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THE UNDERPRICING OF INITIAL PUBLIC OFFERINGS IN THE ATHENS STOCK EXCHANGE

EVIDENCE FROM THE ATHENS STOCK MARKET DURING THE PERIOD 1994-2002

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Abstract

This study investigates the price performance of initial public offerings (IPOs) launched on the Athens Stock Exchange (A.S.E.) during the period 1994-2002. Specifically, it examines the differences between the listing price of IPOs and their equilibrium market prices formed at the end of the first day and at the end of some pre-determined days during the first year of stocks' trading. We find that Greek IPOs had on average large positive initial returns as well as positive one-year returns. The finding of positive one-year returns is inconsistent with international evidence. The IPO puzzle on the Greek stock market is also examined according to the new issues' listing board classification - Main, Parallel or New Market of the A.S.E. - during the period 1994-2002. JEL Classifications: G24, G32, G14

Keywords: Initial public offerings, underpricing, raw return, excess return, kind of stock market.

1. Introduction

A review of the international literature on the price behavior of IPOs reveals two interesting phenomena. First, the shares of new issues appear to be underpriced on average. For example, initial returns range from 5.4% in Denmark to 256.9% in China (see Ritter (2003)). Second, the long run performance of IPOs is associated with negative returns in comparison to the rest of the stock market (see Ritter (1991), Ritter and Welch (2002)). These phenomena prevail in different national markets with various degrees of development and diverse regulatory and institutional regimes.

The purpose of this study is to investigate the price performance of initial public offerings of stocks in Greece in a different institutional setting. In particular, it is examined the price behavior of the newly offered shares over the period that extends from their public placement to the end of the first year of their formal trading on the A.S.E. This study contributes to the developing finance literature investigating the A.S.E., as well as to the international body of literature on IPOs.

This working paper can, in a way, be considered as a sequel to two previous studies on Greek IPOs performance held by C. Kazantzis & D.C. Thomas in 1996 and N.V. Tsangarakis in 2004. The first one examined the underpricing of initial public offerings listed in the A.S.E. during the period 1987-1994 and specially, the impact of the institutional interventions in force at the time on the level of the first day returns for 129 IPO securities. The second one investigated the price performance of 108 Greek IPOs in the period 1993-1997.

In particular, the present study examines the underpricing of Greek IPOs during the extended period 1994-2002. More accurately, not only are the first day returns calculated but also the returns taken during all the period of the first year of trading of new listings in the stock market. Moreover, it is examined whether there were any differences at the altitude of returns taken among the Main, the Parallel and the New Market of the Athens Stock Exchange.

The rest of the paper is classified as follows: The second section introduces the empirical findings of preceding studies that have been found for the Greek IPOs market. The third section analyzes shortly the legislative framework and refers to the factors affecting the initial and aftermarket pricing of IPOs. The fourth section includes the statistical description of IPOs sample that was launched on the Athens Stock Exchange during the period 1994-2002 and also the presentation of the methodology used for the analysis. The fifth section shows the short-term results concerning the returns of new listings, both for the total sample and for the sub-samples examined according to the kind of the market that new issues listed. The final section summarizes the paper and highlights the main conclusions.

2. Empirical Findings of Preceding Studies on the Greek IPO Market

There are seven studies that have examined the Greek IPO puzzle before. All of them came to the conclusion that in the Athens Stock Exchange the initial public offerings were inserted in the stock market considerably underpriced. That means that the Greek market of IPOs offered significant returns to those investors who chose to buy new issues during the period of public offerings and sell them later, after their stock market entrance. Analytically, the exact findings of previous studies were the following:

Using data for the period 1971-1994, Tyligada (1994) found 40 percent mean initial (first day) raw return for the new issues of that period. Papaioannou and Travlos (1995) documented average initial adjusted return of 34 percent for the period 1/1/1987-28/9/1994. Papamatheou (1995), looking into the IPO puzzle of the period 1/1/1987-31/12/1995, found 20.37 percent average initial adjusted return.

Moreover, Kazantzis and Levis (1995) explored the IPOs that were launched on the Athens Stock Exchange during the period 1987-1991. Their results indicated average first day raw return at 48.5 percent. Additionally, Kazantzis and Thomas (1996) searched through the IPO puzzle during the period 1/1/1987 - 30/11/1994 and found that the mean first day raw and adjusted return from new issues were 50.89 percent and 51.73 percent correspondingly. Also, Kolintzas, Sfakianakis and Tyligada (1997), using data for the period 1972 - 1994, found that the average initial adjusted return of IPOs came up to the level of 26.3 percent during that period.

In addition, Tsangarakis (2004), investigated the performance of IPOs issued in Greece in the period 1993-1997. The study revealed that newly listed firms introduced their shares to the Athens Stock Exchange at prices which were below those they obtained when trading started on the exchange. The average raw and excess return of the first trading day in relation to the offer price was 9,07 percent and 8,04 percent correspondingly. Finally, Nounis (2000) investigated the underpricing phenomenon of Greek IPOs during the period 1994-1998[1] and noted that the average initial raw and adjusted return were 18.56 percent and 20.19 percent correspondingly.

