

**ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ**

76418

ΜΕΤΑΠΤΥΧΙΑΚΟ ΠΡΟΓΡΑΜΜΑ

ΣΤΗ ΧΡΗΜΑΤΟΟΙΚΟΝΟΜΙΚΗ ΚΑΙ ΤΡΑΠΕΖΙΚΗ

ΓΙΑ ΣΤΕΛΕΧΗ

**FUNDAMENTAL ANALYSIS AND THE VALUATION OF IPOs  
IN THE ATHENS STOCK EXCHANGE**

**Τζανακάκη Ειρήνη**

Διατριβή υποβληθείσα

προς μερική εκπλήρωση των απαραίτητων προϋποθέσεων

για την απόκτηση του Μεταπτυχιακού Διπλώματος



Αθήνα, Απρίλιος 2000



ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ  
ΚΑΤΑΛΟΓΟΣ



Εγκρίνουμε τη διατριβή της Τζανακάκη Ειρήνης



Υπεύθυνος Καθηγητής: Γκίκας Δημήτριος .....

Γεωργούτσος Δημήτριος .....



## CONTENTS

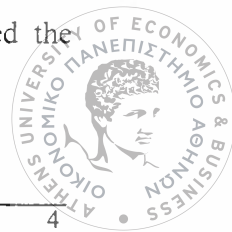
	Σελίδα
1. INTRODUCTION	4
2. METHODOLOGY	7
<i>Association between Earnings Forecasts and Fundamental Signals</i>	8
<i>The use of fundamental signals in the determination of Offer Prices</i>	9
<i>The use of fundamental signals in the determination of stock returns</i>	10
<i>The EMU Factor</i>	14
3. THE INSTITUTIONAL FRAMEWORK AND DATA INPUTS	16
4. MODEL ESTIMATION, EVALUATION AND DISCUSSION OF THE RESULTS	21
5. CONCLUDING REMARKS	29
REFERENCES	30
APPENDIX	32
ACKNOWLEDGMENTS	35

## 1. INTRODUCTION

During the second half of the 1990s, the Athens Stock Exchange witnessed many changes which are characterized by a move to higher share prices, an increase in the number of firms, and a move towards greater maturity. Very recently, March 2000, Morgan Stanley pre-announced the upgrading of the Athens Stock Exchange to a mature market within the year 2000.

It is known that fundamental signals are very important in a mature stock exchange market. A number of studies have tried to associate critical fundamental signals with the IPOs. For the case of the Athens Stock Exchange Ghekas et al (1999) have examined the association between the incomplete contracts of construction firms and stock returns subsequent to the IPO and assess the benefits for investment bankers from exploiting this extra piece of information that is published in the prospectuses of construction firms.

A relatively large number of studies also exists on this topic with empirical results from other stock exchange markets. Thus, recent research on residual income accounting has provided theoretical arguments and empirical support for the view that the book value of equity, as well as earnings is a key determinant of company value (Ohlson (1995), Barth (1998) and Collins (1999)). Other work has examined the



ability of additional signals, beyond earnings and book value of equity, to predict future earnings and explain company value (Lev and Sougiannis (1996) , Abarbanell and Bushee (1997) and Myers (1999)).

Alford (1992) detects the accuracy of the Price-Earnings valuation method in estimating a firm's stock price when comparable firms are selected on the basis of industry, risk and earnings growth. Kim and Ritter (1999) examine the value relevance of fundamental signals using comparable firm multiples for valuing initial public offerings (IPOSs).

The present study attempts a quantitative investigation of the importance of fundamental signals in explaining a number of variables included in the IPOs. More specifically, the association of the following variables with fundamental signals is measured:

- Earnings forecasts
- IPO offer prices
- Stock returns subsequent to the IPO.

The present study proceeds to the econometric estimation of the above associations utilizing the fundamental signals which have been suggested by previous studies. The econometric analysis is based on a sample of IPOs of the firms entering the Athens Stock Exchange during the period of 1995-1999. This period coincides with the attempt to drive the Greek economy into the euro-zone. This course is expected to have influenced one or more of the associations under investigation and an attempt is made to include its influence in the econometric analysis.



The usefulness of this exercise is obvious. First by examining the relations between the fundamental signals and earnings forecasts, it is attempted to establish a benchmark for assessing how efficiently investment bankers use the signals. The examination of the relations between the fundamental signals and offer price, provides information on how efficient is the pricing of IPOs by the firms and its underwriters. Finally, in examining the relations between the fundamental signals and subsequent to the IPO stock returns, we assess how efficient is the stock market with respect to the fundamental information mentioned in the prospectus.

The present study is separated into a number of sections. Following this introduction, the methodology is outlined. In this, the econometric models to be estimated are specified. The variables included in each model are also specified. Special attention is paid to explaining the expected impact of the process towards Greece becoming a member of the European Monetary Union on the variables explained in this paper. Next, the institutional framework applying to the initial public offering in Greece is outlined and the data sources are outlined. In the fourth section, the empirical results are presented along with a discussion of their evaluation and implications. Finally, the concluding remarks appear in the last section.

