}18)$$

The reported results from the two regression models were: from the model (3-17): R^2 (0.414), F-statistics (98.89), and p-value (0.0000), and from the model

(3-18): R^2 (0.443), F-statistics (55.34), and p-value (0.0000). The incremental information usefulness as quantified by the comparison of the R^2s from the two regressions, revealed an absolute increase of 0.029 (0.443 – 0.414) in explaining stock returns in addition to residual income. The low contribution of the 2.9 per cent could point to an empirical similarity between EVA® and residual income. Thus, Chen and Dodd (1997, p. 329) concluded that 'on balance, the benefits of adjusting earnings and capital in order to adopt an EVA® performance system are not warranted. Instead, implementing residual income will likely bring about the same benefits at a lower cost'. Research questions two and three were also tested for multicollinearity and heteroscedasticity while the starting point of the examination was the reported relations from the correlation matrix. Finally the whole study was based on cross-sectional models with an implicit assumption that the coefficients were constant for all firms (Christie, 1987; Easton and Zmijewski, 1989).

In summary, Chen and Dodd (1997) concluded that: improving EVA® performance is associated with higher stock returns, however this association is not as strong as suggested by EVA® proponents, the EVA® measures provide relatively more information than the traditional measures of accounting profit in terms of the strength of their association with stock returns, however the empirical results suggest that alone with EVA® companies should continue to take into consideration the traditional accounting measures and, since most of the EVA® and residual income variables are highly correlated and almost identical in terms of association with stock returns, companies may implement performance measures based on residual income which will probably provide them with most of the benefits promised by an EVA® system.

Chen and Dodd (1997) inspired our study to: use stock return as dependent variable since it has been widely accepted in the literature as a criterion for studying the information usefulness of profit measures (Campbell and Shiller, 1988; Lev, 1989; Easton and Harris, 1991; Cheng, Cheung and Gopalakrishnan, 1993; Chen and Dodd, 1997), use traditional accounting performance measures such as EPS, ROI and ROE as explanatory variables for stock returns, use value based measures EVA® and SVA as explanatory variables for stock returns, incorporate all measures in one model to incrementally assess the information usefulness of each measure and each group of measures, use the variance inflation factor (VIF) to test for the multicollinearity, and to compare the main results from their study with those from other ones and with the results from the present study.

3.2.5. Chen and Dodd (2001) Methodology

Chen and Dodd (2001) study empirically examined the value-relevance of three profitability measures: OI, RI, and EVA®. Motivation for their study emanated firstly from the popular press's encouraging publications of EVA® as the hottest financial idea in corporate America (Tully, 1993) and secondly from their previous study (Chen and Dodd, 1997) where they examined EVA® as a new corporate performance measure. Three decades of research had found that traditional accounting earnings have information content; however the supremacy of EVA® over accounting earnings has only recently been empirically studied. Addressing this question was the main purpose of Chen and Dodd's (2001) study.

Chen and Dodd (2001) study relied on the formal valuation model used in previous studies (Easton and Harris, 1991; Cheng, Cheung and Gopalakrishnan, 1993; Dodd and Chen, 1997). According to Chen and Dodd (2001) the use of a formal valuation model would add credibility to the empirical findings of their study. The model was estimated cross-sectionally by year as well as using pooled cross-sectional intertemporal data. The basic model was the following, (3-19), and is in fact the Easton and Harris (1991) 'levels and changes' model, (3-3a), which has been described in this chapter, in section 3.2.1.3.

$$(\Delta P_{jt} + d_{jt}) / P_{jt-1} = kp[\Delta A_{jt} / P_{jt-1}] + (1-k) [A_{jt} / P_{jt-1}] + e_{jt,} \qquad (3\text{-}19)$$

where $(\Delta P_{jt} + d_{jt}) / P_{jt-1}$ represents the annual compound returns, ΔA_{jt} represents the change in earnings per share of firm *j* from time period *t-1* to *t*, A_{jt} represents the earnings per share of firm *j* over time period *t*, P_{jt-1} represents the price per share of firm *j* at time *t-1*, and k is the weighted factor for the contribution of ΔA_{jt} versus A_{jt}.

In order to conduct their empirical research, Chen and Dodd (2001) based on previous studies (Bowen, Burgstahler and Daley, 1987; Cheng, Cheung and Gopalakrishnan, 1993; Biddle, Seow and Siegel, 1995; Biddle, Bowen and Wallace, 1997; Chen and Dodd, 1997) employed two approaches: the relative and the incremental information content approach. They developed four hypotheses, two for each approach. Analytically, the hypotheses were formed as follows:

For the examination of the relative information usefulness:

H1a: RI does not provide more information than OI in explaining the variation of stock returns.

H1b: EVA® does not provide more information than RI in explaining the variation of stock returns.

For the examination of the incremental information usefulness:

H2a: RI does not provide incremental information in addition to that contained in OI in explaining the variation of stock returns.

H2b: EVA® does not provide incremental information in addition to that contained in OI and RI in explaining the variation of stock returns.

The sample selection was based on the same sources as their previous study (Chen and Dodd, 1997). Firstly, they collected data for ten years (time period from 1983 to 1992) from the *1992 Stern Stewart 1,000* database. This database could provide them with data for the EVA® figures of each company. However, it did not contain detailed data for the EVA® adjustments. Secondly, they retained in the sample only those companies that were also in *Standard and Poor's Compustat PC Plus* database with relevant data for OI and RI variables. After the variables' estimation, they excluded those observations with more than 10 standard deviations from the median. Their final sample consisted then of 6,683 observations. All independed variables were scaled down by the company's stock price in the beginning of period, *t-1*.

To capture the incremental information provided by a measure beyond the other, or the others, Chen and Dodd (2001) adopted the approach used by Cheng, Cheung and Gopalakrishnan (1993). Analytically, to capture the incremental information provided by RI beyond OI, they estimated the difference between these two in both level and change variables. Thus, they created the change in residual income minus operating income, ΔRIMOI, and the residual income minus operating income, RIMOI, variables. The new variables, ΔRIMOI and RIMOI could measure the additional information provided by RI measures due to the incorporation of the cost of capital. The same procedure has been used to measure the incremental information provided by EVA®, beyond RI. Thus, they created two more variables, the change in EVA® minus residual income, ΔEVAMRI, and the EVA® minus residual income, EVAMRI.

To examine the relative information usefulness of OI, RI, and EVA®, Chen and Dodd (2001) fitted the Easton and Harris (1991) model in each of the three profitability measures. The developed models were formed as follows:

$$RET_{jt} = beta_0 + beta_1\ [\Delta OI_{jt} / P_{jt-1}] + beta_2\ [OI_{jt} / P_{jt-1}]\ + e_{jt,} \qquad (3\text{-}20)$$

$$RET_{jt} = beta_0 + beta_1\ [\Delta RI_{jt} / P_{jt-1}] + beta_2\ [RI_{jt} / P_{jt-1}] + e_{jt,} \qquad (3\text{-}21)$$

$$RET_{jt} = beta_0 + beta_1\ [\Delta EVA_{jt} / P_{jt-1}] + beta_2\ [EVA_{jt} / P_{jt-1}] + e_{jt,} \qquad (3\text{-}22)$$

Where $RET_{jt,}$ the dependent variable, is the annual stock return, OI_{jt} is the operating income per share, ΔOI_{jt} is the change in operating income per share, RI_{jt} is the residual income per share, ΔRI_{jt} is the change in residual income per share, EVA_{jt} is the EVA® per share, ΔEVA_{jt} is the change in EVA® per share P_{jt-1}, the deflator factor, is the stock price per share at the beginning of period *t-1,*(nine months prior to fiscal year end).

To estimate the models, Chen and Dodd (2001) used both the pooled cross-sectional and intertemporal (all years) sample and the individual year cross-sectional sample, following the methodology of Bowen, Burgstahler and Daley (1987) and Easton and Harris (1991). Results for the relative information usefulness reported by Chen and Dodd (2001) as follows: Firstly, all the regressions, except one EVA® regression for 1988, were significant at 0.01 level according to F statistics. This result suggested that the Easton and Harris (1991) model provided a good description of the relationship between stock returns and each of the profitability measures (OI, RI, EVA®). Secondly, most of the coefficients in annual regressions were statistically significant at the 0.01 level according to t-statistics. This finding suggested that both profitability levels and changes variables were associated with stock returns. Thirdly, the reported R^2s from the three regressions reported as follows: 0.062, 0.050 and 0.023 for the OI, RI and EVA® respectively. Those R^2s suggested that OI measures provide more information in explaining the variation in stock returns than RI measures, which in turn provide more information than EVA® measures. The same conclusions revealed when they examined the average R^2s of ten yearly regressions. The R^2s were 0.094, 0.078 and 0.066 for the OI, RI and EVA® respectively, revealing that the new information provided by EVA® was less value relevant, at least from the perspective of stock returns. This finding is consistent with that of Biddle, Bowen and Wallace (1997).

To examine the incremental information usefulness of RI in addition to OI, hypothesis H2a, Chen and Dodd (2001) extended the Easton and Harris (1991) model and constructed the following one:

$$RET_{jt} = beta_0 + beta_1\,[\Delta OI_{jt} / P_{jt-1}] + beta_2\,[OI_{jt} / P_{jt-1}] + beta_3\,[\Delta RIMOI_{jt} / P_{jt-1}] + beta_4\,[RIMOI_{jt} / P_{jt-1}] + e_{jt} \qquad (3\text{-}23)$$

Compared to the OI model (3-20), this model contains in addition two more variables, which are the differences between RI and OI in both levels and changes. The model was then estimated using both pooled sample and annual cross-sectional sample.

Results from the examination of both the pooled regression and the individual annual regressions revealed as follows: Firstly, according to F statistics, all of the regressions, pooled or individual, were statistically significant at the 0.01 level suggesting the usefulness of the model. Secondly, all of the coefficients in the pooled regression were significant at the 0.01 level and most annual regressions coefficients were significant either at the 0.01 or at the 0.05 level. This indicated the incremental information usefulness provided by the RI measures. Thirdly, the t-statistics from the cross-temporal mean and standard deviation of the ten annual coefficient estimates, revealed that the stationarity assumption is not violated in the pooled regression and the significant coefficients in annual regressions are not a likely result of cross-sectional correlations (Chen and Dodd, 2001).

To test the hypothesis H2a, Chen and Dodd (2001) used two different procedures. Firstly, they used the regression model (3-23) as a full model and the regression model (3-20) as a reduced model and performed a partial F-test for each regression. The partial F statistic of 23.49 from the pooled regression suggested a rejection of H2a at the 0.01 level. This means that the RI measures add additional information usefulness beyond OI measures. Moreover, since most of the annual regressions revealed significant partial F statistics at the 0.01 or at the 0.05 level, the previous conclusion could be additionally reinforced. Secondly, they conducted the Wilcoxon rank test on the increase of R^2s from model (3-20) to model (3-23). After adding the two RI variables, the average R^2 of the ten annual regressions increased by the absolute 0.0269 (from 0.094 to 0.1209). According to the Wilcoxon rank test, this increase was statistically significant at the 0.01 level. Since the two testing procedures provided evidence to reject the H2a, Chen and Dodd (2001) concluded that RI is of significant incremental information value beyond OI, that is, including the cost of capital in a profitability measure adds significantly to value relevance.

Finally, to further examine the incremental information usefulness of EVA® measures in addition to OI and RI measures, hypothesis H2b, Chen and Dodd (2001) extended the model (3-23) by adding two more variables representing the difference between EVA® and RI. Thus, the model became as follows:

$$RET_{jt} = beta_0 + beta_1 [\Delta OI_{jt} / P_{jt-1}] + beta_2 [OI_{jt} / P_{jt-1}] + beta_3 [\Delta RIMOI_{jt} / P_{jt-1}] + beta_4 [RIMOI_{jt} / P_{jt-1}] + beta_5 [\Delta EVAMRI_{jt} / P_{jt-1}] + beta_6 [EVAMRI_{jt} / P_{jt-1}] + e_{jt} \qquad (3\text{-}24)$$

Again, the model was estimated using the pooled sample and the annual cross-sectional sample as well.

Chen and Dodd (2001) tested hypothesis H2b in the two similar ways they employed to test hypothesis H2a. The full model was the new one (3-24) while the reduced model was the (3-23). The partial F statistic of 38.51 from the pooled regression was statistically significant at the 0.01 level suggesting that EVA® measures contain additional information beyond what is provided by OI and RI measures. Moreover, six F statistics of the ten yearly regressions were significant at the 0.01 and two at the 0.05 level. Thus, Chen and Dodd (2001) were able to reject hypothesis H2b, supporting the alternative one. Secondly, they conducted the Wilcoxon rank test on the increase of R^2s from model (3-23) to model (3-24). The average R^2s of the ten annual regressions increased by the absolute 0.0086 (from 0.1209 to 0.1295). This increase was statistically significant at the 0.05 level. Thus, both testing procedures provided evidence to reject hypothesis H2b, supporting the alternative that EVA® measures convey incremental information value beyond the OI and RI measures.

In summary, Chen and Dodd (2001) concluded that: the three profitability measures, OI, RI and EVA® have information content in terms of value relevance, but contrary to EVA® proponents their results do not support the claim that EVA® is the superior measure for valuation purposes. They found rather that OI has more explanatory power than RI, which in turn has more explanatory power than EVA®. These results are consistent to prior studies of (Dodd and Chen, 1996; Dodd and Chen, 1997; Chen and Dodd, 1997; Biddle, Bowen and Wallace, 1997) even though those studies employed different methodologies. Thus, Chen and Dodd (2001) suggested that perhaps the market might place higher reliance on audited accounting earnings rather than the un-audited EVA® measures. RI measures convey significant incremental information that is not conveyed by OI measures. Thus, including the cost of capital in a profitability measure adds significantly to value relevance. Their tests also provided evidence about the incremental information value of EVA® beyond OI and RI. However, the marginal increase of R^2 suggested that companies might be able to obtain most of the practical benefits promised by an EVA® system by adopting the less costly RI. Their findings were also consistent with prior studies (Dodd and Chen, 1996; Biddle, Bowen and Wallace, 1997) suggesting that accounting based information explains little of the variation in stock returns. The relatively low R^2s suggested that more than 90 per cent of the variation in stock returns might be explained by non-earnings based information. Thus, according to Chen and Dodd (2001) if companies intend to more closely assign organisational measures with stock returns, a measurement system other than EVA® will have to be developed.

The study of Chen and Dodd (2001) influenced the present study in several ways, such as: to adopt the Easton and Harris (1991) formal valuation model, to use annual compound returns as dependent variable, to extend the Easton and Harris (1991) model by examining various performance measures in addition to earnings, to employ relative and incremental information content tests to examine the value relevance of the independent variables, to estimate the models using both pooled samples and annual cross-sectional samples, and to compare our findings with those reported from (Dodd and Chen, 1996; Chen and Dodd, 1997; Biddle, Bowen and Wallace, 1997; Chen and Dodd, 2001).

3.2.6. Worthington and West (2001) Methodology

Worthington and West (2001) conducted a study examining the usefulness of EVA® and its components in the Australian context. Pooled time-series, cross-sectional data over the period 1992-1998 were employed for their research. The approach they selected and the research questions they addressed were most consistent with that used by Biddle, Bowen and Wallace (1997) among others. The first research question addressed by Worthington and West (2001) was related to the acclaimed dominance of EVA® over both the RI and the conventional accounting measures such as EBEI and net cash flow from operations (NCF), in explaining contemporaneous stock returns. The second research question was concerned with those components unique to EVA® that help to explain those contemporaneous stock returns beyond that explained by residual income and the conventional accounting measures. Both relative and incremental information content approaches have been employed to examine those research questions.

The selected sample consisted of 110 listed Australian companies (non-financial) over the period 1992-1998. Both adopters and non-adopters of the EVA® Financial Management System were included in this sample. Worthington and West (2001) firstly identified the dependent and the independent variables. They relied on prior studies of (Bowen, Burgstahler and Daley, 1987; Jennings, 1990; Easton and Harris, 1991; Ali and Pope, 1995; Biddle, Seow and Siegel, 1995) where under the assumption that stock markets are (semi-strong form) efficient, stock market returns can be used to compare the information content of the competing accounting-based performance measures in a regression based approach. Thus, they employed annual stock market returns as the depended variable for their research. Secondly, in order to identify the independent variables, they described the linkages between the competing performance measures (EBEI, NCF, RI and EVA®) as has been described through the specifications (2-26) to (2-34) in chapter two, in section 2.3.3.5, and as has been discussed in this chapter, in section 3.2.3, where the Biddle, Bowen and Wallace (1997) methodology was explained. The third step was to express the relationship between market returns and the independent variables. Thus they developed the models for their study.

They used three different sources of data. Stern Stewart's Australian *EVA Performance Rankings* provided them with data for EVA® and its components. Financial statement data for EBEI, after tax interest expenses (ATI), RI, NCF, accruals (ACC) and adjustments (ADJ) were collected from the Australian Stock Exchange's (ASX) *Datadisk* database and the Connect-4 *Annual Report Collection* database. Finally, the Australian Graduate School of Management's (AGSM) *Share Price and Price Relative* database provided them with share price data.

Worthington and West (2001) specified two models in order to calculate the relative and incremental information content of the EVA®, RI, EBEI and NCF, and to calculate the relative and the incremental information content of the components of EVA® itself. Both models were estimated using a pooled time-series, cross-sectional least square regression with corrections for heteroscedasticity and autocorrelation.

Thus, the first model, referred as 'firm valuation model' was specified as follows:

$$MAR_{it} = b_0 + b_1EVA_{it} + b_2EBEI_{it} + b_3NCF_{it} + b_4RI_{it} + e_{it} \qquad (3\text{-}25)$$

where the depended variable MAR_{it} is the compound annual stock return covering a non-overlapping 12 month period ending three months following the company's fiscal year end. This procedure allows time for information contained in the annual report to be impounded in stock prices. The independent variables are: EVA®, EBEI, NCF and RI. Both the dependent and the independent variables were normalised by the outstanding number of shares. According to the value-relevance literature on the financial statement information, all variables are expected to be positively related to stock returns. That is, the coefficients of EVA®, EBEI, NCF and RI are expected to be positive.

The second model, referred to 'components of EVA®' model, and was specified as follows:

$$MAR_{it} = b_0 + b_1CC_{it} + b_2ATI_{it} + b_3ACC_{it} + b_4ADJ_{it} + b_5NCF_{it} + e_{it} \quad (3\text{-}26)$$

where the dependent variable MAR_{it} is the compound annual stock return covering a non-overlapping 12 months period ending three months following the company's fiscal year end. The independent variables are the five EVA® components, which are the capital charge (*CC*), the after tax interest (*ATI*), the operating accruals (*ACC*), the accounting adjustments (*ADJ*) and the net cash flows (*NCF*). Both the dependent and the independent variables were also normalised by the outstanding number of shares.

To answer the first research question, Worthington and West (2001) employed specification (3-25) and tested it using both the relative and the incremental information content approach. For the relative information content test, they created four regression models, one for each competing performance measure. For the incremental information content test, they created six pairwise regression models plus one more incorporating all the competing variables. An assumption of linear relationship between the variables has been made and the test for multicollinearity has been conducted for the combined regressions.

The relative information content tests revealed the following statistical results: First of all, the significance of the estimated coefficients suggested that all four accounting based performance measures were positively associated with stock returns over the period 1992-1998. Moreover, EBEI achieved an R^2 of

23.67 with an F-statistic of 46.01 while that for the other competing performance measures were: RI (R^2 = 19.29, F = 47.74), NCF (R^2 = 18.10, F = 35.70), and EVA® (R^2 = 14.29, F = 47.83). From those findings, Worthington and West (2001) suggested that EBEI explain stock returns better than the other competing performance measures. RI follows EBEI and NCF and EVA® come next. The findings are consistent with those of Biddle, Bowen and Wallace (1997) and Chen and Dodd (2001), where earnings outperform EVA®.

The examination for the incremental information content was conducted as follows: Firstly they reported the results of the six pairwise regressions. Then, using any pairwise regression as a full model, they subtracted from it one individual R^2 as reported in the relative information content test. The difference was the incremental information content of the second variable of the pair. To illustrate it, assume the R^2 from the pairwise regression between EBEI and EVA® to be 24.55 (as was really reported). The incremental information content then for EBEI/EVA is calculated as the R^2 from the pairwise regression (24.55) minus the individual R^2 for EVA® (here 14.29). Thus, the incremental information content, 10.26, is caused due to the incorporation of EBEI in the model. Worthington and West (2001) revealed that the pairwise combinations of EVA® and EBEI, NCF and RI indicated that explanatory power has increased by 10.26, 6.07 and 5.07 per cent respectively over the EVA® measure alone. That makes clear that earnings convey the largest information content among the competing measures. Examining the incremental information content of the other performance measures beyond earnings, they suggested only limited contribution with EVA® (0.88 per cent), RI (0.57 per cent) and NCF (0.19 per cent). Therefore, the pair with the most explanatory variables in explaining stock returns in that of EBEI and EVA®.

Results from the pairwise regressions plus the regression incorporating all variables, provided additional information about the usefulness of the competing performance measures. Firstly, the reported R^2 (24.55) from the pairwise regression between EBEI and EVA® is the highest one. Next came the pairwise regression between EBEI and RI, R^2 (24.24). This suggests that EVA® and the less costly RI are identical in explaining the stock returns. Finally, the reported R^2 (24.75) from the last regression, incorporating the four performance measures, suggests that stock returns can be explained only by 24.75 per cent from those measures while there are other factors that explain the remaining 75.25 per cent.

As for the second research question, examined by the specification (30-26), Worthington and West (2001) used the same research procedure as for research question one. They created five regression models for the relative information content examination and eleven regression models for the incremental information content. Relative information content results revealed that the components of EVA® explaining the variation in stock returns most are: accruals ($R^2 = 20.50$), followed by after tax interest ($R^2 = 19.47$), capital charges ($R^2 = 17.81$), net cash flows ($R^2 = 13.12$) and accounting adjustments ($R^2 = 8.13$). Incremental information content tests revealed results suggesting that the component of EVA® that explains most variation in stock returns is: accruals, followed by after tax interest, capital charges, net cash flows and accounting adjustments. The limited discussion of the second research question is due to the fact that it is out of the interest of the present study.

The study of Worthington and West (2001) gave us incentive: to examine the various performance measures in addition to earnings, to adopt the use of relative and incremental information content tests to examine the value relevance of the independent variables, to use compound annual stock returns as dependent variable, to estimate the models using both pooled samples and annual cross-sectional samples, and to compare our results with those provided from other studies (Dodd and Chen, 1996; Chen and Dodd, 1997; Biddle, Bowen and Wallace, 1997; Chen and Dodd, 2001; Worthington and West, 2001).

3.2.7. Chen and Zhang (2003) Methodology

The purpose of the Chen and Zhang (2003) study was to show how balance sheet information could be incorporated into a return model to supplement earnings and to empirically examine the incremental usefulness beyond earnings in explaining stock returns. They modelled earnings as a product of two factors, capital base and profitability. They then showed that returns are more appropriately viewed as a function of profitability change and capital investment, rather than a function of earnings change. The empirical tests revealed that profitability change is superior to earnings change as an explanatory variable for returns (although the two are highly correlated). Additionally, they found that capital investment (capital base change) is also significant beyond earnings level and profitability change. Their model increased the average explanatory power by 16.8 per cent relative to the earnings based model. Overall, they found that balance sheet information is important both statistically and economically in explaining stock returns.

3.2.7.1. Development of the Theoretical Model

Chen and Zhang (2003) first developed a theoretical model to show how stock return is linked to both balance sheet and the income statement information. They followed the basic economic intuition that 'flows' originate from 'stocks' in operations and defined earnings as a product of two factors, capital base and profitability. Capital base is the amount of capital invested in operations, while profitability refers to how efficiently capital was deployed in creating wealth.

They adopted the notion that since equity value is related to expected future earnings, returns depend on changes in expected future earnings. There are two different factors that make earnings change: the capital base change (capital investment), and the profitability change. However, those two factors have different implications on returns. That is, while an increase in earnings caused from an increase in profitability increases shareholder value wealth, an earnings increase caused by an expansion of capital base may or may not increase shareholder value.

In the first case, the earnings increase suggests that the company is deploying the capital more efficiently in operations, which has a positive effect on returns. However, in the second case shareholder value increases only if the earnings increase is sufficient to cover the cost of capital, but could also decrease if the earnings increase is not sufficient to cover the cost of capital. Therefore, according to Chen and Zhang (2003) the two sources of earnings change should be distinguished and considered separately in a return model. Additionally, their analysis showed that the earnings level is a separate explanatory variable for returns in addition to capital and profitability change.

To develop their theoretical model, Chen and Zhang (2003) considered an all-equity financed company at time t that is expected to remain as a going concern in the foreseeable future. They then considered the realised earnings in period t as X_t, the book value of equity at time t as B_t, and the market value (the intrinsic value) of equity at the time t as V_t. They also defined the profitability (return on equity) for period t as $q_t = X_t / B_{t-1}$, where B_{t-1} is the book value of equity at the beginning of period, and the capital investment at time t as $I_t = B_t - B_{t-1}$. According to Easton and Harris (1991) and Kothari (2001) they assumed that the conditions are such that equity value equals the capitalisation of expected next-period earnings, that is: $V_t = kE_t(X_{t+1})$, where E_t is the expectations factor, and k the capitalisation factor. They further assumed that profitability follows a mean reversion process as follow: $q_{t+1} = \delta q_t + e_{t+1}$, with $0<\delta \leq 1$, and e_{t+1} to be a zero-mean disturbance term. They then expressed the company's market value as follows:

$$V_t = kE_t(B_t\, q_{t+1}) = k\delta q_t B_t \cong \varphi q_t B_t \text{, where } \varphi = k\delta \tag{3-27}$$

Next, they applied the valuation equation (3-27) to date $t+1$, and formulated it as follows:

$$V_{t+1} = \varphi q_{t+1} B_{t+1} = \varphi\, (q_t + dq_{t+1})(B_{t+1} + I_{t+1}) \tag{3-28}$$

where $dq_{t+1} \cong q_{t+1} - q_t$ represents the profitability change in period $t+1$ relative to period t.

The next step was to identify the returns over period $t+1$ as follows:

$$R_{t+1} = \frac{V_{t+1} + D_{t+1} - V_t}{V_t} \tag{3-29}$$

with V_t and V_{t+1} to be defined as described previously and D_{t+1} to represent the dividends paid at time $t+1$.

Finally, according to Ohlson (1995) and Feltham and Ohlson (1995), Chen and Zhang (2003) assumed the clean surplus relation where:

$$B_{t+1} = B_t + X_{t+1} - D_{t+1}.$$

Then, $$D_{t+1} = X_{t+1} - (B_{t+1} - B_t) = X_{t+1} - I_{t+1} \tag{3-30}$$

Substituting expression (3-30) into (3-29) and simplifying yield

$$R_{t+1} = \frac{V_{t+1} + (X_{t+1} - I_{t+1}) - V_t}{V_t}$$

$$R_{t+1} = \frac{1}{V_t}\left[\varphi(q_t + dq_{t+1})(B_t + I_{t+1}) + X_{t+1} - I_{t+1} - \varphi q_t B_t\right] \tag{3-31}$$

$$R_{t+1} = \frac{X_{t+1}}{V_t} + \varphi \frac{B_t}{V_t} dq_{t+1} + \left(\frac{V_t}{B_t} - 1 \right) \frac{I_{t+1}}{V_t} + \varphi dq_{t+1} \frac{I_{t+1}}{V_t} \qquad (3\text{-}32)$$

Thus, within this setting, they suggested that returns are driven by three fundamental factors: earnings (X_{t+1}), profitability change (dq_{t+1}), and capital investment (I_{t+1}). They also indicated a second-order term that captures the interaction between profitability change and capital investment. Earnings are a measure of operating performance that indicate the value realised from operating activities in the contemporaneous period, while profitability change and capital investment (capital base change) revise the expectations about future earnings generation.

3.2.7.2 The Usefulness of Balance Sheet Information Beyond Earnings

Chen and Zhang (2003) empirically estimated their return model to evaluate the usefulness of balance sheet information in explaining returns. Their main objectives were: to compare profitability change with earnings change as alternative explanatory factors, to evaluate the usefulness of capital investment as an additional factor, and to examine the overall performance of their model versus earnings based models. To perform all empirical tests they used as a basic model the Easton and Harris (1991) earnings-based model and as a full model that they theoretically developed (3-32).

To provide data for their variables, they used two different data sources. Firstly, they extracted data on earnings before extraordinary and discontinued operations[1] and book value of equity from *COMPUSTAT* annual file for companies with at least three consecutive years of data available in order to calculate change of profitability. Secondly, they extracted stock returns and

[1] Their results were qualitatively unchanged when other definitions of earnings were used such as net income and earnings adjusted for special items.

opening market value of common equity from the *CRSP* monthly files. The annual stock returns (R_{t+1}) then, the compounded monthly returns starting from the fourth month after the prior fiscal year end to the third month after current fiscal year end. Thus, the sample for their research was an intersection of the two data sources for year 1966 through year 2001 (36 years). They excluded observations with negative book equity and trimmed 5 per cent of the extreme observations at the top and the bottom end of the sample distributions for each of the variables: returns, earnings, earnings change, profitability change and capital investment. The final sample consisted of 102,966 firm-year observations for period 1966-2001.

According to Easton and Harris (1991) model (3-3), and to their previously developed model (3-32), Chen and Zhang (2003) created the following variables:

SRT_{jt} = Annual stock return for company j for year t, measured nine months prior to fiscal year-end extended to three months after the current fiscal year-end. This is the dependent variable for the models (3-3) and (3-32);

The independent variables are:

$\chi_{jt} = X_{jt} / V_{jt-1}$ is the earnings level, and represents the earnings (X_{jt}) of the company j at time t scaled by the beginning market value of equity (V_{jt-1}). This variable is the first term in both models (3-3 and 3-32).

$\Delta\chi_{jt} = (X_{jt} - X_{jt-1}) / V_{jt-1}$ is the earnings change in year t relative to year t-1, scaled by beginning market value of equity (V_{jt-1}). It is the second term in the Easton and Harris (1991) model (3-3).

$\Delta q_{jt} = (q_{jt} - q_{jt-1}) B_{jt-1} / V_{jt-1}$ is the profitability change in year *t* relative to year *t-1*, adjusted by beginning book-to-market ratio (B_{jt-1} / V_{jt-1}). It is the second term in Chen and Zhang (2003) model (3-32). Profitability change is represented by (q_{jt}-q_{jt-1}), where $q_{jt} = X_{jt} / B_{jt-1}$

$\Delta b_{jt} = \left[(B_{jt} - B_{jt-1}) / V_{jt-1} \right] \left(V_{jt-1} / B_{jt-1} - 1 \right)$ is the capital investment scaled by opening market value of company *j* in year *t*, adjusted by $\left(V_{jt-1} / B_{jt-1} - 1 \right)$. This is the third term in the Chen and Zhang (2003) model (3-32).

$(\Delta qb)_{jt} = (q_{jt} - q_{jt-1}) \left[(B_{jt} - B_{jt-1}) / V_{jt-1} \right]$, is the fourth term in Chen and Zhang (2003) model (3-32), capturing the interaction between profitability change and capital investment for company *j* in year *t*.

To conduct the empirical tests, Chen and Zhang (2003) formed the following set of equations:

$$SRT_{jt} = a + \beta \chi_{jt} + \vartheta \Delta \chi_{jt} + \upsilon_{jt} \tag{3-33}$$

$$SRT_{jt} = a + \beta \chi_{jt} + \gamma \Delta q_{jt} + \upsilon_{jt} \tag{3-34}$$

$$SRT_{jt} = a + \beta \chi_{jt} + \gamma \Delta q_{jt} + \vartheta \Delta \chi_{jt} + \upsilon_{jt} \tag{3-35}$$

$$SRT_{jt} = a + \beta \chi_{jt} + \gamma \Delta q_{jt} + \delta \Delta b_{jt} + \eta (\Delta qb)_{jt} + \upsilon_{jt} \tag{3-36}$$

where all variables are identical to those described previously.

Equation (3-33) is the Easton and Harris (1991) model. The other equations have been specified from Chen and Zhang (2003). Equation (3-34) emanated from equation (3-33) where earnings change ($\vartheta \Delta \chi_{jt}$) is replaced by profitability change ($\gamma \Delta q_{jt}$) but the earnings level variable remains as required by the theoretical model (3-32). A comparison of the equations (3-33) and (3-34) reveals the usefulness of profitability change compared to earnings change. Equation (3-35) further examines the relative strength of profitability change versus earnings change as an explanatory factor for returns. It incorporates both earnings change and profitably change and its results are compared to those of equations (3-33) and (3-34). Finally, equation (3-36) is focused mainly on the effects of capital investment and in fact represents the full theoretical equation (3-32). It is compared directly to the results from the equation (3-34) since it examines how capital investment increases the explanation power beyond earnings and profitability change.

Equation (3-36) is also compared to the results from equation (3-33) to examine the overall performance of the new theoretical model versus earnings-based equations. Chen and Zhang (2003) tested the equations both for the pooled sample and for each of 36 annual samples. They revealed the usefulness of the independent variables by focusing mainly on three points: the comparison of the coefficients statistics of the variables, the comparison of the adjusted R^2s of the regressions, and the Vuong's (1989) and Wilcoxon tests in order to formally discriminate the two competing equations.

Results from the pooled regression models reported the following:

Table 3-1: Chen and Zhang (2003). Regression Results from the Pooled Sample

Coef.	Model (3-33)		Model (3-34)		Model (3-35)		Model (3-36)	
	Estimate	t-stat.	Estimate	t-stat.	Estimate	t-stat.	Estimate	t-stat.
α	0.08	49.76	0.09	56.23	0.09	53.79	0.08	41.10
β	0.97	87.79	0.88	74.16	0.88	73.56	0.96	79.85
ϑ	0.28	35.06			0.03	2.01		
γ			0.47	40.50	0.43	20.26	0.44	38.30
δ							0.22	26.80
η							0.63	20.03
Adj. R^2	10.66		11.02[a]		11.02		11.92[b]	

[a] Vuong's Z-statistic for comparing model (3-33) and model (3-34) is 6.63, significant at the 0.01 level in favour of model (3-34).

[b] Vuong's Z-statistic for comparing model (3-36) and model (3-34) is 10.67, significant at the 0.01 level in favour of model (3-36). Vuong's Z-statistic for comparing model (3-33) and model (3-36) is 12.57, significant at the 0.01 level in favour of model (3-36).

Profitability change versus Earnings change. Chen and Zhang (2003) first performed the correlation analysis and found that the Pearson correlation coefficient between earnings change and profitability change is 0.86, significant at the 0.01 level, in the pooled sample. With this high degree of correlation, the two variables were expected to have similar performances. They compared the two variables in explaining stock returns based on regression models (3-33) and (3-34). As reported in table 3-1, the coefficient of earnings change (ϑ) in model (3-33) and that of profitability change (γ) in model (3-34) are both very significant. However, the significance level of profitability change (t=40.50) is higher than that of earnings change (t=35.06).

Moreover, the adjusted R^2 for the model (3-34) is 11.02 per cent while that for the model (3-33) is 10.66 per cent. This indicates that the use of profitability change $(\gamma\Delta q_{jt})$, versus earnings change $(\gamma\Delta q_{jt})$, results in an improvement in the explanatory power of 3.4 per cent in proportional terms. The Vuong's (1989) tests also showed that the improvement in explanatory power of model (3-34) over model (3-33), although small, is statistically significant at the 0.01 level, with a Z equal to 6.63 and a p-value < 0.01. Another important finding reported in table 3-1 is that in both models (3-33) and (3-34) earnings level is an important determinant of returns. Additionally, results from the annual regressions support the findings from the pooled regressions.

Regression model (3-35) further examines the relative strength of profitability change versus earnings change. This model incorporates both competing variables. Results from (3-35) as reported in table 3-1, provide evidence that while profitability change (γ) remains largely unchanged, that of earnings change drops substantially (ϑ in (3-33) is 0.28 with t=35.06, while in (3-35) is 0.03 with t=2.01). At the same time, adjusted R^2 increases from 10.66

per cent in (3-33) drops to 11.02 per cent in (3-35). Comparing the results from regression models (3-34) and (3-35) the coefficient of profitability change (γ) has almost similar value (in (3-34) is 0.47 with t=40.50 while in (3-35) is 0.43 with t=20.26). The most important evidence here is that adjusted R^2s remain unchanged, 11.02 per cent, that is, there is no change in explanatory power from (3-34) to (3-35) after earnings change is added as an incremental variable. Results from the annual regressions reinforce the previous findings. Thus, Chen and Zhang (2003) concluded that profitability change is a superior explanatory variable for returns relative to earnings change, consistent with the prediction of their theoretical model.

Effect of capital investment on returns. Chen and Zhang (2003) showed theoretically that returns are also affected by capital investment in addition to earnings level and profitability change. To examine this empirically, they formed regression model (3-36), which is in fact their theoretical specification (3-32). For theoretical correctness, they also incorporated in this model the second-order term, $\eta(\Delta qb)_{jt}$. However, since they have proved that the effect of this term on returns is generally of much smaller magnitude compared with the first-order term ($\delta\Delta b_{jt}$), they examined only the coefficient (δ) of the first-order term. They also evaluated the usefulness of capital investment as an explanatory factor in terms of the change in R^2 it causes between model (3-34) and (3-36). Results in table 3-1 reported as follows: The coefficient of capital investment (δ) is positive and highly significant (t=26.80). The reported R^2 of model (3-36) is 11.92 per cent, that is, after adding capital investment there is an increase compared to the 11.02 per cent R^2 of model (3-34). That represents an 8.2 per cent increase in proportional terms. The Vuong's test also indicated that the improvement of model (3-36) is significant at the level 0.01 with a Z=10.67.

They also proved that the effect of capital investment is also economically significant. From the descriptive statistics they could reveal that a change of capital investment by one standard deviation (in the pooled sample) on average leads to a change of annual returns by about 4 per cent. Results from the annual samples supported that of the pooled sample. Thus, after those findings, Chen and Zhang (2003) were able to conclude that capital investment is a valid explanatory factor for returns, beyond earnings and profitability change.

Combining the effects of profitability change and capital investment. Chen and Zhang (2003), in order to evaluate the overall effectiveness of their return model, compared the explanatory power of model (3-36) to that of model (3-33). As reported in table 3-1, from the pooled sample, R^2 of model (3-36) increases compared to that of (3-33) from 10.66 per cent to 11.92 per cent, that is, an 11.8 per cent increase in proportional terms is recorded. Also, the Vuong's test for comparing model (3-33) and (3-36) is 12.57, significant at the 0.01 level in favour of model (3-36). Chen and Zhang (2003) compared the annual regressions (3-33) and (3-36) for all 36 years. They found that the model (3-36) achieves a higher explanatory power than model (3-33) in all 36 years. The average R^2 for model (3-36) is 15.32 per cent relative to 13.12 for model (3-33), which is an increase of 2.2 per cent in magnitude or 16.8 per cent in proportional terms. Thus, they concluded that their model (3-36), which combines the effects of both capital investment and profitability change, outperforms the earnings-based model in all 36 years.

In summary, the Chen and Zhang (2003) empirical results revealed that: while earnings change and profitability change are both highly correlated with returns, profitability change has more explanatory power in explaining returns; capital investment as an additional factor, is highly significant and improves the explanatory power of the model, and balance sheet information is also economically important in explaining returns. These results are consistent with the theoretical claims of Chen and Zhang (2003) and confirm the incremental usefulness of balance sheet information beyond earnings. Finally, as proved in previous studies, their analysis explained why earnings levels and earnings change are both statistically significant in explaining returns.

The Chen and Zhang (2003) study inspired our study: to expand the Easton and Harris (1991) model by incorporating profitability (ROI or/and ROE) and capital investment (EVA® or/and SVA) variables expecting an increase in the explanatory power of the model, to use annual compound returns as the dependent variable (expanding nine months prior to the current fiscal year end to three months after the fiscal year end), to use coefficient statistics, R^2s, and other tests for interpretation of results, and to use pooled and annual regressions to conduct our tests.

3.3. The Basic Model Adopted for this Study

One of the two main objectives of the present study is to examine the value relevance of both traditional accounting (EPS, ROI, ROE) and value based (EVA®, SVA) performance measures, using secondary financial data. This data will be used as the underlying source for the calculation of each measure under examination. In chapter four, there is a comprehensive presentation of how the data was collected, how it is inserted and fitted in a financial framework to calculate the measures, and how the variables are finally developed.

Inspired by the previously discussed studies mainly from those of Chen and Dodd (1997; 2001), Biddle, Bowen and Wallace (1997) and Worthington and West (2001) the present study tries to answer the following question for the Greek stock market: 'is there any measure of corporate performance enabling investors to identify investment opportunities and motivate managers to make value-added business decisions?' To facilitate the answer to the above question, it addressed two research questions as follows:

Research question 1. Do EVA® or SVA dominate traditional accounting performance measures, EPS, ROI, and ROE, in explaining annual stock returns?

Research question 2. Do EVA® or SVA incorporate additional information content beyond that included in traditional accounting performance measures, EPS, ROI, and ROE?

Reliant on the studies of Cheng, Cheung and Gopalakrishnan (1993), Chen and Dodd (1997; 2001), Biddle, Bowen and Wallace (1997), Worthington and West (2001) and Chen and Zhang (2003) it was decided to adopt the Easton and Harris (1991) formal valuation model. The use of the theoretical model will add credibility to the empirical findings of the present study. The valuation model is estimated cross-sectionally by year as well as using pooled cross-sectional and intertemporal data. Easton and Harris (1991) model has been extensively discussed in section 3.2.1 and is in fact the (3-3) model or in a more formal form the (3-3a) one.

$$R_{jt} = \gamma_{0t} + \gamma_{1t}\, A_{jt} / P_{jt-1} + \gamma_{2t}\, \Delta A_{jt}/P_{jt-1} + \varepsilon^{3}_{jt} \qquad (3\text{-}3)$$

$$(\Delta P_{jt} + d_{jt})\, /P_{jt-1} = \kappa\rho[\Delta A_{jt}/P_{jt-1}] + (1\text{-}\kappa)\, [A_{jt}/P_{jt-1}] + \omega_{jt}, \qquad (3\text{-}3a)$$

It is in fact the earnings *levels* and *changes* valuation model. Consequently, for the present study we will adopt the basic model (3-3) and based on this model will develop the rest of the models for conducting the empirical tests.

Based on prior studies carried out by Bowen, Burgstahler and Daley (1987), Jennings (1990), Easton and Harris (1991), Ali and Pope (1995), Biddle, Seow and Siegel (1995), Chen and Dodd (1997; 2001), Worthington and West

(2001), and Chen and Zhang (2003) we employed the annual stock returns as the dependent variable. They assumed that stock markets are (semi-strong form) efficient, and thus, stock market returns can be used to compare the information content of the competing accounting-based performance measures in a regression based approach.

The same assumption was adopted for the Greek stock market. Annual stock returns serve as the dependent variable in various regression models. The regressions' R-squares (R^2) are then used as a gauge of usefulness in examining the traditional accounting and value based performance measures. There are two reasons for this regression approach. Firstly, the ability of EVA® and SVA to drive stock prices is extensively supported by advocates of the SHV approach. Secondly, many equity valuation models, both theoretical and those used by practitioners, include earnings as an explanatory variable (Foster, 1986; Lev, 1989; Easton and Harris, 1991; Cheng, Cheung and Gopalakrishnan, 1993; Chen and Dodd, 1997; 2001; Biddle, Bowen and Wallace, 1997; Worthington and West, 2001 and Chen and Zhang, 2003), that is, stock returns have been widely accepted in the literature as a criterion for studying the information usefulness of profit measures.

3.3.1. Relative Information Content Tests

Both relative and incremental information content approaches will be employed to answer the two research questions. Relative information content approach will be employed to answer the first research question, while incremental information content approach will be employed to answer the second one. To explore the first research question, a system of equations (five regression models) was developed based on the Easton and Harris (1991) model. Following the methodology of

Biddle, Bowen and Wallace (1997), Chen and Dodd (1997; 2001), and Worthington and West (2001) the earnings and change in earnings variables in (3-3) were replaced by each of the performance measures under examination. Thus, the following system of equations (hereafter models) was developed:

Relative / Traditional and Value Based Measures (A).

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* $= c_0 + c_1\ ROE + c_2\ \Delta ROE + u_3$

Model (4): *Returns* $= d_0 + d_1 EVA/P_{t-1} + d_2\ \Delta EVA/P_{t-1} + u_4$

Model (5): *Returns* $= e_0 + e_1\ SVA/P_{t-1} + u_5$

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, EVA is the economic value added of firm at time t, ΔEVA is the change in EVA over period $t-1$ to t, and SVA is the shareholder value added over time $t-1$ to t. In our regression models we make two important comments. Firstly, ROI and ROE are not deflated by P_{t-1} since they have already been divided by investment and equity respectively, while there is no ΔSVA variable since SVA represents the change in shareholder value from year to year (Rappaport, 1998). 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 Dodd, 2001, 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.

3.3.2. Incremental Information Content Tests

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; Chen and Dodd, 2001; Worthington and West, 2001; 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 the extends Easton and Harris (1991) model incorporating in it one measure after the other. Due to the fact that the combinations among the five performance measures under examination are so many, they are organised in nine separate groups (B1 to B9). More analytically, the system of equations (regression models) for each group is as follows.

Incremental / Traditional Measures (B1). First the models (6), (7), (8), and (9) were developed where, each time, a combination of two (pairwise) or more traditional performance measures is presented. The purposes of these models are: to examine the incremental information content of one traditional performance measure beyond an alternative one, to examine which pairwise combination explains best the returns (models 6, 7, and 8), and to reveal the total explanatory power of all three traditional performance measures when they are contemporaneously included in one model (model 9).

Model (6): *Returns* $= f_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + u_6$

Model (7): *Returns* $= g_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + u_7$

Model (8): *Returns* $= h_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + u_8$

Model (9): *Returns* $= i_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + u_9$

Incremental / Value Based Measures (B2). Model (10) is then developed which includes the two value based measures.

Model (10): *Returns* $= k_0 + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{10}$

The purposes of this model are: to examine the incremental information content of one value based performance measure beyond an alternative one, and to reveal the total explanatory power of the two value based performance measures when they are contemporaneously included in one model.

Incremental / One Traditional Measure and One Value Based Measure (B3).

In order to examine the incremental information content of a pairwise combination of one traditional performance measure and one value based performance measure, the models (11), (12), (13), (14), (15), and (16) are developed. These models will reveal which pairwise combination best explains the returns, and which performance measure adds the most incremental information usefulness beyond that incorporated in an alternative one. This group of models mainly examines how the cost of capital, in terms of EVA® or SVA, increases or not the explanatory power of the traditional performance measures (Biddle, Bowen and Wallace, 1997; Chen and Dodd, 1997; 2001; Worthington and West, 2001; Chen and Zhang, 2003).

Model (11): *Returns* $= l_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{11}$

Model (12): *Returns* $= m_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + e_1\,SVA/P_{t-1} + u_{12}$

Model (13): *Returns* $= n_0 + b_1\,ROI + b_2\,\Delta ROI + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{13}$

Model (14): *Returns* $= o_0 + b_1\,ROI + b_2\,\Delta ROI + e_1\,SVA/P_{t-1} + u_{14}$

Model (15): *Returns* $= p_0 + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{15}$

Model (16): *Returns* $= q_0 + c_1\,ROE + c_2\,\Delta ROE + e_1\,SVA/P_{t-1} + u_{16}$

Incremental / One Traditional Measure and Two Value Based Measures (B4).

Models (17), (18), and (19) are constructed to test the incremental information usefulness of the combinations between one traditional performance measure and the two value based performance measures. Consistent with the purposes of the previously developed models, the study examines: which model best explains the returns, and how the two value-based performance measures add incremental information usefulness to each traditional performance measure separately. This group of models incorporates the cost of capital, in terms of both EVA® and SVA, and examines how the two value-based performance measures increase or not the explanatory power of the traditional performance measures.

Model (17): *Returns* $= r_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{17}$

Model (18): *Returns* $= s_0 + b_1\,ROI + b_2\,\Delta ROI + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{18}$

Model (19): *Returns* $= t_0 + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{19}$

Incremental / Two Traditional Measures and One Value Based Measure ($EVA/P_{t-1} + EVA/P_{t-1}$) (B5)

Models (20), (21), and (22) are constructed to test the incremental usefulness of the combinations between two traditional performance measures and one value based performance measure (EVA®). The purpose of these models are to examine the overall explanatory power of each model, and to examine to what degree the cost of capital, in terms of EVA®, adds explanatory power to a pair of traditional accounting measures.

Model (20): *Returns* $= u_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{20}$

Model (21): *Returns* $= v_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{21}$

Model (22): *Returns* $= w_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{22}$

Incremental / Two Traditional Measures and One Value Based Measure (SVA/P_{t-1}) (B6).

Models (23), (24), and (25) are constructed to test the incremental usefulness of the combinations between two traditional performance measures and one value based performance measure (SVA). The purposes are the same as when EVA® is incorporated in the models (group B5). What is changed is the value based variable. The cost of capital is in terms of SVA.

Model (23): *Returns* $= x_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + e_1\, SVA/P_{t-1} + u_{23}$

Model (24): *Returns* $= y_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{24}$

Model (25): *Returns* $= z_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{25}$

Incremental / Two Traditional Measures and Two Value Based Measures (B7)

Models (26), (27), and (28) are constructed to test the incremental usefulness of the combinations between two traditional performance measures and two value based performance measures. Here the study explores which model best explains the returns, and the incremental information usefulness of the two value based performance measures when they are incorporated in the model with a pair of traditional performance measures.

Model (26): *Returns* $= \beta_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{26}$

Model (27): *Returns* $= \gamma_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{27}$

Model (28): *Returns* $= \delta_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{28}$

Incremental / Three Traditional Measures and One Value Based Measure (B8)

Models (29) and (30) are constructed to test the incremental information usefulness of each value based performance measure separately when it is incorporated into a model with the three traditional performance measures. The purpose of these models is to explore (a) which model best explains the returns, (b) the incremental information usefulness of each value-based performance measure when it is incorporated in a model with a pair of traditional performance measures.

Model (29): *Returns* $= \varepsilon_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{29}$

Model (30): *Returns* $= \zeta_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{30}$

Incremental / Three Traditional Measures and Two Value Based Measures (B9)

Finally, Model (30) is developed to test the total information usefulness of all performance measures under examination (traditional and value-based). This will reveal the degree of explanation those performance measures convey and will suggest the degree of explanation that seems to be attributable to other performance measures or to non-earnings-based information.