3. The Legislative Framework of Listing and the Institutional Arrangements on Shares Market Price Formation

During the period investigated, there were some interesting features that affected the performance of initial public offerings in the Athens Stock Exchange, concerning the legislative framework of listing, as well as the institutional arrangements on shares' market price formation. In particular, Greek IPOs consist exclusively of primary equity offerings as the Greek law stipulates the issuance of new shares by firms that are ranged between 15%-25% of the existing number of shares, according to the kind of the market (main, parallel or new stock market).

Second, unlike IPOs in the U.S., which are priced very close to the offering day, Greek IPOs were priced a few weeks before the offerings period during the period 1994-2000. From 2000 the law changed and the pricing of IPOs was improved. But despite this fact the problem of not well pricing and increased waiting risk was obvious in the case of Greek IPOs. Third, trading of an IPO on the A.S.E. starts with a delay of up to four weeks (31 days on average after the end of the offerings period) from the time of sale to the investors. This increases investor uncertainty and as a result should affect the pricing of Greek IPOs. Fourth, the offer prices of IPOs are subject to the review and approval of the A.S.E. Therefore, the exchange authorities tend to exert a downward pressure on offer prices so as to make the investors who participate in the new issues market satisfied from IPOs aftermarket performance.

Fifth, the underwriting syndicate does not control the allocation of Greek IPOs. Investors are invited to subscribe to each IPO and they are allocated a fraction of the new shares on a priority basis. As a result, not only Rock's (1986) winner's curse problem is very likely for investors of Greek IPOs, but in addition, underwriters do not have the ability to elicit private information from informed investors in the manner hypothesized by Benveniste and Spindt (1990).

Finally, throughout the period under study, the institutional framework of the A.S.E. concerning the cap on the daily price movement, incurred considerable reforms and changes, which seriously affected the level of returns taken from IPOs during the periods subject to such intervention[2]. In short, since 1992, there was a daily limit on stock price movement of ±8% imposed. In December 1996 IPOs had a daily price limit of ±99% for the fisrt three days of trading and for the following days the ±8% limit applies. From 1/12/1999 there are no price limits during the first three days of listing in order to avoid the distortions of pricing in the stock market caused by setting limits on stock price movements. From the fourth day on, the limit of ± 10% was applied. Today this limitation has been extended to the ± 20%.

More detailed analysis about the Greek institutional and regulatory framework, the mechanisms for IPOs and the factors affecting the pricing of new issues in Greece can be raised from Tsangarakis (2004) and Kazantzis & Thomas (1995) studies.

4. Empirical Analysis of IPOs in the Athens Stock Exchange (1994-2002)

4.1 Data description

The sample on which the present research was based, included all the initial public offerings and the following listing of stocks in the Athens Stock Exchange that took place from 01/01/1994 to 31/12/2002. The sample included only listings of common stocks. Preference stocks as well as transfers from the one market to another are not examined in this paper.

All data concern the initial public offerings of common stocks of the Main, the Parallel and the New Stock Exchange Market of the Athens Stock Exchange. The Athens Stock Exchange consists of three markets according to firms' equity: The Main market is the oldest one of the A.S.E., dating back to its foundation years (1876). According to the Presidential Decree 350/1985, firms that decide to go public must have a net equity of at least €12 million and they have to be always under the form of joint stock. Those companies need to disclose their financial statements for at least three years preceding their listing application and additionally they have to be controlled by certified auditors.

On the other hand, in the Parallel market (established in 1990), IPOs should have at least a net equity of €3 million according to their accounts. Similarly, firms that go public in that market must disclose their financial information and be audited, for the last two years preceding their application. Finally, IPOs listed in the new market (NEHA, established in 2001), should be a minimum equity of €586.949,57 and firms need to publish their financial statements, as joint stock companies, two years preceding their listing application (A.S.E. Factbook, 2002).

The total number of new listed companies during the period 1994-2002 was 254. Basic sources for the construction of IPOs database were the Annual Statistical Bulletins of the Athens Stock Exchange, the Annual Reports of Hellenic Capital Market Commission and also some special websites, where the prices of stocks and General Index of the Athens Stock Exchange were collected at pre-determined time points during the first year of trading[3].

Table 1 and figure 1 introduce the IPOs launched on the Athens Stock Market per year and totally, during the period 1994-2002. The year 2000 was that with the biggest number of listings in the Athens Stock Exchange. In particular, during that year (2000) the common stocks of 53 new companies were listed in the Athens Stock Market. The second year with the most new listings was 1994. The number of listings that year was 46. A big number of issues (38) was also launched in 1999. The rest of the years recorded the following new listings: 20 IPOs in 1995 and 1996, 12 in 1997, 23 in 1998, 21 in 2001 and 21 in 2002. We should point out that the above distribution of IPOs as well as the statistical analysis which follows worked out taking into consideration the entrance day of common stocks in the A.S.E. and not according to public offering time period, which is used as a criterion of IPOs distribution in some other studies.

Taking as a criterion of IPOs distribution the kind of the market, the results of the survey gave the following distribution: During the examined period 1994-2002 the new listings in the Parallel Market were 128 and in the Main Market 120. Also, 6 issues were launched in the New Stock Exchange Market during its first two years of operation (2001-2002). Figure 2 shows the total percentage distribution of IPOs between the Main and Parallel Market for all the examined period 1994-2002.