## 2. METHODOLOGY

Three types of economic relationships are estimated:

- a) The relationship between Earnings Forecasts and fundamental signals.
- b) The relationship between Offer Price and fundamental signals.
- c) The relationship between stock returns subsequent to the IPOs and fundamental signals.

The nature of the first two relationships is rather different from the third one. Thus, the first two relationships are trying to identify the fundamental factors which are used by the investment bankers in determining the Earnings forecasts and the Offer price which appear in the IPOs. In this sense, these relationship can be considered as behavioral equations. The meaning of the third relationship is somewhat different in the sense that the dependent variable (stock returns) is determined by the stock exchange market and the purpose of this study is to investigate the adequacy of the information included in the IPOs in the determination of the stock returns.

Three types of equations are specified corresponding to the above three relationships. The specification of these equations is made in the light of finding of previous studies but the situation prevailing in the Greek economy during the period covered by the sample used is also taken into account. The specification of these equations is discussed next.



### *Association between Earnings Forecasts and Fundamental Signals*

Penman (1992) expresses the view that predicting accounting earnings should be the central task of fundamental analysis. Studying the links between fundamental signals and future earnings changes allows us to test directly the validity of the economic intuition that underlies the original construction of the signals. In addition, Penman (1996) examines the ability of book value of equity and past earnings to predict future earnings.

The suggestion of Penman leads to the specification of the following regression model:

$$FEPS_t = a_0 + b_1 BVPS_{t-1} + b_2 EPS_{t-1} + \varepsilon_t \quad (1)$$

Where:

The period  $t-1$  refers to the year prior to the public offering and the period  $t$  to the year in which the public offering occurs.

$FEPS_t$  is forecasted earnings per share. For the computation of forecasted earnings per share we use the formula  $FEPS_t = (\text{Forecasted Earnings for the year } t) / (\text{Total Shares for the year } t)$ .

BVPS<sub>t-1</sub> is book value per share. For the computation of book value per share we use the formula  $BVPS_{t-1} = (\text{Book Value for the year } t-1) / (\text{Total Shares for the year } t-1)$ .

EPS<sub>t-1</sub> is earnings per share. For the computation of earnings per share we use the formula  $EPS_{t-1} = (\text{Reported Earnings for the year } t-1) / (\text{Total Shares for the year } t-1)$ .

All explanatory variables are expected to have a positive influence on the value of the Forecasted Earnings.

*The use of fundamental signals in the determination of Offer Prices*

Barth, Beaver and Landsman (1998) have used book value of equity and net income in equity valuation. Ohlson (1995) suggests that there is a positive relation between forecasted earnings, book value of equity and offer price. Thus, the regression model in this case is the following:

$$\text{Offer price} = a + b_1 \text{FEPS}_t + \text{BVPS}_{t-1} + \varepsilon_t \quad (2)$$

Where:

FEPS<sub>t</sub> is the forecasted earnings per share, and

BVPS<sub>t-1</sub> is book value per share

Offer Price is collected from the prospectuses.

We expect to find a positive relation between offer price and earnings forecasts and book value of equity as suggested by Ohlson (1995).



### *The use of fundamental signals in the determination of stock returns*

In order to examine the ability of fundamental signals to explain stock returns subsequent to the IPO, the following, fundamental signals are used: the level of earnings, change in earnings, market value of the firm, book-to-market ratio, financial leverage based on book values and price-to-earnings ratio. Such a specification is also used by Ghekas *et al* and applied to the construction industry.

The specification uses explanatory variables suggested mainly by Fama and French (1992), but also by Easton and Harris (1991). Thus, Fama and French (1992) suggest the following fundamentals to explain stock returns subsequent to the initial public offering: firm size, book-to-market ratio, financial leverage and earnings-to-price ratio. Fama and French show that is a strong cross-sectional relation between average returns and book-to-market equity and if anything, this book-to-market effect is more powerful than the size effect. Also, the combination of size and book-to-market equity absorbs the apparent roles of leverage and earnings-to-price ratio in average stock returns.

Easton and Harris (1991) suggests the level of earnings and the change in earnings variable are relevant for explaining returns, and the two variables are not just substitutes. In multivariate regressions of security returns on both the earnings level and the earnings change variables, both coefficients are generally significantly different from zero. This result suggests that both earnings variables play a role in security valuation.

Additionally, Banz (1981) documents a strong negative relation between average return and firm size (market capitalization). Bhandari (1988) finds that average return is positively related to leverage, and Basu (1983) finds a positive relation between average return and E/P. Stattman (1980) and Rosenberg, Reid and Lanstein (1985) document a positive relation between average return for U.S. stocks and a firm's book-to-market ratio, and Chan, Hamao and Lakonishok (1992) find that BE/ME is also a powerful variable for explaining average returns on Japanese stocks.

The above literature suggests the specification of two regression models. The first is the one associated with the work of Fama and French and it is the following:

$$SR_t = a + b_1 FEMV_t + b_2 \Delta FMEV_t + b_3 \ln MV_t + b_4 \ln (BV_{t-1}/MV_t) + b_5 (TA_{t-1}/BV_{t-1}) + b_6 P/E_t + \varepsilon_t$$

Where:

$SR_t$  are the stock returns which are computed using the formula  $SR_t = (P_t - \text{Offer Price}) / \text{Offer Price}$ .