Model (31): *Returns* $= \eta_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{31}$

3.4. Questionnaire Survey

The second objective of the present study is to conduct a questionnaire survey among all interested groups investing in the ASE to examine whether other factors beyond traditional and value based performance measures influence their investment strategies (Runkel and McGrath, 1972; Kerlinger, 1979; 1985; Schuman and Presser, 1981; Zikmund, 2003). Primary data will be collected and processed in order to answer this question. The need for this survey emanates from the reported empirical evidence from prior studies (Easton and Harris, 1991; Cheng, Cheung and Gopalakrishnan, 1993; Biddle, Bowen and Wallace, 1997; Dodd and Chen, 1996; 1997; 2001; Worthington and West, 2001; Copeland, 2002; Chen and Zhang, 2003) revealing a low explanatory power of either traditional or value based performance measures in explaining stock returns.

Moreover, the analysis of a company's financial statements examines fundamentals to explain and predict their growth and value added potential has been discussed in chapter two, section 2.5, but in many cases, current fundamental-based models fail to explain the past adequately, or predict the future reliably. As a consequence of these failures, researchers have started to look beyond fundamentals to the role of other 'non-fundamentalist' influences on financial and stock markets including the approach to forecasting taken by practitioners (Lui and Mole, 1998). Furthermore, the literature suggests that there are other factors such as: macroeconomic, microeconomic and behavioural that influence investors' investment practices (Fama and French, 1995; Nagy and Obenberger, 1994; Shleifer, 2000; Shefrin, 2000; Warneryd, 2001). An additional incentive for this research is the fact that this is the first survey conducted in Greece on the practice of investment management in terms of stock market forecasting and stock selection.

3.4.1. Questionnaire Design

To design the questionnaire, three different types of studies (theoretical studies/publications, empirical studies on individual investors and empirical studies on professional investors) were taken into consideration. Firstly, the broad literature on survey data collection methodology and questionnaire design was examined to decide how to construct the questions and the design of a whole questionnaire (Payne, 1951; Belson, 1981; Sudman and Bradburn, 1982; Converse and Presser, 1986; Fowler, 1993; 1995; Bean and Roszkowski, 1995; Mangione, Fowler and Louis, 1995; Zikmund, 2003).

Thus, according to previous studies and based mainly on Zikmund (2003) the design of the questionnaire took into consideration the following: the proper wording of relevant questions could significantly contribute to improving the accuracy of the answers, the structure and the content of the questionnaire will be substantially influenced by the type of information needed to answer a question, the question format and the questionnaire layout will be influenced by the decisions about the data collection (mail, internet, telephone, or personal interview), the difference between open-ended response questions and fixed-alternative questions, the guidelines that help to prevent the most common mistakes in questionnaire design (e.g. avoid: complexity, leading and loading questions, ambiguity, double-barreled items, making assumptions, and burdensome questions that may tax respondent's memory), the sequence of questions may improve the questionnaire (e.g. asking general questions before specific questions in order to obtain unbiased responses), the importance of questionnaire layout, and the importance of pre-testing and revising the questionnaire.

The study also took into account the research design and the reported results from the prior empirical research on individual investors (Green and Maheshwari, 1969; Potter, 1971; Baker and Haslem, 1973; Lease, Lewellen and Schlarbaum, 1974; Lewellen, Lease and Schlarbaum, 1977; Blume and Friend, 1978; Schlarbaum, Lewellen and Lease, 1978; Antonides and Van Der Sar, 1990; Nagy and Obenberger, 1994; Fisher and Statman, 1997; and Clark-Murphy and Soutar, 2003) and on professional investors (Black, 1986; Frankel and Froot, 1986; 1990; Campbell and Shiller, 1988; Fama and French, 1989; Allen and Taylor, 1989; Carter and Van Auken, 1990; Shleifer and Summers, 1990; Grinyer, Russell and Walker, 1991; Theodossiou, 1991; Taylor and Allen, 1992; Collison, Grinyer and Russell, 1996; Nassar and Rutherford, 1996; Lui and Mole, 1996; 1998; Wong and Cheung, 1999; Naser and Nuseibeh, 2003).

Reliant on the three previously mentioned sources of information (theoretical studies/publications, empirical studies on individual and professional investors) and taking into account the needs of the present study, the first draft of the questionnaire was constructed. In order to improve on it, a qualitative preliminary study established the relevant attributes of shares to be included in the questionnaire. Personal contacts and interviews (Kahn and Cannel, 1951; Bradburn and Sudman, 1979; Mishler, 1986; Billiet and Loosveldt, 1988; Fowler and Mangione, 1990; and Zikmund, 2003) were conducted on both professional and individual investors to reveal which were the most important factors influencing their investment practices.

For testing the validity of the questionnaire six professional analysts (2 from Official Members of the ASE, 2 from Portfolio Investment Companies, and 2 from Mutual Fund Management Companies), four financial analysts from Listed Companies in the ASE, six brokers from brokerage companies, and ten individual investors were contacted and interviewed during October 2003. They were asked to identify the factors that, in their view, distinguished one stock from another and the sources of information that were most significant to them when evaluating stocks. Professional analysts rated fundamental analysis as the most significant factor in their assessment of a stock while brokers rated the technical analysis as most important. Financial analysts of the listed companies considered that both fundamental and technical analysis played an important role in a stock assessment. However, they considered that other factors, such as noise in the market, newspapers/media and experience are significant for assessing a stock.

All interviews revealed that professional and individual investors employed different investment practices during the last 5 years and especially during the year 1999 when the Composite Share Price Index (CSPI) reached its highest level, 6,484 units. In general, the aim of this preliminary study was to determine the factors that investors (professionals and individuals) considered most significant when selecting stocks and when investing in the Greek stock market. After the qualitative preliminary study, the questions in the first draft of our questionnaire were improved.

3.5. Purposes of the Questionnaire

The purpose of the questionnaire is to study whether individuals and investment analysts: regard some techniques for market forecasting and stock selection as more important and use them more than others, and use some techniques more than others in different time periods (short and long term[2], as well as before,

[2] After consultation with representatives of the various user groups it was agreed to define short-term the period of less than a month, and long-term the period between one month and one year. Very few suggested to add medium-term (from one to six months) too, but the majority did not agree, since their meaning of long term included the medium term and they were not using this term.

during, and after the 1999[3] crisis of the ASE). The questionnaire focuses on four categories of analyses, fundamental analysis, technical analysis, portfolio analysis, and other's opinions. The first two categories have a long history of being used worldwide, while the third category became popular in the past two decades. Each category includes a list of techniques that are used for market forecasting and stock selection. These are:

1. Fundamental analysis: accounting ratio analysis (NOPAT, EPS, ROI, ROE, and E/P), value based ratio analysis (EVA®, MVA, and SVA), discounted and other methods (NPV, IRR, DDM, CFROI, DCA, Economic Profit, and CVA) (Sandahl and Sjögre, 2002).
2. Technical analysis: Chart analysis and technical indicators (Moving averages, Relative Strength Index-RSI, Bollinger bands, MACD, Momentum, On balance volume-OBV, Parabolic Sar, and Stochastic oscillator).
3. Portfolio analysis: returns-variance, CAPM analysis, and simulation analysis (Theriou, 2002).
4. Other's opinions: public and private opinions, newspapers/media, instinct/experience, movement of foreign markets, government policy, other).

The questionnaire does not specify what these techniques are and how they are used. There are two major reasons for this. Firstly, respondents may use the techniques in different ways or may not use them since they are unknown techniques to them. Secondly, a lengthy list of techniques may discourage the respondents' participation in this survey. The above techniques are grouped into

[3] Since the Greek capital market had an extreme fluctuation during last years, with the Composite Share Price Index (CSPI) below 2,000 units before the year 1999, an extreme increase up to nearly 6,484 units during the year 1999, and a very deep decrease below 1,700 units in subsequent years, it was decided to separate the research to these three examining periods hoping to catch some possible differences between the periods. CSPI is reported in table 1, in appendix I.

sections. Three sections are mainly used: forecasting and stock selection usage level before the year 1999, forecasting and stock selection usage level during the year 1999 and forecasting and stock selection usage level after the year 1999. In some cases we have two more sections: short term forecasting and stock selection usage level (less than a month), and long term forecasting and stock selection usage level (one month to one year). The respondents were asked to rate their use of these techniques on a five ordinary Likert (1932) scale, where 'score five' means 'always' or 'very accurate' or 'very much' while 'score one' means respectively 'not at all' or 'not accurate'. This rating scale is consistent with Zikmund (2003) and similar to the one presented in the study of Carter and Van Auken (1990). Finally, respondents were asked to evaluate their level of performance as compared to CSPI fluctuations. A ten point Likert (1932) scale is employed in terms of 'unsuccessful' to 'successful'.

The questionnaire pre-tested and revised in November 2003. According to Fowler and Mangione (1990), Oksenberg, Canell and Kalton (1991), Mangione (1995), Fowler (1995) and Zikmund (2003) an early draft of the questionnaire was piloted by a small number of potential respondents from every user group (4 Official Members of the ASE, 4 Mutual Funds Management Companies, 4 Portfolio Investment Companies, 8 listed companies in the ASE, 12 Brokerage Firms, and 20 Individual Investors). After the feedback from respondents, the wording was modified where needed, the sequence was changed, there was reformation of a few of the questions, and its layout was finally improved. The final version of the questionnaire consisted of 10 pages[4]. To make it easy for the respondents it was translated into Greek. Also, two different forms were created for each language (one to be used for postal communication and the other to be

[4] The various forms of the questionnaire are presented in Appendix II.

sent, completed, and returned via e-mail). Finally, an abbreviation and terminology list was created to accompany the questionnaire.

3.6. Conclusion

In this chapter the two major research objectives of the present study were determined and after having explored and discussed prior empirical research the methodologies used were presented, separately for each research question. The first research objective is: to use secondary financial data to empirically examine the usefulness of value based performance measures such as EVA® and SVA compared to the traditional accounting performance measures such as EPS, ROI, and ROE, for the Greek stock market. The second research objective is: to use primary data collected through a questionnaire survey to examine the perceptions of all user groups investing in the Greek stock market about the performance indicators they are using for portfolio analysis and company valuation purposes.

To explore the first research objective, the Easton and Harris (1991) formal valuation model was adopted. This model links both earnings levels and earnings changes to raw stock returns. Since the findings of Easton and Harris (1991) study were encouraging as far as the validity of the model was concerned, their model became the basic one for many researchers to explore the association of returns with various performance measures. Cheng, Cheung and Gopalakrishnan (1993) used this model to reveal the usefulness of OI compared to NI and CI. Based on this model, Biddle, Bowen and Wallace (1997) revealed that earnings were more highly associated with returns and firm values than EVA®, RI and CFO. Chen and Dodd (1996, 1997) used it also as a basic model to test the association of returns with value based and traditional performance measures. Chen and Dodd (2001) extended the Easton and Harris (1991) model revealing that earnings outperform EVA® and RI, while Worthington and West (2001) also found that earnings better explain the stock returns than EVA®, RI, and CFO. Finally, Chen and Zhang (2003) based on Easton and Harris (1991) developed a theoretical model incorporating the earnings levels, profitability change and investment, which was able to increase the explanatory power in explaining stock returns.

Adopting the Easton and Harris (1991) model and extending it according to Chen and Dodd (2001), Worthington and West (2001), and Chen and Zhang (2003) ten groups (A and B1-B9) of equations (models) were developed to examine the usefulness of traditional and value based performance measures in explaining stock returns. Following the methodologies of Cheng, Cheung and Gopalakrishnan (1993), Biddle, Bowen and Wallace (1997), Chen and Dodd (1997, 2001) and Worthington and West (2001) the relative information content approach (to test the equations in group A) and the incremental information content approach (to test the equations in groups B1-B9) were employed. The Relative information content approach compares which performance measure is superior in terms of association with stock returns, while the incremental information content approach addresses whether one or more measures adds to the information provided by the other or others.

To explore the second research objective a questionnaire was developed. Its design and the formulation of the questions were finalised based on the literature review on survey data collection methodology and questionnaire design. Moreover, the research design and the reported results from several studies concerning the usage of fundamental analysis, technical analysis, portfolio analysis and other factors influencing the investors (both professionals and individuals) were taken into account for the development of the first draft of the questionnaire. To improve it and especially to incorporate it into all the possible factors influencing the Greek investors, a preliminary qualitative study was conducted asking 26 respondents (a weighted selection from all user groups) to identify the factors that, according to their view, were significant in distinguishing one stock from another and the sources of information that were most important to them when evaluating stocks.

After the improvement of the first draft, a second pre-test followed asking a number of investors (weighted selected and twice as many as the first sample) to complete it and to suggest improvements, where needed. After the feedback from respondents, the final draft of the ten page questionnaire was available for distribution to all user groups investing in the Greek stock market.

Chapter Four

EMPIRICAL RESEARCH ON VALUE RELEVANCE OF TRADITIONAL ACCOUNTING AND VALUE-BASED FINANCIAL PERFORMANCE MEASURES

4.1. Introduction

As has been discussed in the methodology chapter, the first objective of our study is to examine the value relevance of both traditional accounting (EPS, ROI, ROE) and value based (EVA®, SVA) performance measures. For this reason we formed the research questions 1 and 2, and developed models (1) to (31)[1]. For the examination of these research questions we use two approaches. Relative information content approach will be used to test research question 1, through the models (1) to (5), while incremental information content approach will be employed to test research question 2, through the models (6) to (31). Thus, in the following sections we will discuss the sample and the data collection, the variable definitions and calculations, the empirical results of both the relative and the incremental information content approaches, and finally, we will conclude the chapter.

4.2. 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[2]. These companies gave us 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

[1] Appendix III shows all models (1) – (31)
[2] Appendix IV shows the name and the years of participation for each company

variable was more than 3 standard deviations from the median. The final sample consisted of 977 year-observations. Table 4-1 shows the variation of companies' participation/observations from year to year.

Table 4-1: Companies' Participation/Observations through 1992 to 2001

Year	Companies' participation / observations	Companies' participation / observations (Outliers excluded)
1992	37	37
1993	55	55
1994	71	71
1995	73	73
1996	80	80
1997	106	106
1998	120	118
1999	135	130
2000	144	144
2001	163	163
Total	984	977

We began our sample selection using daily closing prices of the common stocks, which were trading in the ASE from January 1990 to April 2002. They were raw prices adjusted for capital splits and stock dividends. We started from January 1990 since we needed two years prior trading time for each stock to incorporate it into the sample. The main reason for the two years prior trading time was the need for 36 monthly returns (24 prior plus 12 current) for each stock to calculate its risk (beta) for each year. Fama and McBeth (1973) used 60 monthly returns for beta calculation but because of the limited number of stocks in the ASE in late 1980s and in early 1990s we decided to use 36 monthly returns for this estimation. Thus, the stocks that comprise the sample of 1992 should have a trading presence in the ASE at least from January 1990.

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; Biddle, Bowen and Wallace, 1997; Chen and Dodd, 2001). Except for the daily closing prices for each stock, we have also collected the daily CSPI of the ASE and the three-month Greek Government Treasury Bill rate, which is considered to be the short-term interest rate (risk free interest rate). 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):

$$R_{i,t} = \log\left({}^{P_{i,t}}\!\big/_{P_{i,t-1}} \right) \tag{4-1}$$

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.

Using the same procedure, we calculated the monthly returns for the CSPI. Employing the first selection criterion, we excluded from the sample all financial companies and the banks; while employing the second selection criterion we excluded the companies with penalties or with a long period without transactions (more than two months) or with missing values. By regressing the monthly returns of each stock to the monthly returns of the CSPI, we could estimate the annual beta for each stock. Finally, annual returns were calculated as the aggregation of the monthly returns, extending nine months prior to the three months after each fiscal year end[3].

[3] In Appendix V there is a description of the database development and how we calculate the returns of stocks and CPSI (daily, monthly, yearly) and the annual betas.

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[4]. Thus, the sample of the 984 year observations was developed.

4.3. Variables' Definitions and Calculations

To calculate the variables of our sample we used two sources of data. First, we used the processed data from the developed database, as described in appendix V, for the stock returns, the market returns, the annual risk factor (beta) for each company, and the risk free rate. We have also used the stock prices, nine months prior to fiscal year end, in order to use them as the deflator factor to decrease heteroscedasticity in the data (Biddle, Bowen and Wallace, 1997). Second, in order to calculate our independent variables, we developed a calculation framework[5], where, after inserting the appropriate financial data, all relevant variables were automatically calculated.

Models (1) to (31), as described in the methodology chapter and as presented in appendix III, adopt as an dependent variable the annual stock returns, which in fact represents the annualised compound rate of return to shareholders from capital appreciation and dividends. Returns (for each year) cover a twelve-month non-overlapping period extended nine months prior to the three months after each fiscal year. According to Mayo (1991) returns can be interpreted as the

[4] The financial data is available to everyone and is included in the attached CD.
[5] For a description of this calculation framework, see appendix VI.

discount rate that equates the cost of an investment with the cash flow it generates. Returns serve as the dependent variable in our regression models. The regressions' R-squares (R^2) are then used as a gauge of usefulness in examining the independent variables (traditional accounting and value based performance measures).

The independent variables of our models are: EPS, ΔEPS, ROI, ΔROI, ROE, ΔROE, EVA®, ΔEVA, and SVA. We do not include change in SVA in our sample since the SVA by itself represents the change of shareholders' value added from one period to another. As far as the estimation of each variable is concerned we have come up with the following information:

EPS is the most widely used ratio. It tells how much profit was generated on per share basis. It is calculated by dividing net income (less preferred dividends) to the average number of common shares outstanding (White, Sondhi and Fried, 2003; Williams *et al.* 2003). Balance sheet and income statement information are needed for this calculation. Using the calculation framework we produced the yearly EPS for each company included in our sample (we divide net operating profit before taxes by the average of the number of shares outstanding). By itself, EPS does not really convey much information. However, if it is compared to the EPS from the previous quarters or year it indicates the pace of a company's earnings growing, on a per share basis. For the purpose of our study we calculate the ΔEPS by dividing EPS_t of the current year with EPS_{t-1} of the previous year (EPS_t/EPS_{t-1}). Using the calculation framework we produce the yearly ΔEPS for each company included in our sample. In the literature and in the empirical studies, change in EPS can be also calculated as the quotient of the difference between the two observations divided by that of the previous year

$((EPS_t-EPS_{t-1})/EPS_{t-1})$, but since they produce the same result we adopt the first approach.

ROI or ROA indicate what return a company is generating on its investments/assets. ROI is mostly used as a performance measure for autonomous strategic business units (SBU's), not for the whole company. It is calculated by dividing the net income plus interest expenses with average total assets. In our calculation framework we calculated ROI by dividing the NOPAT with the average total assets. For this calculation, balance sheet and income statement information is needed. ΔROI is also an important ratio for companies. It shows the ROI growth quarterly or from year to year. To calculate ΔROI we adopt the similar approach we used to calculate ΔEPS. We divide the current ROI_t by the ROI_{t-1} of the previous year (ROI_t/ROI_{t-1}).

ROE indicates what return a company is generating on the owners' investment. Sometimes ROE is referred to as stockholders' return on their investment equity capital. Similarly to ROI, balance sheet and income statement data is needed for ROE calculation. To calculate ROE for our sample we divided the after tax earnings by the average shareholder's equity. We did so in order to capture the relevance of the new shares issue during the year. ΔROE is calculated as ΔEPS and ΔROI, by dividing current ROE_t with the ROE_{t-1} of the previous year (ROE_t/ROE_{t-1}).

EVA® attempts to capture the true economic profit of a company. All previous studies examining the value relevance of EVA® in international markets obtained the EVA® figures directly from the Stern Stewart & Co database. That means EVA® was calculated according to the adjustments proposed by Stewart (1991; 1999). However, since there are no available EVA® figures for the Greek listed companies in the ASE, we were required to calculate EVA® adopting the

Stern Stewart's EVA® formula (2-18). The adjustments we made were in terms of NOPAT and invested capital. To calculate EVA® we need balance sheet and income statement information. After revealing the relevant information, we first calculated the adjusted NOPAT where we mainly added back amortisation and subtracted tax benefit on interest expenses as follows:

Operating Profit = EBIT + Amortisation

Cash Operating Taxes = Tax Paid + Tax Benefit on interest expenses

NOPAT = Operating Profit - Cash Operating Taxes

Then, we calculated the total capital invested and the weighted average cost of capital (WACC). To calculate the total capital invested, we needed the total equity capital and the total outstanding debt. Total equity capital can be found on the liability side of the balance sheet (we add minority interest and accumulated Goodwill amortisation), while the total outstanding debt is the sum of short-term and long-term debt, which can also be found on the liability side of the balance sheet. Thus the adjusted invested capital was calculated as follows:

Capital Invested = Capital + Minority interest + Accumulated Goodwill amortisation + S/T and L/T Debt

After the calculation of the total capital invested, we calculated the WACC relying on formula (2-35). Except for the total equity capital, and the short and long term debt we needed to know the cost of equity and the cost of short-term and long-term debt. The cost of short-term and long-term debt (interest rates) was obtained from the annual report of the Board of Directors of the Central Bank, while the cost of equity was calculated using the CAPM model (equations 2-37 and 2-38). To calculate the cost of equity, we needed the risk free rate, the beta coefficient and the market return. The values of all those variables were provided in our database thus we just imported them into the calculation framework. Change in EVA® was also calculated since according to Stewart (1991; 1999), Stern, Stewart and Chew (1995) and Rappaport (1998) it is the change in EVA® that companies should maximise instead of the absolute EVA®. Change in EVA® was calculated using the similar procedure as change in EPS, change in ROI and change in ROE. Namely, we divided the current EVA® to that of the previous year (EVA_t/EVA_{t-1}).

Finally, we estimated the SVA adopting the formula (2-14) for our calculations.

$$\text{SVA} = \frac{\text{Change in NOPAT}}{\text{K} \times (1+\text{K})^{t-1}} - \text{Present Value of Incremental Investment} \qquad (2\text{-}14)$$

To calculate SVA we need to know the change in NOPAT, the WACC, here K, and the time horizon *t* for the calculations of the first term of the formula. All those values are already available in the calculation framework while the power *t-1* is calculated for each year using Excel techniques. The second term of the specification is the PV of total annual changes in investment. To calculate this term we discount the total annual changes in investment using the WACC as a discount factor. First we calculate the Change in NOPAT as ($NOPAT_t - NOPAT_{t-1}$) and then we employ the formula $K \times (1+K)^{t-1}$ for the denominator of the first leg of the equation. Afterwards, we calculate the PV of the incremental investment. By subtracting the PV of incremental investment from the Δ NOPAT / K*(1+K)^(T-1), we produce the SVA.

4.4. Descriptive Statistics, the Correlation Matrix and the Additional Models

In order to reduce the heteroscedasticity in the data, we deflate all independent variables (Easton and Harris, 1991; Biddle, Bowen and Wallace, 1997; Chen and Dodd, 2001) by the market value of equity (stock price) nine months prior to fiscal year end (first trading day in April). We do not deflate ROI and ROE since they are already divided by the average investment and average equity respectively.

Descriptive statistics of the variables are provided in table 4-2, while the correlation among these variables is provided in appendix XI. Descriptive data show

Table 4-2: Selected Descriptive Statistics for all Variables for the Pooled Data[6]

	N	Minimum	Maximum	Mean	Std.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
RETUTNS1	984	-1,6165	2,8700	7,71E-02	,712936	,675	,078	,415	,156
EPS	984	-16,8475	7,7432	,134997	,855426	-9,017	,078	186,540	,156
CHEPS	984	-140,2831	175,7931	,452017	9,250613	,739	,078	228,948	,156
ROI	984	-25,3113	6,8697	6,35E-02	,854058	-26,143	,078	798,910	,156
CHROI	984	-29,6298	341,0302	1,611215	14,882655	19,355	,078	401,476	,156
ROE	984	-1,8952	126,8380	,518670	4,081687	30,222	,078	935,899	,156
CHROE	984	-678,4288	73,6537	-,514879	26,515549	-19,908	,078	463,077	,156
EVA	984	-19,9368	7,6913	-,282460	1,330917	-7,851	,078	101,359	,156
CHEVA	984	-155,7205	2344,0679	3,383079	79,133410	27,326	,078	789,914	,156
SVA	984	-292,0832	43,3444	-,622326	10,310872	-24,509	,078	667,762	,156
Valid N (listwise)	984								

that ROI (0.854058) and EPS (0.855426) have the lowest standard deviation among the independent variables, followed by EVA® (1.330917). Change in EVA® (79.133410) and change in ROE (26.515549) reveal the highest standard deviation. Mean statistics show that SVA (-0.622326) and EVA® (-0.282460) are negative, consistent to Biddle, Bowen and Wallace (1997) who also revealed negative means for EVA® and RI. Near zero or even negative EVA® and SVA is consistent with a competitive economy where even the typical large firm has difficulty earning more than its cost of capital. Low EVA® is also consistent with a potential upward bias in Stern Stewart's cost of capital estimates, that is, when the WACC increases EVA® decreases.

The correlation matrix, as presented in table 4-3, suggests the development of several more models excluding the highly correlated variables from the initial models. The additional models emerging from the correlation

6 The SPSS package uses comma (,) instead of dot (.)

matrix are reported in the appendix VII. These models are incorporated in the existing groups of the initial models (B1-B9) and are identified by the number of the initial model followed by a lowercase letter (for example, 8b). Thus, all models that support our research are those in appendix III supplemented by those in appendix VII. Appendix VIII comprises all models (initials and additional ones).

4.5. Empirical Results / Relative Information Content Approach

We begin with the relative information content approach, as we have explained it in the previous chapter, testing the models (1) to (5). Tables 4-4.1, 4-4.2, 4-4.3, 4-4.4 and 4-4.5 contain the results of the relative information usefulness of EPS, ROI, ROE, EVA®and SVA. The Easton and Harris (1991) model was fitted in each of the five tables using each of the five measures of profitability (EPS, ROI, ROE, EVA®and SVA). Following the Easton and Harris (1991) and Chen and Dodd (2001) 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 five tables reveals several results. Firstly, concerning the results of the intertemporal sample (all years), we notice the following (table 4-4): First, there is a significant difference between the five models in relative information content.

Table 4-3: Correlation Matrix

		RETUTNS1	EPS	CHEPS	ROI	CHROI	ROE	CHROE	EVA	CHEVA	SVA
RETUTNS1	Pearson Correlation										
	Sig. (2-tailed)										
	N										
EPS	Pearson Correlation	,107**									
	Sig. (2-tailed)	,001									
	N	984									
CHEPS	Pearson Correlation	,066*	-,059								
	Sig. (2-tailed)	,039	,063								
	N	984	984								
ROI	Pearson Correlation	,027	,044	,005							
	Sig. (2-tailed)	,389	,171	,867							
	N	984	984	984							
CHROI	Pearson Correlation	,067*	-,043	,066*	,156**						
	Sig. (2-tailed)	,037	,181	,038	,000						
	N	984	984	984	984						
ROE	Pearson Correlation	-,004	,044	,001	,020	-,014					
	Sig. (2-tailed)	,902	,170	,967	,528	,672					
	N	984	984	984	984	984					
CHROE	Pearson Correlation	,003	,009	,212**	,778**	,024	,011				
	Sig. (2-tailed)	,934	,780	,000	,000	,451	,732				
	N	984	984	984	984	984	984				
EVA	Pearson Correlation	-,086**	,671**	-,047	,459**	,064*	,037	,319**			
	Sig. (2-tailed)	,007	,000	,139	,000	,046	,247	,000			
	N	984	984	984	984	984	984	984			
CHEVA	Pearson Correlation	,028	,063*	,019	,010	,000	,020	,011	,011		
	Sig. (2-tailed)	,372	,048	,555	,757	,999	,531	,739	,732		
	N	984	984	984	984	984	984	984	984		
SVA	Pearson Correlation	-,030	,020	-,031	,859**	,020	,009	,727**	,349**	,003	
	Sig. (2-tailed)	,348	,535	,336	,000	,534	,776	,000	,000	,924	
	N	984	984	984	984	984	984	984	984	984	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Models (1) and (4) are significant at 0.01 level, model (2) is significant at 0.1 level, while models (3) and (5) are not statistically significant.

Table 4-4: The Summary (all Years) Results from the Five Models (1) to (5)

All Years	**Model (1)** **EPS**	**Model (4)** **EVA®**	**Model (2)** **ROI**	**Model (5)** **SVA**	**Model (3)** **ROE**
R^2	**0.019**	**0.009**	**0.004**	**0.001**	**0.000**
F	(9.577)***	(4.546)***	(2.781)*	(0.910)	(0.005)
Significance	[0.000]	[0.010]	[0.062]	[0.340]	[0.995]

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

Secondly, comparing the reported R^2s of the five pooled regressions we notice that all are largely consistent to those of Biddle, Bowen and Wallace (1997), Worthington and West (2001) and Chen and Dodd (2001) among others. Our results show that EPS (R^2 = 0.019) provide more information in explaining stock returns than EVA® (R^2 = 0.009). Biddle, Bowen and Wallace (1997) found that EBEI (R^2 = 0.0904) provide more information than RI (R^2 = 0.0624) and EVA® (R^2 = 0.0507). Worthington and West (2001) found similar results, EBEI (R^2 = 0.2367), RI (R^2 = 0.1929) and EVA® (R^2 = 0.1429), while Chen and Dodd (2001) reported that OI (R^2 = 0.062) explains the stock returns better than RI (R^2 = 0.050) and EVA® (R^2 = 0.023).

Our results 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. On the other hand, the low explanatory power of our models is consistent to the results of Copeland (2002) who also found low R^2s for EPS and EVA® (although EPS outperformed EVA®).

Biddle, Bowen and Wallace (1997) considered as possible reasons why they did not detect stronger value-relevance for EVA® the following: they used current realisations, not future flows, of each performance measure, while valuation is ultimately the discounted present value of future equity cash flows (or dividends or EVA®), Stern Stewart's estimates for the charge of capital and accounting adjustments may contain measurement error relative to what the market is using for valuation, they used Stern Stewart's publicly available data which does not include the many adjustments they use for their clients, the data needed to compute EVA® is not easily estimated and the market does not have this data during the examination period, in violation of their maintained hypothesis of semi-strong market efficiency, the market may have failed to recognise the reporting benefits of EVA® through the period they studied, consistent with the notion of 'earnings myopia' where according to Wallace (1997; 1998) some adopters of EVA® feel they must still base their external performance on earnings because this is the measure on which financial analysts continue to rely. Biddle, Bowen and Wallace (1997) believe that as more data becomes available, future studies will be able to assess whether market participants have come to appreciate EVA®.

Worthington and West (2001) also agreed with most of the explanations of Biddle, Bowen and Wallace (1997) but they supported the potential usefulness for EVA® for internal and external performance measurement. Chen and Dodd (2001) explained their results arguing that the market may place higher reliance on audited accounting earnings than the unaudited EVA® metric. Finally, Copeland (2002) argued that value is created when a company's performance exceeds expectations. Thus, using changes in analysts' EPS expectations he found a significant association with total returns to shareholders ($R^2 = 0.416$) suggesting the Expectation-based Management as a proper valuation tool for practitioners.

Although our study has been conducted in a stock market (emerging) with different characteristics than those of the US and the Australian stock markets (mature), we believe that most the above mentioned explanations are largely relevant to our case. Firstly, we agree with Biddle, Bowen and Wallace (1997) and Copeland (2002) that using current realisations and not future flows, for each performance measure, we should expect low explanation power in explaining stock returns. Secondly, since Stern Stewart's estimates for the charge of capital and accounting adjustments may contain measurement error relative to what the market is using for valuation, perhaps our estimates also contain the same type of errors. Thirdly, all the previous mentioned studies used the Stern Stewart's available EVA® figures for the US and Australia. For the Greek market EVA® figures are not available either from Stern Stewart & Co. or from any other company. Thus, we calculated EVA® for the Greek companies in a simpler way than that of Stern Stewart & Co. and moreover we did not include the many adjustments they use for their clients. That means that our EVA® is not exactly the same as that calculated by Stern Stewart & Co.

Fourthly, we agree with Biddle, Bowen and Wallace (1997) that data needed to compute EVA® is not easily estimated and the market does not have this data during the examination period. Fifthly, we agree with Biddle, Bowen and Wallace (1997) and Worthington and West (2001) that in violation of the maintained hypothesis of semi-strong market efficiency, the market may have failed to recognise the reporting benefits of EVA® through the period of our study, consistent with the notion of 'earnings myopia'. Sixthly, we agree with Chen and Dodd (2001) explanation and consider that the market participants in Greece may place higher reliance on audited accounting earnings than the unaudited EVA® measure. Seventhly, our reported results for EVA® support the Worthington and West (2001) suggestion that there is a potential usefulness for EVA® for internal and external performance measurement. Finally, the

Expectation-based Management proposed by Copeland (2002) will perhaps reveal different results for the Greek stock market.

Examining separately each of our five regression models (1 to 5) 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 4-4.1 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 4-4.1: A. Relative Information Content Approach
Regressions of Annual Stock Returns to Earnings Levels and Earnings Changes

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

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**		144
t	(-20.269)***	(3.187)***	(-1.243)		(5.090)***	
Sign.	[0.000]	[0.002]	[0.216]		[0.007]	
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 4-4.2 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 4-4.3 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.

Table 4-4.2: **A.** Relative Information Content Approach
Regressions of Annual Stock Returns to ROI Levels and ROI Changes

Model (2) $Returns_t = b_0 + b_1 ROI + b_2 \Delta ROI + u_{2t}$

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 4-4.3: A. Relative Information Content Approach
Regressions of Annual Stock Returns to ROE Levels and ROE Changes

Model (3) Returns$_t$ = $c_0 + c_1$ ROE + $c_2 \Delta$ROE + u_{3t}

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.

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.

EVA®results are reported in table 4-4.4. Regression model (4) represents EVA® levels and EVA® changes. For the pooled cross-sectional and intertemporal (all years) sample, according to F statistics the model is significant at the 0.01 level, suggesting that the Easton and Harris (1991) model provides a satisfactory description of the relation between stock returns and the EVA®. However, only the coefficient d_1 is statistically significant at the 0.01 level while the same does not happen for the coefficient d_2 suggesting that EVA® is associated with stock returns while change in EVA® is not.

As for the individual year cross-sectional sample, reported results are not encouraging. Only two out of the ten regressions (years 1997 and 1998) are significant at the 0.05 and 0.1 level according to F statistics. Most of the co-efficients in annual regression are not statistically significant according to t-statistics, suggesting that EVA® is not associated with stock returns at least at the individual year's level. Significant R^2s are those of the years 1997 and 1998, which are 0.074, and 0.040 respectively.

Table 4-4.4: A. Relative Information Content Approach
Regressions of Annual Stock Returns to EVA® Levels and EVA® Changes

Model (4) Returns$_t$ = $d_0 + d_1$ EVA/P$_{t-1}$ + d_2 ΔEVA/P$_{t-1}$ + u_{4t}

All Years	d_0	d_1	d_2	R^2	F	No of Obs
Coef.	0.0455	-0.0467	0.0003	**0.009**		977
t	(2.039)**	(-2.856)***	(0.997)		(4.546)***	
Sign.	[0.042]	[0.004]	[0.319]		[0.011]	
2001						
Coef.	-0.4540	-0.0258	-0.0078	**0.019**		163
t	(-17.472)***	(-1.348)	(-1.086)		(1.578)	
Sign.	[0.000]	[0.179]	[0.279]		[0.210]	
2000						
Coef.	-0.6560	0.0883	-0.0575	**0.014**		144
t	(-22.675)***	(1.279)	(-0.598)		(0.997)	
Sign.	[0.000]	[0.203]	[0.551]		[0.372]	
1999						
Coef.	0.8670	0.0748	0.0083	**0.033**		130
t	(20.277)***	(1.700)*	(1.402)		(2.173)	
Sign.	[0.000]	[0.092]	[0.163]		[0.118]	
1998						
Coef.	0.8330	0.0187	0.0288	**0.040**		118
t	(14.570)***	(0.304)	(1.957)*		(2.397)*	
sign	[0.000]	[0.761]	[0.053]		[0.095]	
1997						
Coef.	0.1910	0.1590	0.0001	**0.074**		106
t	(3.455)***	(2.700)***	0.678		(4.128)**	
Sign.	[0.001]	[0.008]	[0.499]		[0.019]	
1996						
Coef.	-0.1600	-0.0154	0.0020	**0.016**		80
t	(-4.327)***	(-0.932)	(0.565)		(0.614)	
Sign.	[0.000]	[0.354]	[0.573]		[0.529]	
1995						
Coef.	0.1270	0.0397	-0.0018	**0.039**		73
t	(3.409)***	(1.640)*	(-0.301)		(1.409)	
Sign.	[0.001]	[0.100]	[0.764]		[0.251]	
1994						
Coef.	-0.2400	0.0006	0.0248	**0.007**		71
t	(-6.206)***	(0.024)	(0.634)		(0.232)	
Sign.	[0.000]	[0.981]	[0.529]		[0.793]	
1993						
Coef.	0.4470	-0.0345	-0.0048	**0.032**		55
t	(6.293)***	(-1.096)	(-0.810)		(0.853)	
Sign.	[0.000]	[0.278]	[0.422]		[0.432]	
1992						
Coef.	-0.1830	-0.0820	0.0115	**0.050**		37
t	(-3.224)***	(-0.572)	(1.265)		(0.888)	
Sign.	[0.003]	[0.571]	[0.241]		[0.421]	

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

Table 4-4.5: A. Relative Information Content Approach
Regressions of Annual Stock Returns to SVA Levels

Model (5) $Returns_t = e_0 + e_1 SVA/P_{t-1} + u_{5t}$

All Years	**e_0**	**e_1**	**R^2**	**F**	**No of Obs**
Coef.	0.0584	-0.0020	**0.001**		977
t	(2.662)***	(0.954)		(0.910)	
Sign.	[0.008]	[0.340]		[0.340]	
2001					
Coef.	-0.4520	-0.0015	**0.011**		163
t	(-17.411)***	(-1.327)		(1.761)	
Sign.	[0.000]	[0.186]		[0.186]	
2000					
Coef.	-0.6480	0.0530	**0.01**		144
t	(-22.291)***	(1.223)		(1.496)	
Sign.	[0.000]	[0.223]		[0.223]	
1999					
Coef.	0.8460	-0.0083	**0.035**		130
t	(19.856)***	(-2.152)**		(4.632)**	
Sign.	[0.000]	[0.033]		[0.033]	
1998					
Coef.	0.8720	0.0428	**0.013**		118
t	(18.544)***	(1.237)		(1.530)	
Sign.	[0.000]	[0.219]		[0.219]	
1997					
Coef.	0.1240	0.0022	**0**		106
t	(2.500)**	(0.192)		(0.037)	
Sign.	[0.014]	[0.848]		[0.848]	
1996					
Coef.	-0.1550	0.0068	**0.001**		80
t	(-4.097)***	(0.273)		(0.075)	
Sign.	[0.000]	[0.785]		[0.785]	
1995					
Coef.	0.1240	0.0613	**0.051**		73
t	(3.519)***	(1.958)**		(3.834)**	
Sign.	[0.001]	[0.054]		[0.054]	
1994					
Coef.	-0.2340	-0.0008	**0**		71
t	(-6.210)***	(-0.039)		(0.002)	
Sign.	[0.000]	[0.969]		[0.969]	
1993					
Coef.	0.4800	0.0311	**0.022**		55
t	(7.506)***	(1.096)		(1.202)	
Sign.	[0.000]	[0.278]		[0.278]	
1992					
Coef.	-0.1900	-0.0182	**0.032**		37
t	(-3.339)***	(-1.074)		(1.154)	
Sign.	[0.002]	[0.290]		[0.290]	

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

Finally, SVA results are reported in table 4-4.5. Regression model (5) represents SVA levels. According to F statistics, for the pooled cross-sectional and intertemporal (all years) sample, the model is not significant. This suggests that the Easton and Harris (1991) model does not provide a good description of the relationship between stock returns and the SVA in our sample. Moreover, the coefficient e_1 is not statistically significant suggesting that SVA is not associated with stock returns at least for our sample. The main reasons for this are: (a) the use of realised rather than future SVA, (b) the complicated calculation of SVA, (c) the reliance of market participants on audited measures rather than unaudited ones, and (d) the fact that SVA is not disclosed in financial reports makes it unknown to investors. As for the individual year cross-sectional sample, reported results are also not encouraging. Only two out of the ten regressions (years 1995 and 1999) are significant at the 0.05 level according to F statistics. As for the co-efficients only those of the above mentioned years are statistically significant at the 0.05 level.

In summary, the relative information content approach revealed that model (1), which represents EPS, is more significant in explaining stock returns than all other four competing models. Next to EPS model, comes model (4), the representative of EVA® model. However, the reported F statistics, the R^2s and the coefficients are lower than those of EPS model, suggesting that although EVA® is an acceptable measure for returns variation it has less explanatory power compared to EPS. The fact that EPS outperforms EVA® in the context of the Greek capital market is consistent with the reported results in terms of international markets. Biddle, Bowen and Wallace (1997), Worthington and West (2001), and Chen and Dodd (2001), among others, reported similar results.

4.6. Empirical Results / Incremental Information Content Approach

Results from the incremental information content approach are revealed by testing the models (6) through (31). Tables 4-5, 4-6, 4-7, 4-8, 4-9, 4-10, 4-11 and 4-12 contain 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, ΔROE, EVA®, ΔEVA and SVA. 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. Only in three cases, models (25), (28) and (31), the reported VIF for ROI are (5.162), (5.741) and (6.139) respectively. Examination of residual plot and normality plot reveal no serious violations of the regressions' assumptions. When we tried to correct these minor violations, we either produced models with insignificant coefficients or models with similar explanation power to the initial ones.

Results are commented upon according to the F statistics, the R^2 and the t-statistics of the coefficients. We start our incremental information content investigation by reporting the results of models (6) through (10)[7]. These models have been developed by (a) the pairwise combinations of the traditional performance measures, (b) according to the correlation matrix, (c) incorporating all traditional performance measures, and (d) incorporating all value based

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[7] See appendix VIII for all models

performance measures as is presented in model (10). Table 4-5, panels B1 and B2 present the detailed results.

According to F-statistics, models (6), (7), (9), (9b) and (10) are significant at 0.05 level or better. Models (8) and (8b) representing the pairwise combinations of ROI and ROE are reported as insignificant. From the significant models, the pairwise combination of EPS, ΔEPS and ROI, ΔROI, model (6), reveal the highest R^2 (0.025). However, in this case the coefficient of ROI is not statistically significant. When this model incorporates ROE and ΔROE, model (9), the R^2 increases (0.027), but the coefficients of ROI, ROE and ΔROE are insignificant at all levels.

Finally, the reported results of model (10), which incorporates all value-based measures, reveal that according to F statistics the model is significant at the 0.05 level. However, the reported R^2 is equal to that reported for the EVA® model (4). That means that SVA does not add explanatory power when it is incorporated into the EVA® model. Moreover, comparing the models (9) and (10), which represent the traditional performance measures and the value based performance measures respectively, the provided evidence suggests that the traditional performance measures (R^2=0.027) outperform the value based performance measures (R^2=0.009) in explaining stock returns.

Table 4-5.1 gives a summary of our results, sorting the examined models according to the R^2. As we can see from this table, the contribution of the EPS in the explanatory power of these models is the highest one, with an R^2 of 0.019, as compared to the contribution of ROI and ROE with an R^2 of 0.004 and 0.000 respectively.

Table 4-5: B. Incremental Information Content Approach

Panel B1. Incremental / Traditional Performance Measures

Model (6) : $Returns_t = f_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + b_1 ROI + b_2 \Delta ROI + u_{6t}$
Model (7) : $Returns_t = g_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + c_1 ROE + c_2 \Delta ROE + u_{7t}$
Model (8) : $Returns_t = h_0 + b_1 ROI + b_2 \Delta ROI + c_1 ROE + c_2 \Delta ROE + u_{8t}$
Model (8b) : $Returns_t = h_0 + b_1 ROI + b_2 \Delta ROI + c_1 ROE + u_{8bt}$
Model (9) : $Returns_t = i_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + b_1 ROI + b_2 \Delta ROI + c_1 ROE + c_2 \Delta ROE + u_{9t}$
Model (9b) : $Returns_t = i_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + b_1 ROI + b_2 \Delta ROI + c_1 ROE + u_{9bt}$

Panel B2. Incremental / Value-Based Performance Measures

Model (10) : $Returns_t = k_0 + d_1 EVA/P_{t-1} + d_2 \Delta EVA/P_{t-1} + e_1 SVA/P_{t-1} + u_{10t}$

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
6	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								
7	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						
8	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						
8b	Coef.	0.0536			0.0145	0.0032	-0.0003					**0.006**		977
	t	(2.416)**			(0.563)	(2.173)**	(-0.055)						(1.853)	
	Sign.	[0.016]			[0.574]	[0.030]	[0.956]						[0.136]	
	VIF				1.025	1.025	1.001							

Table 4-5: B. Incremental information content approach, continued
Panel B1. Incremental / Traditional Performance Measures
Panel B2. Incremental / Value-Based Performance Measures

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
9	Coef.	0.0348	0.0959	0.0067	0.0588	0.0029	-0.0013	-0.0020				**0.027**		977
	t	(1.549)	(3.779)***	(2.677)***	(1.367)	(1.910)*	(-0.237)	(-1.415)					(4.463)***	
	Sign.	[0.122]	[0.000]	[0.008]	[0.172]	[0.056]	[0.813]	[0.158]					[0.000]	
	VIF		1.010	1.142	2.897	1.071	1.003	2.952						
9b	Coef.	0.0386	0.0970	0.0055	0.0099	0.0033	-0.0012					**0.025**		977
	t	(1.733)*	(3.821)***	(2.332)**	(0.387)	(2.220)**	(-0.222)						(4.950)***	
	Sign.	[0.083]	[0.000]	[0.020]	[0.699]	[0.027]	[0.824]						[0.000]	
	VIF		1.009	1.008	1.028	1.032	1.002							
10	Coef.	0.0455							-0.0469	0.0003	0.0001	**0.009**		977
	t	(2.037)**							(-2.689)***	(0.997)	(0.039)		(3.028)**	
	Sign.	[0.042]							[0.007]	[0.319]	[0.969]		[0.029]	
	VIF								1.139	1.000	1.139			

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

Table 4-5.1:
Summary Results of Table 4-5 (Groups B1 & B2)

Model	R^2	F	Sign.
9	**0.027**	4.463	0.000
6	**0.025**	6.181	0.000
9b	**0.025**	4.950	0.000
7	**0.020**	4.859	0.001
10	**0.009**	3.028	0.029
8b	**0.006**	1.853	0.136
8	**0.006**	1.511	0.197

Table 4-6 shows the results from the pairwise combinations of one traditional performance measure and one value based performance measure. Models (11) through (16a) have been employed for this purpose. According to F statistics, R^2s and the coefficients' t-statistics, the reported results are as follows. Models (11), (11b), (12), (13), (14), (14b) and (15) are significant at 0.05 level or better. Only the models (16) and (16b), combining ROE, ΔROE and SVA are reported as insignificant.

The highest R^2 (0.072) is reported in model (11), which combines EPS, ΔEPS and EVA®, ΔEVA. This suggests that the combination of EPS and EVA® represents one of the most satisfactory explanations for the variation of stock returns in the Greek stock market. Chen and Dodd (1997, 2001) and Worthington and West (2001) revealed almost similar results when they incorporated the cost of capital in an earnings model.

They found that EVA® is a useful measure of corporate performance but it is neither as perfect as claimed by its advocates, nor is it the only performance measure that suggests a path to superior stock returns. Also Chen and Zhang (2003) found that the explanatory power in explaining stock returns increases when the capital invested is incorporated in an earnings model. The coefficients of model (11) are significant at 0.05 level or better, except that of ΔEVA.

All other examined models have reported low R^2s (lower than 0.021). Table 4-6.1 gives a summary of the results, sorting the examined models according to the R^2s. As we can see from this table, the contribution of the EPS in the explanatory power of model (11) is higher than that of EVA® since the R^2 of EPS is 0.019 (model 1) while that of EVA® is 0.009 (model 4). The incremental information content for EVA/EPS (contribution coming from EVA®) is calculated as the R^2 from the pairwise regression minus the individual R^2 for EPS (0.053) while the incremental information content for EPS/EVA® (contribution coming from EPS) is calculated as the R^2 from the pairwise regression minus the individual R^2 for EVA® (0.063).

Table 4-6.1:
Summary Results of Table 4-6 (Group B3)

Model	R^2	F	Sign.
11	**0.072**	18.761	0.000
13	**0.021**	5.141	0.000
12	**0.020**	6.773	0.000
11b	**0.020**	6.621	0.000
14	**0.015**	4.904	0.002
15	**0.011**	2.599	0.035
14b	**0.006**	3.165	0.043
16	**0.002**	0.711	0.546
16b	**0.001**	0.459	0.632

Another important finding is the low contribution of SVA in the earnings model. Results from model (12) show that the incremental information content for SVA/EPS (contribution coming from SVA) is 0.001 (0.020-0.019) while the incremental information content for EPS/SVA (contribution coming from EPS) is 0.019 (0.020-0.001 = 0.019).