TABLE 1

Number of issues in A.S.E. by year & by market criterion[4]
Time period: 1/1/1994 – 31/12/2002

Year	Number of Issues	Main Market	Parallel Market	New Stock Exchange Market
1994	46	36	10	-
1995	20	10	10	-
1996	20	7	13	-
1997	12	3	9	-
1998	23	10	13	-
1999	38	15	23	-
2000	53	18	35	-
2001	21	13	6	2
2002	21	8	9	4
TOTAL	**254**	**120**	**128**	**6**

Source: Annual Reports of Hellenic Capital Market Commission, Annual & Monthly Statistical Bulletins of The Athens Stock Exchange

FIGURE 1

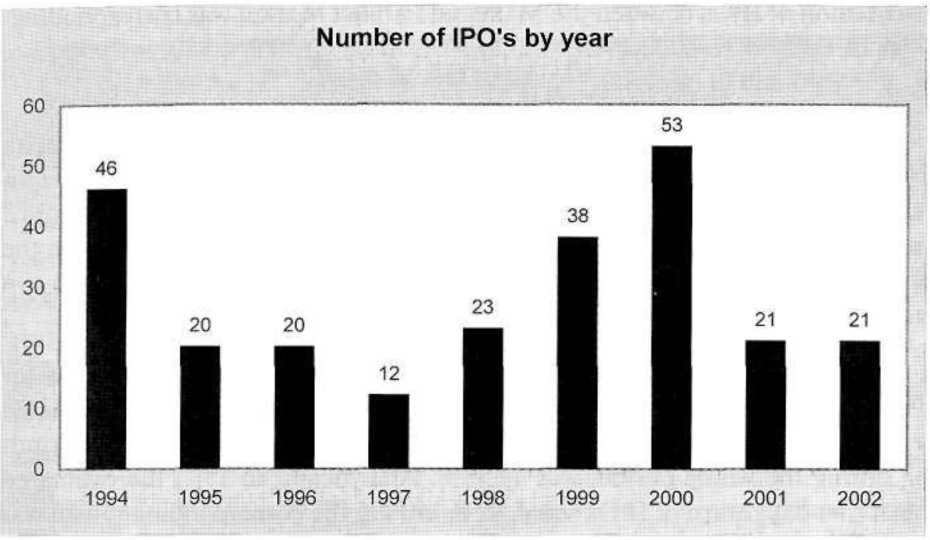
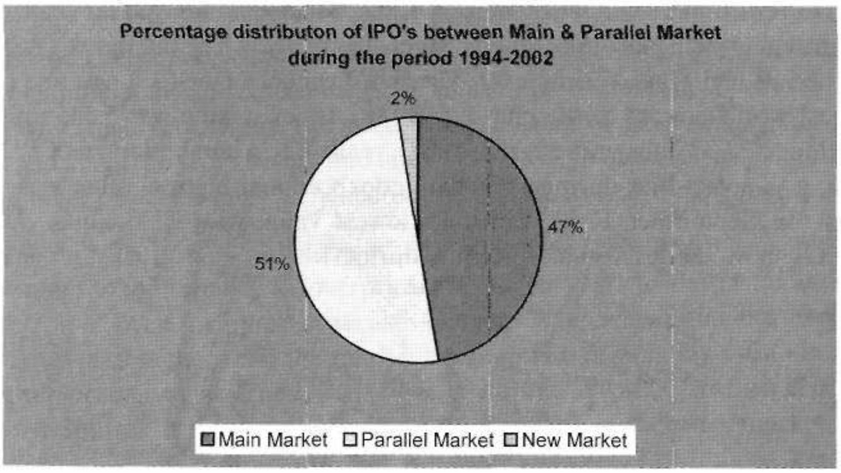


FIGURE 2



Analytically, the annual distribution of IPOs among the Main, the Parallel and the New Market for the examined period was the following: In 1994 the distribution of IPOs between the Main and Parallel Market was correspondingly 36-10, in 1995 10-10,in 1996 7-13, in 1998 10-13, in 1999 15-23, in 2000 15-6, in 2001 15-6 and in 2002 8-9.

Table 2 indicates, in an annual basis and in a native way, the initial mean first day overpricing of public offerings of the Athens Stock Exchange. Specifically, for every year of period 1994-2002 it was estimated the mean listing price and the mean closing price of the first day of trading of common stocks in the stock market and were calculated the percentage differences between the two mean prices.

Table 2 indicates that the mean first day return of IPOs was positive for every year of the examined period 1994-2002. The rate of return fluctuated between 4.40% and 95.34% and the total mean rate of return of first day trading during the whole period, was 49.58%. Analytically, in 1994 the estimated mean first day return of IPOs was 4.56%, in 1995 the corresponding return was 4.40%, in 1996 5.96%, in 1997 31.22%, in 1998 52.14%, in 1999 95.34%, in 2000 54.22%, in 2001 the corresponding return was 29.79% and in 2002 the corresponding return was 34.16%.

It must be underlined that the market of new issues registered its highest level of return in 1999. During that year, the Greek Capital Market realized an enormous growth and the Athens Stock Exchange General Index (ASEGI) reached its highest historical level. The performance of ASEGI was one of the highest worldwide, as at the end of 1999 the Index's value was 5,535 units (in relation to 2,737 units at the end of 1998), realizing an annual return of 102.2%. Also, it is noted that during 1999 the Index's annual highest value was 6,355 units (on September 17th), whilst its lowest value was 2,798 units. So, the ASEGI showed considerable volatility during 1999.

