Users' Perceptions and the Use of Fundamental and Technical Analyses in Athens Stock Exchange

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Abstract

This is the first survey study in Greece on the practice of investment management in terms of stock market forecasting and stock selection. Our respondents come from six different groups of investors, official members of Athens Stock Exchange (ASE), mutual funds, portfolio investment companies, listed companies, brokers and individual investors. ASE has become one of the developed stock market centres for 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 trades. The respondents were asked to rate the relative importance and usage of a number of techniques for stock analysis. There are three major categories of techniques in the survey, namely fundamental analysis, technical analysis and portfolio analysis.

Our results indicate that individual investors rely more on newspapers/media and noise in the market, whereas the professionals rely more on fundamental and technical analyses and less on portfolio analysis. The investment horizon seems to have a direct association with the relative importance of the techniques the professionals use for stock analysis. Also, the use of specific techniques seems to have a different impact on the performance of professionals.

Keywords*:* Investment strategies, Fundamental analysis, Technical analysis, Portfolio analysis.

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1. Introduction

In every stock market, investors have the opportunity to choose among a wide range of investment products, but up to now research in the field of how they express their investment behaviours is still very limited. The exploration and understanding of these behaviours and a consistent and specific education and training are regarded as of high importance in order to assist them and their successful financial future. Since the financial decisions have become more and more complex and risky, investors have to protect themselves from all possible difficulties in the stock markets. Additionally, they have to be well informed and properly trained how all other investment groups are performing in capital markets.

Financial theory considers investors as rational and wealth maximisers (Brealey and Mayers, 2003). They are acting following the basic financial rules and base their strategy on the risk-return consideration. However, the level of risk investors are willing to undertake is not the same, depending mainly on their personal attitudes towards risk. Rational investors, after comparing the level of risk between two investment alternatives, and since their risk is at the same level, they select that alternative which is going to offer them higher return. 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 a choice is presented or structured. The sense that little has been written about the behaviour of individual investors, and other investors' groups, is obvious and strongly referred by Warneryd (2001) in his review of theory of behavioural finance.

Standard analysis of company financial statements examines fundamentals to explain and predict their growth and value added potential, but in many cases, current fundamentals-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 (1988) finds that the interplay between professional analysts basing their views on fundamental analysis and those using the chartist approach influences the market outcome. Shiller (1989) explains excess bond and stock market volatility by 'irrational' patterns of investor

behaviour and suggests that technical analysis is one of the important factors that gave rise to the October 1987 international stock market crash. Despite the increasing interest in non-fundamental analysis, there is little empirical evidence on the prevalence and importance of such techniques in the stock markets (Lui and Mole, 1998).

The objectives of this article 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 adopted 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 paper is structured as follows. Section two summarises recent survey findings on investment practice globally. Section three describes the research method, the questionnaire and the sample. Section four discusses the results from the statistical analysis undertaken. Finally, section five concludes the paper.

2. Literature Review

2.1 Introduction

Empirical evidence suggest that investment professionals may have different practices in different markets and may use different techniques for market forecasting in different time horizons. Thus, it is probable that the practice of market forecasting and stock selection in Greece may be different from that of other developed stock markets, such as the US market. For example, in the US, detailed reports on the stock market are mainly found on financial newspapers and the reports are fundamental analysis oriented. The majority of the daily newspapers in Greece, and other countries (e.g., UK, Hong-Kong), however, provide detailed reports of both fundamental and technical analyses on the stock market.

On the other hand, more than 30 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. Despite the importance of individuals' investment decisions, however, we know little about the factors that influence them.

A body of research has developed, exploring how decisions to sell or buy financial assets are made and how we (individuals as well as investment professionals) choose

between financial assets and it is 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.

2.2 Individual investors

Individuals' investment strategies have been explored through a body of studies performed in the past. 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 stocks*'. They provided evidences that mean and variance were consistent. 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) in their study conducted in the New York Stock Exchange in 1975 for the American individual investors, provided evidence that both price and earnings volatility were the primary measures of risk undertaken by individual investors. Schlarbaum, Lewellen, and Lease (1978), exploring individual investors' investment performance in New York Stock Exchange compared to that of professional fund managers, reveal that they have considerable skills in their investment decisions.