Table 4-6: B3 / **B.** Incremental Information Content Approach

B3. Incremental / One Traditional Measure + One Value-Based Measure

Model (11) : $Returns_t = l_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{11t}$
Model (11b) : $Returns_t = l_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{11bt}$
Model (12) : $Returns_t = m_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + e_1\,SVA/P_{t-1} + u_{12t}$
Model (13) : $Returns_t = n_0 + b_1\,ROI + b_2\,\Delta ROI + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{13t}$
Model (14) : $Returns_t = o_0 + b_1\,ROI + b_2\,\Delta ROI + e_1\,SVA/P_{t-1} + u_{14t}$
Model (14b) : $Returns_t = o_0 + b_2\,\Delta ROI + e_1\,SVA/P_{t-1} + u_{14bt}$
Model (15) : $Returns_t = p_0 + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{15t}$
Model (16) : $Returns_t = q_0 + c_1\,ROE + c_2\,\Delta ROE + e_1\,SVA/P_{t-1} + u_{16t}$
Model (16b) : $Returns_t = q_0 + c_1\,ROE + e_1\,SVA/P_{t-1} + u_{16bt}$

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
11	Coef.	-0.0249	0.2580	0.0056					-0.1570	0.0001		**0.072**		976
	t	(-1.073)	(7.772)***	(2.464)**					(-7.355)***	(0.405)			(18.761)***	
	Sign.	[0.283]	[0.000]	[0.014]					[0.000]	[0.686]			[0.000]	
	VIF		1.834	1.004					1.824	1.006				
11b	Coef.	0.0414	0.0942	0.0058						0.0002		**0.020**		976
	t	(1.887)*	(3.725)***	(2.464)**						(0.696)			(6.621)***	
	Sign.	[0.059]	[0.000]	[0.014]						[0.487]			[0.000]	
	VIF		1.008	1.004						1.004				
12	Coef.	0.0406	0.0958	0.0057							-0.0020	**0.020**		976
	t	(1.848)*	(3.795)***	(2.451)**							(-0.966)		(6.773)***	
	Sign.	[0.065]	[0.000]	[0.014]							[0.334]		[0.000]	
	VIF		1.004	1.004							1.001			
13	Coef.	0.0281			0.0630	0.0032			-0.0680	0.0003		**0.021**		976
	t	(1.243)			(2.195)**	(2.173)**			(-3.730)***	(1.000)			(5.141)***	
	Sign.	[0.214]			[0.028]	[0.030]			[0.000]	[0.317]			[0.000]	
	VIF				1.293	1.025			1.267	1.000				

Table 4-6: B3 / **B.** Incremental Information Content Approach, *continued*
B3. Incremental / One Traditional Measure + One Value-Based Measure

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
14	Coef.	0.0366			0.1480	0.0022					-0.0126	**0.015**		976
	t	(1.635)			(2.887)***	(1.465)					(-3.005)***		(4.904)***	
	Sign.	[0.102]			[0.004]	[0.143]					[0.003]		[0.002]	
	VIF				4.119	1.080					4.021			
14b	Coef.	0.0507				0.0034					-0.0021	**0.006**		976
	t	(2.309)**				(2.326)**					(-1.005)		(3.165)**	
	Sign.	[0.021]				[0.020]					[0.315]		[0.043]	
	VIF					1.000					1.000			
15	Coef.	0.0420					0.0001	0.0009	-0.0528	0.0003		**0.011**		976
	t	(1.869)*					(0.027)	(1.027)	(-3.072)***	(0.977)			(2.599)**	
	Sign.	[0.062]					[0.979]	[0.305]	[0.002]	[0.319]			[0.035]	
	VIF						1.002	1.113	1.115	1.001				
16	Coef.	0.0556					-0.0003	0.0013			-0.0044	**0.002**		976
	t	(2.519)**					(-0.059)	(1.102)			(-1.458)		(0.711)	
	Sign.	[0.012]					[0.953]	[0.271]			[0.145]		[0.546]	
	VIF						1.000	2.126			2.126			
16b	Coef.	0.0564					-0.0003				-0.0020	**0.001**		976
	t	(2.558)**					(-0.052)				(-0.956)		(0.459)	
	Sign.	[0.011]					[0.959]				[0.339]		[0.632]	
	VIF						1.000				1.000			

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

Models (17) to (19b) in group B4 have been developed as a combination of one traditional performance measure and the two value based performance measures. They aim to examine how the explanatory power of one traditional performance measure increases when the model incorporates the two modern value based performance measures, EVA® and SVA. Table 4-7 provides the detailed results from these regression models. It is shown that models (17), (17b), (18) and (18b) are significant at the 0.01 level while model (19b) is significant at the 0.1 level. Only model (19), the combination of ROE, ΔROE and the two value-based performance measures, is reported as insignificant. From the reported results in table 4-7, it is revealed that model (17), which is the combination of EPS, ΔEPS and the two value based measures, provides the highest explanation power with an R^2 of 0.078. This result is almost similar to that provided by model (11) in the previous group of models (B3). The increase of 0.006 comes from the contribution of the SVA in the model (11). An important notice is that the coefficient of SVA is significant at the 0.01 level, while the coefficient of ΔEVA is still insignificant. Table 4-7.1 provides a summary of all models included in this group (B4) of equations.

Table 4-7.1:
Summary Results of Table 4-7 (Group B4)

Model	R^2	F	Sign.
17	**0.078**	16.492	0.000
18	**0.032**	6.507	0.000
17b	**0.021**	5.199	0.000
18b	**0.016**	3.918	0.004
19	**0.011**	2.247	0.048
19b	**0.010**	2.333	0.054

Another important notice from the reported results of model (17) is that the F=16.492, is slightly less than that reported from the model (11), where F=18.761. Comparing the R^2s from the equations in groups B1, B2, B3 and B4 we reveal that model (18) reported an R^2 of 0.032, relatively higher than that of other models except the models (11) and (17).

Table 4-7: B4 / **B.** Incremental Information Content Approach

B4. Incremental / One Traditional Measure + Two Value-Based Measures

Model (17) : $Returns_t = r_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + d_1 EVA/P_{t-1} + d_2 \Delta EVA/P_{t-1} + e_1 SVA/P_{t-1} + u_{17t}$
Model (17b) : $Returns_t = r_0 + a_1 EPS/P_{t-1} + a_2 \Delta EPS/P_{t-1} + d_2 \Delta EVA/P_{t-1} + e_1 SVA/P_{t-1} + u_{17bt}$
Model (18) : $Returns_t = s_0 + b_1 ROI + b_2 \Delta ROI + d_1 EVA/P_{t-1} + d_2 \Delta EVA/P_{t-1} + e_1 SVA/P_{t-1} + u_{18t}$
Model (18b) : $Returns_t = s_0 + b_2 \Delta ROI + d_1 EVA/P_{t-1} + d_2 \Delta EVA/P_{t-1} + e_1 SVA/P_{t-1} + u_{18bt}$
Model (19) : $Returns_t = t_0 + c_1 ROE + c_2 \Delta ROE + d_1 EVA/P_{t-1} + d_2 \Delta EVA/P_{t-1} + e_1 SVA/P_{t-1} + u_{19t}$
Model (19b) : $Returns_t = t_0 + c_1 ROE + d_1 EVA/P_{t-1} + d_2 \Delta EVA/P_{t-1} + e_1 SVA/P_{t-1} + u_{19bt}$

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
17	Coef.	-0.0331	0.2870	0.0058					-0.1850	0.0001	0.0060	**0.078**		976
	t	(-1.420)	(8.229)***	(2.546)**					(-7.771)***	(0.342)	(2.637)***		(16.492)***	
	Sign.	[0.156]	[0.000]	[0.011]					[0.000]	[0.732]	[0.008]		[0.000]	
	VIF		2.029	1.005					2.296	1.007	1.261			
17b	Coef.	0.0401	0.0947	0.0057						0.0002	-0.0020	**0.021**		976
	t	(1.825)*	(3.742)***	(2.434)*						(0.698)	(-0.967)		(5.199)***	
	Sign.	[0.068]	[0.000]	[0.015]						[0.485]	[0.334]		[0.000]	
	VIF		1.008	1.005						1.004	1.001			
18	Coef.	0.0093			0.2200	0.0020			-0.0745	0.0003	-0.0144	**0.032**		976
	t	(0.401)			(4.075)***	(1.349)			(-0.409)***	(0.970)	(-3.427)***		(6.507)***	
	Sign.	[0.688]			[0.000]	[0.178]			[0.000]	[0.333]	[0.001]		[0.000]	
	VIF				4.617	1.081			1.281	1.000	4.065			
18b	Coef.	0.0365				0.0036			-0.0501	0.0003	0.0001	**0.016**		976
	t	(1.633)				(2.506)**			(-2.887)***	(1.010)	(0.058)		(3.918)***	
	Sign.	[0.103]				[0.012]			[0.004]	[0.313]	[0.954]		[0.004]	
	VIF					1.004			1.143	1.000	1.139			

Table 4-7: B4 / **B.** Incremental Information Content Approach, *continued*
B4. Incremental / One Traditional Measure + Two Value-Based Measures

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
19	Coef.	0.0414					0.0001	0.0016	-0.0499	0.0000	-0.0029	**0.011**		976
	t	(1.844)*					(0.022)	(1.376)	(-2.856)***	(0.989)	(-0.918)		2.247	
	Sign.	[0.065]					[0.982]	[0.169]	[0.004]	[0.323]	[0.359]		[0.048]	
	VIF						1.002	2.148	1.152	1.001	2.197			
19b	Coef.	0.0431					0.0001		-0.0475	0.0003	0.0001	**0.010**		976
	t	(1.919)*					(0.026)		(-2.730)***	(1.004)	(0.052)		(2.333)*	
	Sign.	[0.055]					[0.979]		[0.006]	[0.316]	[0.959]		[0.054]	
	VIF						1.002		1.140	1.001	1.139			

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

Table 4-8 shows the detailed results from the combinations of two traditional performance measures and one value based performance measure, which in this case is the EVA® and ΔEVA. Models (20) through (22b) in group B5 are tested to reveal which one best explains the stock returns. Results provided evidence that all models are significant at the 0.01 level, except model (21b), which is significant at the 0.05 level. These results suggest that a combination of any two traditional performance measures with EVA® and ΔEVA provides satisfactory models in explaining the stock returns. Model (20) followed by model (21) revealed the higher R^2s. The combination of EPS, ΔEPS, ROI, ΔROI with EVA® and ΔEVA, model (20), reported an R^2 of 0.115, which, up to now, is the highest reported R^2 from all models. This is consistent to Chen and Zhang (2003) findings. Further, the combination of EPS, ΔEPS, ROE, ΔROE with EVA® and ΔEVA, model (21), revealed a significant R^2 of 0.080. That means that while combining more performance measures than two, the explanation power of the models increases. Consequently, it could be argued that investors should combine multiple determinants in order to decide on their investment strategy. However, the still low explanatory (R^2=0.115) of the performance measures stimulated the present study to search for other factors that may explain stock returns. Table 4-8.1 summarises the results of table 4-8 as follows.

Table 4-8.1:

Summary Results of Table 4-8 (Group B5)

Model	R^2	F	Sign.
20	**0.115**	21.065	0.000
21	**0.080**	14.080	0.000
20c	**0.026**	5.101	0.000
20b	**0.024**	4.842	0.000
22	**0.022**	3.584	0.002
22b	**0.017**	3.343	0.005
21b	**0.014**	2.813	0.016

An important observation is also that the reported F statistic (21.065) for model (20) is the highest one reported from all other regression models, (6 through 22b).

Table 4-8: B5 / **B.** Incremental Information Content Approach

B5. Incremental / Two Traditional Measures + One Value-Based Measure ($d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1}$)

Model (20) : $\mathbf{Returns_t = u_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{20t}}$

Model (20b) : $\mathbf{Returns_t = u_0 + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{20bt}}$

Model (20c) : $\mathbf{Returns_t = u_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + d_2\,\Delta EVA/P_{t-1} + u_{20ct}}$

Model (21) : $\mathbf{Returns_t = v_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{21t}}$

Model (21b) : $\mathbf{Returns_t = v_0 + a_2\,\Delta EPS/P_{t-1} + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{21bt}}$

Model (22) : $\mathbf{Returns_t = w_0 + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{22t}}$

Model (22b) : $\mathbf{Returns_t = w_0 + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{22bt}}$

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
20	Coef.	-0.0827	0.3550	0.0050	0.1790	0.0039			-0.2540	0.0000		**0.115**		976
	t	(-3.423)***	(9.986)***	(2.237)**	(6.009)***	(2.772)***			(-9.916)***	(0.162)			(21.065)***	
	Sign.	[0.001]	[0.000]	[0.025]	[0.000]	[0.006]			[0.000]	[0.871]			[0.000]	
	VIF		2.197	1.008	1.531	1.033			2.761	1.008				
20b	Coef.	0.0270		0.0044	0.0619	0.0030			-0.0661	0.0003		**0.024**		976
	t	(1.196)		(1.895)*	(2.158)**	(2.047)**			(-3.624)***	(0.965)			(4.842)***	
	Sign.	[0.232]		[0.058]	[0.031]	[0.041]			[0.000]	[0.335]			[0.000]	
	VIF			1.008	1.294	1.029			1.271	1.001				
20c	Coef.	0.0354	0.0960	0.0054	0.0096	0.0033				0.0002		**0.026**		976
	t	(1.602)	(3.796)***	(2.317)**	(0.377)	(2.241)**				(0.692)			(5.101)***	
	Sign.	[0.109]	[0.000]	[0.021]	[0.706]	[0.025]				[0.489]			[0.000]	
	VIF		1.012	1.008	1.028	1.032				1.005				
21	Coef.	-0.0349	0.2890	0.0039			-0.0009	0.0027	-0.1870	0.0001		**0.080**		976
	t	(-1.486)	(8.332)***	(1.693)*			(-0.185)	(2.978)***	(-7.940)***	(0.331)			(14.080)***	
	Sign.	[0.138]	[0.000]	[0.091]			[0.854]	[0.003]	[0.000]	[0.741]			[0.000]	
	VIF		2.007	1.065			1.002	1.292	2.250	1.007				

Table 4-8: B5 / **B.** Incremental Information Content Approach, *continued*

B5. Incremental / Two Traditional Measures + One Value-Based Measure (d_1 EVA/P_{t-1} + d_2 ΔEVA/P_{t-1})

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
21b	Coef.	0.0409		0.0046			0.0001	0.0005	-0.0487	0.0003		**0.014**		976
	t	(1.821)*		(1.908)*			(0.021)	(0.542)	(-2.816)***	(0.964)			(2.813)**	
	Sign.	[0.069]		[0.057]			[0.984]	[0.588]	[0.005]	[0.335]			[0.016]	
	VIF			1.063			1.002	1.181	1.132	1.001				
22	Coef.	0.0252			0.0956	0.0030	0.0002	-0.0013	-0.0693	0.0003		**0.022**		976
	t	(1.098)			(2.173)**	(1.991)**	(0.046)	(-0.978)	(-3.787)***	(1.004)			(3.584)***	
	Sign.	[0.272]			[0.030]	[0.047]	[0.964]	[0.324]	[0.000]	[0.316]			[0.002]	
	VIF				3.034	1.051	1.002	2.611	1.275	1.001				
22b	Coef.	0.0352				0.0036	0.0004	0.0009	-0.0554	0.0003		**0.017**		976
	t	(1.561)				(2.503)**	(0.066)	(1.020)	(-3.225)***	(1.001)			(3.343)***	
	Sign.	[0.119]				[0.012]	[0.947]	[0.308]	[0.001]	[0.317]			[0.005]	
	VIF					1.004	1.002	1.113	1.119	1.001				

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

The combination of two traditional performance measures and one value based performance measure is also expressed through models (23) to (25b), in group B6. In this case the value-based measure is the SVA. Table 4-9 presents the detailed results from these regression models. F-statistics revealed that all models are significant. Models (23), (23b), (24) and (24b) are significant at the 0.01 level, while models (25) and (25b) are significant at the 0.05 and 0.1 levels. All these models can be also considered satisfactory in explaining stock returns.

However, the reported R^2s are not as high as those of the combination of traditional performance measures with the EVA® and ΔEVA. Model (23), which has the higher explanation power (R^2 = 0.033), combines EPS, ΔEPS and ROI, ΔROI with the SVA. The coefficients of this model are all significant except that of ΔROI. Table 4-9.1 summarises the results from table 4-9 as follows:

Table 4-9.1:
Summary Results of Table 4-9 (Group B6)

Model	R^2	F	Sign.
23	**0.033**	6.527	0.000
23b	**0.026**	6.490	0.000
24b	**0.021**	5.087	0.000
24	**0.021**	4.087	0.000
25	**0.015**	2.950	0.012
25b	**0.006**	2.108	0.098

The low R^2s from the combination of two performance measures and the SVA, as compared to the reported results in table 4-8.1, suggest that it is preferable for investors to focus on the combination of traditional performance measures and EVA®. However, this does not mean that SVA is an insignificant measure since its combination with EPS, ΔEPS and ROI, ΔROI revealed a significant R^2 of 0.033.

Table 4-9: B6 / **B.** Incremental Information Content Approach

B6. Incremental / Two Traditional Measures + One Value-Based Measure (e_1 SVA/P_{t-1})

Model (23) : $Returns_t = x_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + e_1\, SVA/P_{t-1} + u_{23t}$
Model (23b) : $Returns_t = x_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_2\, \Delta ROI + e_1\, SVA/P_{t-1} + u_{23bt}$
Model (24) : $Returns_t = y_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{24t}$
Model (24b) : $Returns_t = y_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + e_1\, SVA/P_{t-1} + u_{24bt}$
Model (25) : $Returns_t = z_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{25t}$
Model (25b) : $Returns_t = z_0 + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{25bt}$

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
23	Coef.	0.0232	0.0937	0.0051	0.1310	0.0024					-0.0114	**0.033**		976
	t	(1.032)	(3.721)***	(2.177)**	(2.555)**	(1.581)					(-2.726)***		(6.527)***	
	Sign.	[0.302]	[0.000]	[0.030]	[0.011]	[0.114]					[0.007]		[0.000]	
	VIF		1.010	1.011	4.148	1.086					4.044			
23b	Coef.	0.0348	0.0981	0.0054		0.0034					-0.0021	**0.026**		976
	t	(1.579)	(3.894)***	(2.301)**		(2.355)**					(-1.021)		(6.490)***	
	Sign.	[0.115]	[0.000]	[0.022]		[0.019]					[0.307]		[0.000]	
	VIF		1.005	1.009		1.006					1.002			
24	Coef.	0.0411	0.0959	0.0054			-0.0012	0.0004			-0.0028	**0.021**		976
	t	(1.854)*	(3.793)***	(2.192)**			(-0.224)	(0.326)			(-0.880)		(4.087)***	
	Sign.	[0.064]	[0.000]	[0.029]			[0.823]	[0.744]			[0.379]		[0.000]	
	VIF		1.006	1.137			1.002	2.406			2.300			
24b	Coef.	0.0412	0.0960	0.0057			-0.0012				-0.0020	**0.021**		976
	t	(1.860)*	(3.799)***	(2.451)**			(-0.222)				(-0.963)		(5.087)***	
	Sign.	[0.063]	[0.000]	[0.014]			[0.824]				[0.336]		[0.000]	
	VIF		1.006	1.004			1.002				1.001			

Table 4-9: B6 / **B.** Incremental Information Content Approach, *continued*

B6. Incremental / Two Traditional Measures + One Value-Based Measure (e_1 SVA/P_{t-1})

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
25	Coef.	0.0365			0.1550	0.0022	-0.0006	-0.0003			-0.0125	**0.015**		976
	t	(1.613)			(2.689)***	(1.421)	(-0.104)	(-0.245)			(-2.930)***		(2.950)**	
	Sign.	[0.107]			[0.007]	[0.156]	[0.917]	[0.807]			[0.003]		[0.012]	
	VIF				5.162	1.096	1.001	2.662			4.121			
25b	Coef.	0.0507				0.0034	-0.0001				-0.0021	**0.006**		976
	t	(2.292)**				(2.324)**	(-0.021)				(-1.005)		(2.108)*	
	Sign.	[0.022]				[0.020]	[0.984]				[0.315]		[0.098]	
	VIF					1.000	1.000				1.000			

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

The explanatory power of two traditional performance measures in combination with two value-based measures is examined through models (26) to (28b), in group B7. Table 4-10 shows the detailed results. All models, according to F statistics are significant at the 0.01 level, except model (27b) which is significant at the 0.05 level. Thus, the significant F statistics provide evidence that all models are satisfactory in explaining the stock returns. The reported R^2s revealed that the combination of EPS, ΔEPS, ROI, ΔROI with the two value based measures, model (26), followed by the combination of EPS, ΔEPS, ROE, ΔROE with the two value based measures, model (27), explains best the stock returns, among the models of the group B7. Model (26), reported an R^2 of 0.129, while for model (27) the reported R^2 is 0.081. The coefficients in model (26) are all significant except that of ΔEVA, while in model (27) the significant coefficients are that of EPS, ΔEPS and EVA®. Table 4-10.1 gives a summary of all models ranking them according to F statistics and R^2s. The fact that model (26) revealed the highest R^2 of all other models, followed by a significant F and most of the coefficients significant at the 0.1 level or better, strengthens the claim that the combination of both traditional performance measures with value based measures increases the explanatory power in explaining stock returns. According to the reported results from the relative information content approach, one can reveal that model (1), followed by model (4), contributes most to the increasing power of model (26). In other words, the contribution of EPS is greater than that of EVA®.

Table 4-10.1:
Summary Results of Table 4-10 (Group B7)

Model	R^2	F	Sign.
26	**0.129**	20.538	0.000
27	**0.081**	12.156	0.000
28	**0.033**	4.672	0.000
26b	**0.020**	3.894	0.002
28b	**0.016**	3.132	0.008
27b	**0.014**	2.755	0.018

Table 4-10: B7 / **B.** Incremental Information Content Approach
B7. Incremental / Two Traditional Measures + Two Value-Based Measures

Model (26) : $Returns_t = \beta_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{26t}$
Model (26b) : $Returns_t = \beta_0 + a_2\, \Delta EPS/P_{t-1} + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{26bt}$
Model (27) : $Returns_t = \gamma_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{27t}$
Model (27b) : $Returns_t = \gamma_0 + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{27bt}$
Model (28) : $Returns_t = \delta_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{28t}$
Model (28b) : $Returns_t = \delta_0 + b_2\, \Delta ROI + c_1\, ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{28bt}$

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
26	Coef.	-0.1050	0.3610	0.0045	0.3520	0.0026			-0.2640	0.0000	-0.0157	**0.129**		976
	t	(-4.261)***	(10.223)***	(2.010)**	(6.636)***	(1.855)*			(-10.347)***	(0.112)	(-3.935)***		(20.538)***	
	Sign.	[0.000]	[0.000]	[0.045]	[0.000]	[0.064]			[0.000]	[0.911]	[0.000]		[0.000]	
	VIF		2.202	1.012	4.957	1.086			2.792	1.008	4.089			
26b	Coef.	0.0352		0.0045		0.0035			-0.0487	0.0003	0.0002	**0.020**		976
	t	(1.578)		(1.937)*		(2.370)**			(-2.805)***	(0.974)	(0.087)		(3.894)***	
	Sign.	[0.115]		[0.053]		[0.018]			[0.005]	[0.330]	[0.930]		0.002]	
	VIF			1.008		1.009			1.145	1.001	1.139			
27	Coef.	-0.0357	0.2930	0.0045			-0.0009	0.0020	-0.1910	0.0001	0.0025	**0.081**		976
	t	(-1.516)	(8.357)***	(1.842)*			(-0.184)	(1.598)	(-7.927)***	(0.324)	(0.805)		(12.156)***	
	Sign.	[0.130]	[0.000]	[0.066]			[0.854	[0.110]	[0.000]	[0.746]	[0.421]		0.000]	
	VIF		2.053	1.140			1.002	2.469	2.357	1.007	2.410			
27b	Coef.	0.0413		0.0049			0.0001		-0.0461	0.0003	0.0002	**0.014**		976
	t	(1.843)*		(2.100)**			(0.020)		(-2.651)***	(0.965)	(0.084)		(2.755)**	
	Sign.	[0.066]		[0.036]			[0.984]		[0.008]	[0.335]	[0.933]		[0.018]	
	VIF			1.003			1.002		1.142	1.001	1.139			

Table 4-10: B7 / **B.** Incremental Information Content Approach, *continued*
B7. Incremental / Two Traditional Measures + Two Value-Based Measures

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
28	Coef.	0.0084			0.2330	0.0019	0.0000	-0.0006	-0.0750	0.0003	-0.0141	**0.033**		976
	t	(0.357)			(3.863)***	(1.278)	(-0.006)	(-0.479)	(-4.101)***	(0.972)	(-3.314)***		(4.672)***	
	Sign.	[0.721]			[0.000]	[0.201]	[0.995]	[0.632]	[0.000]	[0.331]	[0.001]		[0.000]	
	VIF				5.741	1.098	1.002	2.670	1.286	1.001	4.159			
28b	Coef.	0.0363				0.0036	0.0003		0.0502	0.0003	0.0001	**0.016**		976
	t	(1.610)				(2.506)**	(0.066)		(-2.886)***	(1.008)	(0.058)		(3.132)***	
	Sign.	[0.108]				[0.012]	[0.948]		[0.004]	[0.314]	[0.953]		[0.008]	
	VIF					1.004	1.002		1.145	1.001	1.139			

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

Table 4-11 shows the detailed results of models (29) to (30b) where the three traditional performance measures are combined with one value-based measure. All models, according to F statistics, are reported as significant at the 0.01 level, suggesting the validity of the models in explaining stock returns. Model (29) explains best the stock returns. It combines all traditional performance measures with EVA® and ΔEVA. The R^2 is 0.119 while all co-efficients are significant at the 0.05 level or better, except that of ROE and ΔEVA. This result is almost the same as that of model (20), (R^2=0.115) where we combined all the above measures except ROE and ΔROE. Thus, we can infer that the contribution of ROE in our models is very weak. Table 4-11.1 summarises the detailed results as reported in table 4-11. As can be seen from tables 4-11 and 4-11.1, EPS

Table 4-11.1:
Summary Results of Table 4-11 (Group B8)

Model	R^2	F	Sign.
29	**0.119**	16.320	0.000
30	**0.033**	4.792	0.000
30b	**0.026**	5.194	0.000
29b	**0.024**	4.031	0.001

Table 4-12.1:
Summary Results of Table 4-12 (Group B9)

Model	R^2	F	Sign.
31	**0.131**	16.164	0.000
31c	**0.126**	28.020	0.000
31b	**0.020**	3.242	0.004

contributes most of the increasing explanatory power of model (29). Moreover, examining the models (29) and (30) we can argue that EVA® plays an important role, more significant to that of SVA.

Finally, incorporating all performance measures in one regression model, model (31), the explanatory power of the model reaches its highest levels (R^2 =0.131). Table 4-12 shows the detailed results. The F statistics revealed that the model is significant at the 0.01 level, while the coefficients of ΔROI, ROE, ΔROE and ΔEVA are still insignificant. According to these results we developed model (31c), which contains the variables of model (31) with the exception of the insignificant ones. The model is significant at the 0.01 level, with F=28.020 and R^2=0.126. Table 4-12.1 summarises the results.

Table 4-11: B8 / **B.** Incremental Information Content Approach

B8. Incremental / Three Traditional Measures + One Value-Based Measure

Model (29) : $Returns_t = \varepsilon_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{29t}$

Model (29b) : $Returns_t = \varepsilon_0 + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{29bt}$

Model (30) : $Returns_t = \zeta_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{30t}$

Model (30b) : $Returns_t = \zeta_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_2\, \Delta ROI + c_1\, ROE + e_1\, SVA/P_{t-1} + u_{30bt}$

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
29	Coef.	-0.0884	0.3560	0.0066	0.2450	0.0033	-0.0012	-0.0026	-0.2560	0.0000		**0.119**		976
	t	(-3.611)***	(10.026)***	(2.779)***	(5.457)***	(2.349)**	(-0.239)	(-1.968)**	(-10.008)***	(0.161)			(16.320)***	
	Sign.	[0.000]	[0.000]	[0.006]	[0.000]	[0.019]	[0.811]	[0.049]	[0.000]	[0.872]			[0.000]	
	VIF		2.200	1.143	3.499	1.072	1.003	2.959	2.767	1.008				
29b	Coef.	0.0269		0.0044	0.0619	0.0030	0.0002		-0.0661	0.0003		**0.024**		976
	t	(1.180)		(1.894)*	(2.156)**	(2.047)**	(0.046)		(-3.621)***	(0.963)			(4.031)***	
	Sign.	[0.238]		[0.059]	[0.031]	[0.041]	[0.963]		[0.000]	[0.336]			[0.001]	
	VIF			1.008	1.294	1.030	1.002		1.272	1.001				
30	Coef.	0.0221	0.0935	0.0059	0.1560	0.0021	-0.0014	-0.0013			-0.0107	**0.033**		976
	t	(0.972)	(3.705)***	(2.368)**	(2.703)***	(1.418)	(-0.266)	(-0.937)			(-2.509)**		(4.792)***	
	Sign.	[0.331]	[0.000]	[0.018]	[0.007]	[0.157]	[0.790]	[0.349]			[0.012]		[0.000]	
	VIF		1.012	1.159	5.272	1.111	1.003	3.056			4.188			
30b	Coef.	0.0353	0.0983	0.0054		0.0034	-0.0010				-0.0021	**0.026**		976
	t	(1.590)	(3.897)***	(2.301)**		(2.351)**	(-0.194)				(-1.019)		(5.194)***	
	Sign.	[0.112]	[0.000]	[0.022]		[0.019]	[0.846]				[0.308]		[0.000]	
	VIF		1.007	1.009		1.007	1.002				1.002			

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

Table 4-12: B9 / **B.** Incremental Information Content Approach
B9. Incremental / Three Traditional Measures + Two Value-Based Measures

Model (31) : Returns$_t$ = $\eta_0 + a_1$ EPS/P$_{t-1}$ + a_2 ΔEPS/P$_{t-1}$ + b_1 ROI + b_2 ΔROI + c_1 ROE + c_2 ΔROE + d_1 EVA/P$_{t-1}$ + d_2 ΔEVA/P$_{t-1}$ + e_1 SVA/P$_{t-1}$ + u_{31t}
Model (31b) : Returns$_t$ = $\eta_0 + a_2$ ΔEPS/P$_{t-1}$ + b_2 ΔROI + c_1 ROE + d_1 EVA/P$_{t-1}$ + d_2 ΔEVA/P$_{t-1}$ + e_1 SVA/P$_{t-1}$ + u_{31bt}

B9. Incremental – From Model (31) only those with significance level < 0.05
Model (31c) : Returns$_t$ = $0_0 + a_1$ EPS/P$_{t-1}$ + a_2 ΔEPS/P$_{t-1}$ + b_1 ROI + d_1 EVA/P$_{t-1}$ + e_1 SVA/P$_{t-1}$ + u_{31ct}

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
31	Coef.	-0.1070	0.3620	0.0055	0.3860	0.0024	-0.0015	-0.0017	-0.2650	0.0000	-0.0148	**0.131**		976
	t	(-4.309)***	(10.234)***	(2.339)**	(6.533)***	(1.637)	(-0.299)	(-1.289)	(-10.379)***	(0.116)	(-3.641)***		(16.164)***	
	Sign.	[0.000]	[0.000]	[0.020]	[0.000]	[0.102]	[0.765]	[0.198]	[0.000]	[0.907]	[0.000]		[0.000]	
	VIF		2.203	1.160	6.139	1.111	1.003	3.059	2.794	1.008	4.228			
31b	Coef.	0.0351		0.0045		0.0035	0.0003		-0.0487	0.0003	0.0002	**0.020**		976
	t	(1.556)		(1.936)*		(2.369)**	(0.058)		(-2.804)***	(0.972)	(0.088)		(3.242)***	
	Sign.	[0.120]		[0.053]		[0.018]	[0.954]		[0.005]	[0.331]	[0.930]		[0.004]	
	VIF			1.008		1.009	1.002		1.147	1.001	1.139			

The model with those variables which have significance < 0.05

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA	Δ EVA	SVA	R^2	F	No of Obs
31c	Coef.	-0.103	0.358	0.005	0.376				-0.264		-0.017	**0.126**		976
	t	(-4.167)***	(10.180)***	(2.104)**	(7.297)***				(-10.331)***		(-4.453)***		(28.020)***	
	Sign.	[0.000]	[0.000]	[0.036]	[0.000]				[0.000]		[0.000]		[0.000]	
	VIF		2.1800	1.0090	4.6660				2.7810		3.8890			

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

To conclude the research a summary table was created comprising all models in groups B1-B9 ranking them according to: R^2, F statistics, and significance level. Table 4-13 shows the results.

Table 4-13:
Summary Table[8] of all Models (6) to (31b) (Groups B1-B9)

Ranking	Model	R^2	F	Sign.
1	**31**	**0.131**	16.164	0.000
2	**26**	**0.129**	20.538	0.000
3	**20**	**0.115**	21.065	0.000
4	**27**	**0.081**	12.156	0.000
5	**21**	**0.080**	14.080	0.000
6	**17**	**0.078**	16.492	0.000
7	**11**	**0.072**	18.761	0.000
8	**23**	**0.033**	6.527	0.000
9	**28**	**0.033**	4.672	0.000
10	**18**	**0.032**	6.507	0.000
11	**9**	**0.027**	4.463	0.000
12	**23b**	**0.026**	6.490	0.000
13	**20c**	**0.026**	5.101	0.000
14	**6**	**0.025**	6.181	0.000
15	**9b**	**0.025**	4.950	0.000
16	**20b**	**0.024**	4.842	0.000
17	**17b**	**0.021**	5.199	0.000
18	**13**	**0.021**	5.141	0.000
19	**24b**	**0.021**	5.087	0.000
20	**24**	**0.021**	4.087	0.000
21	**12**	**0.020**	6.773	0.000
22	**11b**	**0.020**	6.621	0.000
23	**7**	**0.020**	4.859	0.001
24	**22**	**0.022**	3.584	0.002
25	**26b**	**0.020**	3.894	0.002
26	**14**	**0.015**	4.904	0.002
27	**31b**	**0.020**	3.242	0.004
28	**18b**	**0.016**	3.918	0.004
29	**22b**	**0.017**	3.343	0.005
30	**28b**	**0.016**	3.132	0.008
31	**25**	**0.015**	2.950	0.012
32	**21b**	**0.014**	2.813	0.016
33	**27b**	**0.014**	2.755	0.018
34	**10**	**0.009**	3.028	0.029
35	**15**	**0.011**	2.599	0.035
36	**14b**	**0.006**	3.165	0.043
37	**19**	**0.011**	2.247	0.048
38	**19b**	**0.010**	2.333	0.054
39	**25b**	**0.006**	2.108	0.098
40	**8b**	**0.006**	1.853	0.136
41	**8**	**0.006**	1.511	0.197
42	**16**	**0.002**	0.711	0.546
43	**16b**	**0.001**	0.459	0.632

[8] model (31c) is not included in the table

The summary table 4-13 contains all models examined in the nine different groups (B1 to B9). From this table we can summarise as follows: Firstly, all performance measures under examination, model (31), cannot explain more than 13.1 per cent of the variation in stock returns between firms. Relatively low R^2 (13.1) suggest the rest 86.9 per cent of the variation of stock returns appears to be attributable to non-earnings based information. This result is consistent with that of Chen and Dodd (1997; 2001) and Worthington and West (2001).

Secondly, models (26) and (20) follow model (31) in explaining stock returns. Model (26) is based on two traditional performance measures (EPS, ΔEPS, ROI and ΔROI) and two value-based performance measures (EVA®, ΔEVA and SVA), while model (20) is based on the same traditional performance measures (EPS, ΔEPS, ROI and ΔROI) and one value based performance measure (EVA® and ΔEVA). This result supports the Chen and Zhang (2003) claim where profitability change and invested capital increase the explanatory power of earnings in explaining stock returns.

Thirdly, models (27), (21), (17) and (11) that reveal an explanatory power between 0.081 and 0.072 incorporate the EPS, ΔEPS, EVA® and ΔEVA variables. Fourthly, the contribution of EPS and ΔEPS in the explanatory power of the above models is higher than that of EVA® and ΔEVA since their R^2s are 0.019 and 0.009 respectively. Fifth, the rest of the models explain less than 0.033 per cent of the variation of stock returns.

Thus, as a conclusion we can suggest that investors should pay attention to a variation of performance measures, mainly the EPS and EVA®, when they design their investment strategies, since either the rest of the combinations or the single measures alone cannot satisfactorily explain the stock returns. Finally, as we have suggested there are many other factors (e.g. non-earnings based information, behavioural, etc.) affecting the stock returns. These factors will be examined in the following chapter.

As a verification of our results, we tested the models (6) to (31) using the stepwise regression procedure available from the SPSS software package. The proposed models were the followings: (32), (33), (34), (35) and (36). These models report significant F, significant co-efficients and relatively high R^2s. Table 4-14.1 presents each model separately.

Table 4-14.1:
Proposed Models from the Stepwise Regression / Incremental – Stepwise_1

Model (32) : $Returns_t = \lambda_0 + a_1\ EPS/P_{t-1} + u_{32t}$
Model (33) : $Returns_t = \mu_0 + a_1\ EPS/P_{t-1} + d_1\ EVA/P_{t-1} + u_{33t}$
Model (34) : $Returns_t = v_0 + a_1\ EPS/P_{t-1} + b_1\ ROI + d_1\ EVA/P_{t-1} + u_{34t}$
Model (35) : $Returns_t = \xi_0 + a_1\ EPS/P_{t-1} + b_1\ ROI + d_1\ EVA/P_{t-1} + e_1\ SVA/P_{t-1} + u_{35t}$
Model (36) : $Returns_t = \rho_0 + a_1\ EPS/P_{t-1} + a_2\ \Delta EPS/P_{t-1} + b_1\ ROI + d_1\ EVA/P_{t-1} + e_1\ SVA/P_{t-1} + u_{36t}$

Table 4-14 reports the detailed results from these models. According to F statistics all models are significant at the 0.01 level. The reported F for each model is relatively high. The coefficients are all significant at the 0.01 level. Table 4-14.2 shows the summary of the results. Model (36) explains best the returns and is similar to the model (26). The only difference is that model (36) automatically excludes ΔROI and ΔEVA from model

Table 4-14.2:
Summary Results of Table 4-14 (Stepwise_1)

Model	R^2	F	Sign.
36	**0.126**	28.020	0.000
35	**0.122**	33.198	0.000
34	**0.103**	37.198	0.000
33	**0.066**	34.230	0.000
32	**0.013**	13.164	0.000

(26) since their co-efficients are not significant at the 0.05 level or better. Thus, the reported (R^2= 0.126) of model (36) is almost similar to that of model (26) (R^2= 0.129). From the proposed models we can conclude that (a) all models incorporate EPS, (b) five out of six models incorporate EVA®, (c) three out of six models incorporate ROI, (d) two out of six models, the best ones (35) and (36)

incorporate the SVA. From the above we could argue that the combination of two traditional performance measures with two value-based performance measures, models (35) and (36), explains the returns better than all other models, a finding consistent to the reported results from our analysis.

Table 4-14: Incremental – Stepwise_1

Model (32) : Returns$_t$ = $\lambda_0 + a_1$ EPS/P$_{t-1}$ + u_{32t}
Model (33) : Returns$_t$ = $\mu_0 + a_1$ EPS/P$_{t-1}$ + d_1 EVA/P$_{t-1}$ + u_{33t}
Model (34) : Returns$_t$ = $\nu_0 + a_1$ EPS/P$_{t-1}$ + b_1 ROI + d_1 EVA/P$_{t-1}$ + u_{34t}
Model (35) : Returns$_t$ = $\xi_0 + a_1$ EPS/P$_{t-1}$ + b_1 ROI + d_1 EVA/P$_{t-1}$ + e_1 SVA/P$_{t-1}$ + u_{35t}
Model (36) : Returns$_t$ = $\rho_0 + a_1$ EPS/P$_{t-1}$ + a_2 ΔEPS/P$_{t-1}$ + b_1 ROI + d_1 EVA/P$_{t-1}$ + e_1 SVA/P$_{t-1}$ + u_{36t}

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
32	Coef.	0.0450	0.0916									**0.013**		976
	t	(2.052)**	(3.628)***										(13.164)***	
	Sign.	[0.040]	[0.000]										[0.000]	
	VIF		1.000											
33	Coef.	-0.0219	0.2560						-0.1580			**0.066**		976
	t	(-0.945)	(7.721)***						(-7.387)***				(34.230)***	
	Sign.	[0.345]	[0.000]						[0.000]				[0.000]	
	VIF		1.821						1.821					
34	Coef.	-0.0731	0.3470		0.1890				-0.2520			**0.103**		976
	t	(-3.027)***	(9.766)***		(6.353)***				(-9.824)***				(37.198)***	
	Sign.	[0.003]	[0.000]		[0.000]				[0.000]				[0.000]	
	VIF		2.171		1.511				2.746					
35	Coef.	-0.1020	0.3560		0.3840				-0.2650		-0.0180	**0.122**		976
	t	(-4.116)***	(10.116)***		(7.451)***				(-10.371)***		(-4.613)***		(33.198)***	
	Sign.	[0.000]	[0.000]		[0.000]				[0.000]		[0.000]		[0.000]	
	VIF		2.179		4.643				2.779		3.868			

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

Table 4-14: Incremental – Stepwise_1, *continued*

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
36	Coef.	-0.1030	0.3580	0.0047	0.3760				-0.2640		0.1260	**0.126**		976
	t	(-4.167)***	(10.180)***	(2.104)**	(7.297)***				(-10.331)***		(-4.453)***		(28.020)***	
	Sign.	[0.000]	[0.000]	[0.036]	[0.000]				[0.000]		[0.000]		[0.000]	
	VIF		2.180	1.009	4.666				2.781		2.180			

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

When we exclude two more observations (extreme cases) from our sample, the proposed models from the stepwise regression are reported in table 4-15.1 as follows:

Table 4-15.1:
Proposed Models from the Stepwise Regression / Incremental – Stepwise_2
Incremental – Stepwise_2 – Two more Observations Excluded (cases 58 and 604)

Model (37) : Returns$_t$ $= \sigma_0 + a_1\, EPS/P_{t-1} + u_{37t}$
Model (38) : Returns$_t$ $= \varphi_0 + a_1\, EPS/P_{t-1} + d_1\, EVA/P_{t-1} + u_{38t}$
Model (39) : Returns$_t$ $= \psi_0 + a_1\, EPS/P_{t-1} + b_1\, ROI + d_1\, EVA/P_{t-1} + u_{39t}$
Model (40) : Returns$_t$ $= \omega_0 + a_1\, EPS/P_{t-1} + b_1\, ROI + d_1\, EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{40t}$

Table 4-15 reports the detailed results from these models, while table 4-15.2 provides the summary results. Models (37), (38), (39) and (40) are similar to models (32), (33), (34) and (35), respectively. The reported R^2s of the models (37) to (40) are almost similar to those of models (32) to (35).

Table 4-15.2:
Summary Results of table 4-15 (Stepwise_2)

Model	R^2	F	Sign.
40	**0.136**	38.045	0.000
39	**0.113**	41.380	0.000
38	**0.069**	36.125	0.000
37	**0.013**	13.240	0.000

As a general conclusion of the two stepwise regressions we can argue that (a) results are consistent with those reported from our initial tests, (b) not a single performance measure satisfactorily explains the stock returns, (c) the combination of two traditional performance measures (EPS and ROI) with the two value based performance measures (EVA® and SVA) provides the best possible model in explaining stock returns, (d) this result is consistent to those of many other studies (Chen and Dodd, 1997; 2001) among others, (e) the contribution of EPS and EVA® in these models are of relatively high importance.

Table 4-15: Incremental – Stepwise_2

Incremental – Stepwise_2 – Two more Observations Excluded (cases 58 and 604)

Model (37) : Returns$_t$ = $\sigma_0 + a_1$ EPS/P$_{t-1}$ + u_{37t}
Model (38) : Returns$_t$ = $\varphi_0 + a_1$ EPS/P$_{t-1}$ + d_1 EVA/P$_{t-1}$ + u_{38t}
Model (39) : Returns$_t$ = $\psi_0 + a_1$ EPS/P$_{t-1}$ + b_1 ROI + d_1 EVA/P$_{t-1}$ + u_{39t}
Model (40) : Returns$_t$ = $\omega_0 + a_1$ EPS/P$_{t-1}$ + b_1 ROI + d_1 EVA/P$_{t-1}$ + e_1 SVA/P$_{t-1}$ + u_{40t}

Model	ALL YEARS	CONST	EPS	Δ EPS	ROI	Δ ROI	ROE	Δ ROE	EVA®	Δ EVA	SVA	R^2	F	No of Obs
37	Coef.	0.0437	0.0927									**0.013**		974
	t	(1.989)*	(3.639)***										(13.240)***	
	Sign.	[0.047]	[0.000]										[0.000]	
	VIF		1.000											
38	Coef.	-0.0258	0.2620						-0.1690			**0.069**		974
	t	(-1.111)	(7.884)***						(-7.631)***				(36.125)***	
	Sign.	[0.267]	[0.000]						[0.000]				[0.000]	
	VIF		1.806						1.806					
39	Coef.	-0.0850	0.3680		0.2100				-0.2840			**0.113**		974
	t	(-3.509)***	(10.262)***		(6.955)***				(-10.431)***				(41.380)***	
	Sign.	[0.000]	[0.000]		[0.000]				[0.000]				[0.000]	
	VIF		2.203		1.584				2.855					
40	Coef.	-0.1170	0.3810		0.4240				-0.3030		-0.0194	**0.136**		974
	t	(-4.734)***	(10.730)***		(8.126)***				(-11.144)***		(-4.997)***		(38.045)***	
	Sign.	[0.000]	[0.000]		[0.000]				[0.000]		[0.000]		[0.000]	
	VIF		2.215		4.841				2.910		3.902			

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

4.7. Conclusion

The relative information content approach revealed that in the Greek stock market, earnings levels and earnings changes are associated with stock returns (significant F statistics, R^2=0.019, significant t-statistics of the coefficients). They also outperform all other performance measures under examination (ROI, ROE, EVA® and SVA) in explaining stock returns, since the reported F-statistics, R^2s and t-statistics of the coefficients for earnings are higher than those of the other performance measures.

The findings that earnings are associated with stock returns are consistent to those reported in terms of international stock markets by Easton and Harris (1991), Cheng, Cheung and Gopalakrishnan (1993), Chen and Dodd (1997; 2001), Biddle, Bowen and Wallace (1997), and Worthington and West (2001), among others. Moreover, the finding that EPS outperforms EVA® is consistent with the provided evidence from other similar studies conducted in the international stock markets. Biddle, Bowen and Wallace (1997) and Chen and Dodd (2001) found that earnings outperform EVA® and RI in the US stock market. Günther, Landrock and Muche (1999; 2000) and Worthington and West (2001) revealed similar results for the German and Australian stock markets respectively. However, our results do not suggest that each traditional performance measure is necessarily more value relevant than each value-based performance measure.

On the other hand, the findings of our research do not support the claims of Stewart (1991) and the advocates of EVA® financial management system that EVA® alone is the best performance measure. Some possible reasons revealing the superiority of EPS in this study are the following: the market participants in Greece may place higher reliance on audited accounting earnings than the unaudited EVA® metric, estimates for the charge of capital and accounting adjustments may contain measurement error relative to what the market is using for valuation, there is no Stern Stewart's available data for the Greek stock market as yet and thus we calculated EVA® in a way which does not include as many adjustments as they would use for their clients, data needed to compute EVA® are not easily estimated and the market did not have this data during the examination period, and in violation of the maintained hypothesis of semi-strong market efficiency, the market may have failed to recognise the reporting benefits of EVA® through the period we studied, consistent with the notion of 'earnings myopia'.

The incremental information content approach provided us with further and significant results. Firstly, all performance measures under examination cannot explain more than 13.1 per cent of the variation of stock returns in the Greek stock market. This finding directed the present study to search for other possible factors to explain the rest of the 86.9 per cent that affects the variation of stock returns. The relative low explanatory power of performance measures under examination is largely consistent with the reported results of relevant studies conducted for the US stock 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 evidence that EPS and EVA® could not explain more than 10 per cent of stock returns.

Secondly, the results of the present study revealed that when EVA® is incorporated into an EPS model, the explanatory power of the model increases, model (11), from 0.019 to 0.072. This suggests that the new information provided by EVA® is of significant value relevance in explaining stock returns. However, the contribution of EPS (0.063) in this increase was higher than that of EVA®(0.053). Thirdly, when ROI levels and changes are incorporated in the EPS and EVA® model, the explanatory power of the model increases to 0.115, (model 20), largely consistent to the Chen and Zhang (2003) findings. Finally, the important role of SVA is revealed when it is added to the previous model. Model (26) reports the results of the combination of EPS, ROI, EVA® and SVA. The R^2 increases from 0.115 to 0.129, which is the highest of all the other models, except model (31), which incorporates all performance measures under examination. These results suggest that the incorporation of the cost of capital in the earnings models contributes to the increase of the value relevance of the model in defining stock returns. Moreover, these findings support the claims of many scholars that more than one determinant should be employed to assess the value of the firms.

Chapter Five

USERS' PERCEPTIONS AND INVESTMENT STRATEGIES IN THE ASE

5.1. Introduction

The first objective of the present study was to empirically examine the usefulness of the value-based performance measures (EVA® and SVA) compared to the traditional accounting performance measures (EPS, ROI and ROE), in explaining (predicting) the shareholders' returns of the Greek listed companies. The conducted research in chapter four was focused on this objective, and the major findings were the following: both EPS and EVA® are correlated to stock returns, EPS outperforms all other performance measures, followed by EVA®, all traditional accounting performance measures under examination (EPS, ROI and ROE) could not explain more than 2.7 per cent of the variation of stock returns, while the explanation power of the value-based performance measures was still less than 1 per cent, the combination of EPS and EVA® increases the explanatory power of the model in explaining stock returns to 7.2 per cent, the introduction of ROI in the model could increase the value relevance to 0.115, and all performance measures under examination, accounting and value-based, could not explain more than 13.1 per cent of the variation of stock returns.

The above evidence indicates that the remaining 86.9 per cent of the variation of stock returns could be explained by other factors beyond the traditional accounting and modern value-based performance measures. Moreover, according to the literature (Fama and French, 1995; Shleifer, 2000; Shefrin, 2000; Warneryd, 2001) other factors such as macroeconomic, microeconomic, and behavioural can influence investors' investment strategies. All of these directed us to the second objective of the present study, where, through a questionnaire survey, we explore the perceptions of all user groups (market participants) investing in the Greek stock market about the performance indicators they are using for portfolio analysis and company valuation purposes. Our respondents come from six different groups of investors: (a) official members of the Athens Stock Exchange (OMOA), (b) mutual funds management companies (MF), (c) portfolio investment companies (PIC), (d) listed companies (LC) in the Athens Stock Exchange, (e) brokers (BR), and (f) individual investors (ININ). The Athens Exchange has become one of the most developed stock market centres in the fund management industry. Thus, it is important for international investors to acquire a better knowledge and understanding of how individual investors and professionals in Greece practice their trade.

The aims of this survey are: to identify the general practices of individual and professional investors for stock analysis in Greece, to investigate the association that might exist between the time horizon and the relative importance of the techniques that individual and professional investors use for stock analysis, and to examine the impact of the various techniques employed on the performance of individual and professional investors. To the best of our knowledge, this is the first survey study on the practice of investment strategies' management in the Greek stock market.