TABLE 2

New listings in Athens Stock Exchange: 1994 – 2002

YEAR	NUMBER OF NEW LISTINGS	MEAN LISTING PRICE	MEAN CLOSING PRICE OF FIRST DAY TRADING IN A.S.E.	PERCENTAGE PRICE DIFFERENCE	NUMBER OF ANNUAL EXCEPTIONS*
1994	46	5.48	5.73	4.56%	5
1995	20	4.32	4.51	4.40%	5
1996	20	4.36	4.62	5.96%	4
1997	12	4.90	6.43	31.22%	1
1998	23	5.85	8.90	52.14%	0
1999	38	10.72	20.94	95.34%	1
2000	53	14.59	22.50	54.22%	12
2001	21	6.31	8.19	29.79%	10
2002	21	4.01	5.38	34.16%	8

* Number of IPOs per year that the closing price in A.S.E. after the first day of exchange trading was smaller than the listing price.

The above analysis comes to the conclusion that the year with the largest expansion of ASE (1999) was accompanied by "hot issue" market. In other words, the IPO market was characterized by the existence of great differences between initial entry price and the price substantially established in the market. Moreover, high returns are recorded in the market of IPOs during the years 1998 and 2000, the years before and after 1999. In both of these years, a substantial number of new listings launched on the A.S.E., as it also happened in 1999.

One more informational element that Table 2 provides and it is useful to be mentioned is the number of overpriced IPOs per year. In the last column of Table 2, it is given the number of cases per year where the initial entry price of new issues was higher than the market closing price of first day listing in ASE. In other words, it gives the new listings of period 1994-2002, which recorded negative returns at the end of the first day of trading in the stock market.

Analytically, in 1994 5 out of 46 new issues had negative first day return in the ASE, in 1995 5 out of 20 were overpriced, in 1996 4 out of 20, in 1997 1 out of 12, in 1999 1 out of 38, in 2000 12 out of 53, in 2001 10 out of 21 and in 2002 8 out of 21. In 1998 all initial public offerings were underpriced and gave positive first day returns. We remark that in 2001, a year of important correction and highly downward of the ASE General Index (23.5% falling of ASE General Index in 2001 in relation with 2000 and 62.3% falling in relation with 1999), almost half of the public offerings came to the stock market overpriced.

This fact reflects on one side the general correction tendencies held in ASE that period and on the other side it may indicate some problems relating with the rational pricing of new issues by the underwriters. On the other hand, in 2002 which was also a year with important downfall for the A.S.E. (32.5% falling of ASE General Index in 2002 in relation to 2001) only 8 out of 21 new listings recorded price reduction at the entrance day in the stock market and also these price differences between the listing and first day equilibrium price were small.

4.2 Methodology

The objective of this paper is to examine the short run (annual) price behavior of new listing stocks in the Athens Stock Exchange during the period 1994-2002, through the analysis of the returns that investors gain when they buy new issues at the period of public offerings and hold them in their portfolio for a short-run period. For the calculation of IPO returns were used the closing stock prices that be referred to the Daily Bulletin of the Athens Stock Exchange. All closing prices were subjected, if necessary, to the appropriate adjustments caused by share capital increases, stock splits and free stocks distribution, if any of these changes took place during the first year of stocks entrance in the stock market.

The stock exchange returns of IPOs are calculated by using the two criteria that are used in both international and domestic bibliography: the raw returns and the excess or adjusted returns. The raw returns are calculated as the percentage change in price from the time point t to the close at the time point $t+k$, where k is the number of days that intervene between the two time points, t and $t+k$.

Based on the listing price of IPOs the initial returns are calculated by taking into consideration the following time points

i. The first day of trading in the Athens Stock Exchange

ii. A month after listing in the Athens Stock Exchange (21st day of trading)

iii. Three months after listing in the Athens Stock Exchange (63rd day of trading)

iv. Six months after listing in the Athens Stock Exchange (126th day of trading)

v. Nine months after listing in the Athens Stock Exchange (189th day of trading)

vi. Twelve months after listing in the Athens Stock Exchange (250th day of trading)

So, through the above methodology, for a new issue it is calculated the raw returns of first day, first month, first three months, first six months, first nine months and first year. For example, the raw return of first day trading is calculated as

$$\frac{(\text{Closing price of first day trading})-(\text{Listing price}) \times 100}{\text{Listing price}}$$

Moreover, proportionate returns of first month, first three months, first six months, first nine months and first year, are calculated taking as a criterion of comparison not the listing price but the closing price of first day trading of new listings in the stock market. For example, these returns are calculated as

$$\frac{(\text{Closing price of n day of trading})-(\text{Closing price of first day trading}) \times 100}{\text{Closing price of first day trading}}$$

where

n = 21st day of trading, 63rd day of trading, 126th day of trading, 189th day of trading, 250th day of trading

Apart from the raw returns, the excess or adjusted returns are also calculated in order to take into consideration the market returns and variances. These calculations are appropriate because the equilibrium prices of stocks in the stock exchange reflect not only the companies' special characteristics but they are also affected - during their formation process - by the ascending or descending trends of capital market. So, adjusted returns must be calculated, especially when the return under consideration refers to a longer than one day period, as happens with most returns of this study.