Lease, Lewellen, and Schlarbaum (1974) describe individual investors as 'investors' rather than 'traders', since they are long term minded and give little interest in short term yields. Moreover, Lewellen, Lease and Schlarbaum (1977) reveal that investors' main source of information is through fundamental or technical analysis. Antonides and Van Der Sar (1990, p. 236), exploring the individual investors' characteristics in Dutch stock market, argue 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 extend to which a listing of 34 variables influence shareholders' perception in Fortune 500 companies, provide evidence to a mix of financial and non-financial variables. Additionally, they found that each shareholder considers in a different way the seven different factors arose from their factor analysis. Fisher and Statman (1997) relying on the general agreement that investment decision is a complex one, reveal that investors are not only concerned about risk and

return when buying shares since there are other parameters to take in to consideration. Clark-Murphy and Soutar (2003) in their study of what individual investors value in Australia, suggest that the vast majority of individual investors have little interest in speculation and are by nature long term investors. All the above mentioned studies have been conducted in developed stock markets such as USA, Australia and Netherlands.

2.3 Professional investors

On the other hand there are few studies examining the way that various investor groups are making their investment decisions, especially in less developed countries with a moderately sophisticated capital market. Nassar and Rutherford (1996) have conducted one concerning Jordan, while Naser and Nuseibeh (2003) one for Saudi Arabia. They asked the user groups to explain their attitudes towards annual reports and the usage of these reports in supporting their investment decisions. Evidence show 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 do not consult intermediary sources of corporate information in order to make informed decisions (Naser and Nuseibeh, 2003). Overall, investors seem to use, mainly, fundamental analysis and, to a lesser degree, portfolio analysis (mean-variance analysis).

Other studies concerning mainly professional investors in sophisticated capital markets, such as Hong Kong (Lui and Mole, 1996, 1998; Wong and Cheung, 1999), UK (Grinyer, Russell and Walker, 1991; Taylor and Allen, 1992; Collison, Grinyer and Russell, 1996) and US (Frankel and Froot, 1986 and 1990; Carter and Van Auken, 1990) reveal that these groups of investors rely 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 (for example, Black, 1986; Campbell and Shiller, 1988; Fama and French, 1989; Shiller, 1989; Shleifer and Summers, 1990; Theodossiou, 1991; Bromwich, 1992; Theodossiou, *et al.,* 1996) 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. For instance, analysts from large firms in Hong Kong, especially those with high positions and high 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 provide 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 (Wong and Cheung, 1999; Lui and Mole, 1988).

From the above survey findings we could conclude that the traditional approaches, including both fundamental analysis and technical analysis, are still dominant in some developing and most of the developed financial markets. They 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.

3. Study method

3.1 The sample

The questionnaire was distributed to a total of 1,014 respondents in Greece in the period between December 2003 and February 2004. The sample consists of six different groups: official members of ASE (OMOA), mutual funds management companies (MF), portfolio investment companies (PIC), listed companies of ASE (LC), brokers (BR), and individual investors (ININ). We decided to investigate all those groups since they constitute the frame of investors contributing to the investment process in Athens Stock Exchange. They were all assumed to have the required knowledge to accurately respond to the questions of the questionnaire.

For the selection of our sample we proceeded to the following process:

We created a database, which included all official members of ASE, all mutual funds management companies, all portfolio investment companies, and all listed companies in ASE except banks or those companies, which were under suspension. To distribute the questionnaire to brokers and individual investors was quite complicated. For this reason we randomly selected ten of the brokerage companies, from each of the thirteen regions in the country, targeting one questionnaire for each company (130 questionnaires in total). To distribute the questionnaire to individual investors, we used the same selected brokerage companies, sending four questionnaires to each one (520 in total) and asking them kindly to randomly select four of their potential respondents-customers.

As we can see from table 1 the response rate is very satisfactory.