Where  $P_t$  is the market price at the end of one week, one month, three months, six months and twelve months for the calculation respectively of one week, one month, three months, six months and twelve months stock return.

$FEMV_t$  is computed using the formula  $FEMV_t = \text{Forecasted Earnings } t / (\text{Total Shares} * \text{Offer Price})$ .

$\Delta FEMV_t$  is computed using the formula  $\Delta FEMV_t = (\text{Forecasted Earnings } t - \text{Reported Earnings } t-1) / (\text{Total Shares} * \text{Offer Price})$

$MV_t$  is the market value of the firm and is computed using the formula  $MV_t = \text{Offer price} * \text{Total Shares}$ .

$BV_{t-1}/MV_t$  is the book-to-market ratio and is computed using the formula  $BV_{t-1}/MV_t = \text{Book value of the firm at the end of year } t-1 / \text{Market Value of the firm at offer prices}$

$TA_{t-1}/BV_{t-1}$  is the financial leverage based on book values and is computed using the formula  $TA_{t-1}/BV_{t-1} = \text{Total Assets of the firm at the end of the year } t-1 / \text{Book value of the firm at the end of year } t-1$ . The regressions use the natural log of leverage ratio, because tests indicated that logs are a good functional form for capturing leverage effects in average returns. Using logs also leads to a simple interpretation of the relation of leverage and book-to-market equity in average returns.

$(P/E)_{t-1}$  is the (offer) price-to-earnings ratio and is hand-collected from the IPO.

A different specification for the explanation of stock returns has also been tried which uses as explanatory variables different fundamental signals suggested in various pieces of the literature. These explanatory variables include: the price-to-earnings

ratio (P/E), the price-to-book value ratio (P/B), the price-to-cash flow ratio (P/CF), the price-to-sales ratio (R/S). The relevant regression model is the following:

$$SR_t = a + b_1 (P/E)_{t-1} + b_2 (P/B)_{t-1} + b_3 (P/CF)_{t-1} + b_4 (R/S)_{t-1} + \varepsilon_t$$

Where:

$SR_t$  are the stock returns which are computed using the formula  $SR_t = (P_t - \text{Offer Price}) / \text{Offer Price}$ .

Where  $P_t$  is the market price at the end of one week, one month, three months, six months and twelve months for the calculation respectively of one week, one month, three months, six months and twelve months stock return.

$(P/E)_{t-1}$  is the price-to-earnings ratio at the end of year t-1 and was hand-collected from the prospectuses.

$(P/B)_{t-1}$  is the price-to-book value ratio at the end of year t-1 and was hand-collected from the prospectuses.

$(P/CF)_{t-1}$  is the price-to-cash flow ratio at the end of year t-1 and was calculated from financial data collected from the prospectuses.

$(R/S)_{t-1}$  is the price-to-sales ratio at the end of year t-1 and was calculated from financial data collected from the prospectuses.

All the above fundamentals were calculated using offer prices.

On *a priori* grounds all the above explanatory variables are expected to have a negative influence on the stock returns. This is confirmed by previous studies also. Thus, Basu (1983) finds a negative relation between average return and P/E. Rorsenberg, Reid and Lanstein (1985) find a negative relation between average return and P/BV. We expect a negative relation between stock returns and P/CF, and a negative relation between stock returns and R/S as suggested also by Vassiliou (1999).

#### *The EMU Factor*

The fundamental signals used to explain the dependent variables of the three relationships studied in this work are all firm-specific. However, the performance of the general economy also has an impact on these variables which is not accounted for with the models specified above. This is especially true for the explanation of stock returns. The Greek economy during the period covered by the sample used (1995-1999) has changed considerably and this change is expected to have an impact on the behaviour of investmet bankers in determining the offer prices and the forecasted earnings and especially on the stock returns subsequent to the IPOs.

The performance of the general economy has raised the general index of the Athens Stock Exchange market to levels not witnessed before. This is due to the stabilization of the economy, which was achieved after decades of instability, to the acceleration of the economic growth and particularly to the achievement of the Maastricht criteria

for entry into the European Monetary Union (EMU) which guarantees the stability of the Greek economy and its prospects in a much bigger market.

On March 9, 2000 Greece applied for membership of the EMU which means that the drachma will be abandoned, the euro will be adopted as the national currency, the Central Bank of Greece will become a branch of the European Central Bank (ECB) and the Greek economy will be bound by the Stability and Development Pact which guarantees fiscal discipline within the EMU. All these will happen if, as expected, at the Lisboa summit of the European Union the Greek application for entry into the EMU is approved.

The entry into the euro-zone meant the achievement of certain criteria of nominal economic convergence with the other members of the zone. These criteria relate to the rate of the inflation, the budget deficit, the public debt and the long term interest rates. The inflation criterion was the last one to be achieved and the one around which the economic policy of the last few years was centred. For this reason the inflation rate, as measured by the Consumer Price Index (CPI), is used in this study to represent the process towards the EMU which has so much affected the performance of the stock exchange market.