The adjusted return for issue i is defined as the raw return less the corresponding market return for the same time period used for raw return calculation. The market return calculated is based on the Athens Stock Exchange General Index (ASEGI). So, the market return is calculated as seeing below

$$\frac{\text{ASEGI1-ASEGI0 x 100}}{\text{ASEGI}_0}$$

where

ASEGI is the Athens Stock Exchange General Index, 0 is the base point of returns calculation and 1 is the end point of returns calculation

For excess returns based on a listing price, as a base point (point 0) for the return calculation is concerned the last day of public offerings, which is the ASEGI of that day. This day is used because investors prefer to buy new issues on the last day of public offerings so as to shorten the time needed to bind their capital to bank accounts in order to buy the securities. On the other hand, for excess returns calculation based on first day closing, as a base point (point 0) is concerned the ASEGI's closing of that day.

5. Empirical Findings

5.1 Results for the Whole Sample

Table 3 provides the average raw and adjusted returns of IPOs concerning the whole sample of new issues that took place during the period 1994-2002. The table includes two panels, A and B. The first panel shows the raw and adjusted returns that are correspondingly calculated, taking as a base point the listing price of new listings and the closing price of the ASEGI on the last date of public offerings period. The second panel shows the raw and adjusted returns that are correspondingly calculated, taking as a base point the closing price of new listings on the first day of their trading and the closing price of ASEGI at the same date (first day of IPOs trading).

Analytically, the first column of Table 3 includes the 22 different definitions of returns of new issues during the first year of trading, the second column shows the average sample return, the third column contains the standard deviation of return, the fourth column shows the number of observations that included in the examined sample, the fifth column shows the median of the sample, the sixth column provides the minimum and the seventh column the maximum return accomplished.

TABLE 3

Raw and Adjusted Returns for Initial Public Offerings from the Athens Stock Exchange – Time Period 1994-2002

PANEL A						
RETURN[1] OF	**MEAN RETURN (%)**	**STANDARD DEVIATION (%)**	**NUMBER OF OBSERVA-TIONS**	**MEDIAN (%)**	**MINIMUM RETURN (%)**	**MAXIMUM RETURN (%)**
			RAW RETURNS			
1st day	41.09	67.21	254	8.00	-37.50	472.42
21st day	44.03	90.43	254	23.67	-84.15	635.88
63rd day	50.44	112.29	254	21.50	-75.70	682.94
126th day	48.31	113.96	254	12.20	-78.46	785.59
189th day	54.06	149.29	254	11.62	-90.39	1125.42
250th day	59.45	171.42	254	5.44	-81.28	1405.00
			EXCESS OR ADJUSTED RETURNS			
1st day	42.10	66.13	254	20.05	-41.84	472.35
21st day	44.09	88.11	254	28.08	-100.16	617.21
63rd day	51.48	104.80	254	28.62	-97.25	641.16
126th day	47.16	102.01	254	20.43	-83.22	740.23
189th day	49.60	125.47	254	13.72	-120.47	945.18
250th day	53.76	146.02	254	8.16	-152.37	1255.66

PANEL B						
RETURN[2] OF	**MEAN RETURN (%)**	**STANDARD DEVIATION (%)**	**NUMBER OF OBSERVA-TIONS**	**MEDIAN (%)**	**MINIMUM RETURN (%)**	**MAXIMUM RETURN (%)**
			RAW RETURNS			
21st day	6.67	54.53	254	-2.89	-83.86	436.90
63rd day	11.08	68.24	254	-2.16	-83.68	493.58
126th day	10.32	71.43	254	-2.76	-88.37	387.72
189th day	15.53	93.21	254	-7.02	-91.45	638.94
250th day	20.63	113.45	254	-11.43	-90.93	807.54
			EXCESS OR ADJUSTED RETURNS			
21st day	5.88	53.21	254	-1.66	-86.73	425.69
63rd day	11.42	62.49	254	1.97	-73.86	476.74
126th day	8.48	62.03	254	-3.74	-77.56	382.37
189th day	10.82	74.13	254	-6.39	-134.63	484.96
250th day	14.68	91.71	254	-10.03	-155.90	681.55

1. The calculation of raw returns based on listing price of initial public offerings and the calculation of excess or adjusted returns based on closing price of General Index of Athens Stock Exchange at the last day of public offerings.
2. The calculation of raw returns based on closing first day price of initial public offerings and the calculation of excess or adjusted returns based on closing price of General Index of Athens

Stock Exchange at the first day of trading of new issues in the stock market.
3. 21st day = first month, 63rd day = first three months, 126th day = first six months, 189th day = first nine months, 250th day = first year.
4. Excess or Adjusted Return = Raw Return – Return of General Index of Athens Stock Exchange for the corresponding time period of raw return calculation.
5. All values are statistically significant at 0.01 levels.

As can be seen from Table 3, Panel A, the mean first day raw and adjusted return, taken together, was 41.09 and 42.10 percent respectively. These results reveal that the new issues offered to investor substantial initial returns and prove the existence of underpricing of initial public offerings phenomenon in the Greek Stock Market. In other words, it is proved that whoever investor participated in public offerings of the Greek Capital Market during the period 1994-2002, buying stocks at the listing price and holding them until the first day of their trading in the stock market, earned very important returns because the listing prices of IPOs were much smaller than the equilibrium prices established at the end of the first day.