The rest of the chapter is structured as follows. Section two describes the sample and the research method. Section three discusses the results from the statistical analysis undertaken. Section four reveals the dynamic of the performance measures, while section five summarises the questionnaire survey.

5.2. Study Method

5.2.1. The Sample

The sample consists of six different user groups: official members of the ASE, mutual funds management companies, portfolio investment companies, listed companies in the ASE, brokers, and individual investors. We decided to investigate all those groups since they constitute the framework of investors contributing to the investment process in the Athens Exchange. Results from this survey will reveal the investment practices of each user group separately and of all user groups as a total. We consider the knowledge of the differences amongst those groups as useful since it will help us to indicate which user group(s) followed the most convenient investment strategy during the examination period. All respondents were assumed to have the required knowledge to accurately respond to the questions of the questionnaire.

For the selection of our sample we proceeded as follows. We first created a database, which included all official members (86) of the ASE, all mutual funds management companies (30), all portfolio investment companies (28) and all listed companies (220) in the ASE. We excluded the banks[1] from this database, the companies that were under suspension or the companies with less than five years participating in the ASE. This population of 364 members/companies constituted the first part of our sample. We planned to send one questionnaire to each of them. The second part of our sample consisted of brokers and individual investors. To select them was quite complicated. We created a new database with all brokerage companies in the country. Since Greece is divided into 13 regions, we randomly selected 10 brokerage companies from each region and planned to send a questionnaire to each of them (130 questionnaires in total). To distribute

[1] Most of the banks are included in the other user groups (official members, mutual fund management companies, portfolio investment companies, brokerage companies).

the questionnaire to individual investors, we used the same selected brokerage companies (130), sending four questionnaires to each of them (520 in total) kindly requesting them to randomly select four of their customers (individual investors) to complete the questionnaire. Thus, the second part of our sample consisted of 130 brokers and 520 individual investors, 650 respondents in total. The final number of the delivered questionnaires was up to 1,014 (364+650). As we can see from the table 5-1 the response rate was very satisfactory. We received 435 responses[2] representing a response rate of 42.90 per cent.

Table 5-1: The Response Rate

Subject groups	Distributed Questionnaires	Returned Question-naires	Response rate (%)
Official members of ASE (OMOA) (All population)	86	45	52.33
Mutual Funds management companies (MF) (All population)	30	17	56.67
Portfolio Investment companies (PIC) (All population)	28	17	60.71
Listed companies (LC) (All population)	220	47	21.36
Brokers (BR) (Sample)	130	85	65.38
Individual investors (ININ) (Sample)	520	224	43.08
Total send and received questionnaires	1,014	435	42.90

As is shown, the response rate of BR and PIC is over 60 per cent, the response rate of OMOA and MF is over 50 per cent, while that of ININ is over 40 per cent. Only the group of listed companies revealed a relatively low response rate, which is marginally over 20 per cent.

[2] Appendix IX shows the names of the respondents' members/companies (except BR and ININ)

5.2.2. The Data Collection Method

To achieve this response rate we used a variety of data collection techniques (personal contacts/interviews, fax, e-mail, post, and telephone) as they detailed presented by Zikmund (2003). As discussed in chapter three, in October 2003 we conducted a qualitative preliminary study among 26 weighted selected potential respondents in order to establish the relevant questions to be included in the questionnaire. Moreover, in November 2003 we pre-tested the questionnaire among 52 weighted selected respondents and revised it after their feedback. The main study started in December 2003 and completed in June 2004.

We distributed the questionnaire in three phases. Table 5-1.1 presents the response rate from phase-to-phase. The first survey phase started in December 2003 and completed at the end of January 2004. We personally visited (or sent the questionnaire by fax) to a large number of official members of the ASE (50 per cent), mutual funds management companies (50 per cent), portfolio investment companies (50 per cent), listed companies in the ASE (30 per cent), and brokerage firms (30 per cent) asking for their participation. Simultaneously, we sent the questionnaire, using e-mail, to all other members of our sample (except individual investors).

The response rate was quite satisfactory. We received up to 29.07 per cent, 23.33 per cent, 7.14 per cent, 11.36 per cent, and 19.23 per cent responses from OMOA, MF, PIC, LC and BR respectively, while no special attempt was made to contact individual investors. The next survey phase started in February 2004 and completed at the end of March 2004. It was mostly oriented to a postal communication with the potential respondents. We sent the questionnaire with a pre paid return envelope. The responses from the second phase increased the total response rate to 31.40 per cent, 26.67 per cent, 10.71 per cent, 15.91 per cent, and 26.92 per cent for the OMOA, MF, PIC, LC and BR, respectively.

The last survey phase started in April 2004 and was completed in June 2004. It was totally focused on communication by phone. We explained the purpose of our study and kindly asked them to participate in the survey. After each phone contact and if the potential respondent was willing to participate, we re-sent the questionnaire either by e-mail or by post with a return pre paid envelope. The third attempt significantly increased the response rate up to 52.33 per cent, 56.67 per cent, 60.71 per cent, 21.36 per cent, 65.38 per cent for the above mentioned user groups respectively, while the response rate of individual investors (ININ) reached the level of 43.08 per cent.

Table 5-1.1: The Response Rate from Phase-to-Phase

				First Phase: personal contacts/interviews, fax, e-mails		Second Phase: Post to everybody (except individuals)		Third Phase: Phone and then post or e-mail to interested for answering	
	User group		Sent Questionnaires	Received answers	Response rate	Received answers	Response rate	Received answers	Response rate
1	OMOA	Population	86	25	29.07%	27	31.40%	45	52.33%
2	MF	Population	30	7	23.33%	8	26.67%	17	56.67%
3	PIC	Population	28	2	7.14%	3	10.71%	17	60.71%
4	LC	Population	220	25	11.36%	35	15.91%	47	21.36%
5	BR	Sample	130	25	19.23%	35	26.92%	85	65.38%
6	ININ	Sample	520					224	43.08%
	Total		1,014	84		108		435	42.90%

5.3. Analysis of the Results

5.3.1. Respondents' Background

We sought information about the respondents' position within the company, educational background and years of experience in the field. Examining the position within the company (table 5-2) for the respondents of the first four user groups (OMOA, MF, PIC, and LC) we found that on average for all groups, 20.4 percent were CEOs, 17.7 were CFOs, 2.7 were shareholders/owners, 32.3 were analysts, and 26.9 percent held other titles.

Table 5-2: Position within the Company

	OMOA	MF	PIC	LC	Average
CEO	8.9	23.5	47.1	2.2	20.4
CFO	0.0	29.4	17.6	23.9	17.7
Shareholder	2.2	0.0	0.0	8.7	2.7
Analyst	73.3	23.5	23.5	8.7	32.3
Other	15.6	23.5	11.8	56.5	26.9
					100.0

As for their educational background (table 5-3), we found that for all six user groups, on average, the respondents held a master's degree (57.3 per cent) followed by those holding a bachelor's degree (26.5 per cent). Moreover, the vast majority of the official members of ASE (71.1), mutual funds management companies (88.2) and portfolio investment companies (82.4) hold a master's degree.

Table 5-3: Educational Background

	OMOA	MF	PIC	LC	BR	ININ	Average
High School	0	0	0	0	17.6	29.9	7.9
Diploma	0	0	0	0	0	2.2	0.4
BA/BSc	17.8	5.9	5.9	42.6	45.9	41.1	26.5
MBA/MSc	71.1	88.2	82.4	48.9	35.3	17.9	57.3
PhD	11.1	5.9	11.7	8.5	1.2	8.9	7.9
							100.0

Finally, concerning the respondents' years of experience, we found (table 5-4) that the average for all user groups was nearly eleven years (10.8).

Table 5-4: Years of Experience

OMOA	7.1
MF	10.4
PIC	12.8
LC	13.0
BR	8.9
ININ	11.6
Average	10.8

Thus, more than 90 per cent of the respondents were university graduates (table 5-3) with less than eleven years of experience (table 5-4). The latter is mainly due to the fact that although the ASE is a long established institution (since 1963), its real role as a financial institution started at the end of 1980s.

5.3.2. Factors Affecting all User Groups' Investment Strategy

Table 5-5 outlines the perceptions of the six-user groups regarding the level of importance they attach to a list of nine factors in their approach to valuation of stocks. On average, respondents rank first their instinct/experience (3.47), followed by fundamental analysis (3.44) and the movement of the foreign stock markets (3.44), while they consider the noise in the market (2.72) and portfolio analysis (2.25) as the least important approaches, which is in direct contrast to the theories developed by many scholars.

Since the ANOVA test shows that there are significant differences between user groups' responses, it is interesting to examine separately the perceptions of each group. Fundamental analysis ranks first in the perceptions of the official members of ASE (4.56), the mutual fund management companies (4.71), the portfolio investment companies (4.29) and the public companies

Table 5-5: Level of Importance Attached to Different Methods of all User Groups

	Item	OMOA (45)	Rank	MF (17)	Rank	PIC (17)	Rank	LC (47)	Rank	BR (85)	Rank	ININ (224)	Rank	Mean whole sample (435)	Rank	ANOVA Sign. level
1	Fundamental analysis	4.56	1	4.71	1	4.29	1	3.74	1	3.61	4	2.92	6	3.44	2	0.000***
2	Technical analysis	3.20	6	2.88	6	3.41	6	2.38	9	3.65	3	2.48	7	2.82	6	0.000***
3	Both Fundamental and Technical	3.62	3	3.76	2	4.06	3	2.83	5	3.51	5	2.12	8	2.76	7	0.000***
4	Noise in the market	2.31	9	2.18	9	1.94	9	2.48	8	2.64	8	2.99	5	2.72	8	0.000***
5	Portfolio analysis	3.16	7	3.18	5	2.94	7	2.53	7	2.48	9	1.80	9	2.25	9	0.000***
6	Newspapers / media	2.60	8	2.82	8	2.35	8	2.77	6	2.81	7	3.30	2	3.02	5	0.000***
7	Instinct / Experience	3.40	4	3.65	4	3.65	4	3.09	2	3.67	2	3.47	1	3.47	1	0.000***
8	Foreign markets	3.80	2	3.71	3	4.12	2	3.04	3	3.75	1	3.26	3	3.44	2	0.000***
9	Government policy	3.27	5	2.88	6	3.47	5	3.02	4	3.31	6	3.06	4	3.14	4	0.117
	Cronbach's Alpha test	0.72		0.73		-0.07		0.71		0.59		0.66		0.71		

(3.74), while it is ranked in fourth and sixth position for brokers and individual investors respectively.

Technical analysis ranks in sixth place for the first three groups but it is considered as an interesting approach for brokers, who rank it in third place. Portfolio analysis seems to be of some interest only to mutual fund management companies whose respondents rank it in fifth place, but with a mean value above the average (3.18). Our results seem to agree with previous research undertaken for developed stock markets (Carter and Van Auken, 1990; Frankel and Froot, 1986 and 1990; Grinyer, Russell and Walker, 1991; Taylor and Allen, 1992; Collison, Grinyer and Russell, 1996; Lui and Mole, 1998; Wong and Cheung, 1999) revealing that these groups of investors rely more on fundamental and technical analysis and less on portfolio analysis.

The results also reveal that despite the perception differences between groups, institutional investors are mainly interested more in fundamental than technical analysis while brokers and individual investors do not consider it as their first choice. Brokers specified technical analysis (3.65) as a priority, while media and newspapers (3.30) mostly influence individual investors. Noise in the market, is considered the least important factor, except for individual investors who rank it in fifth position. An interesting result for individual investors is that instinct/experience (3.47) strongly affects their investment practices, ranking in the first position followed by newspapers and the media (3.30).

Our results about individual investors come in direct contrast to previous research, which identifies other important factors influencing the forecasting and selection decisions of individual investors: dividends, rapid growth, investment for saving purposes, quick profits through trading, professional investment management, and long-term growth (Potter, 1971), earnings projection and historical data (Baker and Haslem, 1973), price and earnings volatility (Blume and Friend, 1978), fundamental or technical analysis (Lewellen, Lease and Schlarbaum, 1977).

The degree of agreement among the respondents of each group concerning their choice of the listed factors is quantified by performing the Cronbach's Alpha test. On the ranking of different approaches, the highest degree of agreement is achieved by mutual fund management companies (0.73), followed by official members of ASE (0.72), and by listed companies (0.71). Cronbach's Alpha test for the whole sample is relatively similar (0.71) to previously mentioned levels.

Table 5-6 shows the results both on average for all user groups and for each user group separately, for each of the three different time periods (before 1999, during 1999 and after 1999). Findings reveal that fundamental analysis, both fundamental and technical analysis, portfolio analysis, and foreign markets rank in first place for the third time period (after 1999). On the other hand, noise in the market, newspapers/media and instinct/experience rank in first place during the second time period (during 1999) when the crisis of Greek stock market appeared. This indicates that factors such as noise in the market, newspapers/media and instinct/experience can drive investors to wrong decisions. A significant finding is that noise in the market and newspapers/media rank last for the third time period, which means that investors realised that these factors led them to wrong decisions in the previous period. We came to the same conclusions when the use of these factors/methods is examined for each user group separately.

In general, it is revealed that noise in the market and information from newspapers/media were the most important sources of information for all groups during the second time period where the crisis occurred, but they rank them last in the third period. Fundamental analysis, both fundamental and technical analysis, portfolio analysis and foreign markets ranked first during the third period, which means that investors are becoming more sophisticated in their investment selection strategy.

Important findings were revealed when we developed a regression model where the dependent variable is the performance (P_t) of the strategy employed in the past by each respondent, while as independent variables are employed the factors previously examined, which are: fundamental analysis (FA), technical analysis (TA), both fundamental and technical analysis (FTA), noise in the market (NM), models for setting up portfolios (MP), newspapers/media (NPM), instinct/experience (IE), foreign markets (FM) and government policy (GP). Thus, the model is expressed as follows:

$$P_t = a + b\,FA_t + c\,TA_t + d\,FTA_t + e\,NM_t + f\,MP_t + g\,NPM_t + h\,IE_t + i\,FM_t + j\,GP + u_t \quad (5\text{-}1)$$

Where P_t is the level of performance of each respondent as compared to the movement of the CSPI.

FA_t is the degree to what respondents rely on as their investment strategy for the fundamental analysis

TA_t is the degree to what respondents rely on as their investment strategy for the technical analysis

FTA_t is the degree to what respondents rely on their investment strategy for both the fundamental and the technical analysis

NM_t is the degree to what respondents are affected by the noise in the market

MP_t is the degree to what respondents rely on as the models for setting up portfolios

NPM_t is the degree to what respondents rely on as the information coming from newspapers and media

IE_t is the degree to what respondents rely on as their instinct and experience

FM_t is the degree to what respondents are affected from the reactions of foreign markets

GP_t is the degree to which respondents rely upon the government policy

The reported results of the above model[3] are shown in table 5-7. The explanatory power of the model, as expressed from the reported R^2 is 42.3 per cent. The F statistic is 34.24, significant at the 1 per cent level. The negative coefficients of the noise in the market and the newspapers/media (significant at 1 per cent level) reveal that these factors should be more carefully treated from investors. More, the positive coefficients of fundamental analysis, technical analysis and models for setting up portfolios and the foreign markets play their positive roles. The fact that 42.3 per cent of the investors' performance can be explained by the independent variables included in this model suggests that these factors can drive it significantly.

Table 5-8 gives us an indication of the perceptions the five user groups have about the factors influencing the investment strategy of individual non-professional investors. On average, all user groups believe that newspapers/media (4.00) and noise in the market (3.96) are the two factors that drive the individual investors' strategy mostly. Comparing this result to what individual investors believe themselves, we realized that they have the same opinion with mean values near to the average response (3.96 and 3.90 respectively).

Additionally, portfolio analysis ranks last (1.52) among all user groups' perceptions, something that is consistent with what the individual investors believe (1.40). These low mean scores indicate that individual investors are far from the use of portfolio analysis. ANOVA test reveals that there are significant differences among the various user groups regarding their perceptions concerning

[3] Appendix X shows the detailed results of the regression

Table 5-6: Level of Importance Attached to Different Methods of all User Groups / for each of the Three Time Periods

Item		OMOA	Rank	Sign.	MF	Rank	Sign.	PIC	Rank	Sign.	LC	Rank	Sign.	BR	Rank	Sign.	ININ	Rank	Sign.	TOTAL	Rank
Fundamental analysis	<99	3.79	2	0.005***	3.64	2	0.005***	3.27	2	0.001***	2.59	2	0.204	3.09	2	0.000***	2.71	2	0.000***	2.92	2
	=99	3.51	3		3.07	3		3.09	3		2.55	3		2.33	3		2.24	3		2.50	3
	>99	4.29	1		4.35	1		4.29	1		3.04	1		3.44	1		3.20	1		3.43	1
	Total	3.89			3.75			3.67			2.73			2.95			2.72			2.94	
Technical analysis	<99	2.77	3	0.353	2.86	3	0.069*	3.09	3	0.035**	1.68	3	0.057*	2.74	3	0.000***	1.72	3	0.000***	2.09	3
	=99	2.95	2		3.61	1		4.00	1		2.04	2		3.24	2		2.56	2		2.75	2
	>99	3.18	1		3.12	2		3.41	2		2.25	1		3.73	1		2.72	1		2.95	1
	Total	2.98			3.18			3.49			1.99			3.24			2.33			2.60	
Both Fundamental and Technical	<99	3.05	3	0.346	3.07	2	0.164	3.00	3	0.110	1.80	3	0.126	2.78	2	0.000***	1.69	3	0.000***	2.13	3
	=99	3.08	2		2.85	3		3.18	2		2.00	2		2.65	3		1.93	2		2.25	2
	>99	3.42	1		3.47	1		3.71	1		2.32	1		3.50	1		2.64	1		2.92	1
	Total	3.20			3.16			3.36			2.04			2.97			2.09			2.44	
Noise in the market	<99	2.82	2	0.001***	2.79	2	0.014**	2.54	2	0.086*	1.89	3	0.026**	2.80	2	0.000***	2.75	2	0.000***	2.67	2
	=99	3.28	1		3.54	1		3.00	1		2.47	1		3.53	1		3.79	1		3.51	1
	>99	2.33	3		2.29	3		2.18	3		2.08	2		2.19	3		2.62	3		2.42	3
	Total	2.79			2.82			2.51			2.15			2.84			3.05			2.86	
Portfolio analysis	<99	2.46	2	0.244	2.14	3	0.291	1.91	3	0.017**	1.91	2	0.452	2.16	2	0.000***	1.68	2	0.003***	1.89	2
	=99	2.28	3		2.54	2		2.09	2		1.83	3		1.97	3		1.61	3		1.81	3
	>99	2.69	1		2.82	1		3.06	1		2.11	1		2.70	1		1.96	1		2.27	1
	Total	2.49			2.52			2.46			1.95			2.28			1.75			2.00	

Table 5-6: Level of Importance Attached to Different Methods of all User Groups / for each of the Three Time Periods, *continued*

Newspapers / media	<99	2.95	2	0.034	3.36	2	0.189	2.91	2	0.024**	2.17	3	0.215	2.97	2	0.000***	2.92	2	0.000***	2.86	2
	=99	3.26	1		3.54	1		3.00	1		2.57	1		3.52	1		3.85	1		3.55	1
	>99	2.62	3		2.76	3		2.18	3		2.32	2		2.50	3		2.82	3		2.66	3
	Total	2.93			3.18			2.62			2.35			3.00			3.19			3.02	
Instinct / Experience	<99	3.36	2	0.583	3.71	3	0.958	3.36	1	0.969	2.51	3	0.544	3.27	3	0.228	3.09	3	0.000***	3.11	3
	=99	3.51	1		3.77	2		3.36	1		2.76	1		3.39	2		3.54	1		3.42	1
	>99	3.24	3		3.82	1		3.29	3		2.76	1		3.53	1		3.34	2		3.32	2
	Total	3.37			3.77			3.33			2.68			3.40			3.32			3.29	
Foreign markets	<99	3.10	3	0.021**	3.14	2	0.119	3.27	2	0.000***	2.45	2	0.439	3.04	2	0.000***	2.88	2	0.000***	2.90	2
	=99	3.31	2		2.85	3		3.18	3		2.42	3		2.91	3		2.82	3		2.85	3
	>99	3.73	1		3.65	1		4.25	1		2.72	1		3.87	1		3.60	1		3.60	1
	Total	3.40			3.25			3.72			2.53			3.28			3.10			3.12	
Government policy	<99	3.18	1	0.788	3.50	1	0.607	3.55	2		2.47	2	0.667	2.18	3	0.000***	2.83	2	0.000***	2.86	2
	=99	3.13	2		3.46	2		3.91	1		2.40	3		3.10	2		2.74	3		2.86	2
	>99	3.02	3		3.12	3		3.47	3		2.64	1		3.43	1		3.57	1		3.36	1
	Total	3.11			3.34			3.61			2.50			3.11			3.05			3.03	

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

Table 5-7: Factors Affecting the Performance of Investors

Model (5-1): $P_t = a + b\,FA_t + c\,TA_t + d\,FTA_t + e\,NM_t + f\,MP_t + g\,NPM_t + h\,IE_t + i\,FM_t + j\,GP + u_t$

	const	FA	TA	FTA	NM	MP	NPM	IE	FM	GP	R^2	F	Sign.
Coef.	3.189	0.558	0.287	-0.017	-0.254	0.208	-0.238	-0.084	0.234	0.018	**0.423**	34.24	0.000***
t	(6.643)***	(6.947)***	(3.671)***	(-0.212)	(-3.064)***	(2.956)***	(-2.705)***	(-0.987)	(2.372)**	(0.206)			
Sign.	[0.000]	[0.000]	[0.000]	[0.830]	[0.002]	[0.003]	[0.007]	[0.327]	[0.018]	[0.837]			

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

Table 5-8: All User groups Perception about the Factors influencing the Investment Selection Strategies of Individual Investors

	Item	OMOA (45)	MF (17)	PIC (17)	LC (47)	BR (85)	ININ (224)	Mean whole sample (435)	Rank	ANOVA Sign. level
1	Fundamental analysis	2.20	2.19	1.88	2.00	2.28	2.29	2.23	7	0.100*
2	Technical analysis	2.76	2.94	2.53	2.26	2.18	2.31	2.36	6	0.000***
3	Both Fundamental and Technical analysis	2.24	2.18	2.06	2.04	2.18	2.01	2.08	8	0.481
4	Noise in the market	4.18	4.12	4.29	3.83	4.00	3.90	3.96	2	0.085*
5	Portfolio analysis	1.40	1.41	1.47	1.70	1.81	1.40	1.52	9	0.004***
6	Newspapers / media	4.09	3.94	3.94	3.94	4.13	3.96	4.00	1	0.897
7	Instinct / Experience	3.62	4.12	3.94	3.83	3.32	3.61	3.61	3	0.002***
8	Foreign markets	2.33	2.82	2.65	2.57	2.74	3.01	2.82	5	0.000***
9	Government policy	2.98	2.88	3.41	2.81	2.76	2.89	2.89	4	0.254
	Cronbach's Alpha test	0.69	0.55	0.61	0.39	0.74	0.58			

the level of usage of the technical analysis, portfolio analysis, instinct/experience and foreign markets from individual investors.

Cronbach's alpha test reveals that the user groups of brokers (0.74), official members of ASE (0.69), and portfolio investment companies (0.61) achieve the highest degree of agreement. Table 5-9 and figure 5.1 summarise what all other user groups think about ININ's practices and what ININ think for themselves.

Table 5-9: Other Groups' and Individual Investors Opinion about Individual Investors Strategy

Item	Other user groups	ININ
Fundamental analysis	2.23	2.72
Technical analysis	2.36	2.33
Both Fundamental and Technical	2.08	2.09
Noise in the market	3.96	3.05
Portfolio analysis	1.52	1.75
Newspapers / media	4.00	3.19
Instinct / Experience	3.61	3.32
Foreign markets	2.82	3.10
Government policy	2.89	3.05

Both consider newspapers/media, noise in the market and instinct/experience that affect ININ investment practices mostly; however, professional investors believe it to a higher degree.

5.3.3. Time Horizon of Investment Strategy

For stock price valuation and forecasting in the short-term, table (5-10) shows that on average, all user groups rank the technical analysis first (3.36), followed by fundamental analysis (2.84), the combination of both analysis (2.75), and portfolio analysis (2.18). ANOVA test reveals significant differences between the responses of various user groups for all four alternatives they had to answer.

Examining each group separately, official members of ASE (3.42), portfolio investment companies (3.59), brokers (3.67), and individual investors (3.36) consider technical analysis as the most important method for short term use, while mutual fund investment companies rank it second (3.35) after fundamental analysis (3.41). The listed companies rank technical analysis in last position (2.68). Portfolio analysis ranks last from the user groups and only listed companies consider it as the second most important. Cronbach's alpha test quantifies the degree of agreement among the responses of a group, revealing that listed companies (0.80), brokers (0.70) and official members of ASE (0.60) achieve the highest degree of agreement among their respondents.

Examining the user groups' perceptions for long-term horizon we find different results. As table 5-11 shows, on average, fundamental analysis ranks first (3.80), followed by the combination of fundamental and technical analysis (3.11). Technical analysis ranks in third place with a mean of (2.98), very near to that of portfolio analysis (2.95), which is still in last place, but is now greater than the average (2.5). The important findings here are that the combination of fundamental and technical analysis is considered the second most important approach while portfolio analysis achieves a mean of (2.95) which is above the average (2.5) and higher than that achieved in the short term (2.18). This directs us to conclude that, portfolio analysis plays a more important role for valuation and forecasting in the long-term. The ANOVA test reveals, again, significant differences between the groups and only portfolio analysis seems to reveal an agreement of perceptions between groups (0.074). Cronbach's alpha test reveals that listed companies (0.75), individual investors (0.70) and official members of ASE (0.61), show the highest degree of agreement among the respondents.

Table 5-10: Level of Usage Attached in Short-term of all User Groups

	Item	OMOA (45)	Rank	MF (17)	Rank	PIC (17)	Rank	LC (47)	Rank	BR (85)	Rank	ININ (224)	Rank	Mean whole sample (435)	Rank	ANOVA Sign. level
1	Fundamental analysis	3.18	3	3.41	1	3.35	3	2.85	1	2.69	3	2.75	2	2.84	2	0.001***
2	Technical analysis	3.42	1	3.35	2	3.59	1	2.68	4	3.67	1	3.36	1	3.36	1	0.000***
3	Both Fundamental and Technical	3.36	2	3.24	3	3.53	2	2.70	2	3.19	2	2.38	3	2.75	3	0.000***
4	Portfolio analysis	2.49	4	2.47	4	2.59	4	2.70	2	2.39	4	1.87	4	2.18	4	0.000***
	Cronbach's Alpha test	0.60		0.45		0.68		0.80		0.70		0.44				

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

Table 5-11: Level of Usage attached in Long-term of all User Groups

	Item	OMOA (45)	Rank	MF (17)	Rank	PIC (17)	Rank	LC (47)	Rank	BR (85)	Rank	ININ (224)	Rank	Mean whole sample (435)	Rank	ANOVA Sign. level
1	Fundamental analysis	4.36	1	4.41	1	4.24	1	3.53	1	4.00	1	3.58	1	3.80	1	0.000***
2	Technical analysis	2.82	4	2.88	3	2.82	4	2.38	4	3.28	3	3.04	2	2.98	3	0.000***
3	Both Fundamental and Technical	3.49	2	3.35	2	3.82	2	2.81	2	3.62	2	2.84	4	3.11	2	0.000***
4	Portfolio analysis	2.87	3	2.88	3	3.18	3	2.53	3	3.19	4	2.95	3	2.95	4	0.074*
	Cronbach's Alpha test	0.61		0.44		0.46		0.75		0.47		0.70				

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

In the examination of time horizon of investment strategies we conclude the following. First, technical analysis is used more often in the short-term probably because it gives better forecasting results than fundamental analysis, especially for the very short-term horizon of a few days up to a month, and of course this leads to better selection strategies. Second, fundamental analysis ranks first in the usage perceptions of all user groups in the long-term valuation and forecasting. This may occur for the following reasons: accounting manipulations may easily be applied to a single period, but in the long-term these manipulations are easily identified and the true condition of the company is exposed, long-term aggregated accounting ratios (e.g. ROI, ROCE) are a better indicator of the strategic position of a company, a group of companies (competitors) or the industry as a whole, the new established accounting (e.g. EVA®) and discounted cash flow (e.g. SVA, CVA) measures are mainly used for performance measurement (evaluation) of the implemented strategies, thus they are bound to cover the whole period of implementation and not only part of it, otherwise the reported results may lead to wrong conclusions and further actions.

Finally, the combination of fundamental and technical analysis seems to be more interesting in the long-term. This is obvious for fundamental analysis for the reasons stated above. The same applies for technical analysis probably because some of its techniques used (e.g. trend-following indicators, chart-pattern analysis) could give accurate forecasting results about the trend of the competitive position of a company or an industry. Similarly, portfolio analysis also earns more reputation in the long-term, but still ranks in last position.

Our results seem to agree with previous research. As we already stated, many scholars (for example, Campbell and Shiller, 1988; Fama and French, 1989; Shiller, 1989; Shleifer and Summers, 1990; Theodossiou, 1991; Bromwich, 1992) contributed to the fields of fundamental analysis, technical analysis, portfolio analysis and noise in the markets. Their results indicate that the extended use of fundamental or technical analysis depends on many factors. Investment professionals may have different practices in different markets and may use different techniques for market forecasting in different time horizons. For example, at shorter horizons, technical analysis is more frequently used than fundamental analysis while the opposite occurs when the time horizon tends to increase (Lui and Mole, 1998; Wong and Cheung, 1999).

5.3.4. Fundamental Analysis

Concerning the usage level of each user group of the various techniques/ratios of fundamental analysis, we separated them into three categories. The first category contains the most commonly used traditional accounting performance measures (NOPAT, EPS, ROI, ROE, P/E), the second contains the value-based performance measures (EVA®, MVA, SVA) while in the third category are the discounted cash flow techniques and measures (NPV, IRR, Payback method, DDM, CFROI, DCA, EP, EVM, CVA). Table 5-12 presents a summary of all those techniques/ratios.

Beginning with the accounting measures, all user groups on average rank P/E (3.65) as their first preference, EPS (3.01) as their second, NOPAT (2.90) as their third and ROE (2.40) as their fourth preference. From the market value-based measures in the usage ranking EVA® comes first (1.86), MVA second (1.75), which is very similar to EVA®, and SVA third (1.62) probably because of its computing difficulty. Finally, from the discounted cash-flow measures, DDM comes first (2.29), NPV second (2.13), CFROI third (2.00), and IRR fourth (1.94), more or less the most known measures of this group. Looking at the three groups of measures, we notice that accounting measures are preferred by all user groups, having the highest mean values. Then the discounted cash-flow measures follow, with the relatively new market value-based measures taking third place with the lowest mean values.

Table 5-12: Level of Usage Attached to Different Techniques of Fundamental Analysis for all User Groups

Traditional Accounting Performance Measures	OMOA	Rank	MF	Rank	PIC	Rank	LC	Rank	BR	Rank	ININ	Rank	TOTAL	Rank
NOPAT	3.53	3	3.20	5	2.50	5	2.74	5	2.67	3	2.92	2	2.90	3
EPS	3.98	2	4.32	2	3.85	2	3.05	2	2.73	2	2.79	3	3.01	2
ROI	3.29	5	3.22	4	2.92	4	2.94	3	2.27	5	1.95	4	2.33	5
ROE	3.53	3	3.96	3	3.35	3	2.93	4	2.36	4	1.93	5	2.40	4
P/E	4.27	1	4.43	1	4.15	1	3.56	1	3.48	1	3.53	1	3.65	1
Value-Based Performance Measures														
EVA	3.21	1	2.77	1	3.12	1	2.27	1	1.94	1	1.36	2	1.86	1
SVA	2.36	3	2.06	3	2.20	3	1.73	3	1.78	3	1.32	3	1.62	3
MVA	2.54	2	2.54	2	2.65	2	1.84	2	1.88	2	1.43	1	1.75	2
Discounted Cash Flow techniques and measures														
NPV	3.30	1	2.90	2	2.82	2	2.52	2	2.40	1	1.64	3	2.13	2
IRR	3.04	3	2.22	4	2.67	3	2.73	1	1.96	5	1.50	5	1.94	4
Payback	2.46	5	1.88	8	1.82	9	2.39	3	1.89	7	1.54	4	1.81	5
DDM	3.27	2	3.49	1	3.62	1	2.05	5	2.34	2	1.98	1	2.29	1
CFROI	2.48	4	2.43	3	2.67	3	1.92	6	2.23	3	1.76	2	2.00	3
DCA	2.41	8	2.12	5	2.42	5	1.57	9	1.76	9	1.25	9	1.57	9
EP	2.45	6	2.08	6	1.85	8	2.14	4	1.98	4	1.33	6	1.70	6
EVM	2.35	9	1.96	7	1.95	7	1.69	7	1.92	6	1.31	8	1.62	7
CVA	2.44	7	1.84	9	2.40	6	1.64	8	1.77	8	1.32	7	1.61	8

These results are quite logical and do not diverge from theory and previous research findings (e.g. Hayes and Garvin, 1982; Sangster, 1993; Sandahl and Sjögren, 2003). Although theory proposes the use of the new market value-based performance measures, research findings are still contradictory in the sense that the majority of research proves the superiority of traditional accounting measures in explaining the expected return (or excess return) of the stocks in any developed stock market (Palepu, Bernard, and Healy 1996; Biddle, Bowen and Wallace, 1997; Holms and Sugden, 1999; Chen and Dodd, 2001).

Tables 5-13, 5-14, and 5-15 provide analytical results for the level of usage of traditional accounting performance measures, value-based performance measures and capital budgeting techniques during the three different periods. Table 5-13 shows that, on average, for all user groups, net operating profit after taxes (3.27), earnings per share (3.48), return on investment (3.03) and return on equity (3.11), are the most used indicators in the third period, while P/E ratio (3.87) seems to be most popular in the second time period. Not surprisingly, all traditional accounting performance measures rank in last place during the second period, except P/E ratio. This means investors were not focused on fundamental analysis during the year 1999 and P/E ratio only was of interest. Since the ANOVA test reveals significant differences between groups, we demonstrate the use of each measure for each user group separately.

NOPAT, for all user groups, ranks in first place for the third time period and in last place during the second period, except for the listed companies, which rank it in third place in the first period and first in the third period. EPS ranks in first place in the third period, except for portfolio investment companies, which rank it in second place for this time period, but regard it as the best choice in the first time period. ROI and ROE rank in first place for all groups, in the third period, while they are not used so much in the second period. P/E ratio seems to be popular in the second time period for the groups of mutual fund management companies (4.50) and individual investors (4.04) while it ranks first for the use of all other user groups.

As a conclusion, we can argue that all traditional accounting measures are used mostly during the third period (after the year 1999), while there were not so popular in the first and second time periods, with the exception of the P/E ratio. Moreover, the high values of the means achieved by the official members of ASE, mutual fund management companies, and portfolio investment companies, compared to the low means achieved by the rest of the user groups, reveal to us that those measures are more popular among institutional investors than individual investors and brokers. Finally, Table (5-13), shows that, on average, when taking all periods as one and for all user groups, P/E ratio (3.65), EPS (3.01), and NOPAT (2.90) rank in the first three places, while ROE (2.40), and ROI (2.33) ranks in fourth and fifth place with means below the average. The superiority of EPS as compared to ROI and ROE, and the superiority of EVA® as compared to SVA are consistent with our findings reported in chapter four.

Respondents were asked to determine the level of usage they attached to different modern value-based measures during the three separate periods. Table 5-14 shows that on average, for all user groups, EVA® (2.32), SVA (1.91) and MVA (2.16) as compared to all three periods, are mostly used in the third period, with EVA® taking the first place. On the other hand, all modern value-based measures rank in last place during the second period with relatively low means. ANOVA test reveals significant differences between groups in the way they consider those measures.

EVA® is the most preferred measure for all groups in the third time period, while official members of the ASE, listed companies, brokers and individual investors rank it in the third place during the second period. Mutual fund management companies and portfolio investment companies seem to use it more in the second period. MVA reveals almost similar results. SVA demonstrates low means revealing the low usage of this measure. However, mutual fund management companies, portfolio investment companies, listed companies and individual investors rank it first in the third period, which means that its usage increases period after period among those groups.

In general, we can argue that modern value-based performance measures are mostly used in the third time period, while they were not so popular in the second time period. Moreover, the fact that official members of the ASE, mutual fund management companies and portfolio investment companies, achieved higher means than those achieved by the rest of the user groups, reveals that modern value-based measures are more popular among institutional investors than public companies, brokers, and individual investors.

Finally, table 5-14 shows that on average, considering all periods as one and for all user groups, EVA® (1.86) ranks first followed by MVA (1.75). SVA (1.62) ranks in third place. Examining each user group separately, we find the same ranking and only individual investors show a preference for MVA. After all, the overall low means achieved reveal the limited use of those measures.

It is of interest to compare the usage of traditional accounting measures to modern value-based measures. Table 5-16 shows the degree of usage of all performance measures under examination during the three examination periods. There is a decline usage for all measures in the second period, which can be considered as an argument for the unorthodox performance of the stock market in that period. Not surprisingly, there is an increase of use of all measures in the last period. That means that investors turned to fundamental analysis after the crisis in year 1999 (second time period). Only P/E does not follow this trend, showing a higher use in the second period. Considering the three periods as one, we show the degree of usage of each performance measure.

Table 5-17 shows, on average, that all traditional accounting measures rank higher than modern value-based measures, with P/E ratio (3.65) followed by EPS (3.01) taking the first two places. EVA® (1.86), MVA (1.75) and SVA (1.62) rank in the three last places. The finding that EPS (3.01) is higher than EVA®

(1.86), among others, is consistent with our findings presented in chapter four when we compared those measures using different examination approaches. Moreover, the result that EPS (3.01) is higher than ROI (2.33) and ROE (2.40) is also consistent to our findings in chapter four where we found that EPS outperformed all other traditional performance measures.

Examining each user group separately, we find almost the same results. Only portfolio investment companies rank EVA® (3.12) in the fourth place and NOPAT (2.50) in the seventh place. This can be considered as an argument that portfolio investment companies consider the economic value added as an important measure for the valuation of stocks consistent to EVA® proponents (Stewart, 1991; 1999).

Table 5-13: All User Groups' Use of the Traditional Accounting-Based Performance Measures. All survey periods

Item		OMOA	Rank	Sign.	MF	Rank	Sign.	PIC	Rank	Sign.	LC	Rank	Sign.	BR	Rank	Sign.	ININ	Rank	Sign.	TOTAL	Rank	Sign.
NOPAT	<99	3.47	2	0.059*	3.12	2	0.788	2.17	2	0.028**	2.55	3	0.131	2.71	2	0.001***	2.74	2	0.000***	2.78	2	0.000***
	=99	3.20	3		3.06	3		1.92	3		2.57	2		2.33	3		2.72	3		2.66	3	
	>99	3.87	1		3.41	1		3.18	1		3.08	1		2.97	1		3.30	1		3.27	1	
	Total	3.53			3.20			2.50			2.74			2.67			2.92			2.90		
EPS	<99	4.10	2	0.189	4.31	2	0.584	4.08	1	0.163	2.83	3	0.129	2.58	2	0.000***	2.43	3	0.000***	2.77	2	0.000***
	=99	3.72	3		4.19	3		3.33	3		2.91	2		2.43	3		2.58	2		2.77	2	
	>99	4.11	1		4.47	1		4.06	2		3.40	1		3.18	1		3.37	1		3.48	1	
	Total	3.98			4.32			3.85			3.05			2.73			2.79			3.01		
ROI	<99	3.20	2	0.073*	2.93	3	0.508	2.91	2	0.097*	2.77	2	0.026**	2.02	2	0.000***	1.49	3	0.000***	1.99	2	0.000***
	=99	3.00	3		3.18	2		2.33	3		2.64	3		1.88	3		1.52	2		1.94	3	
	>99	3.62	1		3.53	1		3.37	1		3.42	1		2.89	1		2.82	1		3.03	1	
	Total	3.29			3.22			2.92			2.94			2.27			1.95			2.33		
ROE	<99	3.51	2	0.050**	3.81	3	0.623	3.33	2	0.042**	2.66	2	0.004***	2.14	2	0.000***	1.51	2	0.000***	2.09	2	0.000***
	=99	3.20	3		3.87	2		2.75	3		2.59	3		1.96	3		1.48	3		1.98	3	
	>99	3.84	1		4.17	1		3.81	1		3.53	1		2.98	1		2.80	1		3.11	1	
	Total	3.53			3.96			3.35			2.93			2.36			1.93			2.40		
P/E	<99	4.31	2	0.155	4.37	3	0.881	4.00	2	0.098*	3.39	3	0.224	3.32	3	0.268	2.96	3	0.000***	3.29	3	0.000***
	=99	4.05	3		4.50	1		3.83	3		3.42	2		3.50	2		4.04	1		3.87	1	
	>99	4.44	1		4.42	2		4.50	1		3.85	1		3.62	1		3.58	2		3.77	2	
	Total	4.27			4.43			4.15			3.56			3.48			3.53			3.65		

OMOA : Official Members Of ASE, MF : Mutual Fund management companies, PIC : Portfolio Investment Companies, LC : Listed Companies, BR : Brokers, ININ : Individual Investors.

NOPAT: Net Operating Profit After Taxes; EPS: Earnings Per Share; ROI: Return On Investment; ROE: Return On Equity; P/E: Price Earnings ratio

Mean values scoring : 1=not at all; 5=always.

Table 5-14: All User Groups' Use of Value-Based Performance Measures. All survey periods

Item		OMOA	Rank	Sig.	MF	Rank	Sig.	PIC	Rank	Sig.	LC	Rank	Sig.	BR	Rank	Sig.	ININ	Rank	Sig.	TOTAL	Rank	Sig.
EVA	<99	2.97	2	0.014**	2.37	3	0.160	2.33	3	0.010***	2.15	2	0.162	1.63	2	0.000***	1.22	2	0.000***	1.65	2	0.000***
	=99	2.90	3		2.53	2		2.87	2		2.06	3		1.55	3		1.18	3		1.61	3	
	>99	3.69	**1**		3.35	**1**		3.81	**1**		2.60	**1**		2.61	**1**		1.69	**1**		2.32	**1**	
	Total	3.21			2.77			3.12			2.27			1.94			1.36			1.86		
SVA	<99	2.82	1	0.420	1.87	3	0.504	1.55	**3**	0.011***	1.59	3	0.127	1.63	1	0.000***	1.21	2	0.000***	1.47	2	0.000***
	=99	2.22	3		1.93	2		1.73	2		1.60	2		1.55	2		1.21	2		1.46	3	
	>99	2.55	**2**		2.35	**1**		3.00	1		2.00	**1**		1.16	**3**		1.55	**1**		1.91	**1**	
	Total	2.36			2.06			2.20			1.73			1.78			1.32			1.62		
MVA	<99	2.46	2	0.294	2.31	2	0.089*	2.67	2	0.060**	1.68	3	0.103	1.67	2	0.000***	1.26	2	0.000***	1.58	2	0.000***
	=99	2.35	3		2.13	3		2.07	3		1.70	2		1.52	3		1.25	3		1.51	3	
	>99	2.78	**1**		3.12	**1**		3.18	**1**		2.15	**1**		2.46	**1**		1.78	**1**		2.16	**1**	
	Total	2.54			2.54			2.65			1.84			1.88			1.43			1.75		

OMOA : Official Members Of ASE, MF : Mutual Fund management companies, PIC : Portfolio Investment Companies, LC : Listed Companies, BR : Brokers, ININ : Individual Investors.
EVA: Economic Value Added; SVA: Shareholder value Added; MVA: Market Value Added.
Mean values scoring: 1=not at all; 5=always.

Table 5-15: All user groups' use of capital budgeting methods. All survey periods.

Item		OMOA	Rank	Sig.	MF	Rank	Sig.	PIC	Rank	Sig.	LC	Rank	Sig.	BR	Rank	Sig.	ININ	Rank	Sig.	TOTAL	Rank	Sig.
NPV	<99	3.23	2	0.091*	2.69	3	0.733	2.58	2	0.168	2.47	2	0.328	2.29	2	0.000***	1.49	2	0.000***	1.99	2	0.000***
	=99	3.00	3		2.87	2		2.33	3		2.32	3		1.93	3		1.39	3		1.83	3	
	>99	3.62	1		3.12	1		3.37	1		2.77	1		2.96	1		2.04	1		2.56	1	
	Total	3.30			2.90			2.82			2.52			2.40			1.64			2.13		
IRR	<99	3.00	2	0.518	2.31	1	0.843	2.42	2	0.155	2.64	2	0.135	1.79	2	0.000***	1.39	2	0.000***	1.82	2	0.000***
	=99	2.87	3		2.06	3		2.25	3		2.47	3		1.74	3		1.32	3		1.73	3	
	>99	3.22	1		2.29	2		3.19	1		3.08	1		2.35	1		1.79	1		2.26	1	
	Total	3.04			2.22			2.67			2.73			1.96			1.50			1.94		

Table 5-15: All user groups' use of capital budgeting methods. All survey periods, *continued*

Payback	<99	2.56 2 0.372	1.87 2 1.000	1.58 2 0.244	2.40 2 0.739	1.77 2 0.000***	1.48 2 0.000**	1.76 2 0.000***
	=99	2.22 3	1.87 2	1.58 2	2.25 3	1.61 3	1.34 3	1.60 3
	>99	2.58 1	1.88 1	2.19 1	2.51 1	2.28 1	1.79 1	2.06 1
	Total	2.46	1.88	1.82	2.39	1.89	1.54	1.81
DDM	<99	3.23 2 0.150	3.62 1 0.872	3.67 2 0.090*	1.94 2 0.425	2.25 2 0.001***	1.63 3 0.000**	2.07 3 0.000***
	=99	3.02 3	3.44 2	3.08 3	1.94 2	2.07 3	1.88 2	2.12 2
	>99	3.53 1	3.41 3	4.00 1	2.28 1	2.71 1	2.43 1	2.67 1
	Total	3.27	3.49	3.62	2.05	2.34	1.98	2.29
CFROI	<99	2.61 2 0.025**	2.23 3 0.623	2.67 2 0.055	1.85 2 0.260	2.07 2 0.000***	1.39 3 0.000**	1.76 3 0.000***
	=99	2.05 3	2.31 2	2.00 3	1.74 3	1.87 3	1.65 2	1.77 2
	>99	2.73 1	2.71 1	3.18 1	2.17 1	2.76 1	2.26 1	2.45 1
	Total	2.48	2.43	2.67	1.92	2.23	1.76	2.00
DCA	<99	2.59 1 0.220	2.31 1 0.791	2.33 2 0.322	1.57 2 0.610	1.61 2 0.003***	1.20 2 0.041**	1.52 2 0.000***
	=99	2.10 3	2.00 3	2.08 3	1.45 3	1.58 3	1.20 2	1.44 3
	>99	2.53 2	2.06 2	2.75 1	1.68 1	2.09 1	1.34 1	1.73 1
	Total	2.41	2.12	2.42	1.57	1.76	1.25	1.57
EP	<99	2.56 1 0.519	2.00 2 0.551	1.83 2 0.266	2.17 2 0.842	1.83 2 0.008***	1.28 2 0.158	1.65 2 0.000***
	=99	2.25 3	1.87 3	1.42 3	2.04 3	1.78 3	1.28 2	1.58 3
	>99	2.53 2	2.35 1	2.19 1	2.21 1	2.33 1	1.41 1	1.86 1
	Total	2.45	2.08	1.85	2.14	1.98	1.33	1.70
EVM	<99	2.30 3 0.275	1.81 3 0.851	1.58 2 0.001***	1.68 2 0.865	1.79 3 0.089*	1.28 2 0.033	1.55 2 0.000***
	=99	2.12 2	1.94 2	1.17 3	1.63 3	1.81 2	1.23 3	1.50 3
	>99	2.60 1	2.12 1	2.81 1	1.77 1	2.16 1	1.43 1	1.81 1
	Total	2.35	1.96	1.95	1.69	1.92	1.31	1.62
CVA	<99	2.41 2 0.584	1.81 2 0.724	2.42 2 0.202	1.62 2 0.816	1.77 2 0.030***	1.24 3 0.033**	1.55 2 0.000***
	=99	2.30 3	1.69 3	1.92 3	1.57 3	1.55 3	1.28 2	1.50 3
	>99	2.60 1	2.00 1	2.75 1	1.72 1	1.98 1	1.44 1	1.76 1
	Total	2.44	1.84	2.40	1.64	1.77	1.32	1.61

OMOA : Official Members Of ASE, MF : Mutual Fund management companies, PIC : Portfolio Investment Companies, LC : Listed Companies, BR : Brokers, ININ : Individual Investors.
NPV: Net Present Value, IRR: Internal Rate of return, Payback, DDM: Discounted Dividend Model, CFROI: Cash Floe Return On Investment, DCA: Discounted Cash analysis, Economic Profit, Economic Value Management, CVA: Cash Value Added. Mean values scoring : 1=not at all; 5=always.