Table 1: The response rate

Subject groups	Distributed Questionnaires	Returned Questionnaires	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

3.2 The questionnaire

The purpose of the questionnaire was to study whether individuals and investment analysts: (a) regard some techniques for market forecasting and stock selection as more important and use them more than others, and (b) use some techniques more than others in different time periods (short and long term[1], as well as before, during, and after the 1999 crises[2] of the ASE). The questionnaire focuses on four categories of analyses, fundamental analysis, technical analysis, portfolio analysis, and others' opinions. The first two categories have a long history of being used worldwide, while the third category began to be 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 P/E), value based ratio analysis (EVA, SVA, and MVA), discounted and other methods (NPV, IRR, DDM, CFROI, DCA, Economic Profit, and CVA) (Theriou, 2002).

[1] After consultation with representatives of the various user groups we 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 agreed, since their meaning of long term included the medium term and they were not using this term.

[2] Since the Greek capital market had an extreme fluctuation during the last years, with the General Index below 2000 before 1999, an extreme increase up to nearly 6500 during 1999, and a very deep decrease below 1700 in subsequent years, we decided to separate our research to these three examining periods hoping to catch some possible differences between these periods.

2. Technical analysis: Chart analysis and Technical indicators (Moving averages, Relative Strength Index-RSI, Bollinger bands, MACD, Momentum, On balance volume-OBV, Parabolic sar, Stochastic oscillator).
3. Portfolio analysis: return-variance analysis (Markowitz, 1952), CAPM analysis, and simulation analysis (Theriou *et al.*, 2004).
4. Others' opinions: public and private opinions, newspapers/media, instinct/experience, movement of foreign stock markets, government policy, other).

The questionnaire does not specify what these techniques are and how they are used. There are two reasons. First, respondents may use the techniques in different ways. Second, a lengthy list of techniques may discourage the respondents' participation in this survey.

The above techniques are grouped into five sections: short-term forecasting and stock selection usage level (less than a month), long-term forecasting and stock selection usage level (one month to a year), forecasting and stock selection usage level before 1999, forecasting and stock selection usage level during 1999, forecasting and stock selection usage level after 1999. The respondents were asked to rate their use of these techniques on a five-point ordinal Likert scale, where 'score five' means 'always' and 'score one' means 'not at all'. This rating scale is similar to the one presented in the study of Carter and Van Auken (1990).

An early draft of questionnaire was piloted by a small number of potential respondents from every user group. After the feedback from respondents, we modified the wording where needed and reformulated a few questions. The final version of the questionnaire consists of ten pages. To make it easy for the respondents we translated it into Greek and additionally we created an abbreviation and terminology list.

4. Analysis of the results

4.1 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 2) for the respondents of the first four user groups (Official members of ASE, Mutual fund management companies, Portfolio investment companies and Listed companies) we find that on average for all groups, 20.4 per cent are CEOs, 17.7 are CFOs, 2.7 are shareholders, 32.3 are analysts, and 26.9 per cent others.

Table 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 3), we find that for all six user groups, on average, the respondents hold a master degree (57.3 per cent) followed by those holding a bachelor degree (26.5 per cent).

Table 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 find that nearly eleven years (10.8) of experience seems to be the average for all user groups (table 4). Thus, we conclude that more than 80 per cent of the respondents are university graduates (table 3) with less than eleven years of experience. This is mainly due to the fact that although ASE is a long established institution (since 1963), its real role as a financial institution started in the end of 1980s. From this point onwards we see the development of all these companies which are necessary for the its proper functioning.

Table 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**

4.2 Result findings

Table 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, followed by fundamental analysis

and the movement of the foreign stock markets, while they consider the noise in the market and portfolio analysis as the least important approaches, which is in direct contrast to the theories developed by various researchers and academics.

Table 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
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***
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***
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***
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***
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***
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***
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***
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***
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		

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 (3.74), while it comes 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 the 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 (Lui and Mole, 1996, 1998; Wong and Cheung, 1999; Grinyer, Russell and Walker, 1991; Taylor and Allen, 1992; Collison, Grinyer and Russell, 1996; Frankel, Froot, 1986 and 1990; Carter and Van Auken, 1990) 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 interesting more in fundamental than technical analysis while brokers and individual investors do not consider it as their first choice. Brokers have the technical analysis (3.65) as a priority, while media and newspapers mostly influence individual investors. Noise in the market, is considered as the least important factor, except for individual investors who rank it in the fifth position. An interesting result for individual investors is that newspapers and the media are strongly affecting their approach, ranking them in the second position.