However, the interesting point of the findings is that the mean raw and adjusted returns of IPOs were not worn on the first day or in the first month of their trading but they followed an increasing trend during the whole of the first year. As can be seen clearly from Panel A of Table 3, both raw and adjusted returns of IPOs had increasing rates of returns in all the short run period of one year during which their behavior was examined.

In particular, the first month mean raw return of new issues during the period 1994-2002 was 44.03%, the mean raw return after three months of trading was 50.44%, the mean raw return after six months of trading was 48.31%, the mean raw return after nine months of trading was 54.06% and finally the annual mean raw return was 59.45%. On the other hand, the correspondingly adjusted returns were marginally shorter than raw returns (except from the first day return which was marginally higher), but they had also increasing rates of returns during the year. So, the adjusted returns were vacillated between 42.10% (first day) and 53.76% (first year).

The above conclusion differentiates from relevant conclusions of previous studies held for Greek IPOs. Especially, even though all previous studies documented substantial raw and adjusted returns during the period of the first year of trading of new issues in the stock market, there was a downward trend in these returns, mainly after the first six months of trading through the end of the first year. Also, there is a study that provides results with negative adjusted returns of IPOs at the end of the first year of trading (Papaioannou & Travlos, 1995).

So, in contrast with previous studies, the informative difference of the present study is the substantially high mean annual returns that the new issues of period 1994-2002 offered to those investors who followed the "buy and hold" strategy for a year. The accurate mean rates of returns for these investors were 59.45% (mean annual raw return) and 53.76% (mean annual excess or adjusted return). These results reveal that the mean return from IPO market was better even for the market's mean return (mean return of ASEGI).

Moreover, the existence of important annual adjusted returns of IPOs seems to be confirmed by the results of the returns taken by the Panel B of Table 3. This Panel provides the returns taken by those investors who bought shares of new issues at the closing price of the first day and held them for at least one month in their portfolios. As can be seen from the table, both raw and adjusted annual returns were positive, proving the dynamism of IPOs activity. In particular, the mean annual raw return was 20.63% and the mean annual adjusted return was 14.68%, for those investors who followed the above investment strategy. The registration of smaller returns, following the strategy of buying new issues on the first day, represents i) the loss of the important first day return and ii) the correction of IPOs valuation as well as the correction of the market's return that probably took place in the mean term of the first year.

5.2 Results for Each Market of A.S.E.

This part analyses the performance of IPOs according to the market classification of the Greek Stock Market. In particular, it is examined the range of underpricing of new listings that took place separately in the Main, Parallel and New Market of the Athens Stock Exchange during the period under consideration 1994-2002. The results are presented in Tables 4, 5 and 6 below.

The statistical analysis of IPOs listed in the Main Market, gave the following results: mean first day raw return 24.29% and mean adjusted return 26.19%. Furthermore, the mean raw returns of first month, first three months, first six months and first nine months was 31.23%, 42.60%, 35.54% and 34.71% respectively. The corresponding adjusted returns was 32.12%, 43.69%, 35.00% and 32.18%. As far as the annual raw return is concerned, it was significant and reached the level of 37.09 percent. The corresponding adjusted return was 32.11%. Moreover, the raw and adjusted returns calculated by using as a base point the first day closing prices of new issues and ASEGI, were much smaller compared to the above returns. So for, the annual raw return was 13.52% and the annual adjusted return was 7.08%.

TABLE 4

Raw and Adjusted Returns for Initial Public Offerings
of the Main Market of Athens Stock Exchange-Time Period 1994-2002

PANEL A						
RETURN[1] OF	**MEAN RETURN (%)**	**STANDARD DEVIATION (%)**	**NUMBER OF OBSERVA-TIONS**	**MEDIAN (%)**	**MINIMUM RETURN (%)**	**MAXIMUM RETURN (%)**
			RAW RETURNS			
1st day	24.29	46.81	120	8.00	-37.50	252.67
21st day	31.23	71.30	120	13.00	-60.47	428.42
63rd day	42.60	111.47	120	15.38	-61.32	674.50
126th day	35.54	108.57	120	7.74	-64.82	785.59
189th day	34.71	98.78	120	8.94	-70.14	534.15
250th day	37.09	119.94	120	3.20	-77.85	618.18
			EXCESS OR ADJUSTED RETURNS			
1st day	26.19	45.78	120	13.24	-41.84	253.69
21st day	32.12	70.52	120	13.57	-100.16	418.85
63rd day	43.69	104.74	120	25.74	-97.25	641.16
126th day	35.00	101.73	120	13.82	-83.22	740.23
189th day	32.18	87.74	120	6.95	-120.36	499.08
250th day	32.11	102.75	120	7.09	-152.37	535.94

PANEL B						
RETURN[2] OF	**MEAN RETURN (%)**	**STANDARD DEVIATION (%)**	**NUMBER OF OBSERVA-TIONS**	**MEDIAN (%)**	**MINIMUM RETURN (%)**	**MAXIMUM RETURN (%)**
			RAW RETURNS			
21st day	7.77	50.77	120	-2.72	-61.49	436.90
63rd day	14.96	69.74	120	0.28	-71.59	493.58
126th day	8.93	60.81	120	-2.30	-76.61	387.72
189th day	11.73	67.54	120	-0.79	-80.11	286.01
250th day	13.52	82.61	120	-5.41	-84.51	393.18
			EXCESS OR ADJUSTED RETURNS			
21st day	7.01	50.48	120	-0.27	-76.13	425.69
63rd day	14.40	64.88	120	3.11	-73.86	476.74
126th day	6.70	55.61	120	-2.43	-77.56	352.52
189th day	7.85	58.04	120	-2.62	-134.63	223.61
250th day	7.08	67.18	120	-5.37	-155.90	269.70