Table 5-16: Use of all Measures, through all Periods
All User Groups

All measures - All periods			
Item	<99	=99	>99
NOPAT	2.78	2.66	3.27
EPS	2.77	2.77	3.48
ROI	1.99	1.94	3.03
ROE	2.09	1.98	3.11
P/E	3.29	3.87	3.77
EVA	1.65	1.61	2.32
SVA	1.47	1.46	1.91
MVA	1.58	1.51	2.16

Table 5-17: All User Groups' Use of all Measures. All Survey Periods as One

Item	OMOA	Rank	MF	Rank	PIC	Rank	LC	Rank	BR	Rank	ININ	Rank	TOTAL	Rank
NOPAT	3.53	3	3.20	5	2.50	7	2.74	5	2.67	3	2.92	2	2.90	3
EPS	3.98	2	4.32	2	3.85	2	3.05	2	2.73	2	2.79	3	3.01	2
ROI	3.29	5	3.22	4	2.92	5	2.94	3	2.27	5	1.95	4	2.33	5
ROE	3.53	3	3.96	3	3.35	3	2.93	4	2.36	4	1.93	5	2.40	4
P/E	4.27	**1**	4.43	**1**	4.15	**1**	3.56	**1**	3.48	**1**	3.53	**1**	3.65	**1**
EVA	3.21	6	2.77	6	3.12	4	2.27	7	1.94	6	1.36	7	1.86	**6**
SVA	2.36	8	2.06	8	2.20	8	1.73	8	1.78	8	1.32	8	1.62	**8**
MVA	2.54	7	2.54	7	2.65	6	1.84	7	1.88	7	1.43	6	1.75	**7**

Table 5-18: Level of Usage Attached to Different Techniques of Technical Analysis for all User Groups

	OMOA	Rank	MF	Rank	PIC	Rank	LC	Rank	BR	Rank	ININ	Rank	Total	Rank
Chart analysis	3.24	1	2.82	2	3.38	1	1.81	2	3.68	2	2.25	2	2.65	2
Technical indicators	3.00	2	3.29	1	3.19	2	1.68	1	3.76	1	2.42	1	2.72	1
Moving Averages	3.13	1	3.29	1	3.38	1	1.83	2	3.83	2	2.54	2	2.83	**2**
RSI	2.91	2	3.12	2	3.13	2	1.66	3	3.51	3	2.42	3	2.65	**3**
Bollinger bands	1.98	7	2.76	4	2.50	6	1.57	4	2.80	5	1.83	5	2.07	5
MACD	2.80	3	2.94	3	2.88	3	1.85	1	3.90	1	2.69	1	2.86	**1**
Momentum	2.53	4	2.24	5	2.69	5	1.55	6	2.96	4	2.08	4	2.27	4
OBV	2.09	6	1.94	7	1.88	7	1.47	7	2.23	7	1.70	6	1.83	**7**
Parabolic	1.87	8	1.82	8	1.69	8	1.45	8	1.99	8	1.58	7	1.69	**8**
Stochastic oscillator	2.47	5	2.06	6	2.88	3	1.57	5	2.69	6	1.57	8	1.95	**6**

Respondents were also asked to determine their perceptions regarding the level of usage they attached to different capital budgeting techniques during the three different time periods. Table 5-15 shows that on average, for all user groups, DDM (2.67), NPV (2.56), CFROI (2.45), IRR (2.26), Payback (2.06), EP (1.86), EVM (1.81), CVA (1.76), DCA (1.73), are most used in the third period, with DDM being in first place. Consistent to the results concerning the traditional performance measures and the value based ones, all capital budgeting techniques rank in last place of use during the second period, except DDM and CFROI which are placed second, with mean values similar to those of the first period. This result makes the argument stronger that during the year 1999 investors did not pay much attention to fundamental analysis and capital budgeting techniques, looking for short term speculative yields, coming, mainly, from the so called "bubble" companies. Findings for the use of each capital budgeting technique, shows that NPV, Payback, CFROI, EVM and CVA rank in first place during the third period, for all user groups, with mean values higher than the previous periods.

Examining each user group separately, we find out that the use of capital budgeting techniques is higher in the third period and generally lower in the second period. Moreover, official members of ASE, mutual fund management companies portfolio investment companies and public companies with their higher means, reveal a higher use of those techniques compared to that of brokers and individual investors.

Table 5-15 shows that on average, taking all periods as one and for all user groups, DDM (2.29) ranks first followed by NPV (2.13), and IRR (1.94). CVA (1.61) and DCA (1.57) rank in last places. Examining each user group separately, we find that official members of ASE prefer the use of NPV, DDM and IRR. Mutual fund management companies and portfolio investment companies seem to implement nearly the same strategy, preferring more DDM, NPV, CFROI, and IRR than the other techniques. As was expected, public companies rank higher IRR, NPV and Payback while they rank last DCA and CVA, perhaps because they do not even know these techniques. Finally, brokers and individual investors seem to prefer NPV, DDM, and CFROI, while they rank DCA in last place.

Thus, we can conclude that institutional investors mostly use NPV, DDM, IRR, and CFROI with mean values above the average. The exceptions are CFROI (2.48) for the official members of the ASE and IRR (2.22) for the mutual funds management companies. Moreover, brokers and individual investors, with low means in all cases, reveal a minor use of all capital budgeting techniques.

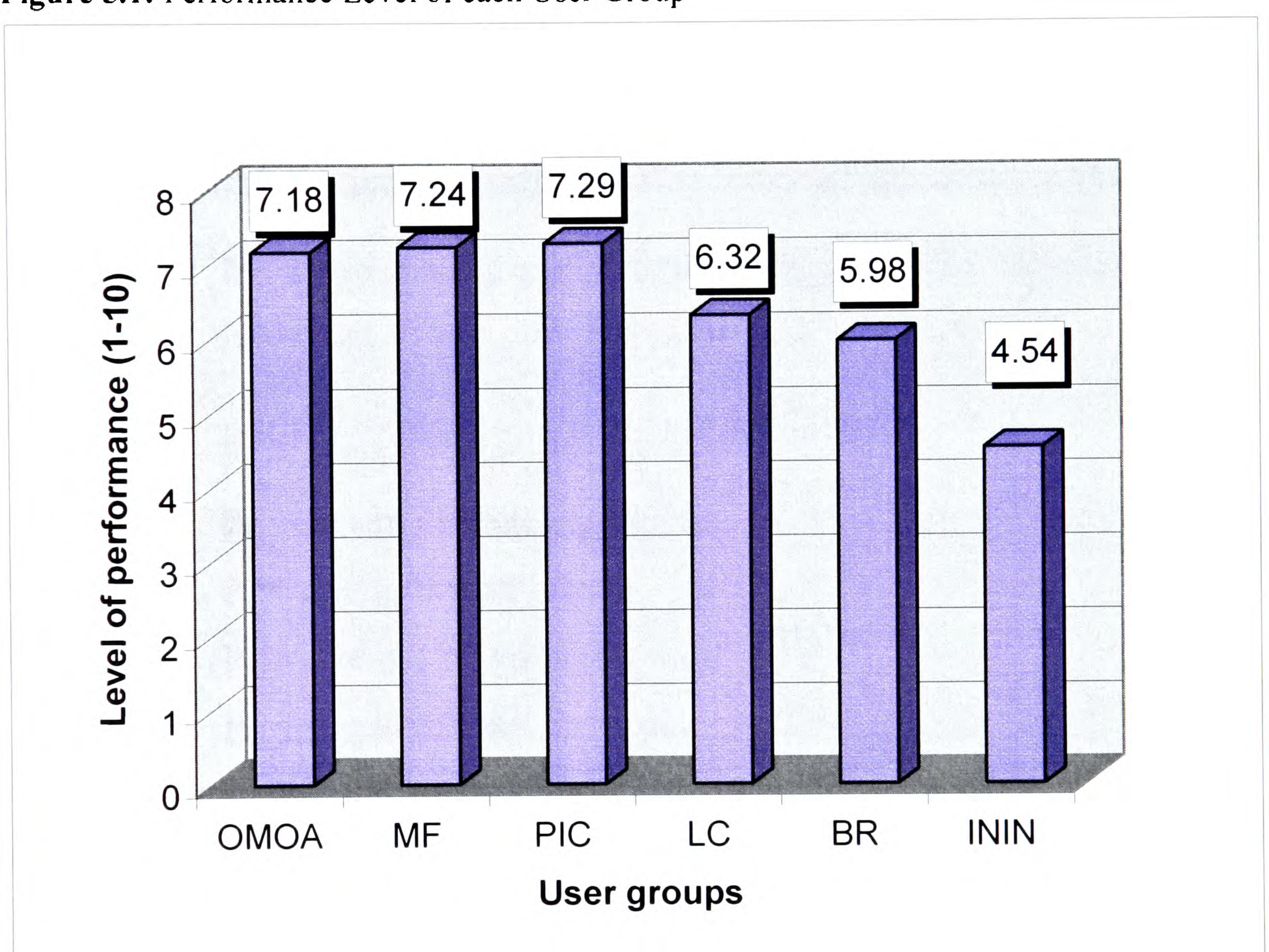
5.3.5. Technical Analysis

Since technical analysis plays an important role in the stock valuation we asked the respondents to indicate their level of usage for chart analysis and technical indicators, and to indicate the most used technical indicators. Table 5-18 presents a summary of the responses.

All user groups, on average, rank first in their preference the use of the technical indicators (2.72) and second the chart analysis (2.65). However, the mean values of both techniques are so close that we could conclude that all groups use both techniques interchangeably. More specifically, official members of ASE and portfolio investment companies mostly use chart analysis, while all other groups prefer the technical indicators. From the technical indicators, those that are used more often are MACD, moving average, RSI, and momentum, all indicating trends. These results are also similar and agree with previous research findings (Wong and Cheung, 1999).

Finally, we examined the level of performance of each user group, asking respondents to valuate their performance indicating their opinion on a ten point Likert (1932) scale in terms of 'unsuccessful' to 'successful'. Figure 5-5 shows that, portfolio investment companies (7.29) and mutual fund management companies (7.24) perform best, followed by official members of the ASE (7.18). Public companies performance (6.32), ranks in fourth place followed by brokers (5.94). Individual investors (4.54) are placed last with a mean value lower than the average.

Figure 5.1: Performance Level of each User Group



These results show that the implemented strategy of portfolio investment companies, mutual fund management companies, and official members of ASE were the most successful, while the strategy of individual investors, based mainly on noise in the market, information of media and low use of fundamental analysis, led to the lower performance.

5.4. Use of Performance Measures/Techniques for Strategy Evaluation

To reveal the dynamics of the traditional accounting performance measures, the value-based performance measures and the capital budgeting techniques, we asked respondents to indicate *to what degree they use the above measures/techniques for the evaluation of the companies' implemented and proposed (future) strategies*. To investigate it we developed six equations associating the revealed performance to the use of the traditional accounting performance measures, or the value based performance measures or the capital budgeting techniques for the evaluation of the implemented or future strategies. As a dependent variable we employed the reported performance of the respondents, while as independent variables we used the answers given for the evaluation of the implemented and future strategies. The equations are the following:

$$P_t = a_0 + a_1\,\text{IMPstr\_tapm}_t + u_2 \qquad (5\text{-}2)$$

$$P_t = b_0 + b_1\,\text{FUTstr\_tapm}_t + u_3 \qquad (5\text{-}3)$$

$$P_t = c_0 + c_1\,\text{IMPstr\_vbpm}_t + u_4 \qquad (5\text{-}4)$$

$$P_t = d_0 + d_1\,\text{FUTstr\_tapm}_t + u_5 \qquad (5\text{-}5)$$

$$P_t = e_0 + e_1\,\text{IMPstr\_cbt}_t + u_6 \qquad (5\text{-}6)$$

$$P_t = f_0 + f_1\,\text{FUTstr\_cbt}_t + u_7 \qquad (5\text{-}7)$$

Where

P_t is the dependent variable revealing the investors' performance

IMPstr_tapm_t is the independent variable concerning the use of the traditional accounting performance measures (tapm) for the evaluation of the companies' implemented strategies

FUTstr_tapm_t is the independent variable concerning the use of the traditional accounting performance measures (tapm) for the evaluation of the companies' future strategies

$IMPstr\_vbpm_t$ is the independent variable concerning the use of the value based performance measures (vbpm) for the evaluation of the companies' implemented strategies

$FUTstr\_tapm_t$ is the independent variable concerning the use of the value based performance measures (vbpm) for the evaluation of the companies' future strategies

$IMPstr\_cbt_t$ is the independent variable concerning the use of the capital budgeting techniques (cbt) for the evaluation of the companies' implemented strategies

$FUTstr\_cbt_t$ is the independent variable concerning the use of the capital budgeting techniques (cbt) for the evaluation of the companies' future strategies

Results from the regression of equations (5-2) to (5-7) are shown in table (5-19)[4], panels A, B and C.

Table 5-19: Regressions of Performance to Implemented and Future Strategies

Panel A

Regression model (5-2) : $P_t = a_0 + a_1\,IMPstr\_tapm_t + u_2$

Regression model (5-3) : $P_t = b_0 + b_1\,FUTstr\_tapm_t + u_3$

Regression model		a_0	a_1	b_0	b_1	R^2	F
	Coef.	2.991	0.766			**0.176**	
(5-2)	t	(10.965)***	(9.610)***				(92.359)***
	Sign.	[0.000]	[0.000]				[0.000]
	Coef.			3.454	0.628	**0.128**	
(5-3)	t			(12.842)***	(7.974)***		(63.578)***
	Sign.			[0.000]	[0.000]		[0.000]

Panel B

Regression model (5-4) : $P_t = c_0 + c_1\,IMPstr\_vbpm_t + u_4$

Regression model (5-5) : $P_t = d_0 + d_1\,FUTstr\_tapm_t + u_5$

Regression model		c_0	c_1	d_0	d_1	R^2	F
	Coef.	3.889	0.757			**0.264**	
(5-4)	t	(25.906)***	(12.433)***				(154.582)***
	Sign.	[0.000]	[0.000]				[0.000]
	Coef.			3.909	0.733	**0.260**	
(5-5)	t			(26.073)***	(12.310)***		(151.534)***
	Sign.			[0.000]	[0.000]		[0.000]

[4] Appendix X shows the detailed results of the regressions

Panel C

Regression model (5-6) : $P_t = e_0 + e_1\ IMPstr\_cbt_t + u_6$

Regression model (5-7) : $P_t = f_0 + f_1\ FUTstr\_cbt_t + u_7$

Regression model		e_0	e_1	f_0	f_1	R^2	F
	Coef.	3.545	0.820			**0.284**	
(5-6)	t	(21.215)***	(13.076)***				(170.976)***
	Sign.	[0.000]	[0.000]				[0.000]
	Coef.			3.519	0.820	**0.286**	
(5-7)	t			(20.930)***	(13.147)***		(172.850)***
	Sign.			[0.000]	[0.000]		[0.000]

All regression models (5-2) to (5-7) are significant at 1 per cent with significantly high F values. The coefficients are all positive, thus, we can discuss the variations of R^2 in explaining investors' performance. Models (5-2) and (5-3) reveal that although traditional accounting performance measures are accepted as important performance measures, their use declines regarding the evaluation of companies' future strategies. The fact that R^2 decreases from 0.176 to 0.128 confirms our suggestion. On the other hand, both value based performance measures, (5-4) and (5-5), and capital budgeting techniques, (5-6) and (5-7), reported higher R^2 both for the evaluation of implemented strategies and for the future strategies.

Value-based performance measures vary from 0.264 to 0.260 while capital budgeting techniques vary from 0.284 to 0.286. These results are consistent to the theory where: (a) value based performance measures are important and of increasing interest and use, and (b) capital budgeting techniques are substantial tools for strategy evaluation. Thus, we can conclude that value based performance measures and capital budgeting techniques should be considered by investors as significant tools for strategy evaluation and consequently for stock valuation. As we know from the theory the strategy evaluation results directly affect the companies and investors' decision and thus the price of the companies' share (Rappaport, 1984).

5.4.1. The Dynamics of EPS and EVA®

Results in chapter four provided evidence that EPS (0.019) outperforms EVA® (0.009) in explaining stock returns. Moreover, the combination of EPS and EVA® in a model increases the power in explaining stock returns to that of 7.2 per cent. This low explanatory power led us to explore through this questionnaire survey the dynamics of these two performance measures and the intrinsic force they probably convey. Thus, we developed the following equations:

$$P_t = j_0 + j_1 EPS_{<99} + u_{<99} \quad (5\text{-}8)$$

$$P_t = k_0 + k_1 EPS_{=99} + u_{=99} \quad (5\text{-}9)$$

$$P_t = l_0 + l_1 EPS_{>99} + u_{>99} \quad (5\text{-}10)$$

$$P_t = m_0 + m_1 EVA_{<99} + ue_{<99} \quad (5\text{-}11)$$

$$P_t = n_0 + n_1 EVA{=}_{99} + ue_{=99} \quad (5\text{-}12)$$

$$P_t = o_0 + o_1 EVA_{>99} + ue_{>99} \quad (5\text{-}13)$$

$$P_t = p_0 + p_1 EPS_{<99} + p_2 EVA_{<99} + uee_{<99} \quad (5\text{-}14)$$

$$P_t = q_0 + q_1 EPS_{=99} + q_2 EVA_{=99} + uee_{=99} \quad (5\text{-}15)$$

$$P_t = r_0 + r_1 EPS_{>99} + r_2 EVA_{>99} + uee_{>99} \quad (5\text{-}16)$$

Where

P_t is the dependent variable revealing the investors' performance

$EPS_{<99}$ and $EVA_{<99}$ are the independent variables concerning the use of EPS and EVA® before 1999

$EPS_{=99}$ and $EVA_{=99}$ are the independent variables concerning the use of EPS and EVA® during 1999

$EPS_{>99}$ and $EVA_{>99}$ are the independent variables concerning the use of EPS and EVA® after 1999

Table 5-20: Regressions of Performance to EPS and EVA® for each of the Three Periods

Panel A

Regression model (5-8) : $P_t = j_0 + j_1\, EPS_{<99} + u_{<99}$
Regression model (5-9) : $P_t = k_0 + k_1\, EPS_{=99} + u_{=99}$
Regression model (5-10) : $P_t = l_0 + l_1\, EPS_{>99} + u_{>99}$

Model		j_0	j_1	k_0	k_1	l_0	l_1	R^2	F
	Coef.	3.875	0.565					**0.141**	
(5-8)	t	(18.709)***	(8.278)***						(68.523)***
	Sign.	[0.000]	[0.000]						[0.000]
	Coef.			4.369	0.388			**0.073**	
(5-9)	t			(21.156)***	(5.744)***				(32.990)***
	Sign.			[0.000]	[0.000]				[0.000]
	Coef.					4.245	0.360	**0.049**	
(5-10)	t					(15.166)***	(4.713)***		(22.210)***
	Sign.					[0.000]	[0.000]		[0.000]

Panel B

Regression model (5-11) : $P_t = m_0 + m_1\, EVA_{<99} + ue_{<99}$
Regression model (5-12) : $P_t = n_0 + n_1\, EVA{=}_{99} + ue_{=99}$
Regression model (5-13) : $P_t = o_0 + o_1\, EVA_{>99} + ue_{>99}$

Model		m_0	m_1	n_0	n_1	o_0	o_1	R^2	F
	Coef.	4.447	0.601					**0.143**	
(5-11)	t	(30.557)***	(8.349)***						(69.710)***
	Sign.	[0.000]	[0.000]						[0.000]
	Coef.			4.376	0.662			**0.164**	
(5-12)	t			(30.457)***	(9.057)***				(82.033)***
	Sign.			[0.000]	[0.000]				[0.000]
	Coef.					4.065	0.616	**0.228**	
(5-13)	t					(27.325)***	(11.307)***		(127.840)***
	Sign.					[0.000]	[0.000]		[0.000]

Table 5-21: Regressions of Performance to EPS + EVA® for each of the Three Periods

Panel A

Regression model (5-14) : $P_t = p_0 + p_1\,EPS_{<99} + p_2\,EVA_{<99} + uee_{<99}$

Regression model (5-15) : $P_t = q_0 + q_1\,EPS_{=99} + q_2\,EVA_{=99} + uee_{=99}$

Regression model (5-16) : $P_t = r_0 + r_1\,EPS_{>99} + r_2\,EVA_{>99} + uee_{>99}$

Model		p_0	p_1	p_2	R^2	F
	Coef.	3.692	0.383	0.414	**0.194**	
(5-14)	t	(18.108)***	(5.139)***	(5.259)***		(50.186)***
	Sign.	[0.000]	[0.000]	[0.000]		[0.000]

Model		q_0	q_1	q_2	R^2	F
	Coef.	4.039	0.169	0.580	**0.175**	
(5-15)	t	(20.066)***	(2.379)***	(7.209)***		(44.302)***
	Sign.	[0.000]	[0.000]	[0.000]		[0.000]

Model		r_0	r_1	r_2	R^2	F
	Coef.	3.967	0.040	0.600	**0.228**	
(5-16)	t	(15.611)***	(0.523)	(9.969)***		(63.327)***
	Sign.	[0.000]	[0.601]	[0.000]		[0.000]

Table (5-20)[5], panel A, shows the dynamic of EPS during the three periods. All models, (5-8) to (5-10), are significant at the 1 per cent level with positive coefficients. However, the decreasing R^2s from the first period (0.141) to the third period (0.049), shows that the intrinsic force of EPS is relatively low. On the other hand, in panel B, models (5-11) to (5-13), we can see that the results for EVA® are reversed compared to that of EPS. The increasing R^2s (0.143, 0.164, 0.228) suggest that EVA® tends to be a valuable tool for investors in the future. The same results reported for MVA and SVA.

Combining both EPS and EVA® (models 14-16) consistent to our findings in chapter four, we notice that the power in explaining investors' performance increases. In fact, what is interesting here is that in period three we achieve the highest R^2 (0.228), which is equal to that achieved for EVA® alone in the third period (0.228). The decline of R^2 (0.175) in the second period reveals the low use of these measures during this period, which is consistent with our findings up to now. Table (5-21) summarises the results.

5.5. Conclusion

All user groups rely more on fundamental and technical analysis and less on portfolio analysis, consistent with Lewellen, Lease and Schlarbaum (1977), Allen and Taylor (1989), Frankel and Froot (1990), Collison, Grinyer and Russell (1996), Lui and Mole (1998), Clark-Murphy and Soutar (2003). Fundamental analysis is mostly used by mutual fund management companies, official members of the ASE, portfolio investment companies and public companies, while the brokerage and individual investors' group consider it less important. Technical

[5] Appendix X shows the detailed results of the regressions

analysis is more popular among brokers while it is less popular among all other user groups. The combined use of both fundamental and technical analysis earns more and more confidence among all user groups. These results are largely consistent with those reported for international markets by Theodossiou (1991), Taylor and Allen (1992), Lui and Mole (1998), Wong and Cheung (1999), Naser and Nuseibeh (2003).

Since we divided our research into three periods, we found that during the second period (year 1999) the use of fundamental analysis and portfolio analysis were very low, while technical analysis and factors such as noise in the market, the information from media, and the instinct/experience drove the investors' strategy, which come in direct contrast to the findings of Lease, Lewellen and Schlarbaum (1974), Lui and Mole (1998), Wong and Cheung (1999), and Clark-Murphy and Soutar (2003), among others. Perhaps this was one of the factors, which contributed to the deepening of the capital crisis in 1999.

Not surprisingly, we found that in the third period (after the year 1999) the use of fundamental analysis, the combination of fundamental and technical analysis, portfolio analysis and foreign stock markets movements, was considerably increased by all user groups. Technical analysis still plays a role, but factors such as noise in the market, and the information from newspapers/media are decreasingly used from all user groups. Finally, individual investors seem to be a very uneducated group in investment selection strategies relying mostly on non-scientific factors such as newspapers/media, noise in the market (rumors) and their instinct/experiences, which are in direct contrast to the reported results of international markets.

Fundamental analysis is considered the most important long-term approach, while technical analysis is more beneficial in the short-term. The combination of fundamental and technical analysis seems to be more successful in the long-term. Similarly, portfolio analysis earns more reputation in the long-term, but still ranks in last position. This evidence is consistent with many studies conducted for different sophisticated stock markets such as the US, the UK, Hong Kong and Australia (Lewellen, Lease and Schlarbaum, 1977; Blume and Friend, 1978; Frankel and Froot, 1990; Grinyer, Russell and Walker, 1991; Lui and Mole, 1998; Wong and Cheung, 1999; Clark-Murphy and Soutar, 2003).

Users of fundamental analysis prefer the traditional accounting performance measures. The discounted cash-flow measures follow, while the relatively new market value-based performance measures take third place with the lowest mean values. These results are quite logical and do not diverge from theory and previous research findings where investors prefer the audited earnings compared to the unaudited value-based measures. Moreover, we reveal that all traditional accounting measures are used mostly during the third period (after 1999), while they were not so popular in the first and second time periods, except for the P/E ratio. The high mean values achieved by the official members of the ASE, mutual fund management companies, and portfolio investment companies, compared to the low means achieved by the rest of the user groups, provide evidence that those measures are more popular among institutional investors than individual investors and brokers.

As for the value-based performance measures, these are mostly appreciating, as the time period tends to reach the recent day, while they were not so popular in the second time period. The fact that the official members of the ASE, mutual fund management companies and portfolio investment companies, achieved higher means than the means achieved by the rest of the user groups, reveal that modern value-based measures are most popular among institutional investors than public companies, brokers, and individual investors. The above findings reveal the dynamic of the value-based performance measures supporting the claims of their advocates such as Stewart (1991; 1999) and Rappaport (1986; 1998).

As for the capital budgeting techniques, results are consistent with the results concerning the traditional and the value based performance measures. All capital budgeting techniques rank in last place of use during the second period, except for DDM and CFROI which are placed second, with mean values similar to those of the first period. This finding makes the argument stronger that during the year 1999 investors did not pay much attention to fundamental analysis and capital budgeting techniques, looking for short-term speculative yields. Moreover, the provided evidence suggests that NPV, DDM, IRR, and CFROI are used mostly by institutional investors and less by brokers and individual investors.

Users of technical analysis provide evidence of preference on technical indicators than chart analysis while MACD, moving averages and RSI are the most used technical indicators. The self-assessment of performance of each user group reveals that portfolio investment companies, mutual fund management companies and official members of the ASE have performed better than the rest of the groups. Examining their investment perceptions, one can reveal some possible reasons for their success. Firstly, they pay much more attention on fundamental analysis while the combination of fundamental and technical analysis earns more reputation among them. Secondly, they are not affected by the noise in the market and the information coming from media or newspapers. Third, they consider the traditional accounting performance measures as the most important indicators for their strategies while they respect the value-based performance measures as well (mean values relatively high). Discounted cash flows are also very important factors for their investment decisions. During the year 1999 they decreased the level of use of the above measures/techniques but this decrease was not dramatically low. However, after 1999 they returned to their common practices and thus, fundamental's analysis ratios/measures are those that mostly drive their decisions. Conversely, individual investors performed worse with a self-assessment below the average. Perhaps, the fact that they mostly relied upon factors such as noise in the market, newspapers/ media and instinct/experience and not on fundamental analysis drove them to low performance of their portfolios.

Finally, exploring the dynamics of the measures and techniques of fundamental analysis, market value analysis and capital budgeting techniques, we suggest that: while traditional accounting performance measures are important tools for the implemented companies' strategies, they do not maintain this dynamic for the evaluation of future strategies, value based performance measures and capital budgeting techniques are considered as important tools for the evaluation both of the implemented and the future companies' strategies, which reveal the instinct force of these measures/techniques and the significant role they are going to play in the future. EPS and EVA® have been thoroughly discussed in this study. While they seem to explain stock returns for the Greek stock market in a relatively low degree, results for their dynamics reveal their instinct force with EVA® to be considered as an important tool for the evaluation of companies' future strategies. This finding is in line with those reported from EVA® proponents (e.g. Stewart, 1991; 1999, Stern, Stewart and Chew, 1995; Ehrbar, 1998) who considered EVA® as the most important tool for firms' valuation.

Chapter Six

SUMMARY AND CONCLUDING REMARKS

This thesis firstly explored the value relevance of both traditional accounting (EPS, ROI, ROE) and value-based (EVA®, SVA) performance measures in explaining stock return variations in the Greek stock market, and secondly, the perceptions of the investment community in Greece about its investment practices, including the extent to which the above performance measures have been utilised in the ASE. To explore the first research part of the present study we used secondary financial data of the listed companies in the ASE for the period 1992-2001, while we used primary data collected by a questionnaire survey conducted among all groups constituting the investment community in Greece to explore the second one. For the second part of our research the investigation period was extended to 2004 since it was the year when the survey took place.

The relationship between capital markets and financial statements originates from the publications of Ball and Brown (1968) and Beaver (1968). They provided evidence that there was information content in accounting earnings announcements. Ball and Brown (1968) correlated the sign of the abnormal stock returns in the month of an earnings announcement with the sign of the earnings change over that company's previous year's earnings. They found a significantly positive correlation between them.

Due to the absence of any formal valuation model linking accounting earnings to stock returns, most scholars followed Ball and Brown (1968) methodology and focused on investigating the relationship between abnormal returns and unexpected earnings. Most of the studies suggested that there is information content in earnings. However, the relationship between abnormal returns with unexpected earnings had been reported considerably lower as reflected in low R^2 statistics. In order to provide an alternative model for the returns/earnings association, Easton and Harris (1991) developed a formal valuation model linking both current earnings levels (earnings deflated by stock price nine months prior to fiscal year end) and earnings changes (earnings changes deflated by stock price nine months prior to fiscal year end) to raw stock returns. They found that earnings deflated by stock price should be used in addition to earnings changes deflated by stock price in explaining stock returns (Easton and Harris, 1991).

A huge body of research has been conducted in the international context revealing the usefulness of earnings in explaining stock returns. However, research in the Greek stock market is particularly limited on this issue. This was the first reason in deciding to carry out this study.

Traditional performance measures, based on earnings, have been strongly criticised by Rappaport (1986; 1998) and Stern, Stewart and Chew (1995), Ehrbar (1998), and Stern (2001). They argued that earnings and ratios based on earnings fail to capture the change in economic value. They also showed that since these measures only partially captured a company's true business performance, they could give a false indication of a company's long-term health outlook. Therefore, they argued that companies should be focused on delivering shareholder value instead of focusing on earnings increase. The performance measures they proposed were SVA by Rappaport (1986) and EVA® by Stewart (1991), known as value-based performance measures.

The empirical research for the value relevance of traditional accounting performance measures and the value-based performance measures provided mixed and contradictory results. Several studies proved the superiority of EVA® as a performance measure (Stewart, 1991; Lehn and Makhija, 1996; Milunovich and

Tseui, 1996; O'Byrne, 1996; Uyemura, Kantor and Petit, 1996; Bao and Bao, 1998; Forker and Powell, 2004) while others (Biddle, Bowen and Wallace, 1997; Chen and Dodd, 1996; 1997; Clinton and Chen, 1998; Stark and Thomas, 1998; de Villiers and Auret 1998; Günther, Landrock and Muche, 1999; 2000; Turvey *et al.* 2000; Chen and Dodd, 2001; Worthington and West, 2001; Copeland 2002; Sparling and Turvey, 2003) provided different results. As for the SVA, to the best of our knowledge, there has not been any study reported in the empirical literature.

These conflicting results suggest further research on this issue both in international markets and in the Greek capital market as well. Several reasons inspired us to carry out the present research. Firstly, the increasing interest on value-based performance measures in the international context. Secondly, the conflicting reported results for the value relevance of EVA® in explaining stock returns in the international stock markets, and finally the absence of any relevant empirical study for the Greek capital market. As a consequence, this study aims to shed light on the value relevance of traditional accounting performance measures in comparison to value-based performance measures, in explaining stock returns and to explore factors other than performance measures that can affect stock return variations. Its contribution is in the sense that it is the starting point of this kind of research in Greece, which opens the debate on the level of usefulness of performance measures and the factors that drive investors' perceptions and investment strategies.

The first empirical part of this study uses pooled time-series, cross-sectional data of 163 listed companies in the ASE, continuously trading for the period 1992 to 2001, to evaluate the usefulness of EVA®, SVA and the traditional accounting performance measures in explaining stock returns. These companies contributed a sample of 977 year-observations. The methodology of the empirical work is based on the Easton and Harris (1991) formal valuation model used in prior studies (Chen and Dodd, 1997; Biddle, Bowen and Wallace, 1997; Worthington and West, 2001; Chen and Dodd, 2001). This model has been expanded in order to examine the value relevance of both traditional and value-based performance measures in the Greek context. A number of equations have been developed, sections 3.3.1. and 3.3.2. in chapter three, either associating only one performance measure or a combination thereof, with stock returns, to empirically test the value relevance of those measures in explaining stock returns.

Annual stock returns have been used as the dependent variable (extended three months after each fiscal year end), while the levels and changes of performance measures were the independent variables. Relative and incremental information content approaches have been employed to test the usefulness of performance measures. The methodology was mainly motivated by the research of Biddle, Bowen and Wallace (1997), Worthington and West (2001) and Chen and Dodd (2001). The development of the equations, the construction of the whole model and the testing procedures is the next contribution to knowledge of this study. It offers a framework of examining similar research questions.

The main findings from the first empirical part of the present study are the following. Firstly, both EPS levels and changes and EVA® levels and changes are associated with stock returns in the Greek capital market. Secondly, EPS levels and changes outperform EVA® levels and changes in explaining stock returns. Thirdly, when EPS and EVA® are incorporated in a research equation (regression model) the explanatory power of the model increases significantly. Fourthly, when ROI levels and changes are introduced in the EPS and EVA® regression model the explanatory power of the model increases from 7.2 per cent to 11.5 per cent, an increase of 60 per cent. Fifthly, the incorporation of SVA in the previous regression model increases the explanatory power to that of 12.9 per cent, an increase of 12 per cent. Finally, all performance measures under examination cannot explain more than 13.1 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 EVA® stems from the fact that the first component of this performance measure is a variation of earnings, the NOPAT. Earnings per share outperform EVA®. This is also expected since investors are more focused on the already known and used EPS and not in an unknown measure such as EVA®. Moreover, EPS is announced quarterly in Greece while EVA® still seems to be an ignored performance measure.

What makes this study suggest the usefulness of EVA® is the incremental explanatory power this measure adds to EPS. Therefore, we propose that companies, at least, will estimate the EVA®, or its less costly variant the RI, and take it into account when measuring financial performance. To the best of our knowledge, only a few companies in Greece internally report a kind of EVA® while none adopts it as an integrated financial performance management system. Return on investment also adds significant explanatory power to the combination of EPS and EVA®. That reveals the important role of the employed capital in business. This finding suggests that analysts and investors should not avoid monitoring the return on capital invested at least in combination with EPS and EVA®.

The SVA alone does not reveal a significant explanatory power in explaining stock returns in the ASE. This is also expected since this measure is almost unknown among companies and investors in Greece and there are no companies in the ASE adopting the shareholder value approach. However, According to SHV proponents, companies that are not focusing on maximising shareholder value will face serious financial problems in the future.

The fact that the incorporation of SVA in a specification (model) including also EPS, EVA® and ROI, leads to the increase of its explanatory power makes us to suggest that it is time for Greek companies to start focusing on the Shareholder Value approach. This finding constitutes another contribution to knowledge both for the Greek analysts and investors and for those investing in the emerging capital markets as well. Finally, the low explanatory power of all performance measures proves that the Greek capital market, in line with the international capital markets, is affected by many other factors such as microeconomic, macroeconomic and behavioural.

Largely, our results are similar with those reported from previous studies. Firstly, consistent to Biddle, Bowen and Wallace (1997), Chen and Dodd (1997), de Villiers and Auret (1998), Turvey *et al.* (2000), Worthington and West (2001), Chen and Dodd (2001), Sparling and Turvey (2003), the study suggests the superiority of EPS compared to EVA®. Secondly, in line with Worthington and West (2001), and Chen and Dodd (2001), it is suggested that including both the cost of debt and equity capital in a profitability measure seems to be a promising practice in terms of increasing the value relevance. Thirdly, similarly to Chen and Dodd (1997) it is argued that along with EVA®, companies should continue to rely on traditional performance measures. Fourthly, our results are consistent with most of the previous studies that found a relatively low explanatory power of the performance measures in explaining stock returns. This suggests that if companies wish to align organisational metrics more closely to stock price, another measurement paradigm should be developed.

The reported results from the first part of this research suggested that only 13.1 per cent of the variation of stock returns could be explained by the traditional (EPS, ROI and ROE) and value-based (EVA® and SVA) performance measures. That means 86.9 per cent of the variation of stock returns could be explained by other factors beyond the above performance measures. According to Fama and French (1995), Shefrin (2000) and Warneryd (2001) other factors such as macroeconomic, microeconomic and behavioural can affect investors' investment practices.

Thus, the second part of our empirical research attempts to explore the perceptions of all user groups investing in the Greek stock market concerning the performance indicators they are utilising for portfolio analysis and company valuation purposes. For the purposes of this study, based on theory and previous studies, a questionnaire was developed to explore the perceptions and the investment strategies of the market participants in the ASE. The research design of the second part of our study constitutes the next contribution to knowledge. The questionnaire and the methodology of the second part of the empirical research can be easily employed in many capital markets at least with the same market characteristics as Greece.

The sample for this second part of the research consists of six different groups: official members of the ASE, mutual funds management companies, portfolio investment companies, listed companies of ASE, brokers, and individual investors. Through the questionnaire survey, all these groups were examined since they constitute the framework of investors contributing to the investment process in the ASE. The survey began in December 2003 and finished in June 2004. In total, 1,014 questionnaires were distributed to the potential respondents and 435 responses were received, which indicate an average response rate of 42.90 per cent.

Statistical analysis has shown that most of the results are in line with those reported for the mature capital markets, while others, especially the findings for the individual investors, are in direct contrast to international practice. A major finding is that the investment practices among all six different user groups are dissimilar. Mainly, the investment strategies of institutional investors (OMOA, MF and PIC) differ significantly from those of LC, BR and individual investors. Moreover, individual investors' investment practices differ from those of LC and BR.

Analytically, the evidence provided from the second part of the present research revealed the following. Firstly, in general, all user groups are relying more on fundamental and technical analysis and less on portfolio analysis. This is consistent with the results reported for the sophisticated capital markets such as the US, the UK and Hong Kong (Frankel and Froot, 1990; Collison, Grinyer and Russell, 1996; Lui and Mole 1998; Wong and Cheung, 1999). However, for the Greek case, fundamental analysis earns more reputation from professional investors and listed companies and less from brokers and individual investors. This happens because institutional investors are better educated and experienced in the issues of capital markets. One important reason for this result is that during the year 1999 the number of brokerage firms suddenly increased dramatically and were easily accessible in almost every part of the country. Many of those brokerage firms were managed by people who were almost totally uneducated and consequently led individual investors to wrong decisions.

Individual investors seem to be a unique group in investment selection strategies relying mostly on non-scientific factors such as noise in the market (rumours) newspapers/media, and their instinct/experiences, which is in direct contrast to the reported results of international markets. Lease, Lewellen and Schlarbaum (1974) presented individual investors as 'investors' rather than 'traders', since they are long term minded and pay relatively little attention to short term yields. Schlarbaum, Lewellen and Lease (1978) found that individual investors in the US show considerable skill in their investment practices. Antonides and Van der Sar (1990), argued that individual investors in the Dutch capital market rely on fundamental analysis. These results were in line with those of Blume and Friend (1978) for the US capital market. Clark-Murphy and Soutar (2003) found that individual investors in Australia have little interest in speculation and are by nature long-term investors. These findings suggest that individual investors in Greece need further training in order to adopt the long-run prospect of investing.

Secondly, technical analysis is more popular among brokers while it is less popular among all other user groups. The findings from other studies were along the same lines where brokerage firms relied more on technical analysis and less on fundamental analysis and portfolio analysis (Lui and Mole, 1998; Wong and Cheung, 1999). However, the combined use of both technical and fundamental analyses earns an increasing reputation among all user groups.

Thirdly, since stock prices movements in the ASE revealed an extreme fluctuation during the last decade, with the CSPI lying at under 2,000 units before the year 1999, an extreme increase up to 6,484 units during the year 1999, and a decrease below 1,700 units in subsequent years, we decided to separate our research into these three periods hoping to catch significant differences between the periods. The results provided evidence that during the second period (year 1999) fundamental analysis and portfolio analysis were used less, while technical analysis and non-financial factors such as noise in the market, the information from media, and the instinct/experience played an important role for the investors' strategy.

Perhaps this was one of the reasons which assisted the capital crisis in the ASE to become even deeper. Also, it was found that in the third period (after the year 1999) the use of fundamental analysis, the combination of fundamental and technical analyses, portfolio analysis, and foreign stock market movements, in all groups, increased their use to a considerable degree. Technical analysis still plays its role, but all user groups decreasingly used factors such as noise in the market and information from newspapers/media during the third period. These findings reveal that investors realised the need for a more rational approach to investment.

Fourthly, we found that fundamental analysis is considered as the most important approach in the long-term, while technical analysis becomes more popular in the short-term. The combination of fundamental and technical analyses seems to be more convincing in the long-term. This revealed evidence is consistent with many studies conducted for different sophisticated stock markets such as the US, the UK, Hong Kong and Australia (see: Collison, Grinyer and Russell, 1996; Lui and Mole, 1998; Wong and Cheung, 1999; Clark-Murphy and Soutar, 2003). Similarly, portfolio analysis earns more respect in the long-term, but still ranks last compared to fundamental and technical analysis.

Fifthly, the users of fundamental analysis mostly prefer accounting measures. They follow discounted cash-flow measures, with the relatively new market value-based measures revealing the lowest mean values and taking third place. These results are quite logical and do not diverge from theory and previous research findings. Moreover, we found that all traditional accounting performance measures were used mostly during the third period (after 1999), while they were not so popular in the first and second periods. The only exception was the P/E ratio, which was appreciated more from all user groups during the second period. The high values of the means achieved by the official members of ASE, mutual fund management companies, and portfolio investment companies, compared to the low means achieved by the rest of the user groups, provided evidence that those measures are more popular among institutional investors than brokers and individual investors.

Sixthly, value-based performance measures were mostly appreciated during the third period, while they were not so popular in the previous two periods. This was expected since these measures were introduced in the corporate world in the late 1990s, while there have been no reported special attempts from the Greek capital market to adopt them. The fact that the official members of the ASE, the mutual fund management companies and the portfolio investment companies, achieved higher means than the means achieved by the rest of the user groups, indicates that the value-based performance measures are more popular among institutional investors than public companies, brokers, and individual investors. These findings reveal the dynamics of the value-based performance measures supporting their advocates such as Stewart (1991; 1999), Stern, Stewart and Chew (1995) and Rappaport (1986; 1998).

Seventhly, as for the capital budgeting techniques, we found results consistent to the results concerning the traditional and value-based performance measures. During the second period all capital budgeting techniques ranked last, except for DDM and CFROI which were placed second. However, the mean values are similar to those of the first period. These results make the argument stronger that, during the year 1999, investors did not pay much attention to fundamental analysis and capital budgeting techniques, instead looking for short-term speculative yields. Perhaps this strategy helped the crisis in the ASE to deepen. Moreover, the provided evidence suggested that NPV, DDM, IRR, and CFROI were used mostly by institutional investors and less by brokers and individual investors. The relatively high use of NPV, IRR and discounted techniques were in line with the results provided for the Swedish capital market from Sandahl and Sjögren (2003).

Eighthly, the self-assessment of performance of each user group reveals that portfolio investment companies (7.29), mutual fund management companies (7.24) and official members of the ASE (7.18) have performed better than the rest of the groups. In contrast, individual investors (4.54) have performed worse with a self-assessment below the average. These results suggest that the investment practices employed by the portfolio investment companies, the mutual fund management companies and the official members of the ASE, which were based mostly on fundamental analysis and less on non-financial factors, provided satisfactory returns. On the other hand, the investment practices employed by individual investors, which in most cases were based upon non-financial factors such as instinct/experience, newspapers/media and noise in the market (rumours), led them to significant capital losses. All those discussed results offer an important contribution to knowledge especially for those who are studying emerging capital markets.

Finally, to examine the dynamics of the measures and techniques of fundamental analysis, market value analysis and capital budgeting techniques, we developed a set of specifications, sections 5.4. and 5.4.1. in chapter five, associating the financial performance of all user groups to the level of usage of all traditional and value-based performance measures in evaluating implemented and future strategies. Moreover, we developed a set of specifications associating the EPS and EVA® of all three time periods to financial performance of all user groups. We found that (a) although traditional accounting performance measures are important tools for the evaluation of the companies' implemented strategies, they do not maintain this dynamic for the evaluation of companies' future strategies, (b) the value-based performance measures and capital budgeting techniques are considered as important tools for the evaluation both of the implemented and future companies' strategies, and (c) the potential importance of EVA® as compared to EPS. These findings reveal the instinctual force of these measures/techniques and highlight the important role they are going to play in the future. The next contribution to knowledge comes from the development of those specifications and the whole model, the methodology and the revealed results.

Overall, the two unique samples, the developed methodology and the revealed findings contribute both to the Greek capital market and to capital markets with similar characteristics as Greece. Since the stock market is based on expectations, markets discount events that are going to happen in the future. It is proved that Greek capital market followed the market paradigm of countries that discounted such important expectations and events (e.g. Portugal and Spain) with considerable fluctuations of their stock returns. Thus, this study gives significant information to countries that are going to follow the monetary policy of Greece (e.g. countries that are going to join Euro zone) to avoid, if possible, the bad performance of their stock markets.

The present study examined the value relevance of both traditional and value-based performance measures in explaining variations in stock returns. With regard to value-based performance measures it was particularly focused on EVA® results since SVA is still a complicated measure with relatively low implementation and poor empirical examination. The provided evidence of the present study supports the suggestion of Chen and Dodd (1997; 2001) that EVA® is not a panacea and should never be viewed as a substitute for good management practice. Instead of this, it should be considered as a good supplementary proxy to traditional accounting performance measures.

Moreover, since our findings for EVA® compared to earnings are largely consistent with those of Chen and Dodd (1997; 2001), Biddle, Bowen and Wallace (1997), Worthington and West (2001), and since according to them EVA® is similar to RI, we suggest the adoption of RI instead of EVA® for the companies that are interested in EVA® but cannot calculate it since they do not know the proper Stern Stewart & Co. adjustments. This is a significant suggestion for Greek companies, which can calculate and focus on the less costly variant of EVA®, the RI.

However, EVA® is an integrated financial management system and not a single performance measure. What EVA® can do is to help senior managers put the proper incentives and monitoring systems in place to increase the chances that all managers will manage the company in a way consistent with the creation of shareholder value. In that sense, EVA® is an improvement over the performance metrics that came before it. With the rising demands on managers in Europe and elsewhere to deliver value to shareholders, the number of companies using EVA® or similar metrics will certainly increase in the coming years (Young, 1997). This is an expected evolution suggesting that Greek companies have to start focusing at least on reporting shareholder value added.

According to EVA® advocates, companies should adopt EVA® because it can encourage managers to think and act more like owners. When managers are paid based on metrics other than EVA® or similar value-based measures, there is a significant risk that they will undertake activities, such as growth for its own sake that might increase their own compensation at the expense of shareholder wealth creation. When companies align compensation to EVA®, and especially to improvements of EVA®, managers soon learn that the most secure manner to high pay and advancement is creating as much wealth as possible for shareholders over the long term. But while the idea is simple enough, implementation is often complicated and discouraging.

Almost all companies in Greece still rely on traditional performance measures as the primary measures of their business performance. Since these measures only partially capture a company's true business performance, they can give a false indication of the company's long-term health outlook. This study suggests that in most cases taking into account EVA® may be a first move towards continuous improvement and a future adoption of modern strategic managerial tools.

There are various ways in which this research may be extended. As for the value relevance of performance measures in explaining stock returns: (a) to test the data using alternative dependent variables (two-year or five-year return interval), (b) to adopt the same methodology in a sample which will be constituted of data coming from a greater 10-year window than we have employed, (c) to use as a dependent variable the unexpected earnings or the abnormal returns (Easton and Harris, 1991; Biddle, Bowen and Wallace, 1997), (d) to use as a dependent variable the MVA, since most of the studies supporting the superiority of EVA® are based on this model (Stewart, 1991; Milunovich and Tseui, 1996; O'Byrne, 1996; Uyemura, 1996), (e) to calculate the cost of capital in a different way, such as employing the proposed method of Rappaport (1998) and Stewart (1999) where they proposed a standard risk premium, or to use APT, (f) to use Stern Stewart & Co. tailored EVA® figures, which however are still not available for the Greek companies, (g) to identify and use behavioural independent variables as predictors of the stock returns' variation, and (h) to examine other performance measures such as Tobin's Q or other integrated management systems such as Balanced Scorecard and Intellectual Capital.

This study could not separate those who adopted the value-based performance measures from those that did not. A study comparing performance of companies that have implemented an EVA® system to those who have not would also be valuable. It also seems essential to investigate the ability of other measures of short-term performance to reflect long-run value added. We also think that it should be useful (over a longer time frame and with more available data) to repeat our study and to compare the results, following the methodology of Wallace (1997) and Lovata and Costigan (2002). Perhaps the results of this study will reveal the real prospect of the value relevance of EVA® in the Greek capital market. It has been argued that an effective implementation of EVA® also requires a commitment on the part of companies to make it the cornerstone of a total financial management system. The company attributes the lack of success in many EVA® implementations to four factors: (a) EVA® is not a way of life, (b) EVA® is implemented too fast, (c) lack of conviction by the CEO or division head and (d) inadequate training (Stern, Stewart and Chew, 1995). These discussions suggest a number of testable hypotheses regarding determinants of the measure effectiveness. However, at the moment this kind of research cannot be carried out in Greece since we do not have EVA® adopters.

Another suggestion for further research is to follow the methodology adopted by Biddle, Bowen and Wallace (1997) and Worthington and West (2001) to test the same assertions for the Greek capital market. This will explore whether

EVA® is more highly associated with stock returns and firm values than accrual earnings, and will evaluate which components of EVA®, if any, contribute to these associations. As a further research of this study we can follow the suggestion of Biddle, Bowen and Wallace (1997, pp. 333) where 'an avenue for future research suggested by the findings of this study is to examine more closely which components of EVA® and earnings contribute to, or subtract from, information content'. Differently stated, given that EVA® consists of nearly 164 potential changes to accounting figures grouped across adjustments to accounting measures of operating profits and capital, there is a requirement to quantify the contribution of these sub-components to overall firm performance. This is in line with the Worthington and West, (2001) suggestion for further research.

Another research direction is to employ methodologies adopted from other studies. For instance, de Villiers and Auret (1998) adopted a procedure developed by Demsetz (1995) while Forker and Powell (2004) based their study on Shiller (1981) methodology. Bacidore *et al.* (1997) proposed that a more appropriate measure of the capital used in the firm for any period of time is the market value at the beginning of the period. This approach led them to a refinement of the EVA® measure, the REVA. The motivation for the REVA refinement to EVA® emanates partly from EVA®'s use of the economic book value of assets when the capital charge for the firm is derived from a market based WACC. To make inferences about changes in shareholder wealth, a market-derived cost of capital should be applied to the market value of the firm's assets. Thus, as invested capital it considered the total market value of the firm's assets at the beginning of the period. They concluded that REVA should be used to compensate senior executives and EVA® could be used to compensate those at lower levels in an organisation. Future research in this area should address the important issues of optimal compensation design using both EVA® and REVA for firms of hierarchical organisation design. In the same way, the efficiency of AEVA (De Villiers, 1997) should also be useful for examination.

As for the second research question of our study we suggest the same survey be conducted (a) from 2005 onwards, and (b) in different international markets with the same characteristics as Greece and to compare the results. Moreover, given the limited knowledge of investment decision-making processes and consumer behaviour as it applies to financial assets and services, the possibilities for further research in this area are extensive.