The aforementioned regression model is expanded using the variable CPI (EMU effect) as follows:

$$SR_t = a + b_1 (P/E)_{t-1} + b_2 (P/B)_{t-1} + b_3 (P/CF)_{t-1} + b_4 (R/S)_{t-1} + b_5 CPI_t + \varepsilon_t$$

Where:

CPI is the inflation rate at the end of one week, one month, three months, six months and twelve months after the first closing day for the calculation respectively of one week, one month, three months, six months and twelve months stock return.

CPI was computed on the following basis: if the date after of one week, one month three months, six months and twelve months was before the 15<sup>th</sup> of that month, the inflation rate of the previous month was selected. If the aforementioned date was after the 15<sup>th</sup> of that month, the inflation rate of that month was selected.

### 3. THE INSTITUTIONAL FRAMEWORK AND DATA INPUTS

The institutional framework in Greece for initial public offerings (IPOs) was set by Presidential Decree No.348 of 1985 and the Board of Directors of the Athens Stock Exchange. The aforementioned Presidential Decree sets the information that must be included in the prospectus. For an initial public offering of a firm in the Athens Stock Exchange a legal advisor is required for the preparation of the prospectus. Also, the role of the advisor is to guide the firm to make all the prerequisite actions that are necessary for the initial public offering. In addition, an underwriter of the placement is required who is responsible for the settlement of the offer price and the legal, economic and tax reports that must be submitted to the Athens Stock Exchange.

The main information that must be included in the prospectus of an initial public offering are the following:



- ❖ Information about the writers of the prospectus
  - The names of the firm's employees responsible for the information provided in the prospectus.
  - The names of the advisor's employees responsible for the writing of the prospectus.
  - The names of the underwriter's employees responsible for the offering.
  - The names of the certified chartered accountants.
  - The name of the Law Office responsible for the legal procedures.
  
- ❖ Information about the shares that will be offered and usage of the contributed capital
  - Number of shares that will be issued (public and private placement)
  - The rights of the shares
  - The offer price and the total proceeds
  - The underwriter's charges.
  - Usage of the contributed capital
  
- ❖ Information about the corporation
  - Major activities of the corporation going public.
  - Production procedure.
  - Marketing and sales structure.
  - Tangible and intangible assets of the firm.
  - Changes in the contributed capital of the firm.
  - Major shareholders and percentages of ownership.



- The board of directors and their compensation arrangements.
  - Curriculum Vitae of top executives and their compensation arrangements.
  - Organization chart.
  - The number of employees
  - Investment policy
- ❖ Information about the sector
- ❖ Financial information about the firm
- The financial statements of the firm for the last three years if the firm applies for Parallel Market (five years for Main Market) and consolidated financial statements if any available.
  - Financial ratios and Cash flows for the examined period.
  - Projections for the following financial year.
  - Earnings and book value per share.
- ❖ Future prospects of the corporation.

The empirical analysis of this study is based on a sample of fifty -five (55) firms that went public during period 1995-1999. The selection of this particular period was based on data availability and on the fact that after 1996 the prospectuses contained more detailed financial information as it was imposed by the Board of Directors of the Athens Stock Exchange. The firms included in the sample are shown in the following table:



**Firms included in the sample**

<b>FIRM</b>	<b>DATE OF PUBLIC OFFERING</b>
ANEK LINES	21/1/1999
BABYLAND	16/9/1997
CONNECTION	24/8/1998
KLEEMAN	5/4/1999
VETERIN	5/4/1999
ALKO	10/2/1997
ALOUMIL MILONAS	26/1/1998
ALTEC	1/6/1995
ASPIS BANK	8/9/1998
VARAGIS	29/7/1998
VERNIKOS	14/9/1996
GENER	18/3/1996
GIANNOUSIS	18/2/1998
GALIS	3/12/1997
DORIKI	11/8/1998
ELVAL	10/6/1996
ELATEX	19/3/1996
ELPE	30/6/1998
ENDISI	24/12/1996
EPIFANEIA	19/8/1997
ETANE-EFKLEIDIS	8/7/1997
EVROPAIKI PISTI	29/4/1997
IATRIKO P.FALIROU	9/12/1996
IMPERIO	19/8/1996
INFOQUEST	17/12/1998
HELLENIC DUTY FREE SHOPS	30/3/1998
KARAMOLEGOS	7/1/1999
KARDASILARIS	9/10/1996
KLOSTIRIA NAFPECTU	8/7/1996
KORASIDIS	26/3/1996
KOUMPAS	21/3/1996
KIRIAKIDIS	16/12/1998
KIRIAKOULIS	10/4/1998
LAMPRAKIS	6/11/1998
MINOAN LINES	5/5/1998
MOSCHOLIOS CHEMICALS	22/7/1998
DESPEC	17/12/1998
DIS	16/3/1998
DRUCKFARBEN	11/12/1998
XIFIAS	9/11/1998
OTE	19/4/1996
PAIRIS	8/1/1997