1. The calculation of raw returns based on listing price of initial public offerings and the calculation of excess or adjusted returns based on closing price of General Index of Athens Stock Exchange at the last day of public offerings
2. The calculation of raw returns based on closing first day price of initial public offerings and the

calculation of excess or adjusted returns based on closing price of General Index of Athens Stock Exchange at the first day of trading of new issues in the stock market
3. 21st day = first month, 63rd day = first three months, 126th day = first six months, 189th day = first nine months, 250th day = first year
4. Excess or Adjusted Return = Raw Return – Return of General Index of Athens Stock Exchange for the corresponding time period of raw return calculation
5. All values are statistically significant at 0.01 levels.

On the other hand, the main characteristic of Parallel Market's IPOs was the much higher rates that were accomplished in relation with that of the Main Market, during the period 1994-2002. In particular, the mean raw return of IPOs for the first day and first year was 53.69% and 80.82% correspondingly, but there were also registered substantial returns during all the period of the first year of trading of new issues in the stock market. The same upward trend was also noted on mean adjusted returns. For instance, the mean first day adjusted return was 53.76% and the mean first year adjusted return was 73.17%. In contrast, the raw and adjusted returns calculated by using as a base point the first day closing prices of new issues and ASEGI, were, as in the case of the Main Market, much smaller in relation to the returns calculated by using as a base point the listing price of IPOs and the price of the ASEGI at the last day of public offerings.

TABLE 5

Raw and Adjusted Returns for Initial Public Offerings
of the Parallel Market of Athens Stock Exchange
Time Period 1994-2002

PANEL A						
RETURN[1] OF	**MEAN RETURN (%)**	**STANDARD DEVIATION (%)**	**NUMBER OF OBSERVA-TIONS**	**MEDIAN (%)**	**MINIMUM RETURN (%)**	**MAXIMUM RETURN (%)**
			RAW RETURNS			
1st day	53.69	77.31	128	23.90	-24.38	472.42
21st day	52.19	100.18	128	29.11	-84.15	635.88
63rd day	55.99	113.10	128	31.18	-75.70	682.94
126th day	60.93	119.99	128	20.42	-78.46	574.58
189th day	72.37	185.15	128	72.37	-90.39	1125.41
250th day	80.82	208.93	128	9.83	-81.28	208.93
			EXCESS OR ADJUSTED RETURNS			
1st day	53.76	76.55	128	27.73	-27.42	472.35
21st day	51.15	96.64	128	34.86	-75.01	617.21
63rd day	56.44	104.27	128	32.41	-84.43	615.36
126th day	58.10	103.28	128	27.31	-74.94	494.62
189th day	64.95	152.86	128	21.54	-107.53	945.18
250th day	73.17	177.07	128	7.28	-91.74	1255.66

PANEL B						
RETURN[2] OF	**MEAN RETURN (%)**	**STANDARD DEVIATION (%)**	**NUMBER OF OBSERVATIONS**	**MEDIAN (%)**	**MINIMUM RETURN (%)**	**MAXIMUM RETURN (%)**
			RAW RETURNS			
21st day	5.65	58.49	128	-5.14	-83.86	338.98
63rd day	8.24	67.98	128	-8.70	-83.68	293.44
126th day	13.42	81.10	128	-3.23	-88.37	384.74
189th day	20.27	112.79	128	-10.22	-91.45	638.94
250th day	28.46	136.58	128	-16.35	-90.93	807.54
			EXCESS OR ADJUSTED RETURNS			
21st day	4.62	56.31	128	-4.19	-86.73	319.68
63rd day	8.97	61.39	128	-1.03	-73.41	266.46
126th day	10.91	68.60	128	-8.64	-71.60	382.37
189th day	13.76	87.20	128	-14.75	-111.69	484.96
250th day	21.80	110.00	128	-11.84	-107.47	681.55

1. The calculation of raw returns based on listing price of initial public offerings and the calculation of excess or adjusted returns based on closing price of General Index of Athens Stock Exchange at the last day of public offerings.
2. The calculation of raw returns based on closing first day price of initial public offerings and the calculation of excess or adjusted returns based on closing price of General Index of Athens Stock Exchange at the first day of trading of new issues in the stock market.
3. 21st day = first month, 63rd day = first three months, 126th day = first six months, 189th day = first nine months, 250th day = first year.
4. Excess or Adjusted Return = Raw Return – Return of General Index of Athens Stock Exchange for the corresponding time period of raw return calculation.
5. All values are statistically significant at 0.01 levels.

However, the higher first day returns was recorded in the New Stock Market of the A.S.E., as the first day mean raw and adjusted return was 108.54% and 111.44% correspondingly (Table 6). Actually, the mean raw and adjusted returns taken from the New Stock Market, both initially and secondarily, during the first trimester of new stocks' trading were the biggest than the corresponding returns taken from the two other markets.

Finally, an important comment that should be underlined about the New Stock Market, is that whoever investor participated in this market by buying and holding new stocks at the end of the first day trading and not during the public offering period, it took negative raw returns in the short run period.