Moreover, for further research it is proposed to explore the attributes that were not included in the present study, such as company size, company nature, location of the company's headquarters and the influence a company's environment and social credentials might have on investors' choices. Other attributes that could be examined are the age, gender, educational background, years of experience and level of investment activity. Further attention should also be paid to the examination of how investors buy and sell shares. Moreover, it would be useful to explore investors' attitudes as far as the decision about whether to sell one stock in order to buy another is concerned. Future research should explore whether there is any similarity in the share attributes valued by successful investors and thus, whether it is possible to describe more closely a successful investor's approach to stock selection.

In general, there is very little evidence about the behaviour and the attitudes of investors' on financial markets and especially in Greece. The second research part of this study made a first attempt to converge the area of investors' behaviour and behavioural finance for the Greek capital market. However, it is obvious that more research in the same or different directions needs to be undertaken both for the Greek and international markets. All those suggestions for further research constitute another contribution to knowledge stemming from literature review to date.

To close, first of all we believe that this study provided clear evidence for the value relevance of both traditional accounting and value-based 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 EVA® ROI, and SVA 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. Secondly, this study proved that the investment practices among the market participants of the ASE are not the same. Institutional investors relied more on fundamental analysis and less on non-financial factors such as noise in the market (rumours), newspapers/media and instinct/experience, revealed a relatively high success rate. On the other hand, brokers and individual investors who followed a strategy based mostly on technical analysis and non-financial factors respectively, reported a low performance.

Thirdly, the decreasing use of fundamental analysis with a contemporaneous increase in the use of non-financial factors (rumours, media, instinct) during the year 1999 perhaps helped the crisis in the ASE to become more serious and led investors to significant losses. Fourthly, our results suggest that after this extreme period, investors became more rational, relying mostly on fundamental analysis, capital budgeting techniques and portfolio analysis. An additional interesting finding is that the value-based performance measures in Greece seem to convey instinctual forces, which make them particularly attractive for the companies in the near future. We stand firm in our convictions of the revealed evidence but also recognise that this could be considered a starting point for further study of the Greek market participants both for their views on corporate performance measurement and which other factors were affecting their investment practices.

Both parts of the empirical research of this study have limitations. As far as the first part of the empirical research is concerned, the relatively short period examined (ten years) is one limitation. However, there was no further possibility of expanding this period either earlier to 1992 or later to 2001. Firstly, it could not be extended earlier to 1992 since the number of companies trading in the ASE at that time was very small and more importantly there was no available data organised for this period. Secondly, we preferred to consider year 2001 as the last year of our research period since from this year onwards and until 2003 investing in the ASE was very limited and of relatively low interest. As for the second part of the empirical research of this study there are limitations to the extent that many other performance measures could be explored such as return on sales and Tobin's Q, or other integrated management systems such as Balanced Scorecard, and Intellectual Capital.

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APPENDICES

Appendix I: Historical Data of the ASE

In this appendix the arguments for the selection of the specific investigation period (1992 – 2001) are expressed. Year 1992 is considered as the beginning of the investigation period but in fact the actual starting year is 1990 since the sample comprises only those shares, which have two years continuous trading in the ASE (in order to calculate their betas). Year 2001 was selected as the last year of the investigation period since it is considered that after the stormy fluctuation of the stock prices in the ASE during 1999 and 2000, a new investing period started at year 2002. From this year onwards, the investors' interest decreased dramatically and the new legislation for transparency and dissemination of information applied for the listed companies in the ASE.

Simultaneously, the authorities started a management audit for many listed and trading companies as well. This made the vast majority of investors more careful than they were in the previous years (most of them reported great losses) and led to a decrease in their investment interests. The Composite Share Price Index (CSPI) dropped below the level of 2,000 units. Although investor shares were more than 2,200,000, from the year 2002 onwards the active investor shares (making daily transactions) were less than 20,000. Only in the year 2005 did the ASE CSPI pass the hurdle of 3,000 units and the investor community gradually started to participate in the investment processing again.

Moreover, the decision for the selection of the specific investigation period was based on many other factors, such as (a) the ASE CSPI movement, (b) the annual average rate of growth of ASE CSPI, (c) the issuance of new companies in the ASE, (d) the total number of companies in the ASE, (e) the Market Capitalisation, (f) the Total Raised Capital, and (g) the investors' activity such as the issuance of New Investor Shares. How the above factors affected this decision, why the starting year was the 1990 and why the last investigation year is considered 2001 and not 2002 or 2003, is explained as follow.

Firstly, up to the year 1990 the ASE CSPI was below 500 units and there was no investing interest from the public side. From 1990 onwards the ASE started to gain a reputation among investors. The closing price of the CSPI at the end of year 1990 was up to 932 units (see tables and figures in Appendix I1) meaning that the ASE started to challenge the investors' interest. At this period many investors reported significant gains. This is revealed in appendix I2, table I-2, where it can be seen a 102.86 per cent growth of the annual average rate of ASE CSPI compared to the previous year (1989). On the other hand, the issuance of new companies in the ASE during this year, 28 in total, was significantly higher than that of the previous 5 years (see appendix I3). The total number of listed companies increased from 114 to 119 during the period of 1985-1989, and only during 1990 to 145 (see appendix I4). The market capitalisation also increased from 2,924.72 million Euros in 1989 to 7,121.32 million Euros in 1990 (see appendix I5). Finally, the raised capital during 1990 was 6,672.76 million Euros while in 1992 it reached the level of 17,552.80 million Euros. This was four times higher that the raising capital in 1989 (see appendix I6).

The selection of year 2001 as the last year of the investigation period was also based on the seven factors previously mentioned. In appendix I1, it can be seen that in 2002 the CSPI dropped down to the level of 1,700 units. Moreover, during 2003 it recorded a minimum level of 1,462 units and only in 2004 did it pass the hurdle of 2,500 units (see appendix I1). This could make some consider that a new period started for the ASE in year 2002. The negative annual average rate of growth of the ASE stopped during the period from year 2002 to 2003 (0.04 per cent). This probably shows that the capital market started to become attractive again (see appendix I2). The issuance of new companies in the ASE dropped from 53 in 2000 to 21 in 2001. The increasing number of the issuance of new companies in year 2002 indicated the start of a new investment period for the ASE (see appendix I3). Despite this change, the number of listed companies in the ASE during 2002 was 349, exactly the same as in the year 2001 (see appendix I4).

Another reason was the market capitalisation. While in 2001 it was 96,945.50 million Euros, this number dropped to 65,757.68 million Euros in 2002 revealing the decreasing interest of the investment community. However, it appeared to increase in the following years. In 2003 it was shortly below the 90,000.00 million Euros (see appendix I5). The raised capital also revealed the same evidence. While in 2001 decreased to 14,569.00 million Euros, in 2002 it gradually started to increase (see appendix I6).

Finally, what is evidenced by the decreasing interest of investors is that new shares opened in the ASE during the period 1999 to 2002 (see appendix I7). While the actual total number of investor shares reached the level of 1,103,545 in 1999, it dropped to 635,155 in 2001 and in 36,213 and 17,636 in 2001 and 2002 respectively.

APPENDIX I - ASE's Historical Data

I1: ASE Composite Share Price Index Movement

Table I-1a: ASE Composite Share Price Index

Year	Close
1985	71
1986	104
1987	273
1988	280
1989	460
1990	932
1991	810
1992	672
1993	959
1994	869
1995	914
1996	933
1997	1,480
1998	2,738
1999	5,535
2000	3,389
2001	2,592
2002	1,748
2003	2,264
2004	2,452

Source: ATHEX, Annual Statistical Bulletin (2004)

Table I-1b: ASE Composite Share Price Index

Year	Close	Minimum	Maximum
1991	810	795	1,684
1992	672	559	1,009
1993	959	668	959
1994	869	794	1,206
1995	914	782	997
1996	933	871	1,026
1997	1,480	932	1,809
1998	2,738	1,356	2,829
1999	5,535	2,763	6,484
2000	3,389	3,165	5,875
2001	2,592	1,998	3,456
2002	1,748	1,705	2,655
2003	2,264	1,462	2,327
2004	2,452	2,259	2,523

Source: ATHEX, Annual Statistical Bulletin (2004)

Note: The Composite Share Price Index (close) refers to the closing prices for each year

Figure I-1a: ASE Composite Share Price Index, 1985 - 2004, Closing Prices

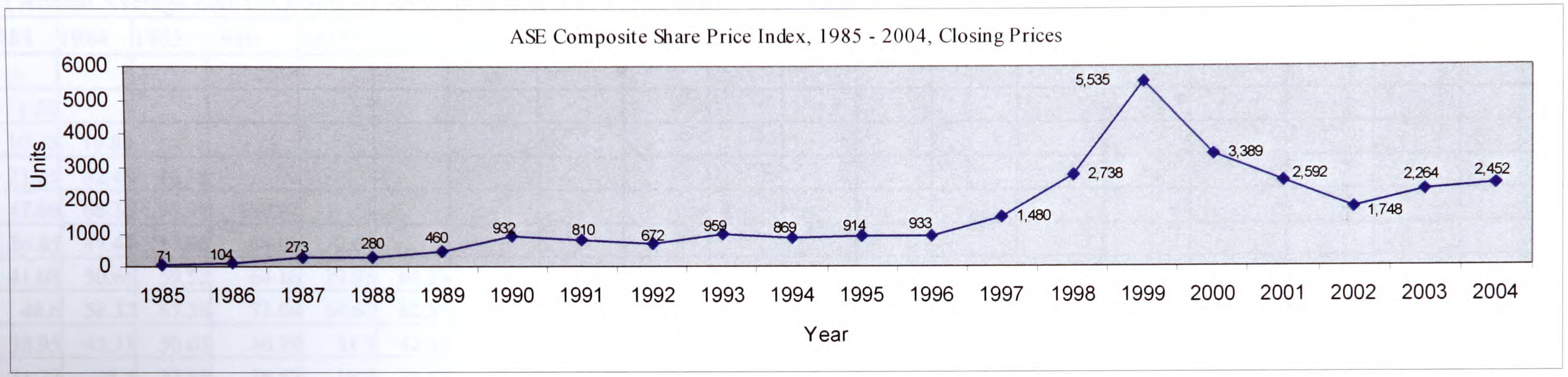
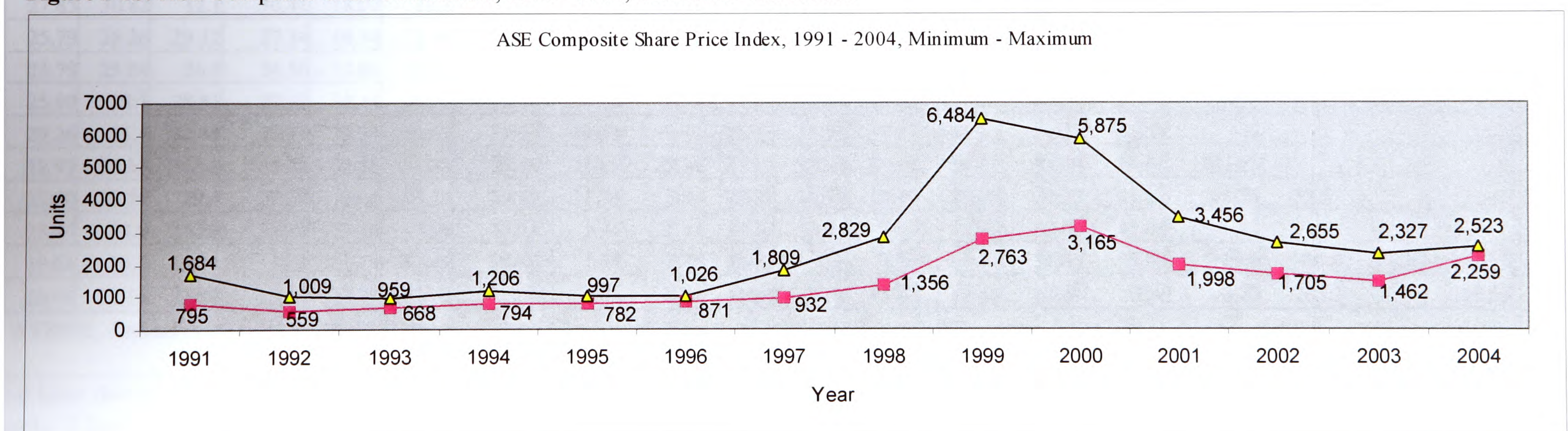


Figure I-1b: ASE Composite Share Price Index, 1991 - 2004, Minimum - Maximum



Source: ATHEX, Annual Statistical Bulletin (2004)

I2: Annual Average Rate of Growth of ASE's Composite Share Price Index

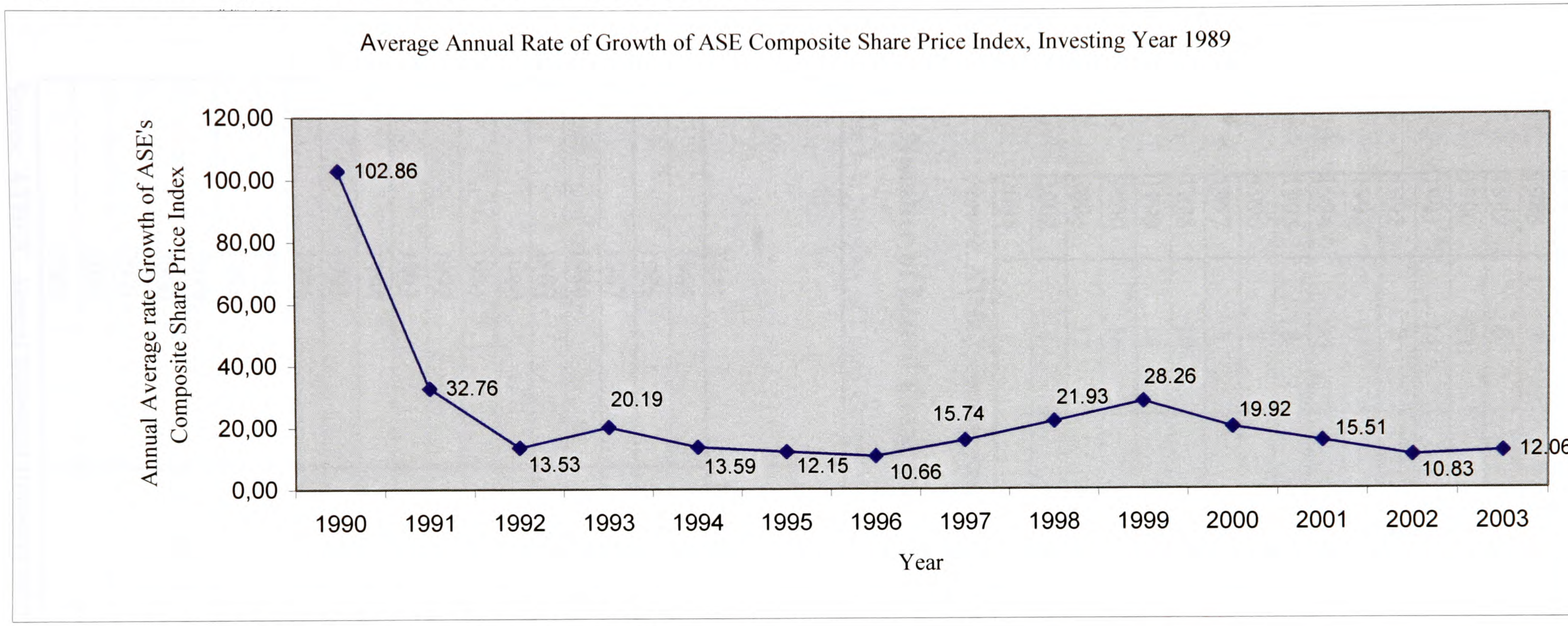
Table I-2: Annual Average Rate of Growth of ASE Composite Share Price Index, 1983 - 2003

Year	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1983	-																				
1984	1.58	-																			
1985	10.35	19.89	-																		
1986	21.25	32.48	46.38	-																	
1987	47.06	66.36	95.97	162.32	-																
1988	36.85	47.44	57.96	64.09	2.64	-															
1989	41.08	50.66	59.52	64.16	29.85	64.29	-														
1990	48.6	58.32	67.38	73.08	50.67	82.56	102.86	-													
1991	38.95	45.31	50.05	50.79	31.3	42.53	32.76	-13.12	-												
1992	31.23	35.5	37.88	36.52	19.8	24.52	13.53	-15.07	-16.97	-											
1993	32.32	36.27	38.46	37.37	23.33	27.94	20.19	0.94	8.81	42.59	-										
1994	27.85	30.82	32.1	30.41	18.02	20.8	13.59	-1.74	2.38	13.68	-9.36	-									
1995	25.79	28.26	29.12	27.34	16.34	18.44	12.15	-0.39	3.08	10.79	-2.35	5.21	-								
1996	23.79	25.84	26.4	24.56	14.66	16.26	10.66	0.03	2.89	8.55	-0.88	3.65	2.11	-							
1997	25.99	28.1	28.81	27.32	18.44	20.34	15.74	6.83	10.57	17.09	11.46	19.42	27.22	58.51	-						
1998	29.26	31.5	32.44	31.34	23.34	25.62	21.93	14.42	19.01	26.37	23.35	33.23	44.14	71.25	85.02	-					
1999	32.93	35.33	36.51	35.78	28.52	31.18	28.26	21.89	27.16	35.14	33.94	44.82	56.87	81.00	93.41	102.91	-				
2000	27,00	28.79	29.4	28.27	21.4	23.11	19.92	13.78	17.24	22.41	19.77	25.46	29.96	38.03	31.82	11.26	-38.77	-			
2001	23.47	24.9	25.22	23.92	17.46	18.68	15.51	9.74	12.34	16.17	13.24	16.9	18.97	22.68	15.04	-1.81	-31.57	-23.53	-		
2002	19.61	20.7	20.74	19.3	13.19	13.99	10.83	5.38	7.25	10.03	6.9	9.13	9.71	11.03	3.39	-10.6	-31.9	-28.17	-32.53	-	
2003	20.08	21.14	21.21	19.87	14.15	14.96	12.06	7.06	8.94	11.67	8.97	11.22	12.00	13.49	7.34	-3.73	-20.03	-12.59	-6.54	0.04	

Source: ATHEX, Annual Statistical Bulletin (2003)

The above table shows the annual average rate of growth of ASE Composite Share Price Index between different periods.
For example, if funds had been invested in the stocks of the Composite Share Price Index at year 1992 and the portfolio remained unchanged until the year 2001, the average annual rate of growth should be 16.17 per cent. The 102.86 annual growth is revealed from 1989 to 1990.
However, if we followed the same strategy starting at the year 2002, the average rate growth for the year 2003 should be 0.04 per cent (a return around 0).

Figure I-2: Average Annual Rate of Growth of ASE's CSPI



Source: ATHEX, Annual Statistical Bulletin (2003)

I3: New Companies in the ASE during 1985 –2003

Table I-3: New Companies in the ASE during 1985 - 2003

Year	Main Market	Parallel Market	New Market	Total
1985	0	0	0	0
1986	0	0	0	0
1987	4	0	0	4
1988	3	0	0	3
1989	0	0	0	0
1990	23	5	0	28
1991	14	3	0	17
1992	2	0	0	2
1993	11	0	0	11
1994	36	11	0	47
1995	8	10	0	18
1996	7	13	0	20
1997	3	9	0	12
1998	10	13	0	23
1999	14	23	0	37
2000	18	35	0	53
2001	12	8	1	21
2002	2	10	14	26
2003	1	13	2	16

Source: ATHEX, Annual Statistical Bulletin (2003)

I4: Number of Listed Companies in the ASE during 1985 – 2003

Table I-4: Number of Listed Companies in the ASE during 1985 - 2003

Year	**Number of Listed Companies in the ASE**
1985	114
1986	114
1987	116
1988	119
1989	119
1990	145
1991	159
1992	164
1993	150
1994	196
1995	215
1996	235
1997	237
1998	258
1999	294
2000	342
2001	349
2002	349
2003	355

Source: ATHEX, Annual Statistical Bulletin (2003)

I5: Shares: Two Decades of the ASE - Market Capitalization

Table I-5: Shares: Two decades of the ASE

Year	Composite Share Price Index 1980=100	Number of Listed Companies	Share transaction (in mil. Euro)	Market Capitalisation of Listed Companies (in mil. Euro)	Total Amount of Paid Dividends (in mil. Euro)
1985	70.95	114	7.00	331.80	35.49
1986	103.86	114	13.29	459.61	58.78
1987	272.47	116	174.96	1,659.82	84.74
1988	279.65	119	130.24	1,756.23	123.74
1989	459.43	119	261.38	2,924.79	169.73
1990	932.00	145	1,786.32	7,121.32	274.95
1991	809.71	159	1,284.08	6,911.73	374.14
1992	672.31	164	901.81	5,999.59	261.62
1993	958.66	150	1,869.63	9,147.68	374.34
1994	868.91	196	3,701.87	10,499.70	503.03
1995	914.15	215	4,133.44	11,814.83	568.24
1996	933.48	235	5,840.08	17,446.15	733.08
1997	1,479.63	237	17,027.24	28,793.29	1,010.38
1998	2,737.55	258	41,331.15	67,024.81	1,316.33
1999	5,535.09	294	173,013.97	197,536.99	2,320.02
2000	3,388.86	342	101,423.83	117,956.27	2,331.53
2001	2,591.56	349	42,345.16	96,949.50	96.98
2002	1,748.42	349	24,771.04	65,757.68	111.98
2003	2,263.58	355	34,895.55	89,789.28	

Source: ATHEX, Annual Statistical Bulletin (2003)

I6: Capital Raised Through ASE (in mil. Euro)

Table I-6: Total Raised Capital (in mil. Euros), 1985 - 2003

	Total Raised Capital (in mil. Euros)
1985	563.89
1986	821.47
1987	1,414.83
1988	4,291.72
1989	4,440.82
1990	6,672.76
1991	9,180.54
1992	17,552.80
1993	15,055.55
1994	21,107.56
1995	19,806.67
1996	12,637.30
1997	21,914.54
1998	28,978.89
1999	38,178.07
2000	25,334.47
2001	14,569.13
2002	19,933.57
2003	19,781.83

Source: ATHEX. Annual Statistical Bulletin (2003)

I7: Investors' Activity

Table I-7a: Number of New Investor Shares (NIS)

Year	Number of NIS
1998	389,910
1999	1,114,367
2000	650,471
2001	42,780
2002	22,132
2003	101,083
2004	42,864

Source: CSD, Monthly Statistics Bulletin (May, 2005)

Note: CSD is the Central Security Depository

The New Investor Shares are those opened in DSS for the relevant period
The increased number of Investor Shares in 2003 and 2004 results from the issuance and registration of Special Saving Bonds (SSB) held in DSS

SSB:	2003:	68,380
	2004:	16,597

Table I-7b: New Investor Shares, SSB excluded

Year	NIS	SSB	NIS-SSB
1998	389,910	0	389,910
1999	1,114,367	0	1,114,367
2000	650,471	0	650,471
2001	42,780	0	42,780
2002	22,132	0	22,132
2003	101,083	68,380	32,703
2004	42,864	16,597	26,267

Source: CSD, Monthly Statistics Bulletin (May, 2005)

Table I-7c*:* Deactivated Investor Shares

Year	Number of deactivated Investor Shares
1998	22,165
1999	10,822
2000	15,316
2001	6,567
2002	4,496
2003	3,143
2004	3,258

Source: CSD, Monthly Statistics Bulletin, (May, 2005)

Table I-7d: Actual total number of Investor Shares

Year	NIS-SSB Table A-7b	Deactivated Investor Shares Table A-7c	Actual Total Number of Investor Shares	Existed Total Number of Investor Shares in DSS
1998	389,910	22,165	367,745	367,745
1999	1,114,367	10,822	1,103,545	1,471,290
2000	650,471	15,316	635,155	2,106,445
2001	42,780	6,567	36,213	2,142,658
2002	22,132	4,496	17,636	2,160,294
2003	32,703	3,143	29,560	2,189,854
2004	26,267	3,258	23,009	2,212,863

Source: CSD, Monthly Statistics Bulletin (May, 2005)

Appendix II

The Questionnaire (Four Versions)

Performance Measures and Stock Price Movements: The case of ASE – Greece

A research project being conducted by:

the UNIVERSITY of GREENWICH

The Business School

First Supervisor

Zeljko Sevic, SJD, PhD (Fin Econ)
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Nikolaos G. Theriou, PhD
Associate Professor in Strategic Management
Head, Department of Business Administration
Acting Director of Research
The Business School
TEI of Kavala, Greece

Date, 10-12-2003

Introduction

- The purpose of this survey is to understand your strategy about the valuation of companies.
- Mainly we are interested in investigating how profit or value based measures are affecting your strategy.
- Your individual responses are strictly confidential.
- Please complete this survey (it takes 15-20 minutes) and return it within 7 days, by e-mail, or by fax (2510-462156 and 2510-462186). If you have any question or comments, please call Mr Dimitrios I Maditinos at 2510-462219, 25940-22141, 6946363250 or mail dmadi@teikav.edu.gr
- We sincerely appreciate your time and ideas. The results can be forwarded to you upon your written request.

SECTION A: GENERAL QUESTIONS

This first part is divided into two sub-units and includes general information about the person who fills out the questionnaire and the company he is working in.

1. INFORMATION ON THE PERSON WHO IS COMPLETING THE QUESTIONNAIRE

A1 Position within the company.	CEO ☐ CFO ☐ Shareholder ☐ Other (specify)
A2 Education.	High School ☐ Associate degree/ Diploma ☐ Degree / BA ☐ Masters / MSc MBA ☐ Doctorate / PhD ☐
A3 Years of experience in Finance (in total).	
A4 Years of experience with the current company.	

2. INFORMATION ON THE COMPANY

A5 Official name of the company.	
A6 Year of incorporation.	
A7 Number of employees in 2004.	
A8 Company's sector in the ATHEX.	
A9 Main Market or Parallel Market.	Main Market ☐ Parallel Market ☐

SECTION B: MAIN SET OF QUESTIONS

B1 To what degree are these factors affecting your approach to valuate stock prices?

(Please fill in each box for every factor)

1 = not at all
2 = very little
3 = equal
4 = much
5 = very much

Fundamental Analysis	0
Technical Analysis	0
Both Fundamental & Technical Analysis	0
Noise in the market	0
Models for setting up the portfolio	0
Newspapers / Media	0
Instinct / Experience	0
Foreign markets	0
Government policy	0
Other (specify)	

B2 To what degree do you use Fundamental or / and Technical Analysis?

(Please fill in each box for every factor)

1 = not at all
2 = very little
3 = equal
4 = much
5 = very much

Fundamental Analysis	0
Technical Analysis	0

B3 what degree do you think these factors are urate in predicting the future value of stock prices (in short term)?

(Please fill in each box for every factor)

1 = not accurate
2 = fairly accurate
3 = equal
4 = accurate
5 = very accurate

Fundamental Analysis	0
Technical Analysis	0
A combination of Fundamental & Technical Analysis	0
Models for setting up the portfolio	0
Other (specify)	

B4 To what degree do you think these factors are accurate in predicting the future value of stock prices (in long term)?

(Please fill in each box for every factor)

1 = not accurate
2 = fairly accurate
3 = equal
4 = accurate
5 = very accurate

Fundamental Analysis	0
Technical Analysis	0
A combination of Fundamental & Technical Analysis	0
Models for setting up the portfolio	0
Other (specify)	

B5 To what degree have these factors been used by your company in predicting future stock prices before year 1999?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

Fundamental Analysis	0
Technical Analysis	0
Both Fundamental & Technical Analysis	0
Noise in the market	0
Models for setting up the portfolio	0
Newspapers / Media	0
Instinct / Experience	0
Foreign markets	0
Government policy	0
Other (specify)	

B6 To what degree have these factors been used by your company in predicting future stock prices during year 1999?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

Fundamental Analysis	0
Technical Analysis	0
Both Fundamental & Technical Analysis	0
Noise in the market	0
Models for setting up the portfolio	0
Newspapers / Media	0
Instinct / Experience	0
Foreign markets	0
Government policy	0
Other (specify)	

B7 To what degree have these factors been used by your company in predicting future stock prices after year 1999?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

Fundamental Analysis	0
Technical Analysis	0
Both Fundamental & Technical Analysis	0
Noise in the market	0
Models for setting up the portfolio	0
Newspapers / Media	0
Instinct / Experience	0
Foreign markets	0
Government policy	0
Other (specify)	

B8 To what degree do you think that individual non-professional investors are relying on thes factors in order to build their stock portfolios

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

Fundamental Analysis	0
Technical Analysis	0
Both Fundamental & Technical Analysis	0
Noise in the market	0
Models for setting up the portfolio	0
Newspapers / Media	0
Instinct / Experience	0
Foreign markets	0
Government policy	0
Policy of their investment company	0

Other (specify)

SECTION C: QUESTIONS TO BE ANSWERED BY THOSE WHO USE FUNDAMENTAL ANALYSIS

The following questions are to be answered only by those who use Fundamental Analysis in order to estimate the present and future performance of public companies.

C1 Which Profit Based Measures did you use before 1999 and to which degree?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

NOPAT (earnings)	0
EPS	0
ROI	0
ROE	0
P/E ratio	0

Other (specify)

C2 Which Profit Based Measures did you use during 1999 and to which degree?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

NOPAT (earnings)	0
EPS	0
ROI	0
ROE	0
P/E ratio	0

Other (specify)

C3 Which Profit Based Measures did you use after 1999 and to which degree? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	NOPAT (earnings) 0 EPS 0 ROI 0 ROE 0 P/E ratio 0 Other (specify)
C4 To what degree do you use the above measures for the evaluation of the companies' implemented strategies? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	0
C5 To what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	0
C6 Which Value Based Measures did you use before 1999 and to what degree? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	EVA 0 SVA 0 MVA 0 Other (specify)
C7 Which Value Based Measures did you use during 1999 and to what degree? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	EVA 0 SVA 0 MVA 0 Other (specify)

C8 Which Value Based Measures did you use after 1999 and to what degree? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	EVA 0 SVA 0 MVA 0 Other (specify)
C9 To what degree do you use the above measures for the evaluation of the companies' implemented strategies? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	0
C10 To what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	0
C11 Which Other Measures did you use before 1999 and to what degree? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	NPV 0 IRR 0 Payback 0 DDM 0 CFROI 0 DCA 0 Economic Profit 0 Economic Value Management 0 CVA 0 Other (specify)

C12 Which Other Measures did you use during 1999 and to what degree? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	NPV 0 IRR 0 Payback 0 DDM 0 CFROI 0 DCA 0 Economic Profit 0 Economic Value Management 0 CVA 0 Other (specify)
C13 Which Other Measures have you used after 1999 and to what degree? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	NPV 0 IRR 0 Payback 0 DDM 0 CFROI 0 DCA 0 Economic Profit 0 Economic Value Management 0 CVA 0 Other (specify)
C14 To what degree do you use the above measures for the evaluation of the companies' implemented strategies? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	0
C15 To what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	0

C16 To which extent does CAPM analysis affect your decisions about stock valuation? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	0

SECTION D: QUESTIONS TO BE ANSWERED BY THOSE WHO USE TECHNICAL ANALYSIS

The following questions are to be answered only by those who use Technical Analysis in order to estimate the future value of stocks.

D1 To what degree do you use the beside described factors?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

Chart analysis	0
Technical indicators	0
Moving averages	0
Relative Strength Index (RSI)	0
Bollinger bands	0
MACD (Moving Average Convergence Divergence)	0
Momentum	0
On balance volume (OBV)	0
Parabolic sar	0
Stochastic oscillator	0

Other (specify)

D2 To what degree do you use the above method for the evaluation of the companies' implemented strategies? **Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	0

D3 To what degree do you use the above method for the evaluation of the companies' proposed (future) strategies?

Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

0

FINAL QUESTION

As compared to the performance of the market (CSPI), how would you term the performance of the strategy you have adopted in the past?

(you can use the full scale from 1 to 10)

1 = unsuccessful
5 = neutral
10 = successful

0

Please return this survey using one of the following ways:

a. By e-mail (dmadi@teikav.edu.gr)

b. By fax (2510-462156 and 2510-462186)

Thank you for your time in the completion of this questionnaire

Dimitrios I. Maditinos

T.E.I of Kavala,

The Business School

Agios Loukas, 654 04,

Kavala, Greece

0030-2510-462219

dmadi@teikav.edu.gr

Would you like the results of this survey to be sent to you?

Yes ☐ **No** ☐

Performance Measures and Stock Price Movements: The case of ASE – Greece

A research project being conducted by:

the UNIVERSITY of GREENWICH

The Business School

First Supervisor

Zeljko Sevic, SJD, PhD (Fin Econ)
Reader in Accounting, Finance & Public Policy
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Second Supervisor

Nikolaos G. Theriou, PhD
Associate Professor in Strategic Management
Head, Department of Business Administration
Acting Director of Research
The Business School
TEI of Kavala, Greece

Date, 10-12-2003

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A2 Education.	High School ☐ Associate degree/ Diploma ☐ Degree/ BA ☐ Masters/ MSc MBA ☐ Doctorate/ PhD ☐
A3 Years of experience in Finance (in total).	
A4 Years of experience with the current company.	

2. INFORMATION ON THE COMPANY

A5 Official name of the company.	
A6 Year of incorporation.	
A7 Number of employees in 2004.	
A8 Company's sector in the ATHEX.	
A9 Main Market or Parallel Market.	Main Market ☐ Parallel Market ☐

SECTION B: MAIN SET OF QUESTIONS

B1 To what degree are these factors affecting your approach to valuate stock prices?

(Please fill in each box for every factor)

1 = not at all
2 = very little
3 = equal
4 = much
5 = very much

Fundamental Analysis	1	2	3	4	5
Technical Analysis	1	2	3	4	5
Both Fundamental & Technical Analysis	1	2	3	4	5
Noise in the market	1	2	3	4	5
Models for setting up the portfolio	1	2	3	4	5
Newspapers / Media	1	2	3	4	5
Instinct / Experience	1	2	3	4	5
Foreign markets	1	2	3	4	5
Government policy	1	2	3	4	5

Other (specify)

B2 To what degree do you use Fundamental or / and Technical Analysis?

(Please fill in each box for every factor)

1 = not at all
2 = very little
3 = equal
4 = much
5 = very much

Fundamental Analysis	1	2	3	4	5
Technical Analysis	1	2	3	4	5

B3 To what degree do you think these factors are accurate in predicting the future value of stock prices (in short term)?

(Please fill in each box for every factor)

1 = not accurate
2 = fairly accurate
3 = equal
4 = accurate
5 = very accurate

Fundamental Analysis	1	2	3	4	5
Technical Analysis	1	2	3	4	5
A combination of Fundamental & Technical Analysis	1	2	3	4	5
Models for setting up the portfolio	1	2	3	4	5

Other (specify)

B4 To what degree do you think these factors are accurate in predicting the future value of stock prices (in long term)?

(Please fill in each box for every factor)

1 = no accurate
2 = fair accurate
3 = equal
4 = accurate
5 = very accurate

Fundamental Analysis	1	2	3	4	5
Technical Analysis	1	2	3	4	5
A combination of Fundamental & Technical Analysis	1	2	3	4	5
Models for setting up the portfolio	1	2	3	4	5

Other (specify)

B5 To what degree have these factors been used by your company in predicting future stock prices before year 1999?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

Fundamental Analysis	1	2	3	4	5
Technical Analysis	1	2	3	4	5
Both Fundamental & Technical Analysis	1	2	3	4	5
Noise in the market	1	2	3	4	5
Models for setting up the portfolio	1	2	3	4	5
Newspapers / Media	1	2	3	4	5
Instinct / Experience	1	2	3	4	5
Foreign markets	1	2	3	4	5
Government policy	1	2	3	4	5

Other (specify)

B6 To what degree have these factors been used by your company in predicting future stock prices during year 1999?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

Fundamental Analysis	1	2	3	4	5
Technical Analysis	1	2	3	4	5
Both Fundamental & Technical Analysis	1	2	3	4	5
Noise in the market	1	2	3	4	5
Models for setting up the portfolio	1	2	3	4	5
Newspapers / Media	1	2	3	4	5
Instinct / Experience	1	2	3	4	5
Foreign markets	1	2	3	4	5
Government policy	1	2	3	4	5

Other (specify)

B7 To what degree have these factors been used by your company in predicting future stock prices after year 1999?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

Fundamental Analysis	1	2	3	4	5
Technical Analysis	1	2	3	4	5
Both Fundamental & Technical Analysis	1	2	3	4	5
Noise in the market	1	2	3	4	5
Models for setting up the portfolio	1	2	3	4	5
Newspapers / Media	1	2	3	4	5
Instinct / Experience	1	2	3	4	5
Foreign markets	1	2	3	4	5
Government policy	1	2	3	4	5

Other (specify)

B8 To what degree do you think that individual non-professional investors are relying on these factors in order to build their stock portfolios?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

Fundamental Analysis	1	2	3	4	5
Technical Analysis	1	2	3	4	5
Both Fundamental & Technical Analysis	1	2	3	4	5
Noise in the market	1	2	3	4	5
Models for setting up the portfolio	1	2	3	4	5
Newspapers / Media	1	2	3	4	5
Instinct / Experience	1	2	3	4	5
Foreign markets	1	2	3	4	5
Government policy	1	2	3	4	5

Other (specify)

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The following questions are to be answered only by those who use Fundamental Analysis in order to estimate the present and future performance of public companies.

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(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

NOPAT (earnings)	1	2	3	4	5
EPS	1	2	3	4	5
ROI	1	2	3	4	5
ROE	1	2	3	4	5
P/E ratio	1	2	3	4	5

Other (specify)

C2 Which Profit Based Measures did you use during 1999 and to which degree?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

NOPAT (earnings)	1	2	3	4	5
EPS	1	2	3	4	5
ROI	1	2	3	4	5
ROE	1	2	3	4	5
P/E ratio	1	2	3	4	5

Other (specify)

C3 Which Profit Based Measures did you use after 1999 and to which degree?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

NOPAT (earnings)	1	2	3	4	5
EPS	1	2	3	4	5
ROI	1	2	3	4	5
ROE	1	2	3	4	5
P/E ratio	1	2	3	4	5

Other (specify)

C4 To what degree do you use the above measures for the evaluation of the companies' implemented strategies?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

1 2 3 4 5

C5 To what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

1 2 3 4 5

C6 Which Value Based Measures did you use before 1999 and to what degree?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

EVA	1	2	3	4	5
SVA	1	2	3	4	5
MVA	1	2	3	4	5

Other (specify)

C7 Which Value Based Measures did you use during 1999 and to what degree?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

EVA	1	2	3	4	5
SVA	1	2	3	4	5
MVA	1	2	3	4	5

Other (specify)

C8 Which Value Based Measures did you use after 1999 and to what degree?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

EVA	1	2	3	4	5
SVA	1	2	3	4	5
MVA	1	2	3	4	5

Other (specify)

C9 To what degree do you use the above measures for the evaluation of the companies' implemented strategies?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

1 2 3 4 5

C10 To what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

1 2 3 4 5

C11 Which Other Measures did you use before 1999 and to what degree?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

NPV	1	2	3	4	5
IRR	1	2	3	4	5
Payback	1	2	3	4	5
DDM	1	2	3	4	5
CFROI	1	2	3	4	5
DCA	1	2	3	4	5
Economic Profit	1	2	3	4	5
Economic Value Management	1	2	3	4	5
CVA	1	2	3	4	5

Other (specify)

C12 Which Other Measures did you use during 1999 and to what degree? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	NPV 1 2 3 4 5 IRR 1 2 3 4 5 Payback 1 2 3 4 5 DDM 1 2 3 4 5 CFROI 1 2 3 4 5 DCA 1 2 3 4 5 Economic Profit 1 2 3 4 5 Economic Value Management 1 2 3 4 5 CVA 1 2 3 4 5 Other (specify)
C13 Which Other Measures have you used after 1999 and to what degree? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	NPV 1 2 3 4 5 IRR 1 2 3 4 5 Payback 1 2 3 4 5 DDM 1 2 3 4 5 CFROI 1 2 3 4 5 DCA 1 2 3 4 5 Economic Profit 1 2 3 4 5 Economic Value Management 1 2 3 4 5 CVA 1 2 3 4 5 Other (specify)
C14 To what degree do you use the above measures for the evaluation of the companies' implemented strategies? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	1 2 3 4 5
C15 To what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies? **(Please fill in each box for every factor)** **1 = not at all** **2 = sometimes** **3 = often** **4 = very often** **5 = always**	1 2 3 4 5

C16 To which extent does CAPM analysis affect your decisions about stock valuation?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

1 2 3 4 5

SECTION D: QUESTIONS TO BE ANSWERED BY THOSE WHO USE TECHNICAL ANALYSIS

The following questions are to be answered only by those who use Technical Analysis in order to estimate the future value of stocks.

D1 To what degree do you use the beside described factors?

(Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

Chart analysis	1	2	3	4	5
Technical indicators	1	2	3	4	5
Moving averages	1	2	3	4	5
Relative Strength Index (RSI)	1	2	3	4	5
Bollinger bands	1	2	3	4	5
MACD (Moving Average Convergence Divergence)	1	2	3	4	5
Momentum	1	2	3	4	5
On balance volume (OBV)	1	2	3	4	5
Parabolic sar	1	2	3	4	5
Stochastic oscillator	1	2	3	4	5

Other (specify)

D2 To what degree do you use the above method for the evaluation of the companies' implemented strategies?

Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

1 2 3 4 5

D3 **To what degree do you use the above method for the evaluation of the companies' proposed (future) strategies?**

Please fill in each box for every factor)

1 = not at all
2 = sometimes
3 = often
4 = very often
5 = always

1 2 3 4 5

FINAL QUESTION

As compared to the performance of the market (CSPI), how would you term the performance of the strategy you have adopted in the past?

(you can use the full scale from 1 to 10)

1 = unsuccessful
5 = neutral
10 = successful

1 2 3 4 5 6 7 8 9 10

Please return this survey using one of the following ways:

a. Using the enclosed postage paid envelope

b. By fax (2510-462156 and 2510-462186)

Thank you for your time in the completion of this questionnaire

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Would you like the results of this survey to be sent to you?

Yes ☐ **No** ☐

Performance Measures and Stock Price Movements: The case of ASE – Greece

A research project being conducted by:

the UNIVERSITY of GREENWICH

The Business School

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Ημερομηνία, 10-12-2003

Εισαγωγή

- Σκοπός αυτής της μελέτης είναι η κατανόηση της στρατηγικής που ακολουθούν οι διάφορες εταιρίες για την αξιολόγηση των μετοχών των εισηγμένων επιχειρήσεων.

- Το βασικό μας ενδιαφέρον βρίσκεται στον προσδιορισμό του κατά πόσο τα μέτρα που βασίζονται στην αξία (value based measures) και τα μέτρα που βασίζονται στο κέρδος (profit based measures) επηρεάζουν την στρατηγική αξιολόγησης.

- Οι απαντήσεις που θα δοθούν είναι αυστηρά εμπιστευτικές.

- Παρακαλώ συμπληρώστε το παρακάτω ερωτηματολόγιο (απαιτεί 15 με 20 λεπτά από τον χρόνο σας) και επιστρέψτε το μέσα σε 7 μέρες, μέσω e-mail (dmadi@teikav.edu.gr) ή fax στο 2510-462156 και 2510-462186. Σε περίπτωση που έχετε οποιαδήποτε ερώτηση, επικοινωνήστε με τον κύριο Δημήτριο Ι. Μαδυτινό στο 2510-462219, 25940-22141 ή 6946363250 ή στο mail dmadi@teikav.edu.gr

- Σας ευχαριστούμε ειλικρινά για τον χρόνο και τις σκέψεις σας. Τα αποτελέσματα της έρευνας μπορούν να σας αποσταλούν έπειτα από γραπτή σας απαίτηση.

ΜΕΡΟΣ Α: ΓΕΝΙΚΕΣ ΕΡΩΤΗΣΕΙΣ

Το πρώτο από τα τέσσερα μέρη του ερωτηματολογίου είναι χωρισμένο σε δύο υποενότητες, εκ των οποίων η πρώτη περιλαμβάνει πληροφορίες για το πρόσωπο που το συμπληρώνει και η δεύτερη πληροφορίες για την εταιρία στην οποία εργάζεται.

1. ΠΛΗΡΟΦΟΡΙΕΣ ΠΟΥ ΑΦΟΡΟΥΝ ΤΟ ΠΡΟΣΩΠΟ ΠΟΥ ΣΥΜΠΛΗΡΩΝΕΙ ΤΟ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ

Α1 Θέση στην ετσ	Γενικός Διευθυντής ☐ Οικονομικός διευθυντής ☐ Μέτοχος ☐ Άλλο (προσδιορίστε)
Α2 Σπουδές.	Λύκειο ☐ Ι.Ε.Κ ☐ Πτυχίο ΤΕΙ/ Πανεπιστημίου ☐ Master ☐ PhD ☐
Α3 Χρόνια εμπειρίας στα χρηματοοικονομικά (συνολικά).	
Α4 Χρόνια εμπειρίας στην συγκεκριμένη εταιρία.	

2. ΠΛΗΡΟΦΟΡΙΕΣ ΠΟΥ ΑΦΟΡΟΥΝ ΤΗΝ ΕΤΑΙΡΙΑ ΣΤΗΝ ΟΠΟΙΑ ΕΡΓΑΖΕΤΑΙ

Α5 Ονομασία εταιρίας.	
Α6 Έτος ίδρυσης.	
Α7 Αριθμός υπαλλήλων το 2004.	
Α8 Κλάδος στο ΧΑΑ (αν είναι εισηγμένη).	
Α9 Κύρια ή Παράλληλη αγορά.	Κύρια αγορά ☐ Παράλληλη αγορά ☐

ΜΕΡΟΣ Β: ΒΑΣΙΚΟ ΣΕΤ ΕΡΩΤΗΣΕΩΝ

B1 Σε ποιο βαθμό επηρεάζουν αυτοί οι παράγοντες την προσέγγιση σας στην αξιολόγηση της τιμής των μετοχών; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = πολύ λίγο** **3 = μέτρια** **4 = πολύ** **5 = πάρα πολύ**	Θεμελιώδης ανάλυση 0 Τεχνική ανάλυση 0 *Και* Θεμελιώδης *και* Τεχνική ανάλυση 0 Φήμες που κυκλοφορούν στην αγορά 0 Μοντέλα για την διαμόρφωση του χαρτοφυλακίου 0 Εφημερίδες / ΜΜΕ 0 Ένστικτο / Εμπειρία 0 Αγορές του εξωτερικού 0 Κυβερνητική πολιτική 0 Άλλο (προσδιορίστε)
B2 Σε ποιο βαθμό χρησιμοποιείτε Θεμελιώδη ή / και Τεχνική Ανάλυση; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = πολύ λίγο** **3 = μέτρια** **4 = πολύ** **5 = πάρα πολύ**	Θεμελιώδης ανάλυση 0 Τεχνική ανάλυση 0
B3 Σε ποιο βαθμό πιστεύετε ότι αυτοί οι παράγοντες είναι ακριβείς στην πρόβλεψη των μελλοντικών τιμών των μετοχών (σε βραχυχρόνια βάση); **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου ακριβείς** **2 = λίγο ακριβείς** **3 = ουδέτεροι** **4 = ακριβείς** **5 = πολύ ακριβείς**	Θεμελιώδης ανάλυση 0 Τεχνική ανάλυση 0 Ένας συνδυασμός της Θεμελιώδους και της Τεχνικής ανάλυσης 0 Μοντέλα για την διαμόρφωση του χαρτοφυλακίου 0 Άλλο (προσδιορίστε)
B4 Σε ποιο βαθμό πιστεύετε ότι αυτοί οι παράγοντες είναι ακριβείς στην πρόβλεψη των μελλοντικών τιμών των μετοχών (σε μακροχρόνια βάση); **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου ακριβείς** **2 = λίγο ακριβείς** **3 = ουδέτεροι** **4 = ακριβείς** **5 = πολύ ακριβείς**	Θεμελιώδης ανάλυση 0 Τεχνική ανάλυση 0 Ένας συνδυασμός της Θεμελιώδους και της Τεχνικής ανάλυσης 0 Μοντέλα για την διαμόρφωση του χαρτοφυλακίου 0 Άλλο (προσδιορίστε)

Β5 Σε ποιο βαθμό χρησιμοποιήθηκαν από την επιχείρησή σας αυτοί οι παράγοντες για την πρόβλεψη των τιμών των μετοχών πριν το 1999;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

Θεμελιώδης ανάλυση	0
Τεχνική ανάλυση	0
Και Θεμελιώδης *και* Τεχνική ανάλυση	0
Φήμες που κυκλοφορούν στην αγορά	0
Μοντέλα για την διαμόρφωση του χαρτοφυλακίου	0
Εφημερίδες / ΜΜΕ	0
Ένστικτο / Εμπειρία	0
Αγορές του εξωτερικού	0
Κυβερνητική πολιτική	0
Άλλο (προσδιορίστε)	

Β6 Σε ποιο βαθμό χρησιμοποιήθηκαν από την επιχείρησή σας αυτοί οι παράγοντες για την πρόβλεψη των τιμών των μετοχών κατά την διάρκεια του 1999;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

Θεμελιώδης ανάλυση	0
Τεχνική ανάλυση	0
Και Θεμελιώδης *και* Τεχνική ανάλυση	0
Φήμες που κυκλοφορούν στην αγορά	0
Μοντέλα για την διαμόρφωση του χαρτοφυλακίου	0
Εφημερίδες / ΜΜΕ	0
Ένστικτο / Εμπειρία	0
Αγορές του εξωτερικού	0
Κυβερνητική πολιτική	0
Άλλο (προσδιορίστε)	

Β7 Σε ποιο βαθμό χρησιμοποιήθηκαν από την επιχείρησή σας αυτοί οι παράγοντες για την πρόβλεψη των τιμών των μετοχών μετά το 1999;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

Θεμελιώδης ανάλυση	0
Τεχνική ανάλυση	0
Και Θεμελιώδης *και* Τεχνική ανάλυση	0
Φήμες που κυκλοφορούν στην αγορά	0
Μοντέλα για την διαμόρφωση του χαρτοφυλακίου	0
Εφημερίδες / ΜΜΕ	0
Ένστικτο / Εμπειρία	0
Αγορές του εξωτερικού	0
Κυβερνητική πολιτική	0
Άλλο (προσδιορίστε)	

B8 Σε ποιο βαθμό πιστεύετε ότι οι ιδιώτες (μη επαγγελματίες) επενδυτές στηρίζονται σε αυτούς τους παράγοντες προκειμένου να διαμορφώσουν το χαρτοφυλάκιό τους; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	Θεμελιώδης ανάλυση 0 Τεχνική ανάλυση 0 *Και* Θεμελιώδης *και* Τεχνική ανάλυση 0 Φήμες που κυκλοφορούν στην αγορά 0 Μοντέλα για την διαμόρφωση του χαρτοφυλακίου 0 Εφημερίδες / ΜΜΕ 0 Ένστικτο / Εμπειρία 0 Αγορές του εξωτερικού 0 Κυβερνητική πολιτική 0 Άλλο (προσδιορίστε)

ΜΕΡΟΣ Γ: ΕΡΩΤΗΣΕΙΣ ΠΟΥ ΣΥΜΠΛΗΡΩΝΟΝΤΑΙ ΜΟΝΟ ΑΠΟ ΑΥΤΟΥΣ ΠΟΥ ΧΡΗΣΙΜΟΠΟΙΟΥΝ ΘΕΜΕΛΙΩΔΗ ΑΝΑΛΥΣΗ

Οι παρακάτω ερωτήσεις συμπληρώνονται από αυτούς που χρησιμοποιούν την θεμελιώδη ανάλυση προκειμένου να υπολογίσουν την παρούσα και / ή την μελλοντική απόδοση των μετοχών των εισηγμένων εταιριών.