Our results about individual investors come in direct contrast with previous researches, which identify 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. The highest degree of agreement on the ranking of different approaches is achieved by mutual fund investment companies (0.73), followed by official members of ASE (0.72), and by listed companies (0.71).

For stock price valuation and forecasting in the short-term, table 6 shows that on average, all user groups rank first the technical analysis (3.36), followed by fundamental analysis (2.84), the combination of both analyses (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.

Table 6: 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
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***
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***
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***
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				

Examining each group separately, official members of ASE (3.42), portfolio investment companies (3.59), brokers (3.36), and individual investors (3.36) consider technical analysis as the first important method for short term use, while mutual fund investment companies rank it second (3.35) after fundamental analysis (3.41) and listed companies rank technical analysis in the last position (2.68). Portfolio analysis ranks last from all 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 higher degree of agreement among their respondents.

Examining the user groups' perception for long-term horizon we find different results. As table 7 shows, on average, fundamental analysis ranks first (3.80), followed by the combination of fundamental and technical analysis (3.11). Technical analysis ranks in the third place with a mean of (2.98), very near to that of portfolio analysis (2.95), which is still in the last place.

Table 7: 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
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***
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***
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***
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**
Alpha test	0.61		0.44		0.46		0.75		0.47		0.70				

The important findings here are that the combination of fundamental and technical analyses is considered as the second 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 leads 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 (sign. 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.

From above we could 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 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: (a) 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, (b) long-term aggregated accounting ratios (e.g., ROI, ROCE) are giving a better indication of the strategic position of a company, a group of companies (competitors) or the industry as a whole, (c) the new established accounting (e.g., EVA) and discounted cash flow (e.g., SVA, CVA) measures are mainly used for the performance measurement (evaluation) of the implemented strategies, thus are bound to cover the whole period of implementation and not only a part of it, otherwise the reported results may lead to wrong conclusions and further actions. Finally, the combination of fundamental and technical analyses 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 the 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; Theodossiou, *et al.,* 1996) 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 (Wong and Cheung, 1999; Lui and Mole, 1988).

Now concerning the usage level of each user group of the various techniques of each of the four categories, we notice that the results do not differentiate at all between short and long-term. Table 8 presents a summary of the first category.

Table 8: Level of usage attached to different techniques of fundamental analysis for all user groups

Accounting 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
Market Value-Based														
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														
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	3
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	4
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

Beginning with the accounting measures, all user groups rank P/E as their first preference, EPS as their second, NOPAT as their third and ROE as their fourth preference. From the market value-based measures first in the usage ranking comes EVA, second MVA, which is very similar to EVA, and third SVA probably because of its computing difficulty. Finally, from the discounted cash-flow measures, first come DDM (Dividends discounted model), second NPV, third IRR, and fourth CFROI, more or less the most known measures of this group. Looking at the three groups of measures, we could notice that accounting measures are preferred by all user groups, having the highest mean values. Then follow the discounted cash-flow measures, with the relatively new market value-based measures taking the third place with the lowest mean values.

These results are quite logical and do not diverge from theory and previous research findings (e.g., Rappaport, 1977; Prakash and Rappaport, 1977; Chow and Wong-Boren, 1987; Sandahl and Sjögren, 2003). Although theory proposes the use of the new market value-based performance measures, research findings are still contradicting in the sense that the majority of researches prove the superiority of the traditional accounting measures in explaining the expected return (or excess return) of the stocks in any developed stock market (Palepu, Bernard and Healy 1996; Watts, 1996; White, Sondhi and Fried 1997; Holms and Sugden, 1999; Brealey and Myers 2000, 2003).

Table 9 presents a summary of the second major category.