TABLE 6

Raw and Adjusted Returns for Initial Public Offerings
of the New Market of Athens Stock Exchange-Time Period 1994-2002

PANEL A						
RETURN[1] OF	**MEAN RETURN (%)**	**STANDARD DEVIATION (%)**	**NUMBER OF OBSERVA-TIONS**	**MEDIAN (%)**	**MINIMUM RETURN (%)**	**MAXIMUM RETURN (%)**
RAW RETURNS						
1st day	108.54*	90.91	6	101.39	14.76	233.69
21st day	126.17*	155.56	6	61.33	11.43	405.00
63rd day	88.82*	115.46	6	52.38	6.20	317.67
126th day	34.21*	51.49	6	25.08	-17.29	114.00
189th day	50.25*	84.83	6	22.58	-48.09	179.52
250th day	50.74*	109.39	6	32.71	-48.57	255.23
EXCESS OR ADJUSTED RETURNS						
1st day	111.44*	85.13	6	102.51	28.52	216.77
21st day	132.89*	151.96	6	65.07	23.91	409.30
63rd day	101.47*	115.78	6	67.30	14.28	330.09
126th day	56.97*	50.41	6	51.44	8.57	131.81
189th day	70.42*	77.45	6	43.72	-14.72	188.09
250th day	72.79*	99.47	6	46.56	-13.97	258.82

PANEL B						
RETURN[2] OF	**MEAN RETURN (%)**	**STANDARD DEVIATION (%)**	**NUMBER OF OBSERVA-TIONS**	**MEDIAN (%)**	**MINIMUM RETURN (%)**	**MAXIMUM RETURN (%)**
RAW RETURNS						
21st day	6.35	46.31	6	-1.45	-39.45	94.21
63rd day	-5.72	39.61	6	-11.49	-45.72	60.63
126th day	-28.00*	32.90	6	-31.60	-67.98	29.04
189th day	-9.80	78.67	6	-25.63	-81.68	143.57
250th day	-4.18	107.34	6	-48.33	-81.85	209.54
EXCESS OR ADJUSTED RETURNS						
21st day	10.26	44.16	6	0.14	-34.75	94.92
63rd day	3.90	36.13	6	-6.39	-26.74	69.76
126th day	-7.79	31.39	6	-10.09	-49.38	46.38
189th day	7.47	65.74	6	-10.45	-47.48	137.55
250th day	14.92	90.47	6	-16.10	-46.43	197.74

1. The calculation of raw returns based on listing price of initial public offerings and the calculation of excess or adjusted returns based on closing price of General Index of Athens Stock Exchange at the last day of public offerings.
2. The calculation of raw returns based on closing first day price of initial public offerings and the calculation of excess or adjusted returns based on closing price of General Index of Athens Stock Exchange at the first day of trading of new issues in the stock market.

3. 21st day = first month, 63rd day = first three months, 126th day = first six months, 189th day = first nine months, 250th day = first year.
4. Excess or Adjusted Return = Raw Return - Return of General Index of Athens Stock Exchange for the corresponding time period of raw return calculation.
5. All values with * are statistically significant at 0.01 levels and the rest are no statistically significant.

6. Conclusions

The price behavior analysis of initial public offerings of common stocks in the Athens Stock Exchange during the period 1994-2002, reveals that the new listing companies launched their titles on the stock market seriously mis-priced and more accurately, in such prices that were much smaller than the equilibrium closed prices formed at the end of first day of trading. In particular, it was calculated that during the examined period the total average rate of first day underpricing of new issues was 41.09 percent in the Athens Stock Exchange. Moreover, at the end of first year of trading, the mean average rate of return of new issues was bigger and recorded the level of 59.45 percent.

The results found for IPOs returns, were based on price observations taken at different pre-determined time points during the first year of trading of new issues in the stock market. The analysis following the international practice included the calculation of both raw and adjusted returns for the new issues.

For all the sample (1994-2002), the conclusion that can be taken out by observing both raw and adjusted returns of IPOs is that considerable returns were gained from those investors who bought stocks of new issues at their public offerings period and held them for one year. Furthermore, whoever investor put money on IPOs of the Parallel Market, enrolled hyper-double first day mean return in relation with those investors who bought new issues for the Main Market of the Athens Stock Exchange and even higher if he took part in the initial public offerings of the New Stock Market. It is characteristic that the returns of the Parallel Market's new issues were bigger than those of the Main Market in all pre-determined time points that were examined.

The conclusion of the existence and persistent appearance of underpricing of initial public offerings phenomenon in the Greek stock market is further and strongly enforced by the fact that there were also registered significant returns in the secondary market of IPOs. In other words, not only did the investors make money by buying titles of new issues at the public offerings period, but they also rewarded with substantial returns by buying stocks of new listing companies after their stock market entrance. In both investment choices, the afterward selling of the securities yielded important returns to the investors.

Overall, the findings regarding the initial returns of Greek IPOs is consistent with international evidence on the short-run behavior of IPOs and more accurately on average positive first day returns in relation to offer prices. Returns computed throughout the first year of trading and particularly one year exactly after listing in relation to the first trading day price are positive (and furthermore following an upward trend), something that is inconsistent with international evidence and underlines the fact of substantial underpricing.

Notes

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4. The annual distribution of the new issues of common stocks in this table became according to the first date of entrance of a firm in the A.S.E. and not according to the time period of public offerings.

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