PANAFON	7/12/1998
PAPAELLINAS	24/7/1996
POULIADIS	3/7/1996
REMEK	11/1/1996
SPIROU	28/7/1997
SYSWARE	27/8/1997
SFAKIANAKIS	18/6/1997
SOLINOYRGIA KORINTHOU	30/7/1998
TASOGLOU	7/3/1996
TEGOPOULOS	30/12/1998
FLEXOPACK	2/4/1996
HALKOR	27/12/1996
HIOS BANK	27/5/1997

From the selected sample one firm went public at 1995, 18 firms at 1996, 11 firms at 1997, 21 firms at 1998 and 4 firms at 1999. The firms selected during period 1996-1998 include all firms that went public during that period.

The aforementioned sample covers a large portion of listed firms of Athens Stock Exchange. The following table contains information about the categorization of the sample firms in the different sectors of Athens Stock Exchange.

**Sectoral classification of sample firms**

SECTOR	NUMBER OF FIRMS	PERCENTAGE OF TOTAL SAMPLE
MISCELLANEOUS	15	27%
INFORMATION TECHNOLOGY	6	11%
METAL	5	9%
SHIPPING	4	7%
PHARMACEUTICALS	3	5%
CHEMICALS	3	5%
BANKING	3	5%



PUBLICING	3	5%
CONSTRUCTION	2	4%
TEXTILE	3	5%
INSURANCE	2	4%
TELECOMMUNICATION	2	4%
ENERGY	1	2%
FOOD	1	2%
MILLS	1	2%
<b>TOTAL</b>	<b>55</b>	<b>100%</b>

From the total sample, 33 firms (60%) went public for the Parallel Market and 22 firms (40%) for the Main Market.

Financial data for the measurement of fundamental signals was hand-collected from the prospectus. Stock returns were estimated from stock prices adjusted for stock splits and stock dividends. Stock prices were collected from Athens Stock Exchange database and stock returns were calculated for one week, one month, three months, six months and twelve months period. This piece of information was entered in the EVIEWS program for further investigation. Data for the inflation rate was collected from the Monthly Statistical Bulletin of National Statistical Service of Greece and the Bulletin of Conjunctural Indicators of Economic Research Department of Bank of Greece.

#### **4. MODEL ESTIMATION, EVALUATION AND DISCUSSION OF THE RESULTS**

The Ordinary Least Squares method was used to estimate the above specified models:

Table 1 presents the results from the regression of fundamental signals including the variable CPI, on the forecasted earnings per share. The statistical fit of the regression is not at the desirable levels, although according to the F value the overall regression is statically significant. Two variables, the book value per share and the CPI (standing for the EMU effect), are not statistically significant which means that they do not appear to be taken into account forming the forecasts about earnings per share.

However, the variable earnings per share of the previous period appears to be highly significant. This result suggests that forecasts are made according to a relatively simple forecasting rule which is based on the history of the forecasted variable, which is a backward looking forecasting process.

**TABLE 1**

**Fundamental Signals and Earnings Forecasts**

$$\text{Model: FEPS}_t = a + b_1 \text{BVPS}_{t-1} + b_2 \text{EPS}_{t-1} + b_3 \text{CPI}_t + \varepsilon_t$$

(n=55)

a	b1	b2	b3	R <sup>2</sup>	F value
45,05	-0,0036	0,72	6,4	0,31	7,61
(0,79)	(-0,08)	(4,15)	(0,78)		

Table 2 presents the results on the determination of the offer price. The CPI does not appear as a variable in this table of results because it turned up to be statistically insignificant. Although the  $R^2$  is low, the overall significance of the regression is at the conventional levels. Of the two explanatory variables included in the estimated model, the forecasted earnings are highly significant whereas the book value per share variable is statistically significant only at the 13 percent level.

In this case, the determination of the offer price seems to be based on a wider information set since the results suggest that both variables have a contribution (when lowering somewhat the confidence levels).



**TABLE 2**

**Fundamental Signals and Offer price**

**Model: Offer price = a + b<sub>1</sub> FEPS<sub>t</sub> + b<sub>2</sub> BVPS<sub>t-1</sub> + ε<sub>t</sub>**

**(n=55)**

a	b1	b2	F	R2	F value
908,94	2,82	0,59	5,85	0,18	5,85
(3,10)	(2,82)	(1,53)			

Tables 3 and 4 as well the two tables in the appendix present the results on the determination of the stock returns subsequent to the IPOs using some of the variables which appear to the IPOs. More variables have been added in an attempt to explore



larger number of potential determinants. The CPI accounting for the EMU effect on stock returns is the most notable of these variables and the only one which is not firm-specific.