Γ1 Ποιά Μέτρα Βασιζόμενα στο Κέρδος χρησιμοποιούσατε πριν το 1999 και σε ποιο βαθμό; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	NOPAT (earnings) 0 EPS 0 ROI 0 ROE 0 P/E ratio 0 Άλλο (προσδιορίστε)
Γ2 Ποιά Μέτρα Βασιζόμενα στο Κέρδος χρησιμοποιούσατε κατά την διάρκεια του 1999 και σε ποιο βαθμό; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	NOPAT (earnings) 0 EPS 0 ROI 0 ROE 0 P/E ratio 0 Άλλο (προσδιορίστε)

Γ3 Ποια Μέτρα Βασιζόμενα στο Κέρδος χρησιμοποιείτε μετά το 1999 και σε ποιο βαθμό; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	NOPAT (earnings) 0 EPS 0 ROI 0 ROE 0 P/E ratio 0 Άλλο (προσδιορίστε)
Γ4 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των εφαρμοζόμενων στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	0
Γ5 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των προτεινόμενων (μελλοντικών) στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	0
Γ6 Ποιά Μέτρα Βασιζόμενα στην Αξία χρησιμοποιούσατε πριν το 1999 και σε ποιο βαθμό; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	EVA 0 SVA 0 MVA 0 Άλλο (προσδιορίστε)

Γ7 Ποιά Μέτρα Βασιζόμενα στην Αξία χρησιμοποιούσατε κατά την διάρκεια του 1999 και σε ποιο βαθμό; **(Παρακαλώ συμπληρώστε κάθε μια από τις** προτεινόμενες επιλογές) **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	EVA 0 SVA 0 MVA 0 Άλλο (προσδιορίστε)
Γ8 Ποιά Μέτρα Βασιζόμενα στην Αξία χρησιμοποιείτε μετά το 1999 και σε ποιο βαθμό; **(Παρακαλώ συμπληρώστε κάθε μια από τις** προτεινόμενες επιλογές) **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	EVA 0 SVA 0 MVA 0 Άλλο (προσδιορίστε)
Γ9 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των εφαρμοζόμενων στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις** προτεινόμενες επιλογές) **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	0
Γ10 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των προτεινόμενων (μελλοντικών) στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις** προτεινόμενες επιλογές) **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	0

Γ11 Ποιά άλλα μέτρα χρησιμοποιούσατε πριν το 1999 και σε ποιο βαθμό;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

NPV	0
IRR	0
Payback	0
DDM	0
CFROI	0
DCA	0
Economic Profit	0
Economic Value Management	0
CVA	0
Άλλο (προσδιορίστε)	

Γ12 Ποια άλλα μέτρα χρησιμοποιούσατε κατά την διάρκεια του 1999 και σε ποιο βαθμό;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

NPV	0
IRR	0
Payback	0
DDM	0
CFROI	0
DCA	0
Economic Profit	0
Economic Value Management	0
CVA	0
Άλλο (προσδιορίστε)	

Γ13 Ποια άλλα μέτρα χρησιμοποιείτε μετά το 1999 και σε ποιο βαθμό;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

NPV	0
IRR	0
Payback	0
DDM	0
CFROI	0
DCA	0
Economic Profit	0
Economic Value Management	0
CVA	0
Άλλο (προσδιορίστε)	

Γ14 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των εφαρμοζόμενων στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	0
Γ15 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των προτεινόμενων (μελλοντικών) στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	0
Γ16 Σε ποιο βαθμό η ανάλυση CAPM επηρεάζει τις αποφάσεις σας για την αξιολόγηση των μετοχών; **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	0

ΜΕΡΟΣ Δ: ΕΡΩΤΗΣΕΙΣ ΠΟΥ ΣΥΜΠΛΗΡΩΝΟΝΤΑΙ ΜΟΝΟ ΑΠΟ ΑΥΤΟΥΣ ΠΟΥ ΧΡΗΣΙΜΟΠΟΙΟΥΝ ΤΕΧΝΙΚΗ ΑΝΑΛΥΣΗ

Οι παρακάτω ερωτήσεις συμπληρώνονται από αυτούς που χρησιμοποιούν την τεχνική ανάλυση προκειμένου να υπολογίσουν την μελλοντική απόδοση των μετοχών των εισηγμένων εταιριών.

Δ1 Σε ποιο βαθμό χρησιμοποιείτε τους παράγοντες που περιγράφονται στην διπλανή στήλη;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

Chart analysis	0
Technical indicators	0
Moving averages	0
Relative Strength Index (RSI)	0
Bollinger bands	0
MACD	0
Momentum	0
On balance volume (OBV)	0
Parabolic sar	0
Stochastic oscillator	0

Άλλο (προσδιορίστε)

Δ2 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των εφαρμοζόμενων στρατηγικών των εισηγμένων εταιριών;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

0

Δ3 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των προτεινόμενων (μελλοντικών) στρατηγικών των εισηγμένων εταιριών;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

0

ΤΕΛΕΥΤΑΙΑ ΕΡΩΤΗΣΗ

Ε1 Συγκρινόμενη με την απόδοση και την πορεία του ΧΑΑ, πως θα χαρακτηρίζατε την απόδοση της στρατηγικής που υιοθετήσατε στο παρελθόν όσον αφορά στην πρόβλεψη των μελλοντικών τιμών των μετοχών; **(μπορείτε να χρησιμοποιήσετε την κλίμακα από το 1 έως το 10)** **1 = ανεπιτυχής** **5 = ουδέτερη** **10 = επιτυχής**	0

<u>Παρακαλώ επιστρέψτε το παρόν ερωτηματολόγιο με ένα από τους παρακάτω τρόπους:</u>

α) Μέσω e-mail (dmadi@teikav.edu.gr)

β) Μέσω fax (2510-462156 και 2510-462186)

<u>Ευχαριστούμε για τον χρόνο που διαθέσατε για την ολοκλήρωση του ερωτηματολογίου</u>

Δημήτριος Ι. Μαδυτινός

Καθηγητής εφαρμογών

Τ.Ε.Ι Καβάλας

Σχολή Διοίκησης και Οικονομίας

Τμήμα Διοίκησης Επιχειρήσεων

Άγιος Λουκάς, 654 04, Καβάλα

2510-462219

dmadi@teikav.edu.gr

Επιθυμείτε να σας αποστείλουμε τα αποτελέσματα τις έρευνας;

Διευκρινήστε

Performance Measures and Stock Price Movements: The case of ASE – Greece

A research project being conducted by:

The Business School

First Supervisor

Zeljko Sevic, DJD, PhD (FinEcon)
Reader in Accounting, Finance & Public Policy
Head, Department of Accounting and Finance
The Business School
University of Greenwich, London, UK

Υποψήφιος Διδάκτορας

Δημήτριος Ι. Μαδυτινός
Καθηγητής Εφαρμογών
T.E.I Καβάλας
Σχολή Διοίκησης και Οικονομίας
Τμήμα Διοίκησης Επιχειρήσεων
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2510-462219
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Second Supervisor

Νικόλαος Γ. Θερίου, PhD
Αναπληρωτής Καθηγητής
Προϊστάμενος του Τμήματος Διοίκησης Επιχειρήσεων
T.E.I Καβάλας
Σχολή Διοίκησης και Οικονομίας
Τμήμα Διοίκησης Επιχειρήσεων
Άγιος Λουκάς, 654 04, Καβάλα
2510-462156
ntheriou@teikav.edu.gr

Ημερομηνία, 10-12-2003

Εισαγωγή

- Σκοπός αυτής της μελέτης είναι η κατανόηση της στρατηγικής που ακολουθούν οι διάφορες εταιρίες για την αξιολόγηση των μετοχών των εισηγμένων επιχειρήσεων.

- Το βασικό μας ενδιαφέρον βρίσκεται στον προσδιορισμό του κατά πόσο τα μέτρα που βασίζονται στην αξία (value based measures) και τα μέτρα που βασίζονται στο κέρδος (profit based measures) επηρεάζουν την στρατηγική αξιολόγησης.

- Οι απαντήσεις που θα δοθούν είναι αυστηρά εμπιστευτικές.

- Παρακαλώ συμπληρώστε το παρακάτω ερωτηματολόγιο (απαιτεί 15 με 20 λεπτά από τον χρόνο σας) και επιστρέψτε το μέσα σε 14 μέρες με ταχυδρομείο, χρησιμοποιώντας τον φάκελο με πληρωμένα τέλη που σας αποστείλαμε, ή με fax στο 2510-462156 και 2510-462186. Σε περίπτωση που έχετε οποιαδήποτε ερώτηση, επικοινωνήστε με τον κύριο Δημήτριο Ι. Μαδυτινό στο 2510-462219, 25940-22141, 6946363250 ή στο mail dmadi@teikav.edu.gr

- Σας ευχαριστούμε ειλικρινά για τον χρόνο και τις σκέψεις σας. Τα αποτελέσματα της έρευνας μπορούν να σας αποσταλούν έπειτα από γραπτή σας απαίτηση.

ΜΕΡΟΣ Α: ΓΕΝΙΚΕΣ ΕΡΩΤΗΣΕΙΣ

Το πρώτο από τα τέσσερα μέρη του ερωτηματολογίου είναι χωρισμένο σε δύο υποενότητες, εκ των οποίων η πρώτη περιλαμβάνει πληροφορίες για το πρόσωπο που το συμπληρώνει και η δεύτερη πληροφορίες για την εταιρία στην οποία εργάζεται.

1. ΠΛΗΡΟΦΟΡΙΕΣ ΠΟΥ ΑΦΟΡΟΥΝ ΤΟ ΠΡΟΣΩΠΟ ΠΟΥ ΣΥΜΠΛΗΡΩΝΕΙ ΤΟ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ

Α1 Θέση στην εταιρία.	Γενικός Διευθυντής ☐ Οικονομικός διευθυντής ☐ Μέτοχος ☐ Άλλο (προσδιορίστε)
Α2 Σπουδές.	Λύκειο ☐ Ι.Ε.Κ ☐ Πτυχίο ΤΕΙ/ Πανεπιστημίου ☐ Master ☐ PhD ☐
Α3 Χρόνια εμπειρίας στα χρηματοοικονομικά (συνολικά).	....
Α4 Χρόνια εμπειρίας στην συγκεκριμένη εταιρία.	....

2. ΠΛΗΡΟΦΟΡΙΕΣ ΠΟΥ ΑΦΟΡΟΥΝ ΤΗΝ ΕΤΑΙΡΙΑ ΣΤΗΝ ΟΠΟΙΑ ΕΡΓΑΖΕΤΑΙ

Α5 Ονομασία εταιρίας.	....
Α6 Έτος ίδρυσης.	....
Α7 Αριθμός υπαλλήλων το 2004.	....
Α8 Κλάδος στο ΧΑΑ (αν είναι εισηγμένη).	....
Α9 Κύρια ή Παράλληλη αγορά.	Κύρια αγορά ☐ Παράλληλη αγορά ☐

ΜΕΡΟΣ Β: ΒΑΣΙΚΟ ΣΕΤ ΕΡΩΤΗΣΕΩΝ

Β1 Σε ποιο βαθμό επηρεάζουν αυτοί οι παράγοντες την προσέγγιση σας στην αξιολόγηση της τιμής των μετοχών;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = πολύ λίγο
3 = μέτρια
4 = πολύ
5 = πάρα πολύ

Θεμελιώδης ανάλυση	1	2	3	4	5
Τεχνική ανάλυση	1	2	3	4	5
Και Θεμελιώδης *και* Τεχνική ανάλυση	1	2	3	4	5
Φήμες που κυκλοφορούν στην αγορά	1	2	3	4	5
Μοντέλα για την διαμόρφωση του χαρτοφυλακίου	1	2	3	4	5
Εφημερίδες / ΜΜΕ	1	2	3	4	5
Ένστικτο / Εμπειρία	1	2	3	4	5
Αγορές του εξωτερικού	1	2	3	4	5
Κυβερνητική πολιτική	1	2	3	4	5

Άλλο (προσδιορίστε) ....

Β2 Σε ποιο βαθμό χρησιμοποιείτε Θεμελιώδη ή / και Τεχνική Ανάλυση;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = πολύ λίγο
3 = μέτρια
4 = πολύ
5 = πάρα πολύ

Θεμελιώδης ανάλυση	1	2	3	4	5
Τεχνική ανάλυση	1	2	3	4	5

Β3 Σε ποιο βαθμό πιστεύετε ότι αυτοί οι παράγοντες είναι ακριβείς στην πρόβλεψη των μελλοντικών τιμών των μετοχών (σε βραχυχρόνια βάση);

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου ακριβείς
2 = λίγο ακριβείς
3 = ουδέτεροι
4 = ακριβείς
5 = πολύ ακριβείς

Θεμελιώδης ανάλυση	1	2	3	4	5
Τεχνική ανάλυση	1	2	3	4	5
Ένας συνδυασμός της Θεμελιώδους και της Τεχνικής ανάλυσης	1	2	3	4	5
Μοντέλα για την διαμόρφωση του χαρτοφυλακίου	1	2	3	4	5

Άλλο (προσδιορίστε) ....

Β4 Σε ποιο βαθμό πιστεύετε ότι αυτοί οι παράγοντες είναι ακριβείς στην πρόβλεψη των μελλοντικών τιμών των μετοχών (σε μακροχρόνια βάση);

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου ακριβείς
2 = λίγο ακριβείς
3 = ουδέτεροι
4 = ακριβείς
5 = πολύ ακριβείς

Θεμελιώδης ανάλυση	1	2	3	4	5
Τεχνική ανάλυση	1	2	3	4	5
Ένας συνδυασμός της Θεμελιώδους και της Τεχνικής ανάλυσης	1	2	3	4	5
Μοντέλα για την διαμόρφωση του χαρτοφυλακίου	1	2	3	4	5

Άλλο (προσδιορίστε) ....

B5 Σε ποιο βαθμό χρησιμοποιήθηκαν από την επιχείρησή σας αυτοί οι παράγοντες για την πρόβλεψη των τιμών των μετοχών πριν το 1999;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

Θεμελιώδης ανάλυση	1	2	3	4	5
Τεχνική ανάλυση	1	2	3	4	5
Και Θεμελιώδης *και* Τεχνική ανάλυση	1	2	3	4	5
Φήμες που κυκλοφορούν στην αγορά	1	2	3	4	5
Μοντέλα για την διαμόρφωση του χαρτοφυλακίου	1	2	3	4	5
Εφημερίδες / ΜΜΕ	1	2	3	4	5
Ένστικτο / Εμπειρία	1	2	3	4	5
Αγορές του εξωτερικού	1	2	3	4	5
Κυβερνητική πολιτική	1	2	3	4	5

Άλλο (προσδιορίστε) ....

B6 Σε ποιο βαθμό χρησιμοποιήθηκαν από την επιχείρησή σας αυτοί οι παράγοντες για την πρόβλεψη των τιμών των μετοχών κατά την διάρκεια του 1999;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

Θεμελιώδης ανάλυση	1	2	3	4	5
Τεχνική ανάλυση	1	2	3	4	5
Και Θεμελιώδης *και* Τεχνική ανάλυση	1	2	3	4	5
Φήμες που κυκλοφορούν στην αγορά	1	2	3	4	5
Μοντέλα για την διαμόρφωση του χαρτοφυλακίου	1	2	3	4	5
Εφημερίδες / ΜΜΕ	1	2	3	4	5
Ένστικτο / Εμπειρία	1	2	3	4	5
Αγορές του εξωτερικού	1	2	3	4	5
Κυβερνητική πολιτική	1	2	3	4	5

Άλλο (προσδιορίστε) ....

B7 Σε ποιο βαθμό χρησιμοποιήθηκαν από την επιχείρησή σας αυτοί οι παράγοντες για την πρόβλεψη των τιμών των μετοχών μετά το 1999;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

Θεμελιώδης ανάλυση	1	2	3	4	5
Τεχνική ανάλυση	1	2	3	4	5
Και Θεμελιώδης *και* Τεχνική ανάλυση	1	2	3	4	5
Φήμες που κυκλοφορούν στην αγορά	1	2	3	4	5
Μοντέλα για την διαμόρφωση του χαρτοφυλακίου	1	2	3	4	5
Εφημερίδες / ΜΜΕ	1	2	3	4	5
Ένστικτο / Εμπειρία	1	2	3	4	5
Αγορές του εξωτερικού	1	2	3	4	5
Κυβερνητική πολιτική	1	2	3	4	5

Άλλο (προσδιορίστε) ....

B8 Σε ποιο βαθμό πιστεύετε ότι οι ιδιώτες (μη επαγγελματίες) επενδυτές στηρίζονται σε αυτούς τους παράγοντες προκειμένου να διαμορφώσουν το χαρτοφυλάκιο τους;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

Θεμελιώδης ανάλυση	1	2	3	4	5
Τεχνική ανάλυση	1	2	3	4	5
Και Θεμελιώδης *και* Τεχνική ανάλυση	1	2	3	4	5
Φήμες που κυκλοφορούν στην αγορά	1	2	3	4	5
Μοντέλα για την διαμόρφωση του χαρτοφυλακίου	1	2	3	4	5
Εφημερίδες / ΜΜΕ	1	2	3	4	5
Ένστικτο / Εμπειρία	1	2	3	4	5
Αγορές του εξωτερικού	1	2	3	4	5
Κυβερνητική πολιτική	1	2	3	4	5

Άλλο (προσδιορίστε) ....

ΜΕΡΟΣ Γ: ΕΡΩΤΗΣΕΙΣ ΠΟΥ ΣΥΜΠΛΗΡΩΝΟΝΤΑΙ ΜΟΝΟ ΑΠΟ ΑΥΤΟΥΣ ΠΟΥ ΧΡΗΣΙΜΟΠΟΙΟΥΝ ΘΕΜΕΛΙΩΔΗ ΑΝΑΛΥΣΗ

Οι παρακάτω ερωτήσεις συμπληρώνονται από αυτούς που χρησιμοποιούν την θεμελιώδη ανάλυση προκειμένου να υπολογίσουν την παρούσα και / ή την μελλοντική απόδοση των μετοχών των εισηγμένων εταιριών.

Γ1 Ποιά Μέτρα Βασιζόμενα στο Κέρδος χρησιμοποιούσατε πριν το 1999 και σε ποιο βαθμό;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

NOPAT (earnings)	1	2	3	4	5
EPS	1	2	3	4	5
ROI	1	2	3	4	5
ROE	1	2	3	4	5
P/E ratio	1	2	3	4	5

Άλλο (προσδιορίστε) ....

Γ2 Ποιά Μέτρα Βασιζόμενα στο Κέρδος χρησιμοποιούσατε κατά την διάρκεια του 1999 και σε ποιο βαθμό;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

NOPAT (earnings)	1	2	3	4	5
EPS	1	2	3	4	5
ROI	1	2	3	4	5
ROE	1	2	3	4	5
P/E ratio	1	2	3	4	5

Άλλο (προσδιορίστε) ....

Γ3 Ποια Μέτρα Βασιζόμενα στο Κέρδος χρησιμοποιείτε μετά το 1999 και σε ποιο βαθμό;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

NOPAT (earnings)	1 2 3 4 5
EPS	1 2 3 4 5
ROI	1 2 3 4 5
ROE	1 2 3 4 5
P/E ratio	1 2 3 4 5

Άλλο (προσδιορίστε) ....

Γ4 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των εφαρμοζόμενων στρατηγικών των εισηγμένων εταιριών;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

1 2 3 4 5

Γ5 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των προτεινόμενων (μελλοντικών) στρατηγικών των εισηγμένων εταιριών;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

1 2 3 4 5

Γ6 Ποιά Μέτρα Βασιζόμενα στην Αξία χρησιμοποιούσατε πριν το 1999 και σε ποιο βαθμό;

(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)

1 = καθόλου
2 = κάποιες φορές
3 = συχνά
4 = πολύ συχνά
5 = πάντα

EVA	1 2 3 4 5
SVA	1 2 3 4 5
MVA	1 2 3 4 5

Άλλο (προσδιορίστε) ....

Γ7 Ποιά Μέτρα Βασιζόμενα στην Αξία χρησιμοποιούσατε κατά την διάρκεια του 1999 και σε ποιο βαθμό; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	EVA 1 2 3 4 5 SVA 1 2 3 4 5 MVA 1 2 3 4 5 Άλλο (προσδιορίστε) ....
Γ8 Ποιά Μέτρα Βασιζόμενα στην Αξία χρησιμοποιείτε μετά το 1999 και σε ποιο βαθμό; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	EVA 1 2 3 4 5 SVA 1 2 3 4 5 MVA 1 2 3 4 5 Άλλο (προσδιορίστε) ....
Γ9 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των εφαρμοζόμενων στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	1 2 3 4 5
Γ10 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των προτεινόμενων (μελλοντικών) στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	1 2 3 4 5

Γ11 Ποιά άλλα μέτρα χρησιμοποιούσατε πριν το 1999 και σε ποιο βαθμό; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	NPV 1 2 3 4 5 IRR 1 2 3 4 5 Payback 1 2 3 4 5 DDM 1 2 3 4 5 CFROI 1 2 3 4 5 DCA 1 2 3 4 5 Economic Profit 1 2 3 4 5 Economic Value Management 1 2 3 4 5 CVA 1 2 3 4 5 Άλλο (προσδιορίστε) ....
Γ12 Ποια άλλα μέτρα χρησιμοποιούσατε κατά την διάρκεια του 1999 και σε ποιο βαθμό; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	NPV 1 2 3 4 5 IRR 1 2 3 4 5 Payback 1 2 3 4 5 DDM 1 2 3 4 5 CFROI 1 2 3 4 5 DCA 1 2 3 4 5 Economic Profit 1 2 3 4 5 Economic Value Management 1 2 3 4 5 CVA 1 2 3 4 5 Άλλο (προσδιορίστε) ....
Γ13 Ποια άλλα μέτρα χρησιμοποιείτε μετά το 199 και σε ποιο βαθμό; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	NPV 1 2 3 4 5 IRR 1 2 3 4 5 Payback 1 2 3 4 5 DDM 1 2 3 4 5 CFROI 1 2 3 4 5 DCA 1 2 3 4 5 Economic Profit 1 2 3 4 5 Economic Value Management 1 2 3 4 5 CVA 1 2 3 4 5 Άλλο (προσδιορίστε) ....

Γ14 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των εφαρμοζόμενων στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	1 2 3 4 5
Γ15 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των προτεινόμενων (μελλοντικών) στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	1 2 3 4 5
Γ16 Σε ποιο βαθμό η ανάλυση CAPM επηρεάζει τις αποφάσεις σας για την αξιολόγηση των μετοχών; **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	1 2 3 4 5

ΜΕΡΟΣ Δ: ΕΡΩΤΗΣΕΙΣ ΠΟΥ ΣΥΜΠΛΗΡΩΝΟΝΤΑΙ ΜΟΝΟ ΑΠΟ ΑΥΤΟΥΣ ΠΟΥ ΧΡΗΣΙΜΟΠΟΙΟΥΝ ΤΕΧΝΙΚΗ ΑΝΑΛΥΣΗ

Οι παρακάτω ερωτήσεις συμπληρώνονται από αυτούς που χρησιμοποιούν την τεχνική ανάλυση προκειμένου να υπολογίσουν την μελλοντική απόδοση των μετοχών των εισηγμένων εταιριών.

Δ1 Σε ποιο βαθμό χρησιμοποιείτε τους παράγοντες που περιγράφονται στην διπλανή στήλη; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	Chart analysis 1 2 3 4 5 Technical indicators 1 2 3 4 5 Moving averages 1 2 3 4 5 Relative Strength Index (RSI) 1 2 3 4 5 Bollinger bands 1 2 3 4 5 MACD 1 2 3 4 5 Momentum 1 2 3 4 5 On balance volume (OBV) 1 2 3 4 5 Parabolic sar 1 2 3 4 5 Stochastic oscillator 1 2 3 4 5 Άλλο (προσδιορίστε) ....
Δ2 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των εφαρμοζόμενων στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	1 2 3 4 5
Δ3 Σε ποιο βαθμό χρησιμοποιείτε τα παραπάνω μέτρα για την αξιολόγηση των προτεινόμενων (μελλοντικών) στρατηγικών των εισηγμένων εταιριών; **(Παρακαλώ συμπληρώστε κάθε μια από τις προτεινόμενες επιλογές)** **1 = καθόλου** **2 = κάποιες φορές** **3 = συχνά** **4 = πολύ συχνά** **5 = πάντα**	1 2 3 4 5

ΤΕΛΕΥΤΑΙΑ ΕΡΩΤΗΣΗ

Ε1 Συγκρινόμενη με την απόδοση και την πορεία του ΧΑΑ, πως θα χαρακτηρίζατε την απόδοση της στρατηγικής που υιοθετήσατε στο παρελθόν όσον αφορά στην πρόβλεψη των μελλοντικών τιμών των μετοχών; **(μπορείτε να χρησιμοποιήσετε την κλίμακα από το 1 έως το 10)** **1 = ανεπιτυχής** **5 = ουδέτερη** **10 = επιτυχής**	1 2 3 4 5 6 7 8 9 10

Παρακαλώ επιστρέψτε το παρόν ερωτηματολόγιο με ένα από τους παρακάτω τρόπους:

α) Χρησιμοποιώντας τον φάκελο πληρωμένων τελών που σας έχουμε αποστείλει

β) Μέσω fax (2510-462156 και 2510-462186)

Ευχαριστούμε για τον χρόνο που διαθέσατε για την ολοκλήρωση του ερωτηματολογίου

Δημήτριος Ι. Μαδυτινός
Καθηγητής εφαρμογών
Τ.Ε.Ι Καβάλας
Σχολή Διοίκησης και Οικονομίας
Τμήμα Διοίκησης Επιχειρήσεων
Άγιος Λουκάς, 654 04, Καβάλα
2510-462219
dmadi@teikav.edu.gr

Επιθυμείτε να σας αποστείλουμε τα αποτελέσματα τις έρευνας;

Ναι ☐ **Όχι** ☐

B3. Incremental / One Traditional Measure + One Value-Based Measure

Model (11) : $Returns_t = l_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{11t}$

Model (12) : $Returns_t = m_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + e_1\, SVA/P_{t-1} + u_{12t}$

Model (13) : $Returns_t = n_0 + b_1\, ROI + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{13t}$

Model (14) : $Returns_t = o_0 + b_1\, ROI + b_2\, \Delta ROI + e_1\, SVA/P_{t-1} + u_{14t}$

Model (15) : $Returns_t = p_0 + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{15t}$

Model (16) : $Returns_t = q_0 + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{16t}$

B4. Incremental / One Traditional Measure + Two Value-Based Measures

Model (17) : $Returns_t = r_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{17t}$

Model (18) : $Returns_t = s_0 + b_1\, ROI + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{18t}$

Model (19) : $Returns_t = t_0 + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{19t}$

B5. Incremental / Two Traditional Measures + One Value-Based Measure ($d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1}$)

Model (20) : $Returns_t = u_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{20t}$

Model (21) : $Returns_t = v_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{21t}$

Model (22) : $Returns_t = w_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{22t}$

Appendix III: The Series of Equations –Regression Models- (1) to (31),

Constructing the Model for the First Part of the Empirical Study

A. Relative / All Performance Measures

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

Model (2) : $Returns_t = b_0 + b_1\, ROI + b_2\, \Delta ROI + u_{2t}$

Model (3) : $Returns_t = c_0 + c_1\, ROE + c_2\, \Delta ROE + u_{3t}$

Model (4) : $Returns_t = d_0 + d_1 EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{4t}$

Model (5) : $Returns_t = e_0 + e_1\, SVA/P_{t-1} + u_{5t}$

B1. Incremental / Traditional Performance Measures

Model (6) : $Returns_t = f_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + u_{6t}$

Model (7) : $Returns_t = g_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + u_{7t}$

Model (8) : $Returns_t = h_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + u_{8t}$

Model (9) : $Returns_t = i_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + u_{9t}$

B2. Incremental / Value-Based Performance Measures

Model (10) : $Returns_t = k_0 + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{10t}$

B6. Incremental / Two Traditional Measures + One Value-Based Measure ($e_1\,SVA/P_{t-1}$)

Model (23) : $Returns_t = x_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + e_1\,SVA/P_{t-1} + u_{23t}$

Model (24) : $Returns_t = y_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + c_1\,ROE + c_2\,\Delta ROE + e_1\,SVA/P_{t-1} + u_{24t}$

Model (25) : $Returns_t = z_0 + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + e_1\,SVA/P_{t-1} + u_{25t}$

B7. Incremental / Two Traditional Measures + Two Value-Based Measures

Model (26) : $Returns_t = \beta_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{26t}$

Model (27) : $Returns_t = \gamma_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{27t}$

Model (28) : $Returns_t = \delta_0 + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{28t}$

B8. Incremental / Three Traditional Measures + One Value-Based Measure

Model (29) : $Returns_t = \varepsilon_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{29t}$

Model (30) : $Returns_t = \zeta_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + e_1\,SVA/P_{t-1} + u_{30t}$

B9. Incremental / Three Traditional Measures + Two Value-Based Measures

Model (31) : $Returns_t = \eta_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{31t}$

Appendix IV:

Companies included in the sample and the years of participation of each of them

	STOCKS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1	ALBIO HOLDINGS S.A. (CR)										
2	ALFA ALFA ENERGY S.A. (CB)										
3	ALTEC S.A. (CR)										
4	CHIPITA INTERNATIONAL S.A. (CR)										
5	COCA-COLA E.E.E. S.A. (CB)										
6	CONNECTION S.A. (CR)										
7	CROWN HELLAS CAN S.A. (CR))										
8	CYCLON HELLAS S.A. (CR)										
9	ELMEC SPORT A.B.E.T.E. (CR)										
10	F.G. EUROPE S.A. (CR)										
11	F.H.L. H. KYRIAKIDIS MARBLES - GRANITES S.A. (CR)										
12	FANCO S.A. (CR)										
13	FLEXOPACK S.A. (CR)										
14	FOLLI - FOLLIE S.A. (CR)										
15	FOURLIS S.A.(CR)										
16	GOODYS S.A. (CB)										
17	Info-Quest S.A. (CR)										
18	INFORM P. LYKOS S.A. (CR)										
19	J. & P. - AVAX S.A. (CR)										
20	JUMBO S.A. (CR)										
21	LAVIPHARM S.A. (CR)										
22	LOGIC DATA INF.SYSTEMS S.A. (CR)										
23	MULTIRAMA S.A.(CR)										
24	NEXANS HELLAS S.A. (CR)										
25	PLIAS CONSUMER GOODS S.A. (CB)										

	STOCKS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
26	RILKEN S.A. (CB)										
27	SATO S.A. (CR)										
28	SEAFARM IONIAN AQUACULTURE S.A. (CB)										
29	STABILTON S.A. (CB)										
30	YALCO - CONSTANTINOY S.A. (CB)										
31	A. KALPINIS - N. SIMOS (C)										
32	HERACLES GEN.CEMENT COMPANY S.A. (CR)										
33	THE HOUSE OF AGRICULTURE SPIROU S.A. (CR)										
34	AEGEK (CR)										
35	ATHENA S.A. (CR)										
36	AKTOR S.A. (CR)										
37	ALCO HELLAS SA (CR)										
38	ALLATINI IND &COM S.A. (CB)										
39	ALUMINIUM OF GREECE S.A. (CR)										
40	ALUMIL MILONAS ALUM. IND. S.A. (CR)										
41	ALTE S.A. (CR)										
42	ALISIDA S.A. (CB)										
43	ALFA-BETA VASSILOPOULOS S.A.(CR)										
44	ANEK LINES S.A. (CR)										
45	TITAN CEMENT COMPANY S.A. (CR)										
46	KARAMOLEGOS BAKERY INDUSTRY S.A. (CR)										
47	ATTI-KAT S.A. (CR)										
48	MINERVA KNITWEAR (CB)										
49	MESOCHORITI BROS S.A.(CR)										
50	VARANGIS S.A. (C.R.)										
51	VIOTER S.A. (CR)										
52	BIOSSOL S.A. (CR)										
53	VIOHALCO (CB)										
54	VIS S.A. (CR)										

	STOCKS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
55	GEN. COMMERCIAL & IND.(CB)										
56	GENER S.A. (CR)										
57	GENERAL CONSTRUCTION COMPANY S.A. (CR)										
58	UNCLE STATHIS S.A. (CR)										
59	DELTA SINGULAR S.A. (CR)										
60	LAMBRAKIS PRESS S.A. (CR)										
61	DIEKAT S.A. (CR)										
62	E. PAIRIS S.A (CR)										
63	EDRASIS - C. PSALLIDAS S.A. (CR)										
64	N.B.G. REAL ESTATE DEVELOPMENT CO. (CR)										
65	EKTER S.A. (CR)										
66	EL. D. MOUZAKIS S.A. (CB)										
67	ELAIS OLEAGINOUS PROD. S.A. (CR)										
68	ELVAL S.A. (CB)										
69	ELVE S.A. (CB)										
70	HELLENIC SUGAR INDUSTRY S.A. (CB)										
71	HELLENIC SUGAR INDUSTRY S.A. (CB)										
72	HELLENIC CABLES S.A. (CR)										
73	HELLENIC PETROLEUM S.A. (CR)										
74	ELLINIKI TECHNODOMIKI TEB AE (CR)										
75	HELLENIC FABRICS S.A. (CR)										
76	ELTRAK S.A. (CB)										
77	ELFICO S.A. (CR)										
78	EMPORIKOS DESMOS S.A. (KR)										
79	EXELIXI S.A. (CR)										
80	SELECTED TEXTILE IND. ASSOC. S.A. (CB)										
81	ERGAS S.A. (CR)										
82	WOOL INDUSTRY TRIA ALFA S.A. (CR)										
83	HERMES REAL ESTATE S.A. (CR)										

	STOCKS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
84	ETEM S.A. (CB)										
85	ETMA RAYON S.A. (CR)										
86	EFKLEIDIS S.A. (CR)										
87	EUROPEAN TECHNICAL S.A. (CR)										
88	ZAMPA S.A. (CB)										
89	THEMELIODOMH S.A. (CR)										
90	J.BOUTARIS & SON HOLDING S.A. (CB)										
91	ATHENS MEDICAL C.S.A. (CR)										
92	IMPERIO S.A. (CR)										
93	INTERSAT S.A. (CR)										
94	INTERTECH S.A. (CR)										
95	INTRACOM S.A. (CR)										
96	IONIAN HOTEL S.A. (CR)										
97	IPPOTOUR S.A. (CB)										
98	SELONDA AQUACULTURE S.A. (CR)										
99	C. CARDASSILARIS & SONS - CARDICO S.A. (CR)										
100	KARELIA TOBACCO COMPANY S.A. (C)										
101	DUTY FREE SHOPS S.A. (CR)										
102	CERAMICS ALLATINI S.A. (CR)										
103	CERAMICS ALLATINI S.A. (CR)										
104	CERAMICS ALLATINI S.A. (CR)										
105	COR-FIL S.A. (CR)										
106	NAOUSSA SPINNING MILLS S.A. (CR)										
107	NAFPAKTOS TEXTILE INDUSTRY S.A. (CB)										
108	KOYMBAS SYNERGY GROUP (CR)										
109	KRE.KA S.A. (CB)										
110	C. SARANTOPOULOS FLOUR MILLS S.A. (CR)										
111	KIRIACOULIS SHIPPING S.A. (CR)										
112	LAMPSA HOTEL S.A. (CR)										

	STOCKS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
113	LANAKAM S.A. (CR)										
114	M. J. MAILLIS S.A. (CR)										
115	MAXIM C.M. PERTSINIDIS (CB)										
116	CH. ROKAS S.A. (CR)										
117	METKA S.A. (CR)										
118	MICHANIKI S.A. (CR)										
119	MINOAN LINES (CR)										
120	MOURIADES S.A. (CB)										
121	MOCHLOS S.A. (CR)										
122	BALAFAS S.A. (CR)										
123	BITROS HOLDING S.A.(CR)										
124	LOULIS MILLS S.A. (CR)										
125	MYTILINEOS HOLDINGS S.A. (CR)										
126	N. LEVEDERIS S.A. (CB)										
127	MARITIME COMPANY OF LESVOS S.A. (CR)										
128	NIREFS S.A. (CR										
129	NICK GALIS S.A. (CR)										
130	DRUCKFARBEN HELLAS S.A. (CR)										
131	XIFIAS S.A. (CB)										
132	XYLEMPORIA S.A. (CB)										
133	KEKROPS S.A. (CR)										
134	O. DARING SAIN (CR)										
135	IDEAL GROUP S.A. (CR)										
136	HELLENIC TELECOM. ORGANISATION (CR)										
137	P.G. NIKAS S.A. (CR)										
138	PANTECHNIKI S.A. (CR)										
139	PARNASSOS ENTERPRISES S.A. (CR)										
140	PETZETAKIS S.A. (CB)										
141	THRACE PLASTICS S.A.(CB)										

	STOCKS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
142	POULIADIS ASSOCIATES S.A.(CR)										
143	PROODEFTIKH TECHNICAL COMPANY S.A. (CR)										
144	RADIO A. KORASSIDIS S.A. (CR)										
145	RIDENCO S.A. (CB)										
146	SANYO HELLAS HOLDING S.A. (CB)										
147	SHELMAN S.A. (CR)										
148	SIDENOR S.A. (FORMER ERLIKON) (CB)										
149	SP. TASOGLOU S.A. (CR)										
150	SFAKIANAKIS S.A. (CR)										
151	CORINTH PIPEWORKS S.A. (CR)										
152	PIPEWORKS GIRAKIAN PROFIL S.A. (CB)										
153	TEXAPRET (CR)										
154	TERNA S.A. (CR)										
155	TECHNODOMI M. TRAVLOS BROS S.A. (CR)										
156	TELETIPOS S.A. (CR)										
157	KATSELIS SONS S.A. BREAD IND. (CR)										
158	FINTEXPORT S.A. (CR)										
159	CH.C. TEGOPOULOS PUBLISHING S.A. (CR)										
160	CH.. BENRUBI S.A. (CR)										
161	HALKOR S.A (FORMER VECTOR) (CB)										
162	SHEET STEEL S.A.(CR)										
163	CHATZIIOANNOU HOLDINGS S.A. (CR)										

Appendix V:

The Database Development and the Calculation of Returns and Betas

As mentioned in chapter four, we purchased from the ATHEX the daily closing prices of all shares, the daily CSPI and the three-month Greek Government Treasury Bill rates (in Excel format). The total daily observations were 845,365 representing a number of 388 shares. Since our sample was focused on the ten years period (1992-2001) and since we needed data starting two years prior to 1992 and ending three months after the fiscal year 2001, we used database techniques to produce our sample. In order to create our sample we developed a new database in which all purchased data (in excel format) was initially imported and then using SQL queries we processed and grouped the data according to our needs.

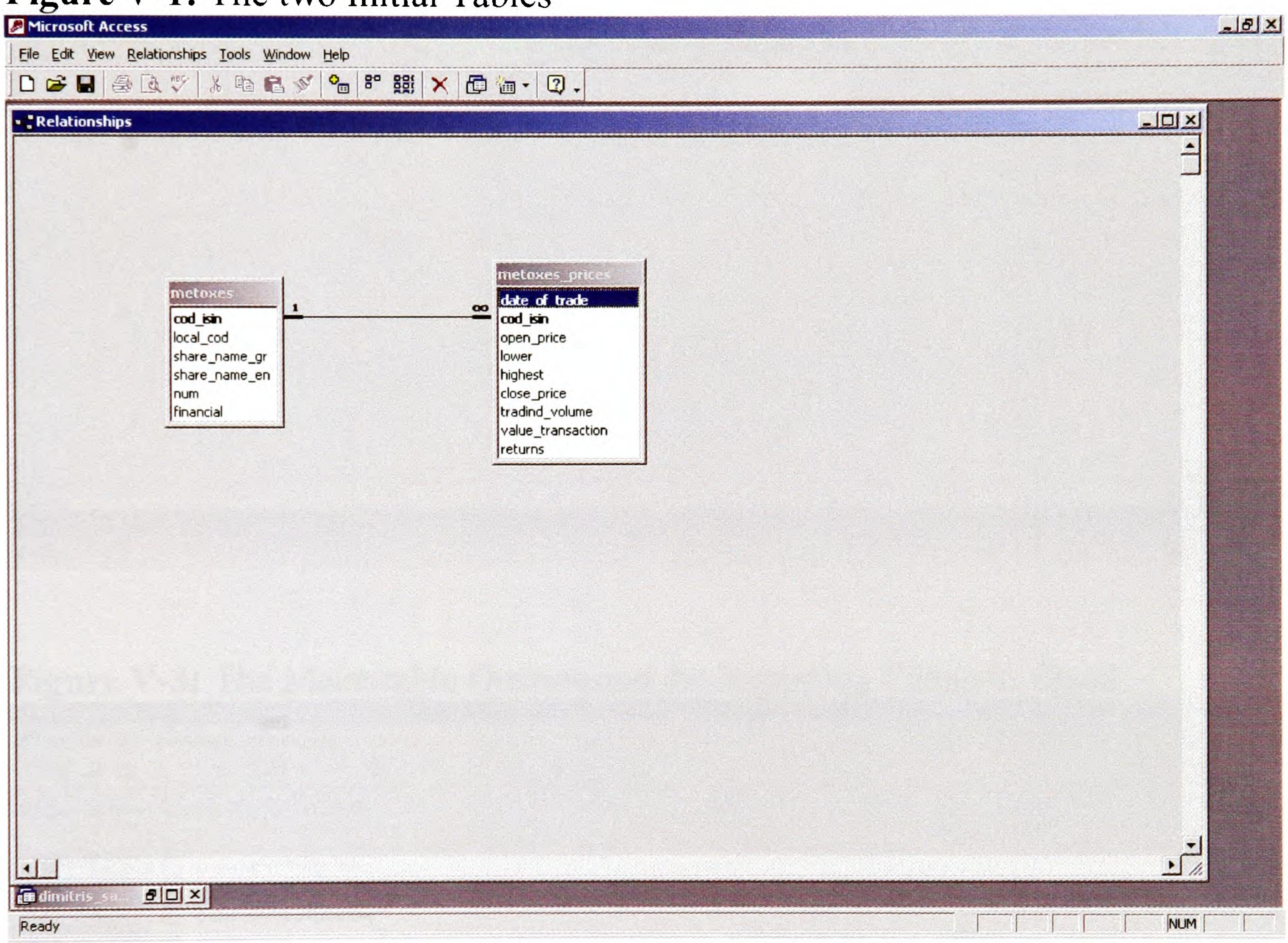
First, we developed a database named *dimitris_sample* where we created two tables named *metoxes* and *metoxes_prices* respectively (Figure V-1). The first table (*metoxes*) contains the unchangeable data of the shares (cod_isin, the Greek symbol, the Greek and English name of the share, the id number of share and a field indicating if the share is a financial one or not). The second one (*metoxes_prices*) contains the date of trade, the open, low, highest and closing price of the share, the trading volume, the value of transactions and a field named returns, where we are going to calculate the daily returns of the share. Then we created a data import filter in order to transfer the data from Excel format to Access format. Returns were calculated using the logarithmic approximation (Benninga, 2001):

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

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

Since we are going to use monthly returns (mainly for beta estimation and for annual returns calculation) we created an update query in order to initially calculate the daily returns of the share and record this data into the *returns* field of table (*metoxes_prices*).

Figure V-1: The two Initial Tables



After the implementation of the query outlined above, we created the make-table queries, which could automatically create tables, in order to create the new tables *monthly_returns_final* and *monthly_returns_final_name* (Figure V-2). In these new tables, which are connected with the table *metoxes*, as is shown in figure V-2, we stored the monthly compounded returns of all shares and indicated the date and the name of the share. Then we created several select queries in order to create the samples for each year. Figure V-3 shows the make-table queries and the exporting filters, while figure V-4 shows all tables, the initials and the new ones.