Table 9: 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	ANOVA sign. level
Chart analysis	3.24	1	2.82	2	3.38	1	1.81	2	3.68	2	2.25	2	2.65	2	0.000
Technical indicators	3.00	2	3.29	1	3.19	2	1.68	1	3.76	1	2.42	1	2.72	1	0.000
Moving Averages	3.13	1	3.29	1	3.38	1	1.83	2	3.83	2	2.54	2	2.83	**2**	0.000
RSI	2.91	2	3.12	2	3.13	2	1.66	3	3.51	3	2.42	3	2.65	**3**	0.000
Bollinger bands	1.98	7	2.76	4	2.50	6	1.57	4	2.80	5	1.83	5	2.07	5	0.000
MACD	2.80	3	2.94	3	2.88	3	1.85	1	3.90	1	2.69	1	2.86	**1**	0.000
Momentum	2.53	4	2.24	5	2.69	5	1.55	6	2.96	4	2.08	4	2.27	4	0.000
OBV	2.09	6	1.94	7	1.88	7	1.47	7	2.23	7	1.70	6	1.83	**7**	0.000
Parabolic	1.87	8	1.82	8	1.69	8	1.45	8	1.99	8	1.58	7	1.69	**8**	0.012
Stochastic oscillator	2.47	5	2.06	6	2.88	3	1.57	5	2.69	6	1.57	8	1.95	**6**	0.000

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) but 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 use mostly the 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).

Table 10 shows the results both on average for all user groups and for each user group separately, for each of the three different time periods. Findings reveal that fundamental analysis, technical analysis, both fundamental and technical analysis, portfolio analysis, and foreign markets rank in the first place for the third time period (after 1999). On the other hand, noise in the market, newspapers/media and instinct/experience rank in the first place during the second time period (during 1999) where the crisis of Greek stock market appeared. This is an indication that factors such as noise in the market, newspapers/media and instinct/experience can drive investors to wrong decisions. An interesting 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. Examining the use of these factors-methods for each user group separately, we come to the same results.

Table 10: All user groups' level of usage attached in different time periods (before, during, and after 1999)

Item		OMOA	Rank	Sig.	MF	Rank	Sig.	PIC	Rank	Sig.	LC	Rank	Sig.	BR	Rank	Sig.	ININ	Rank	Sig.	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
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
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
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
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
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
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
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
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

We could argue that noise in the market and newspapers/media were the most important sources of information for all groups during the second time period where the crisis occurred while they rank them last in the third period. Fundamental analysis, technical analysis, both fundamental and technical analysis, portfolio analysis, foreign markets and government policy rank in the first place in the third period, which means that investors became more sophisticated in their investment selection strategy.

Next table 11 gives us an indication of the perceptions the five user groups have about the factors influencing the investment strategy of individual non-professional investors.

Table 11: 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
Fundamental analysis	2.20	2.19	1.88	2.00	2.28	2.29	2.23	7	0.114
Technical analysis	2.76	2.94	2.53	2.26	2.18	2.31	2.36	6	0.000***
Both Fundamental and Technical	2.24	2.18	2.06	2.04	2.18	2.01	2.08	8	0.481
Noise in the market	4.18	4.12	4.29	3.83	4.00	3.90	3.96	2	0,085
Portfolio analysis	1.40	1.41	1.47	1.70	1.81	1.40	1.52	9	0.004***
Newspapers / media	4.09	3.94	3.94	3.94	4.13	3.96	4.00	1	0.897
Instinct / Experience	3.62	4.12	3.94	3.83	3.32	3.61	3.61	3	0.002***
Foreign markets	2.33	2.82	2.65	2.57	2.74	3.01	2.82	5	0.000***
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			

On average, all user groups believe that newspapers/media (4.00) and the 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, we realise 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 between user groups regarding the technical analysis, portfolio analysis, instinct/ experience, and foreign markets. That means that different user groups have not the same perceptions for those factors.

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.

Finally, we examine the level of performance of each user group, asking from respondents to valuate their performance indicating their opinion on a ten point Likert scale in terms of 'not very successful' to 'very successful'.