Table 3 presents the results without including the CPI as an explanatory variable which is added next and the results with all the variables included appear in table 6. The results of table 3 cannot be considered as satisfactory, The coefficient of determination in all but the last case is very low and the F-statistic in most cases

**TABLE 3**

**Fundamental Signals and Stock Returns**

$$\text{Model: } SR_t = a + b_1 (P/E)_{t-1} + b_2 (P/B)_{t-1} + b_3 (P/CF)_{t-1} + b_4 (R/S)_{t-1} + \varepsilon_t$$

(n=55)

	a	b1	b2	b3	b4	F	R2	Adj-R2
1 week	-0,389	0,021	0,001	-0,00015	-0,05	1,24	0,09	0,02
	(-2,67)	(1,84)	(0,47)	(0,62)	(-1,58)			
1 month	-0,398	0,03	-0,002	0,0003	-0,064	1,8	0,12	0,06
	(-2,28)	(2,23)	(-0,63)	(1,11)	(-1,69)			
3 month	-0,47	0,054	0,0014	0,00078	(-0,10)	4,18	0,25	0,19
	(-2,26)	(3,29)	(0,36)	(2,28)	(-2,25)			
6 month	-0,41	0,08	-0,004	0,0015	-0,132	4,74	0,27	0,22
	(-1,33)	(3,32)	(-0,59)	(3,02)	(-1,98)			
12 month	-0,3	0,21	-0,02	0,006	-0,34	9,63	0,44	0,39
	(-0,46)	(3,96)	(-1,54)	(5,03)	(-2,36)			

statistically insignificant. In addition, most coefficients have the wrong sign compared to the expected one. The same applies to the P/E ratio in all equations. What is more worrying is that the positive sign of the P/E ratio is in some cases statistically significant. Things are a little better for the P/B ratio the coefficients of which have the correct sign in most cases but it is not statistically significant in any one equation. The situation with the P/CF variable is similar to that of the P/E ratio. It is only the R/S ratio which has acquired the correct sign in all cases and in some of them it is also statistically significant.

The addition of the CPI variable to the model has created a more favourable situation. The coefficient of determination has increased and the F statistic indicates statistically significant regressions in the majority of the equations. The CPI variable has acquired the correct sign in all cases and it is statistically significant in all cases also. Its addition to the model has improved somewhat the performance of the other variables but far from the point of them having the correct sign and being statistically significant.

From all the firm specific variables used, it is the R/S variable which has given the best results since it has acquired the correct sign in all equations and it is statistically significant in some cases. This result requires further exploration. It is possible that the unexpected results are due to intercorrelations which exist among the explanatory variables.

The most important conclusion from these results is that the entry of Greece into the European Monetary Union seems to be the determining factor behind the evolution of

TABLE 4

## Fundamental Signals and Stock Returns

$$\text{Model: } SR_t = a + b_1 (P/E)_{t-1} + b_2 (P/B)_{t-1} + b_3 (P/CF)_{t-1} + b_4 (R/S)_{t-1} + b_5 CPI_t$$

(n=55)

	a	b1	b2	b3	b4	b5	F	R2	Adj-R2
1 week	0,669	-0,0005	0,0004	-0,00003	-0,038	-0,136	3,46	0,26	0,19
	(1,96)	(-0,04)	(0,16)	(-0,14)	(-1,32)	(-3,37)			
1 month	0,91	0,0017	-0,0026	-0,00009	-0,047	-0,17	4,2	0,3	0,23
	(2,26)	(0,11)	(-0,86)	(0,35)	(-1,38)	(-3,53)			
3 month	1,007	0,019	0,0011	0,00052	(-0,079)	(-0,2016)	6,54	0,4	0,34
	(2,18)	(1,09)	(0,32)	(1,64)	(-1,91)	(-3,5)			
6 month	1,98	0,012	-0,003	0,0001	-0,096	-0,341	8,58	0,47	0,41
	(3,15)	(0,47)	(-0,58)	(2,19)	(-1,64)	(-4,2)			
12 month	3,84	0,11	-0,023	0,005	-0,28	-0,75	12,45	0,56	0,51
	(3,04)	(1,98)	(-1,96)	(4,93)	(-2,17)	(-3,72)			

the stock returns with firms that entered the Athens Stock Exchange market closer to the realisation of the entry exhibiting higher returns. Thus, the EMU effect on the stock exchange market is confirmed by the analysis in the study which also gives a weak indication of the irrelevance of firm specific fundamentals in determining stock returns subsequent to the IPOs. Supportive of this result could also be the observed evolution of the share prices of the firms of various sectors in the Athens Stock Exchange market which move all together upwards or downwards depending on the

TABLE 5

## Fundamental Signals and Stock Returns

$$\text{Model: } SR_t = a + b_1 FEMV_t + b_2 \Delta FMEV_t + b_3 \text{Ln}MV_t +$$

$$b_4 \text{Ln} (BV_{t-1}/MV_t) + b_5 (TA_{t-1}/BV_{t-1}) + b_6 P/E_t + \varepsilon_t$$