Figure V-2: All Tables of the Database

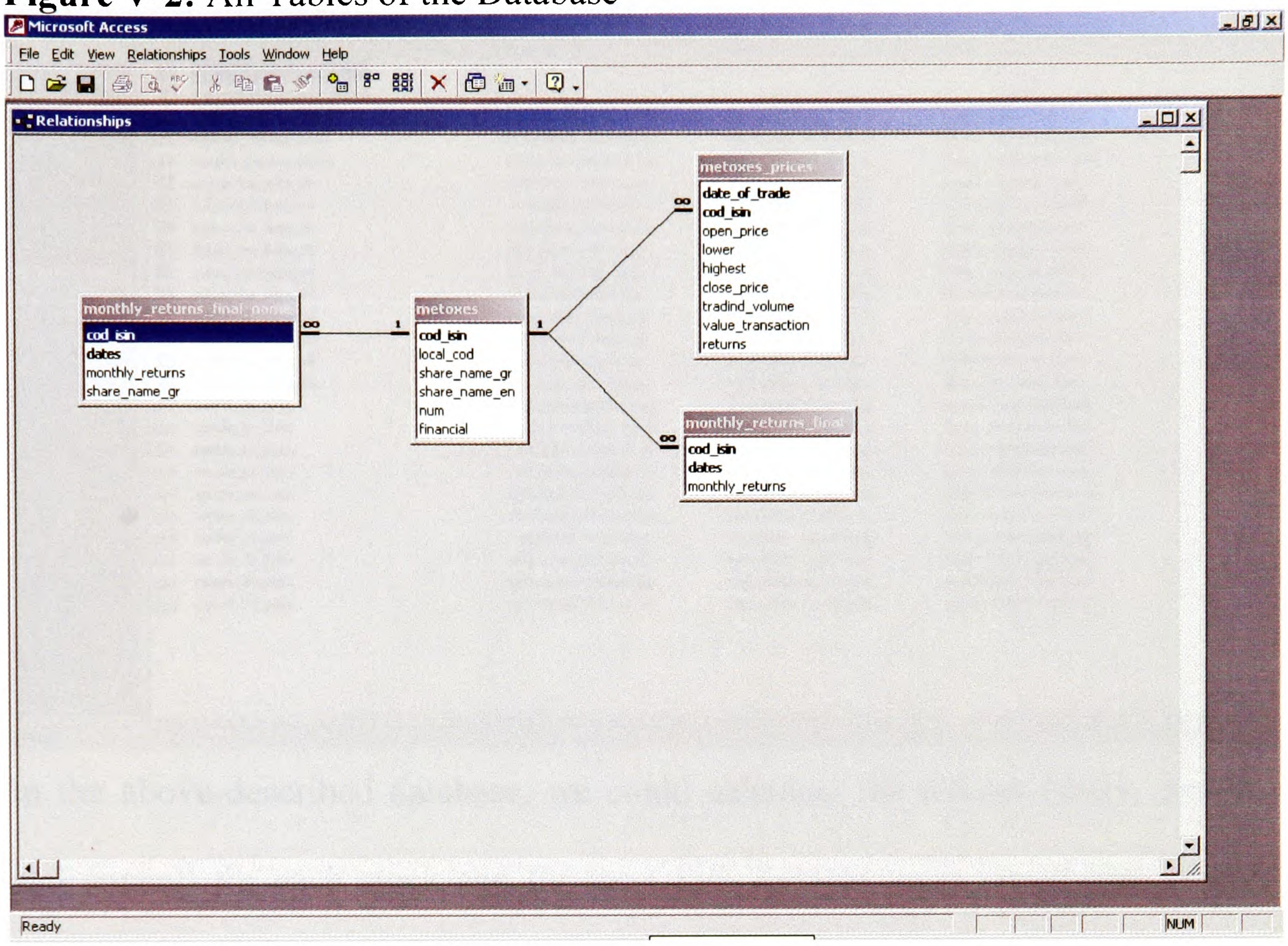


Figure V-3: The Make-table Queries and the Exporting Filters to Excel

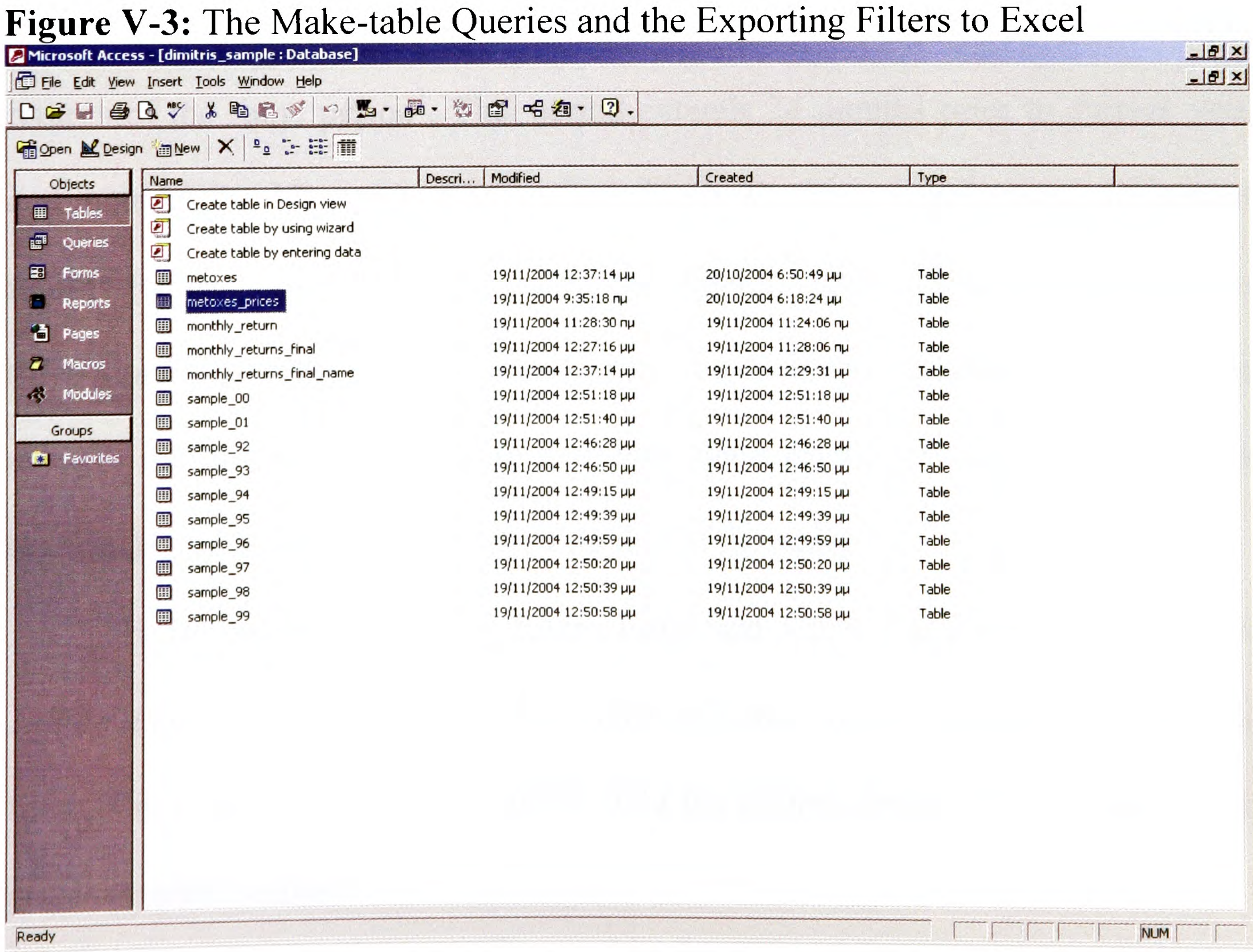
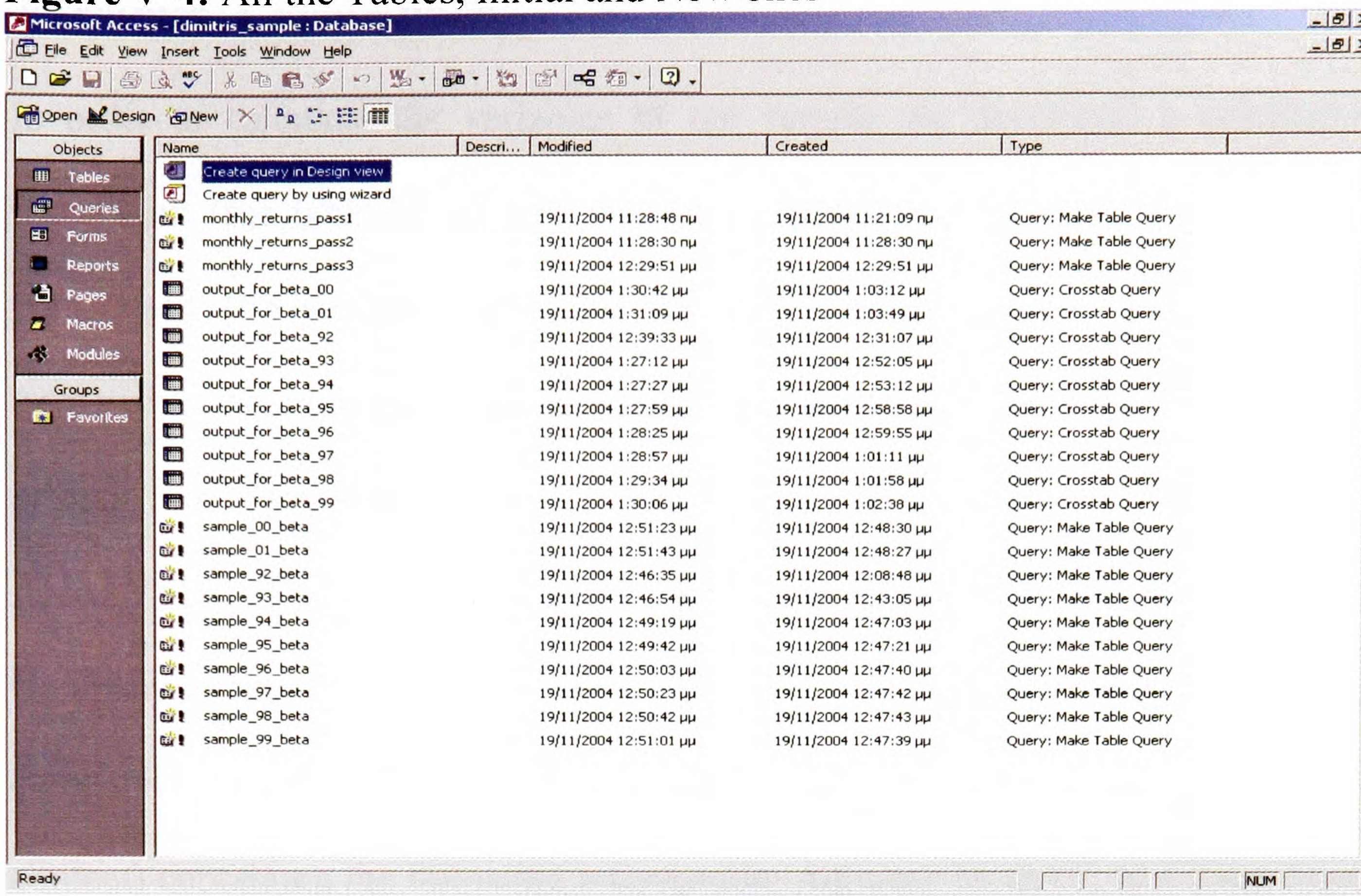


Figure V-4: All the Tables, Initial and New ones



In the above-described database, we could calculate the returns (daily, monthly and annual) for each stock and for the CSPI. Returns were transferred to excel files where we calculated the annual betas for each stock employing the slope function. We regressed 36 monthly returns of each stock to 36 monthly market returns of the same period[1]. This period extends 24 months prior to current year and includes the 12 months of the current year. Further, we calculated the annual returns for each stock by aggregating the monthly returns nine months prior to three months after the fiscal year end. Also, the developed database could provide us with the annual risk free rate and with stock prices at a specific time (first trading day of April and the last trading day of the year).

In the attached CD, the folder Empirical_Ch_4 contains the sub-folders *1_Step_Prices_Returns* and *2_Step_Returns_betas* which include all relevant files, tables, queries and the available data for returns, betas, risk free and stock prices (market values).

[1] Excel file: *output_3* contains the beta calculations. This file is incorporated in the sub-folder *1_Step_Prices_Returns* of the folder Empirical_Ch_4.

Appendix VI:

Variables' Calculations

In order to calculate the variables of our sample we developed a calculation framework (see table VI-1) with automatic calculation procedures. Afterwards, we created 163 similar sheets, one for each company of our sample. In this framework we imported data from: (a) the developed database (betas, stock prices, risk free rates) and (b) the excel file named FUNDAMENTAL ANALYSIS_VI[1], which had been produced from data coming from the PROFILE Company's files, from ICAP files or from our personal contacts with the companies concerned. This file consists of various sheets (named after their content) containing the following information: Adjusted NOPAT, Net Total Fixed Assets, Total Current Assets, Total Current Liabilities, Total Equity Capital, Short-term Outstanding Debt, Long-term Outstanding Debt, Tax Paid, Number of Shares Outstanding, Equity Capital, Net Profit Before Taxes, Net Profit After Taxes, Total Assets, and Cost of Debt (short and long term). We also used other supplementary excel files in case the previous file could not provide us with information of some of the companies[2].

Financial data from the above files was imported into our calculation framework, in each one of the 163 sheets[3], in the following order: Adjusted NOPAT, Net Total Fixed Assets, Total Current Assets, Total Current Liabilities, Total Equity Capital, Short-term Outstanding Debt, Long-term Outstanding Debt, Tax Paid, Cost of Outstanding short-term Debt, Cost of Outstanding long-term Debt, Average Cost (Returns) of Capital, Risk Free Cost of Capital, Company

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[1] In the attached CD, the sub-folder *3_Step_Fundamentals* of the folder *Empirical_Ch_4* contains the Excel file FUNDAMENTAL ANALYSIS_VI.
[2] In the attached CD, the sub-folder *3_Step_Fundamentals* of the folder *Empirical_Ch_4* comprises the various files with the relevant fundamental data.
[3] In the attached CD, the sub-folder *4_Step_I_S* of the folder *Empirical_Ch_4* includes the file *2001_Final*, which comprises all the163 sheets.

Risk Coefficient, Year End Share Price, Total Number of Shares Outstanding, Equity Capital, Net Profit Before Taxes, Net Profit After Taxes, and Total Assets.

After the insertion of the above data, we could automatically calculate each component of the variables of our sample. Thus, we calculated our variables as follows:

Table VI-2: The Variables and their Formulas

	Variable	Formula
1	EPS	NET PROFIT BEFORE TAXES / AVERAGE OF TOTAL NUMBER OF SHARES OUTSTANDING
2	ΔEPS	EPS_t / EPS_{t-1}
3	ROI	Adjusted NOPAT / AVERAGE TOTAL ASSETS
4	ΔROI	ROI_t / ROI_{t-1}
5	ROE	NET PROFIT AFTER TAXES / AVERAGE EQUITY CAPITAL
6	ΔROE	ROE_t / ROE_{t-1}
7	EVA®	(Adjusted NOPAT-WACC*BEGINNING CAPITAL) / AVERAGE OF TOTAL NUMBER OF SHARES OUTSTANDING
8	ΔEVA	EVA_t / EVA_{t-1}
9	SVA	(Δ adjusted NOPAT/(WACC * (1+WACC)^t-1) - PV OF TOTAL ANNUAL CHANGE IN INVESTMENT) / AVERAGE OF TOTAL NUMBER OF SHARES OUTSTANDING

After the calculations, we created new sheets (in the same file: *2001_Final*) where we automatically transferred the variables of our sample. Each new sheet contained one variable for all years for all companies. We named the new sheets as follows: ALL_VALUES_(EPS), ALL_VALUES_(change EPS), ALL_VALUES_(ROI), ALL_ VALUES_(change ROI), etc. From the above file (*2001_Final*) we transferred all data to a new excel file named *All Measures*[4]. To control this transformation we created separate sheets (one for each year) giving them names like: All-Measures (1992), All-Measures (1993) to All-Measures (2001). Finally, we transferred all data from the separate sheets to the sheet

[4] In the attached CD, the sub-folder *4_Step_I_S* of the folder *Empirical_Ch_4* includes the file *All Measures*.

named: *The Sample (measures)*. This sheet included all data for our variables (for all companies, for all years). To import the data into SPSS for statistical analysis, we performed two further steps. We created the excel file *Output_6_for Regressions*[5] where we put in panel form, year after year, all companies and all their variables, accompanied by their deflators. This file consisted of many sheets, one for each year and one final sheet named: *The Final Sample*[6] where all data was summarised. The final form of our sample was then presented in the file *Sample_1*[7]. Thus, the data was available for transformation into SPSS for the statistical analysis.

[5] In the attached CD, the sub-folder *5_Step_Output_6_Reg* of the folder *Empirical_Ch_4* includes the file *Output_6_for Regressions.*

[6] In the attached CD, the sub-folder *5_Step_Output_6_Reg* of the folder *Empirical_Ch_4* includes the sheet *The Final Sample.*

[7] In the attached CD, the sub-folder *6_Step_Final Sample_Excel* of the folder *Empirical_Ch_4* includes the file *Sample_1.*

Appendix VI: Table VI-1: The Information System (Calculation framework)

ESTIMATION OF EPS, ROI, ROE, EVA, SVA	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
NOPAT+Finance exp.-(Finance exp(1-T))*	1.716.159	2.634.398	2.053.982	2.027.940	2.055.055	2.890.540	1.616.861	809.706	1.263.287	4.225.132	4.876.744	2.448.911
CHANGE IN NOPAT		918.239	-580.415	-26.042	27.115	835.485	-1.273.680	-807.155	453.581	2.961.846	651.612	-2.427.833
Δ NOPAT/(c* X (1+c*)$^{\wedge t-1}$)			-3.035.443	-88.701	116.726	3.650.194	-6.739.695	-394.490	164.606	414.740	4.483.203	-25.234.704
NET TOTAL FIXED ASSETS	5.124.989	6.898.533	9.976.076	10.713.341	10.013.324	10.967.195	12.733.035	12.354.534	11.044.257	33.655.897	41.909.204	42.319.877
ANNUAL NET FIXED ASSETS		1.773.544	3.077.543	737.265	-700.017	953.871	1.765.841	-378.501	-1.310.277	22.611.640	8.253.307	410.674
TOTAL CURRENT ASSETS	6.867.330	8.707.329	8.566.443	8.598.198	9.413.037	13.350.741	12.587.570	15.165.161	13.604.681	21.592.867	29.427.465	32.282.963
ANNUAL CHANGE IN CURRENT ASSETS		1.839.999	-140.886	31.755	814.840	3.937.704	-763.172	2.577.591	-1.560.480	7.988.186	7.834.598	2.855.498
TOTAL CURRENT LIABILITIES	2.443.918	3.721.479	3.657.985	3.278.026	3.911.894	6.868.344	4.706.471	5.728.696	4.615.303	10.013.859	9.909.307	7.043.748
ANNUAL CHANGE IN CURRENT LIABILITIES		1.277.561	-63.494	-379.959	633.868	2.956.451	-2.161.873	1.022.225	-1.113.393	5.398.556	-104.552	-2.865.559
ANNUAL NET WORKING CAPITAL		562.438	-77.392	411.714	180.972	981.253	1.398.701	1.555.366	-447.087	2.589.630	7.939.150	5.721.057
TOTAL ANNUAL CHANGE IN INVESTMENT		2.335.982	3.000.151	1.148.979	-519.045	1.935.124	3.164.542	1.176.864	-1.757.364	25.201.270	16.192.457	6.131.731
PV OF TOTAL ANNUAL CHANGE IN INVEST.			2.518.569	888.205	-363.788	1.214.988	1.935.915	180.053	-195.479	1.235.171	8.549.025	3.621.675
TOTAL EQUITY CAPITAL, EC	8.619.240	9.633.225	11.223.868	11.865.314	12.488.863	13.828.476	15.222.696	15.203.485	15.003.041	34.982.810	35.810.942	35.357.593
SHORT-TERM OUTSTANDING DEBT, STD	0	0	1.240.646	1.988.975	1.432.171	3.590.689	5.203.750	6.439.002	3.636.939	10.010.951	16.654.635	20.378.739
LONG-TERM OUTSTANDING DEBT, LTD	1.042.846	2.126.529	1.892.394	1.432.952	1.008.586	0	0	0	0	0	8.804.109	11.738.811
TOTAL OUTSTANDING DEBT, TD	1.042.846	2.126.529	3.133.040	3.421.926	2.440.758	3.590.689	5.203.750	6.439.002	3.636.939	10.010.951	25.458.743	32.117.551
TOTAL CAPITAL INVESTED	9.662.086	11.759.754	14.356.908	15.287.240	14.929.621	17.419.165	20.426.446	21.642.487	18.639.979	44.993.762	61.269.685	67.475.143
NET PROFIT BEFORE TAXES	1.486.049	2.028.894	1.190.185	991.047	1.211.670	2.483.459	1.514.179	945.678	509.339	4.860.765	4.046.836	460.029
TAX PAID	151.024	70.906	147.281	179.069	198.041	466.060	325.471	502.336	187.363	1.374.374	1.160.321	33.676
INCOME TAX RATE, T	10,2%	3,5%	12,4%	18,1%	16,3%	18,8%	21,5%	53,1%	36,8%	28,3%	28,7%	7,3%
COST OF OUTSTANDING SHORT-TERM DEBT	27,50%	29,50%	28,70%	28,60%	26,40%	21,10%	20,20%	18,92%	18,56%	15,00%	12,33%	8,58%
NET COST OF SHORT-TERM DEBT		28,469%	25,148%	23,432%	22,085%	17,140%	15,858%	8,870%	11,733%	10,759%	8,795%	7,952%

COST OF OUTSTANDING LONG-TERM DEBT	25,20%	27,60%	27,00%	26,90%	25,40%	19,50%	18,70%	16,78%	16,64%	13,53%	11,52%	8,66%
NET COST OF LONG-TERM DEBT		26,635%	23,659%	22,040%	21,249%	15,841%	14,680%	7,867%	10,519%	9,704%	8,217%	8,026%
AVERAGE COST (RETURN) OF CAPITAL, Rm	5,00%	7,00%	-18,60%	35,48%	-9,83%	5,06%	2,11%	46,06%	61,53%	70,40%	-49,06%	-26,82%
RISK-FREE COST OF CAPITAL, Rf	18,0%	18,0%	17,69%	19,00%	19,00%	16,69%	12,12%	9,49%	11,79%	9,07%	8,11%	4,25%
COMPANY'S RISK COEFFICIENT, b		0,8865	0,7865	0,7425	0,7340	1,1282	0,8331	1,4115	0,8098	0,9312	1,0863	2,0812
COST OF EQUITY:k=Rf+b X (Rm - Rf)		18,0%	17,69%	31,2372%	19,00%	16,69%	12,12%	61,1102%	52,0685%	66,1821%	8,11%	4,25%
WACC (**c***)		19,56%	19,12%	29,36%	19,45%	16,78%	13,07%	45,57%	44,20%	53,85%	8,31%	6,02%
SVA		0	-5.554.011	-976.907	480.514	2.435.206	-8.675.610	-574.543	360.085	-820.432	-4.065.822	-28.856.379
CHANGE IN SVA			-5.554.011	4.577.105	1.457.420	1.954.692	-11.110.816	8.101.067	934.628	-1.180.516	-3.245.391	-24.790.557
RESIDUAL EVA		461.284	-1.154.083	-363.378	128.058	510.717	-1.687.358	-1.343.426	1.230.307	-10.609.200	-694.223	-2.797.268
BEGINNING CAPITAL (t-1)		9.662.086	11.759.754	14.356.908	15.287.240	14.929.621	17.419.165	20.426.446	21.642.487	18.639.979	44.993.762	61.269.685
EVA		744.344	-194.633	-2.187.192	-917.983	384.930	-660.222	-8.498.185	-8.302.344	-5.812.616	1.137.093	-1.242.572
CHANGE IN EVA			**-938.977**	**-1.992.558**	**1.269.208**	**1.302.913**	**-1.045.152**	**-7.837.963**	**195.841**	**2.489.728**	**6.949.709**	**-2.379.664**
YEAR END SHARE PRICE		0,95	1,02	0,72	0,77	0,60	0,43	0,61	14,89	2,93	1,82	2,08
ADJUSTED BOOK VALUE SHARE PRICE		1,32	1,34	1,63	1,74	1,70	1,98	2,32	2,46	0,82	1,97	2,69
DIFFERENCE BETWEEN SHARE PRICES		-0,37	-0,32	-0,91	-0,97	-1,10	-1,55	-1,71	12,43	2,11	-0,15	-0,61
NO. OF SHARES OUTSTANDING		7.324.660	8.789.592	8.789.592	8.789.592	8.789.592	8.789.592	8.789.592	8.789.592	22.800.582	22.800.582	22.800.582
ALL INTEREST BEARING LIABILITIES		2.126.529	3.133.040	3.421.926	2.440.758	3.590.689	5.203.750	6.439.002	3.636.939	10.010.951	25.458.743	32.117.551
MARKET VALUE		9.084.956	12.098.424	9.750.433	9.208.744	8.864.444	8.983.275	11.800.653	134.513.963	76.816.657	66.955.803	79.570.121
CHANGE IN MARKET VALUE			**3.013.468**	**-2.347.991**	**-541.689**	**-344.300**	**118.831**	**2.817.378**	**122.713.311**	**-57.697.307**	**-9.860.854**	**12.614.318**
MARKET VALUE ADDED (MVA)		-577.130	338.670	-4.606.476	-6.078.496	-6.065.177	-8.435.890	-8.625.794	112.871.477	58.176.678	21.962.041	18.300.436
CHANGE IN MVA			**915.800**	**-4.945.146**	**-1.472.021**	**13.319**	**-2.370.713**	**-189.903**	**121.497.270**	**-54.694.799**	**-36.214.636**	**-3.661.605**
YEAR END SHARE PRICE	1,77	0,95	1,02	0,72	0,77	0,60	0,43	0,61	14,89	2,93	1,82	2,08
TOTAL NUMBER OF SHARES OUTSTANDING	3.662.330	7.324.660	8.789.592	8.789.592	8.789.592	8.789.592	8.789.592	8.789.592	8.789.592	22.800.582	22.800.582	22.800.582

EQUITY CAPITAL	1.239.128	2.478.257	2.973.908	2.973.908	4.460.862	4.460.862	4.460.862	4.460.862	4.460.862	10.036.940	20.073.880	20.073.880
ANNUAL CHANGE IN EQUITY CAPITAL		**1.239.128**	**495.651**	**0**	**1.486.954**	**0**	**0**	**0**	**0**	**5.576.078**	**10.036.940**	**0**
NET PROFIT BEFORE TAXES	1.486.049	2.028.894	1.190.185	991.047	1.211.670	2.483.459	1.514.179	945.678	509.339	4.860.765	4.046.836	460.029
NET PROFIT AFTER TAXES	1.210.739	1.939.157	1.039.544	811.977	1.013.629	2.017.399	1.188.708	443.342	321.975	3.486.392	2.886.515	426.353
SALES	11.333.601	14.072.224	16.921.845	17.661.925	18.728.681	27.504.357	29.723.951	28.665.449	29.303.631	35.343.427	39.416.315	40.966.371
TOTAL ASSETS	12.187.608	15.874.338	18.562.016	19.324.004	19.431.386	24.426.519	25.378.170	27.576.021	24.712.462	55.356.029	71.501.732	74.886.537
EARNINGS PER SHARE (EPS)		0,3693	0,1477	0,1128	0,1379	0,2825	0,1723	0,1076	0,0579	0,3077	0,1775	0,0202
Change in EPS (ΔEPS)			**0,4000**	**0,7633**	**1,2226**	**2,0496**	**0,6097**	**0,6245**	**0,5386**	**5,3106**	**0,5767**	**0,1137**
RETURN ON INVESTMENT (ROI)		0,1878	0,1193	0,1071	0,1061	0,1318	0,0649	0,0306	0,0483	0,1055	0,0769	0,0335
Change in ROI (ΔROI)			**0,6354**	**0,8974**	**0,9906**	**1,2429**	**0,4926**	**0,4710**	**1,5800**	**2,1842**	**0,7285**	**0,4352**
NET PROFIT BEFORE TAXES / SALES		0,1442	0,0703	0,0561	0,0647	0,0903	0,0509	0,0330	0,0174	0,1375	0,1027	0,0112
CHANGE IN MARGIN			**-0,0738**	**-0,0142**	**0,0086**	**0,0256**	**-0,0394**	**-0,0180**	**-0,0156**	**0,1201**	**-0,0349**	**-0,0914**
RETURN ON EQUITY (ROE)		1,0433	0,3813	0,2730	0,2727	0,4522	0,2665	0,0994	0,0722	0,4810	0,1917	0,0212
Change in ROE (ΔROE)			**0,3655**	**0,7160**	**0,9987**	**1,6586**	**0,5892**	**0,3730**	**0,7262**	**6,6635**	**0,3986**	**0,1108**
MARKET VALUE/BEGINNING CAPITAL		**0,9403**	**1,0288**	**0,6791**	**0,6024**	**0,5937**	**0,5157**	**0,5777**	**6,2153**	**4,1211**	**1,4881**	**1,2987**
RETURN ON CAPITAL (r)		0,2727	0,1747	0,1413	0,1344	0,1936	0,0928	0,0396	0,0584	0,2267	0,1084	0,0400
r / c*		**1,3938**	**0,9134**	**0,4811**	**0,6912**	**1,1536**	**0,7101**	**0,0870**	**0,1321**	**0,4209**	**1,3041**	**0,6634**
NOPAT/BEGINNING CAPITAL	0,0000		0,2126	0,1724	0,1431	0,1891	0,1083	0,0465	0,0618	0,1952	0,2616	0,0544
EVA (Stewart) / per Share		**0,1016**	**-0,0242**	**-0,2488**	**-0,1044**	**0,0438**	**-0,0751**	**-0,9668**	**-0,9446**	**-0,3680**	**0,0499**	**-0,0545**
Change in EVA (Stewart) per share (ΔEVA)			**-0,2377**	**10,3010**	**0,4197**	**-0,4193**	**-1,7152**	**12,8717**	**0,9770**	**0,3896**	**-0,1355**	**-1,0928**
EVA Rappaport / per Share			**-0,1165**	**-0,2267**	**0,1444**	**0,1482**	**-0,1189**	**-0,8917**	**0,0223**	**0,1576**	**0,3048**	**-0,1044**
Change in EVA Rappaport per share				**1,9452**	**-0,6370**	**1,0266**	**-0,8022**	**7,4994**	**-0,0250**	**7,0745**	**1,9337**	**-0,3424**
SVA (Rappaport) / per share		**0**	**-0,6893**	**-0,1111**	**0,0547**	**0,2771**	**-0,9870**	**-0,0654**	**0,0410**	**-0,0519**	**-0,1783**	**-1,2656**

Appendix VII:

Additional Equations (Regression Models) – According to the Correlation Matrix

B1. Incremental / Traditional Measures

Model (8b) : $Returns_t = h_0 + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + u_{8bt}$

Model (9b) : $Returns_t = i_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + u_{9bt}$

B3. Incremental / One Traditional Measure + One Value-Based Measure

Model (11b) : $Returns_t = l_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{11bt}$

Model (14b) : $Returns_t = o_0 + b_2\,\Delta ROI + e_1\,SVA/P_{t-1} + u_{14bt}$

Model (16b) : $Returns_t = q_0 + c_1\,ROE + e_1\,SVA/P_{t-1} + u_{16bt}$

B4. Incremental / One Traditional Measure + Two Value-Based Measures

Model (17b) : $Returns_t = r_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{17bt}$

Model (18b) : $Returns_t = s_0 + b_2\,\Delta ROI + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{18bt}$

Model (19b) : $Returns_t = t_0 + c_1\,ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{19bt}$

B5. Incremental / Two Traditional Measures + One Value-Based Measure ($d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1}$)

Model (20b) : $Returns_t = u_0 + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{20bt}$

Model (20c) : $Returns_t = u_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + d_2\,\Delta EVA/P_{t-1} + u_{20ct}$

Model (21b) : $Returns_t = v_0 + a_2\,\Delta EPS/P_{t-1} + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{21bt}$

Model (22b) : $Returns_t = w_0 + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{22bt}$

B6. Incremental / Two Traditional Measures + One Value-Based Measure ($e_1\,SVA/P_{t-1}$)

Model (23b) : $Returns_t = x_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_2\,\Delta ROI + e_1\,SVA/P_{t-1} + u_{23bt}$

Model (24b) : $Returns_t = y_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + c_1\,ROE + e_1\,SVA/P_{t-1} + u_{24bt}$

Model (25b) : $Returns_t = z_0 + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + e_1\,SVA/P_{t-1} + u_{25bt}$

B7. Incremental / Two Traditional Measures + Two Value-Based Measures

Model (26b) : $Returns_t = \beta_0 + a_2\,\Delta EPS/P_{t-1} + b_2\,\Delta ROI + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{26bt}$

Model (27b) : $Returns_t = \gamma_0 + a_2\,\Delta EPS/P_{t-1} + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{27bt}$

Model (28b) : $Returns_t = \delta_0 + b_2\,\Delta ROI + c_1\,ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{28bt}$

B8. Incremental / Three Traditional Measures + One Value-Based Measure

Model (29b) : $Returns_t = \varepsilon_0 + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{29bt}$

Model (30b) : $Returns_t = \zeta_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_2\,\Delta ROI + c_1\,ROE + e_1\,SVA/P_{t-1} + u_{30bt}$

B9. Incremental / Three Traditional Measures + Two Value-Based Measures

Model (31b) : $Returns_t = \eta_0 + a_2\,\Delta EPS/P_{t-1} + b_2\,\Delta ROI + c_1\,ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{31bt}$

Appendix VIII: All Equations (Regression Models), Initials and Additional ones for the First Empirical Part of the Study

A. Relative

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

Model (2) : $Returns_t = b_0 + b_1\, ROI + b_2\, \Delta ROI + u_{2t}$

Model (3) : $Returns_t = c_0 + c_1\, ROE + c_2\, \Delta ROE + u_{3t}$

Model (4) : $Returns_t = d_0 + d_1 EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{4t}$

Model (5) : $Returns_t = e_0 + e_1\, SVA/P_{t-1} + u_{5t}$

B1. Incremental / Traditional Performance Measures

Model (6) : $Returns_t = f_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + u_{6t}$

Model (7) : $Returns_t = g_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + u_{7t}$

Model (8) : $Returns_t = h_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + u_{8t}$

Model (8b) : $Returns_t = h_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + u_{8bt}$

Model (9) : $Returns_t = i_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + u_{9t}$

Model (9b) : $Returns_t = i_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + u_{9bt}$

B2. Incremental / Value-Based Performance Measures

Model (10) : $Returns_t = k_0 + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{10t}$

B3. Incremental / One Traditional Measure + One Value-Based Measure

Model (11) : $Returns_t = l_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{11t}$

Model (11b) : $Returns_t = l_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{11bt}$

Model (12) : $Returns_t = m_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + e_1\, SVA/P_{t-1} + u_{12t}$

Model (13) : $Returns_t = n_0 + b_1\, ROI + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{13t}$

Model (14) : $Returns_t = o_0 + b_1\, ROI + b_2\, \Delta ROI + e_1\, SVA/P_{t-1} + u_{14t}$

Model (14b) : $Returns_t = o_0 + b_2\, \Delta ROI + e_1\, SVA/P_{t-1} + u_{14bt}$

Model (15) : $Returns_t = p_0 + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{15t}$

Model (16) : $Returns_t = q_0 + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{16t}$

Model (16b) : $Returns_t = q_0 + c_1\, ROE + e_1\, SVA/P_{t-1} + u_{16bt}$

B4. Incremental / One Traditional Measure + Two Value-Based Measures

Model (17) : $Returns_t = r_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{17t}$

Model (17b) : $Returns_t = r_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{17bt}$

Model (18) : $Returns_t = s_0 + b_1\, ROI + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{18t}$

Model (18b) : $Returns_t = s_0 + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{18bt}$

Model (19) : $Returns_t = t_0 + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{19t}$

Model (19b) : $Returns_t = t_0 + c_1\, ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{19bt}$

B5. Incremental / Two Traditional Measures + One Value-Based Measure ($d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1}$)

Model (20) : $Returns_t = u_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{20t}$

Model (20b) : $Returns_t = u_0 + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{20bt}$

Model (20c) : $Returns = u_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + d_2\, \Delta EVA/P_{t-1} + u_{20ct}$

Model (21) : $Returns_t = v_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{21t}$

Model (21b) : $Returns_t = v_0 + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{21bt}$

Model (22) : $Returns_t = w_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{22t}$

Model (22b) : $Returns_t = w_0 + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + u_{22bt}$

B6. Incremental / Two Traditional Measures + One Value-Based Measure ($e_1\, SVA/P_{t-1}$)

Model (23) : $Returns_t = x_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + e_1\, SVA/P_{t-1} + u_{23t}$

Model (23b) : $Returns_t = x_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_2\, \Delta ROI + e_1\, SVA/P_{t-1} + u_{23bt}$

Model (24) : $Returns_t = y_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{24t}$

Model (24b) : $Returns_t = y_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + c_1\, ROE + e_1\, SVA/P_{t-1} + u_{24bt}$

Model (25) : $Returns_t = z_0 + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{25t}$

Model (25b) : $Returns_t = z_0 + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + e_1\, SVA/P_{t-1} + u_{25bt}$

B7. Incremental / Two Traditional Measures + Two Value-Based Measures

Model (26) : $Returns_t = \beta_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{26t}$

Model (26b) : $Returns_t = \beta_0 + a_2\,\Delta EPS/P_{t-1} + b_2\,\Delta ROI + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{26bt}$

Model (27) : $Returns_t = \gamma_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{27t}$

Model (27b) : $Returns_t = \gamma_0 + a_2\,\Delta EPS/P_{t-1} + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{27bt}$

Model (28) : $Returns_t = \delta_0 + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{28t}$

Model (28b) : $Returns_t = \delta_0 + b_2\,\Delta ROI + c_1\,ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + e_1\,SVA/P_{t-1} + u_{28bt}$

B8. Incremental / Three Traditional Measures + One Value-Based Measure

Model (29) : $Returns_t = \varepsilon_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{29t}$

Model (29b) : $Returns_t = \varepsilon_0 + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + d_1\,EVA/P_{t-1} + d_2\,\Delta EVA/P_{t-1} + u_{29bt}$

Model (30) : $Returns_t = \zeta_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_1\,ROI + b_2\,\Delta ROI + c_1\,ROE + c_2\,\Delta ROE + e_1\,SVA/P_{t-1} + u_{30t}$

Model (30b) : $Returns_t = \zeta_0 + a_1\,EPS/P_{t-1} + a_2\,\Delta EPS/P_{t-1} + b_2\,\Delta ROI + c_1\,ROE + e_1\,SVA/P_{t-1} + u_{30bt}$

B9. Incremental / Three Traditional Measures + Two Value-Based Measures

Model (31) : $\text{Returns}_t = \eta_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + b_2\, \Delta ROI + c_1\, ROE + c_2\, \Delta ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{31t}$

Model (31b) : $\text{Returns}_t = \eta_0 + a_2\, \Delta EPS/P_{t-1} + b_2\, \Delta ROI + c_1\, ROE + d_1\, EVA/P_{t-1} + d_2\, \Delta EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{31bt}$

B9. Incremental – From Model (31) only those variables with significance level < 0.05

Model (31c) : $\text{Returns}_t = \theta_0 + a_1\, EPS/P_{t-1} + a_2\, \Delta EPS/P_{t-1} + b_1\, ROI + d_1\, EVA/P_{t-1} + e_1\, SVA/P_{t-1} + u_{31c}$

Appendix IX: Respondents' name (OMOA, MF, PIC, LC)

COUNT	ID/ No of CASE	GROUP CODE	NAME	GROUP NAME
1	1	1	Eurobank AXEPEY	OMOA
2	2	1	G.A.PERVANAS	OMOA
3	3	1	HELLENICAMMERICAN	OMOA
4	4	1	OLYMPIC AXEPEY	OMOA
5	5	1	SIGMA	OMOA
6	6	1	MAGNA TRUST AEPEY	OMOA
7	7	1	COMMERCIAL	OMOA
8	8	1	ARTION AXEPEY	OMOA
9	9	1	EUROXX AXEPEY	OMOA
10	10	1	RATE CAPITAL AXEPEY	OMOA
11	11	1	ALPHA FINANCE AXEPEY	OMOA
12	12	1	NORTH HELLENIC	OMOA
13	13	1	EUROANALYSIS AXEPEY	OMOA
14	14	1	OLYMPIA AXEPEY	OMOA
15	15	1	OMEGA	OMOA
16	16	1	P&K SECURITIES	OMOA
17	17	1	MERIT AXEPEY	OMOA
18	18	1	STANDARD AXEPEY	OMOA
19	19	1	CYCLOS SECURITIES	OMOA
20	20	1	PRELIUM AXEPEY	OMOA
21	21	1	GENERAL AXEPEY	OMOA
22	22	1	PROTON SECURITIES	OMOA
23	23	1	GARDIAN TRUST	OMOA
24	24	1	NEXUS EUROLINK	OMOA
25	25	1	DEVLETOGLOU AXEPEY	OMOA
26	26	1	NATIONAL SECURITIES	OMOA
27	27	1	PENDEDEKAS SECURITIES	OMOA
28	28	1	FASMA SECURITIES	OMOA
29	29	1	DYNAMIC SECURITIES	OMOA
30	30	1	FORTIUS FINANCE	OMOA
31	31	1	ASPIS EXEPEY	OMOA
32	32	1	CFS AXE	OMOA
33	33	1	SARRIS AXE	OMOA
34	34	1	ALKI AXE	OMOA
35	35	1	MIDAS AXE	OMOA
36	36	1	SARROS AXE	OMOA
37	37	1	VOILIS AXE	OMOA
38	38	1	LAVRENDARAKIS AXE	OMOA
39	39	1	CHRISOCHIOIDIS AXE	OMOA
40	40	1	LAIKI ATTALOS XAE	OMOA
41	41	1	ATHINAIKI AXE	OMOA
42	42	1	ETHNIKI AXE	OMOA
43	43	1	PEGASUS AXEPEY	OMOA
44	44	1	SOLIDUS AXEPEY	OMOA
45	45	1	AKROPOLIS AXEPEY	OMOA
46	283	2	ALICO AIG MUTUAL FUN	MF
47	284	2	CYPRUS AEDAK	MF
48	285	2	OMEGA AEDAK	MF

49	286	2	DELOS AEDAK	MF
50	287	2	GENERAL AEDAK	MF
51	288	2	ASPIS AEDAK	MF
52	289	2	PROFUND AEDAK	MF
53	290	2	MARFIN AEDAK	MF
54	291	2	ATTIKI AEDAK	MF
55	292	2	P & K MUTUAL FUND	MF
56	293	2	HELLENIC FINANCE TRU	MF
57	294	2	PIRAEUS MUTUAL FUNDS	MF
58	295	2	PROTON MUTUAL FUNDS	MF
59	296	2	ABN AMRO	MF
60	297	2	EUROBANK MUTUAL FUND	MF
61	298	2	HSBC HELLAS MUTUAL	MF
62	299	2	LAIKI ATALOS MUTUAL	MF
63	266	3	AEOLIAN IMNVESTMENT	PIC
64	267	3	MAGNA TRAST PIC	PIC
65	268	3	ACTIVE INVESTMENT	PIC
66	269	3	MARFIN GLOBAL INVESM	PIC
67	270	3	NEW MILLENIUM ASSET	PIC
68	271	3	ARROW INVESTMENT COM	PIC
69	271	3	ALPHA INVESTMENT	PIC
70	273	3	ALTIUS PIC	PIC
71	274	3	EUROLINE AEEX	PIC
72	275	3	OPTIMA AEEX	PIC
73	276	3	NEXUS PIC	PIC
74	277	3	OMEGA AEEX	PIC
75	278	3	NATIONAL INVESTMENT	PIC
76	279	3	P &K INVESTMENT	PIC
77	280	3	VALUE PIC	PIC
78	281	3	DOMUS PIC	PIC
79	282	3	INTER INVESTMENT	PIC
80	385	4	ROKAS	LC
81	386	4	THEMELIODOMI	LC
82	387	4	EDRASIS	LC
83	388	4	KOTSOVOLOS	LC
84	389	4	DOLNET	LC
85	390	4	MEVACO S.A.	LC
86	391	4	COMPUCOM	LC
87	392	4	GENERAL FOOD	LC
88	393	4	DELTA S.A.	LC
89	394	4	EMFASIS S.A.	LC
90	395	4	MEDICON HELLAS S.A.	LC
91	396	4	HITECH SNT S.A.	LC
92	397	4	EVEREST S.A.	LC
93	398	4	KRI KRI S.A.	LC
94	399	4	GENERAL TRADING	LC
95	400	4	KREKA S.A.	LC
96	401	4	COSMOTE	LC
97	402	4	MOUZAKIS S.A.	LC
98	403	4	MESOCHORITIS	LC
99	404	4	XIFIAS S.A.	LC

100	405	4	AKTOR S.A.	LC
101	406	4	EXAE	LC
102	407	4	ELBISCO	LC
103	408	4	ANEK	LC
104	409	4	ATTI-KAT A.T.E.	LC
105	410	4	CHATZIOANNOU HOLDIND	LC
106	411	4	RILKEN HELLAS S.A.	LC
107	412	4	AGET IRAKLIS	LC
108	413	4	JUMBO A.E.E	LC
109	414	4	TITAN CEMENT	LC
110	415	4	PUPBLIC POWER CO	LC
111	416	4	ELVE S.A.	LC
112	430	4	HELLENIC SUGAR INDUS	LC
113	431	4	KLEEMAN ABEE	LC
114	417	41	COCA COLA S.A.	LC
115	418	41	DELTA HORLDINGS	LC
116	419	41	MOCHLOS	LC
117	420	41	KIRIAKOULIS	LC
118	421	41	HELLENIC FABRICS	LC
119	422	41	MOTOR OIL HELLAS	LC
120	423	41	PIRAEUS BANK	LC
121	424	41	MINOAN LINES	LC
122	425	41	PLAISIO COMPUTERS	LC
123	426	41	MLS INFORMATICS	LC
124	427	41	IATRIKO ATHINON	LC
125	428	41	EMPORIKI BANK	LC
126	429	41	EUROBANK SA	LC

Appendix X:
Second Part of the Empirical study - Regression Results

Regression Model (5-1)[1] - Results

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Government policy, Noise in the market, Technical Analysis, Instinct / Experience, Fundamental Analysis, Newspapers / Media, Models for setting up the portfolio, Foreign markets, Both Fundamental & Technical Analysis[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

[1] Our SPSS version uses comma (,) instead of dot (.)

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,651[a]	,423	,411	1,43	1,915

a. Predictors: (Constant), Government policy, Noise in the market, Technical Analysis, Instinct / Experience, Fundamental Analysis, Newspapers / Media, Models for setting up the portfolio, Foreign markets, Both Fundamental & Technical Analysis

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	631,225	9	70,136	34,243	,000[a]
	Residual	860,238	420	2,048		
	Total	1491,463	429			

a. Predictors: (Constant), Government policy, Noise in the market, Technical Analysis, Instinct / Experience, Fundamental Analysis, Newspapers / Media, Models for setting up the portfolio, Foreign markets, Both Fundamental & Technical Analysis

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,189	,480		6,643	,000
	Fundamental Analysis	,558	,080	,347	6,947	,000
	Technical Analysis	,287	,078	,191	3,671	,000
	Both Fundamental & Technical Analysis	-1,74E-02	,082	-,012	-,212	,832
	Noise in the market	-,254	,083	-,138	-3,064	,002
	Models for setting up the portfolio	,208	,070	,139	2,956	,003
	Newspapers / Media	-,238	,088	-,122	-2,705	,007
	Instinct / Experience	-8,45E-02	,086	-,040	-,982	,327
	Foreign markets	,234	,099	,119	2,372	,018
	Government policy	1,844E-02	,090	,009	,206	,837

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression - Models (5-2) – (5-7)

Regression Model (5-2)- C4 - Traditional Accounting Performance Measures and the Evaluation of Implemented Strategies

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	In what degree do you use the above measures for the evaluation of the companies implemented strategies?[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,420[a]	,176	,174	1,69

a. Predictors: (Constant), In what degree do you use the above measures for the evaluation of the companies' implemented strategies?

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	264,642	1	264,642	92,359	,000[a]
	Residual	1237,837	432	2,865		
	Total	1502,479	433			

a. Predictors: (Constant), In what degree do you use the above measures for the evaluation of the companies' implemented strategies?

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,991	,273		10,965	,000
	In what degree do you use the above measures for the evaluation of the companies' implemented strategies?	,766	,080	,420	9,610	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-3)- C5 - Traditional Accounting Performance Measures and the Evaluation of Future Strategies

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	In what degree do you use the above measures for the evaluation of the companies ' proposed (future) strategies?[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,358[a]	,128	,126	1,74

a. Predictors: (Constant), In what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies?

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	192,753	1	192,753	63,578	,000[a]
	Residual	1309,726	432	3,032		
	Total	1502,479	433			

a. Predictors: (Constant), In what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies?

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3,454	,269		12,842	,000
	In what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies?	,628	,079	,358	7,974	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-4)- C9 - Value-Based Performance Measures and the Evaluation of Implemented Strategies

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	In what degree do you use the above measures for the evaluation of the companies' implemented strategies?[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,513[a]	,264	,262	1,60

a. Predictors: (Constant), In what degree do you use the above measures for the evaluation of the companies' implemented strategies?

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	395,948	1	395,948	154,582	,000[a]
	Residual	1106,531	432	2,561		
	Total	1502,479	433			

a. Predictors: (Constant), In what degree do you use the above measures for the evaluation of the companies' implemented strategies?

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,889	,150		25,906	,000
	In what degree do you use the above measures for the evaluation of the companies' implemented strategies?	,757	,061	,513	12,433	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-5)- C10 - Value-Based Performance Measures and the Evaluation of Future Strategies

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	In what degree do you use the above measures for the evaluation of the companies ' proposed (future) strategies?[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,510[a]	,260	,258	1,60

a. Predictors: (Constant), In what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies?

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	390,168	1	390,168	151,534	,000[a]
	Residual	1112,311	432	2,575		
	Total	1502,479	433			

a. Predictors: (Constant), In what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies?

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3,909	,150		26,073	,000
	In what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies?	,733	,060	,510	12,310	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-6)- C144 - Capital Budgeting and the Evaluation of Implemented Strategies

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	To what degree do you use the above measures for the evaluation of the companies ' implemented strategies?[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,532[a]	,284	,282	1,58

a. Predictors: (Constant), To what degree do you use the above measures for the evaluation of the companies' implemented strategies?

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	426,033	1	426,033	170,976	,000[a]
	Residual	1076,446	432	2,492		
	Total	1502,479	433			

a. Predictors: (Constant), To what degree do you use the above measures for the evaluation of the companies' implemented strategies?

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3,545	,167		21,215	,000
	To what degree do you use the above measures for the evaluation of the companies' implemented strategies?	,820	,063	,532	13,076	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-7)- C144 - Capital Budgeting and the Evaluation of Future Strategies

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	To what degree do you use the above measures for the evaluation of the companies ' proposed (future) strategies?[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,535[a]	,286	,284	1,58

a. Predictors: (Constant), To what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies?

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	429,368	1	429,368	172,850	,000[a]
	Residual	1073,111	432	2,484		
	Total	1502,479	433			

a. Predictors: (Constant), To what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies?

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3,519	,168		20,930	,000
	To what degree do you use the above measures for the evaluation of the companies' proposed (future) strategies?	,820	,062	,535	13,147	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Models (5-8) – (5-16)

Regression Model (5-8) - EPS < 99

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EPS[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,375[a]	,141	,139	1,72

a. Predictors: (Constant), EPS

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	203,046	1	203,046	68,525	,000[a]
	Residual	1238,582	418	2,963		
	Total	1441,629	419			

a. Predictors: (Constant), EPS

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,875	,207		18,709	,000
	EPS	,565	,068	,375	8,278	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-9) - EPS = 99

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EPS[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,270[a]	,073	,070	1,79

a. Predictors: (Constant), EPS

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	105,401	1	105,401	32,990	,000[a]
	Residual	1345,044	421	3,195		
	Total	1450,444	422			

a. Predictors: (Constant), EPS

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,369	,206		21,156	,000
	EPS	,388	,068	,270	5,744	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-10) - EPS > 99

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EPS[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you te m the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,221[a]	,049	,047	1,82

a. Predictors: (Constant), EPS

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	73,325	1	73,325	22,210	,000[a]
	Residual	1422,925	431	3,301		
	Total	1496,249	432			

a. Predictors: (Constant), EPS

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,245	,280		15,166	,000
	EPS	,360	,076	,221	4,713	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-11) - EVA < 99

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EVA < 99[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,378[a]	,143	,141	1,72

a. Predictors: (Constant), EVA < 99

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	206,132	1	206,132	69,710	,000[a]
	Residual	1233,066	417	2,957		
	Total	1439,198	418			

a. Predictors: (Constant), EVA < 99

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,447	,146		30,557	,000
	EVA < 99	,601	,072	,378	8,349	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-12) - EVA = 99

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EVA = 99[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,405[a]	,164	,162	1,70

a. Predictors: (Constant), EVA = 99

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	237,029	1	237,029	82,033	,000[a]
	Residual	1210,677	419	2,889		
	Total	1447,705	420			

a. Predictors: (Constant), EVA = 99

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,376	,144		30,457	,000
	EVA = 99	,662	,073	,405	9,057	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-13) - EVA > 99

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EVA > 99[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,478[a]	,228	,227	1,64

a. Predictors: (Constant), EVA > 99

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	343,094	1	343,094	127,840	,000[a]
	Residual	1159,386	432	2,684		
	Total	1502,479	433			

a. Predictors: (Constant), EVA > 99

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,065	,149		27,325	,000
	EVA > 99	,616	,054	,478	11,307	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-14) - EPS < 99 and EVA < 99

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EVA < 99, EPS[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,441[a]	,194	,191	1,67

a. Predictors: (Constant), EVA < 99, EPS

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	279,752	2	139,876	50,186	,000[a]
	Residual	1159,446	416	2,787		
	Total	1439,198	418			

a. Predictors: (Constant), EVA < 99, EPS

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,692	,204		18,108	,000
	EPS	,383	,075	,255	5,139	,000
	EVA < 99	,414	,079	,261	5,259	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-15) - EPS = 99 and EVA = 99

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EVA = 99, EPS[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,418[a]	,175	,171	1,69

a. Predictors: (Constant), EVA = 99, EPS

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	253,203	2	126,601	44,302	,000[a]
	Residual	1194,503	418	2,858		
	Total	1447,705	420			

a. Predictors: (Constant), EVA = 99, EPS

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,039	,201		20,066	,000
	EPS	,169	,071	,117	2,379	,018
	EVA = 99	,580	,080	,354	7,209	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Regression Model (5-16) - EPS > 99 and EVA > 99

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EVA > 99, EPS[a]		Enter

a. All requested variables entered.

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,477[a]	,228	,224	1,64

a. Predictors: (Constant), EVA > 99, EPS

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	340,438	2	170,219	63,327	,000[a]
	Residual	1155,811	430	2,688		
	Total	1496,249	432			

a. Predictors: (Constant), EVA > 99, EPS

b. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,967	,254		15,611	,000
	EPS	3,978E-02	,076	,024	,523	,601
	EVA > 99	,600	,060	,466	9,969	,000

a. Dependent Variable: As compared to the performance of the market (G.I), how would you term the performance of the strategy you have adopted in the past?(you can use the full scale from 1 to 10)