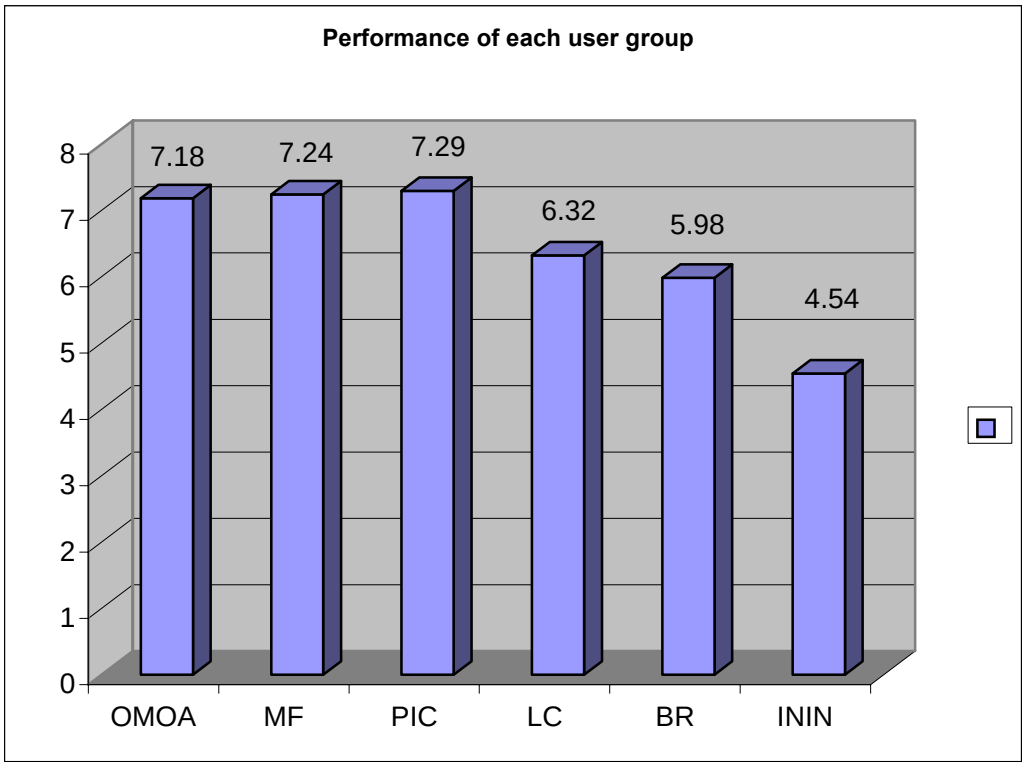

Chart 1: Performance level of each user group

Chart 1 shows that, portfolio investment companies (7.29) and mutual fund management companies (7.24) perform best, followed by official members of ASE (7.18). Public companies performance (6.32), ranks in the fourth place followed by brokers (5.94). Individual investors (4.54) are placed last with a mean value lower than the average. 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. Conclusions

The results of the statistical analysis drive us to the following conclusions.

All user groups are relying most on fundamental and technical analysis and less on portfolio analysis. Fundamental analysis is mostly used by mutual fund management companies, official members of ASE, portfolio investment companies and public companies, while the brokerage and individual investors' group consider it as less important. Technical analysis is more popular among brokers while is less popular among all other user groups. The combined use of both fundamental and technical analyses earns more and more confidence among all user groups. Fundamental analysis is considered as the most important approach in the long-term, while technical analysis becomes more favorable in the short-term. The combination of fundamental and technical analyses seems to be more convincing in the long-term. Similarly, portfolio analysis earns more reputation in the long-term, but still ranks in the last position. The above revealed evidence are consistent with many studies conducted for different sophisticated stock markets such as US, UK, Australia and Hong Kong.

Users of fundamental analysis prefer the accounting measures. Then the discounted cash-flow measures follow, with the relatively new market value-based measures taking the third place with the lowest mean values. These results are quite logical and do not diverge from theory and previous research findings

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.

Since we divided our research in three periods, we found that during the second period (year 1999) the use of fundamental analysis and portfolio analysis were of very low use, while technical analysis and factors such as noise in the market and the information from media drove the investors' strategy. Perhaps this was one of the reasons for the capital crisis at this year. Not surprisingly, we found that in the third period the use of fundamental analysis, the combination of fundamental and technical analyses and portfolio analysis, nearly in all groups, are increasing their use in a considerable degree. Technical analysis still plays its role, but factors such as noise in the market and the information from media are decreasingly used from all user groups.

Individual investors seem to be a very untrained group in investment selection strategies relying mostly on non-scientific factors such as newspapers/media, noise in the market (rumors) and their instinct/experiences.

Finally, the self-assessment of performance of each user group reveals that portfolio investment companies, mutual fund management companies and official members of ASE have performed better than the rest of the groups. Conversely, individual investors have performed worse with a self-assessment below the average.

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