(n=55)

	a	b1	b2	b3	b4	b5	b6	F	R2	Adj-R2
1 week	-0,21 (-0,18)	-4,403 (-2,94)	3,712 (2,51)	0,03 (0,59)	0,078 (0,88)	0,0008 (0,06)	-0,012 (-0,86)	2,23	0,22	0,12
1 month	0,883 (0,62)	-5,28 (-2,88)	4,435 (2,45)	-0,015 (-0,23)	0,039 (0,36)	-0,008 (-0,46)	-0,007 (-0,39)	2,15	0,21	0,11
3 month	2,254 (1,24)	-6,31 (-2,69)	5,398 (2,33)	-0,075 (-0,94)	0,057 (0,41)	0,01 (0,45)	0,013 (0,58)	2,32	0,23	0,13
6 month	4,59 (1,7)	-9,85 (-2,84)	8,46 (2,48)	-0,146 (-1,23)	0,165 (0,81)	0,007 (0,22)	-0,022 (0,67)	2,65	0,25	0,25
12 month	12,37 (1,83)	-18,3 (-2,09)	15,7 (-1,82)	-0,42 (-1,41)	0,59 (1,15)	0,055 (0,65)	0,001 (1,22)	2,16	0,21	0,11

existing investment climate and disregarding the differences that exist among the different firms.

The estimation results of the model which is based on the Fama and French suggestions appear in tables 5 and 6. The results of table 5 include the equations without the CPI variable which is included in the results of table 6. According to the calculated F statistics of table 5, two equations are statistically significant at five percent level of significance (critical F-value=2.25) and the rest are significant at the ten percent level of significance. This relatively low statistical significance of the

TABLE 6

## Fundamental Signals and Stock Returns

$$\text{Model: } SR_t = a + b_1 \text{ FEMV}_t + b_2 \Delta \text{FMEV}_t + b_3 \text{ LnMV}_t +$$

$$b_4 \text{ Ln} (BV_{t-1}/MV_t) + b_5 (TA_{t-1}/BV_{t-1}) + b_6 P/E_t + b_7 \text{ CPI}_t + \varepsilon_t$$

(n=55)

	a	b1	b2	b3	b4	b5	b6	b7	F	R2	Adj-R2
1 week	0,263 (0,24)	-2,856 (-1,88)	2,324 (1,57)	0,036 (0,74)	0,065 (0,78)	-0,004 (-0,31)	-0,02 (-1,49)	-0,11 (-2,69)	3,19	0,32	0,22
1 month	1,5 (1,12)	-3,27 (-1,78)	2,57 (1,43)	-0,007 (-0,12)	0,018 (0,18)	-0,013 (-0,77)	-0,02 (-1,16)	-0,15 (-2,94)	3,37	0,33	0,24
3 month	3,042 (1,84)	-4,149 (-1,89)	3,38 (1,57)	-0,057 (-0,79)	0,033 (0,27)	0,005 (0,23)	-0,001 (-0,47)	-0,211 (-3,53)	4,24	0,39	0,3
6 month	5,89 (2,56)	-6,41 (-2,1)	5,27 (1,76)	-0,117 (-1,16)	0,146 (0,84)	0,003 (0,11)	-0,027 (-0,91)	-0,359 (-4,38)	5,88	0,47	0,39
12 month	17,17 (2,77)	-12,25 (-1,53)	10,85 (-1,39)	-0,475 (-1,77)	0,461 (0,99)	0,054 (0,71)	0,03 (0,39)	-0,875 (-3,57)	4,14	0,38	0,29

estimated equations is due to the statistical insignificance of the variables suggested by Fama and French and which probably reflects the existence of efficient pricing by both the investment bankers and the stock market. The statistical significance of the variables suggested by Easton and Harris proved not sufficient to raise the overall statistical significance of the regression to the conventional significance levels (5 percent) in the majority of cases.

The overall significance of the regressions improves when the EMU factor variable (CPI) enters the model (results in table 6). According to these results all equations are statistically significant at the one percent level. The Fama and French explanatory variables continue to be statistically insignificant and the ones suggested by Easton and Harris significant. The difference is made by the CPI which has the correct sign and it is statistically significant in all equations. Approaching the criteria set at Maastricht for EMU membership prove once again to be a very important determining factor of the stock returns.

## 5. CONCLUDING REMARKS

Using a sample of 55 firms which entered the Athens Stock Exchange market during the 1995-1999 period, it is attempted to associate the Earnings forecasts, the Offer Prices, which are included in the IPOs, and the Stock returns subsequent to the IPOs with a number of variables representing fundamental signals.

Simple forecasting rules and the entry of Greece into the EMU seem to dominate the results. Thus, future earnings seem to be forecasted solely on the basis of previous earnings, which indicates a rather myopic rule. Then, these forecasted earnings seem to be the main determining factor of the Offer Prices. As a consequence, past earnings indirectly influence the offer price also. Therefore, previous earnings seem to determine two very important variables included in the IPOs which shows the absence of more dynamic factors. The entry of Greece into the EMU is nearly the only and definitely the most important factor determining stock returns. This is due to the high price rises recorded especially during 1999. Future research will prove whether or not the fundamental signals become more important, for both investment bankers and the stock market, now that the Athens Stock Exchange approaches maturity and soon will officially be upgraded to a mature market.

## REFERENCES

### A) Papers

1. Abarbanell, Jeffery S. and Brian J. Bushee 1997. "Fundamental Analysis, Future Earnings and Stock Prices", *Journal of Accounting Research (Spring)* : (1-24).
2. Alford, Andrew W. 1992 "The Effect on the Set of Comparable Firms on the Accuracy of the Price-Earnings Valuation Method" *Journal of Accounting Research (Spring)*: 94-108.
3. Banz, Rolf W. 1981, "The relationship between return and market value of common stocks", *Journal of Financial Economics* 9: 3-18.
4. Barth, Mary E., William H. Beaver and Wayne R. Landsman, 1998 "Relative Valuation Roles of Equity Book Value and Net Income as a Function of Financial Health" *Journal of Accounting and Economics (February)*: 1-34.
5. Basu, Sanjoy, 1983, "The relationship between earnings yield, market value and
6. Return for NYSE common stocks: Further evidence" *Journal of Financial Economics* 12: 129-156.
7. Bhandari, Laxmi Chand, 1998, "Debt/Equity ratio and expected common stock returns: Empirical evidence", *Journal of Finance* 43, 507-528.
8. Chan, Louis K., Yasushi Hamao, and Joseph Lakonishok, 1999, "Fundamentals and stock returns in Japan", *Journal of Finance* 46, (1739-1789).
9. Easton, Peter D. and Trevor Harris, 1991, "Earnings as an Explanatory Variable for Returns", *Journal of Accounting Research (Spring)* : (19-36).
10. Fama, Eugene and Keneth French, 1992, "The Cross-Section of Expected Stock Returns", *Journal of Finance (June)*, (1739-1789).

11. Ghikas, Iriotis, Papadaki and Walker , 1999, “Fundamental Analysis and the Valuation of IPOs in the Construction Industry.
12. Kim, Moonchul and Jay R.Ritter, 1999, “Valuing IPOs ” , *Journal of Financial Economics (September): 409-437.*
13. Ohlson, James A, 1995, “ Earnings, Book Values and Dividends in Equity Valuation”, *Contemporary Accounting Research, (Spring): 661-687.*
14. Penman, Stephen H, 1992, “Return to Fundamentals”, *Journal of Accounting, Auditing and Finance, (Fall): 465-482.*
15. Penman, Stephen H, 1992. “Combining Earnings and Book Values in Equity Valuation” , *Working Paper, University of California, Berkeley.*
16. Rosenberg, Barr, Kenneth Reid and Ronald Lanstein, 1985, “Persuasive evidence of market inefficiency”, *Journal of Portfolio Management 11, 9-17*

#### B)Books

1. Δημήτρης Βασιλείου, «Ανάλυση και Διαχείριση Επενδύσεων»
2. Clyde P.Stickney, Roman L.Weil, “Financial Accounting: an Introduction to Concepts, Methods and Uses”.
3. Eugene F.Brigham, Louis C.Gapenski, Michael C.Ehrhardt, “Financial Management Theory and Practice”
4. Terry J.Watsham and Keith Parramore, “Quantitative Methods in Finance”

## APPENDIX

Fundamental Signals and Stock Returns						
Model: $SR_t = a + b_1 (P/E)_{t-1} + b_2 (P/B)_{t-1} + \varepsilon_t$						
(n=55)						
	a	b1	b2	F	R2	Adj-R2
1 week	-0,422	0,015	0,001	1,05	0,04	0,002
	(-2,96)	(1,36)	(0,46)			
1 month	-0,429	0,022	0,002	1,5	0,05	0,02
	(-2,48)	(1,65)	(-0,56)			
3 month	-0,5	0,039	0,003	2,92	0,1	0,07
	(-2,29)	(2,31)	(0,62)			
6 month	-0,4	0,06	-0,0007	2,6	0,09	0,06
	(-1,21)	(2,28)	(-0,11)			
12 month	-0,14	0,14	-0,008	2,67	0,09	0,06
	(-0,17)	(2,26)	(-0,54)			

Fundamental Signals and Stock Returns							
Model: $SR_t = a + b_1 (P/E)_{t-1} + b_2 (P/B)_{t-1} + b_3 (P/CF)_{t-1} + \epsilon_t$							
(n=55)							
	a	b1	b2	b3	F	R2	Adj-R2
1 week	-0,434	0,016	0,0009	0,00014	0,8	0,05	-0,01
	(-2,99)	(1,41)	(0,32)	(0,57)			
1 month	-0,455	0,024	-0,003	0,0003	1,4	0,07	0,02
	(-2,61)	(1,77)	(-0,78)	(1,05)			
3 month	-0,56	0,043	0,0006	0,00075	3,6	0,17	0,13
	(-2,65)	(2,64)	(0,14)	(2,14)			
6 month	-0,53	0,07	-0,005	0,0015	4,74	0,22	0,17
	(-1,7)	(2,77)	(-0,77)	(2,88)			
12 month	-0,61	0,17	-0,02	0,005	10,07	0,37	0,34
	(-0,46)	(3,96)	(-1,54)	(5,03)			

## ACKNOWLEDGMENTS

I would like to thank Professor Gkekas for the valuable help during this study.