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# Initial Public Offerings underpricing in Greek Stock Exchange of Athens

## Abstract

The purpose of this article is to investigate the function of Initial Public Offerings in the Greek Stock Market of Athens during a 4-year period, from 2002 to 2005. To this effect the article consists of three parts. In the first part, we present the theory of the Initial Public Offerings. After the specification of an IPO and the explanation of its function, we display previous articles, patterns, theories and opinions that observe, explain and promote the dialog for both the Initial Public Offerings Underpricing issue and the Aftermarket Underperformance. In the second part of the article, we move on with our purpose and examine whether the performance of the stocks that entered the market during the examined 4-year period is consistent with the presented theory. This examination is conducted through statistical tests. Some remarkable comments follow every test. The statistical analysis does not support the existence of either IPOs underpricing or aftermarket underperformance in the Athens Stock Exchange from 2002 to 2005. Finally, in the third part of our article, we concentrate our results from the statistical analyses and, keeping in mind the presented theories, opinions and propositions, we draw our conclusions. The grounds for the inconsistency between the theory and the results are quested and suggested and some recommendations on future research topics are made.

**Keywords:** Athens Stock Exchange, Initial Public Offerings, underpricing, long-run underperformance, aftermarket performance.
**JEL Classification:** G12, G14.

## Introduction

Initial public offerings are the subject investigated in this article. In the Athens Stock Exchange, there have been 32 cases of IPOs during the period of time from 2002 to 2005. The paper aims at finding new empirical results about underpricing and long-run performance of initial public offerings of companies listed on the Athens Stock Exchange during this 4-year period.

The article consists of three parts. The first part includes a short analysis of the patterns associated with initial public offerings. The second part contains the empirical findings of the investigation and their analysis. The third part includes the conclusions of the empirical investigation and topics for further research.

## 1. Initial public offerings, underpricing and long-run performance

**1.1. Initial public offerings.** An initial public offering occurs when a security is sold to the general public for the first time with the expectation that a liquid market will develop (Ritter, 1998). Most companies start out by raising equity capital from a small number of investors, with no liquid market existing if these investors wish to sell their stock. If a company prospers and needs additional equity capital, it can go public by selling stock to a large number of diversified investors.
A company's decision to go public is accompanied by certain ongoing costs associated with the need to supply information on a regular basis. Furthermore, there are substantial one-time costs associated with initial public offerings, which can be categorized as direct and indirect costs. The direct costs include the legal, auditing, and underwriting fees. The indirect costs consist of the management time and effort devoted to conducting the offering. Underpricing is considered to be an indirect cost of the IPO, as it serves as compensation to the analysts (Cliff and Denis, 2004). The amount of underpricing per share, multiplied by the number of shares offered, is referred to as the amount of money "left on the table". Loughran and Ritter (2002) provide an explanation of why issuers don't object to large amount of money left on the table in IPOs. Most IPOs leave relatively little money on the table. In most situations occurring in the IPO market, issuers will sum the loss from leaving money on the table with the larger wealth gain on the retained shares from a price jump, producing a net increase in wealth for pre-issue shareholders.

**1.2. Underpricing of IPOs.** Initial Public Offerings are observed to have large initial returns (the price change measured from the offering price to the market price on the first trading day). A number of reasons have been proposed for the new issues underpricing phenomenon. In general, these theories are not mutually exclusive.

An important rationale for the underpricing of IPOs is the 'winner's curse' explanation. If some investors are more likely to attempt to buy shares when an issue is underpriced, then the amount of excess demand will be higher when there is more underpricing. Other investors will be allocated only

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a fraction of the most desirable new issues, while they are allocated most of the least desirable new issues. They face a winner's curse: if they get all of the shares they asked for, it is because the informed investors don't want the shares. Facing this adverse selection problem, the less informed investors will only submit purchase orders if IPOs are underpriced sufficiently to compensate them for the bias in the allocation of new issues.

Rock (1986) suggested a model for IPOs underpricing. The argument depends upon the existence of a group of investors whose information is superior to that of the firm as well as that of other investors. If the new shares are priced at their expected value, these better informed investors crowd out the others when good issues are offered and they withdraw from the market when bad issues are offered. Later, Koh and Walter (1989) tested Rock's model in Singapore between 1973 and 1987. Their empirical results are consistent with the model and the winner's curse hypothesis.

Potential investors are supposed to pay attention, not only to their own information about a new issue, but also to whether other investors are purchasing. If an investor sees that no one else wants to buy, he may decide not to buy even in the event of favorable information. To prevent this from happening, an issuer may want to underprice the issue.

Another explanation for the new issues underpricing phenomenon argues that investment bankers take advantage of their superior knowledge of market conditions to underprice offerings, which permits them to expend less marketing effort.

IPO underpricing can also be connected to the Signalling Hypothesis. Underpriced new issues leave a good taste to investors, allowing the firms and insiders to sell future offerings at a higher price than otherwise. Issuing firms may intentionally underprice their shares in order to generate excess demand and so be able to have a large number of small shareholders. This dispersed ownership will both increase the liquidity of the market for the stock, and make it more difficult for outsiders to challenge management.

Dandapani et al. (1992) proposed an alternative explanation for the underpricing of IPOs. Their model examines the effect of personal taxes paid by entrepreneurs on the choice of the issue price. They showed that, in the presence of taxes and for certain levels of ownership, it might be preferable to underprice the issue. This theoretical result is reinforced by empirical findings.

**1.3. Long-run performance.** IPOs usually have poor stock price performance in the long run. Long-run performance of IPOs affects the associated parties in a number of ways. There are three explanations for the phenomenon of the long-run underperformance of the IPO.

Investors who are most optimistic about an IPO will be the first buyers. If there is a great deal of uncertainty about the value of the IPO, the valuations of optimistic investors will be much higher than those of pessimistic investors. As time goes on and more information becomes available, the divergence of opinion between optimistic and pessimistic investors will narrow, and consequently, the market price will drop.

The Impressario Hypothesis argues that the market for IPOs is subject to fads and that IPOs are underpriced by investment bankers to create the appearance of excess demand. This hypothesis predicts that companies with the higher initial returns should have the lowest subsequent returns.

The Windows Opportunity Hypothesis predicts that firms going public in high volume periods are more likely to be overvalued than other IPOs. This has the testable implication that the high volume periods should be associated with the lowest long-run returns.

Numerous studies have documented two anomalies in the pricing of IPOs of common stock: the short-run underpricing phenomenon, and the "hot-issue" market phenomenon. It is often believed that cycles exist in both the volume and the average initial returns of IPOs. High initial returns tend to be followed by rising IPO volume. The periods of high average initial returns and rising volumes are known as "hot issue" markets.

Ritter (1991) documents a third anomaly: in the long run, IPOs appear to be overpriced. He found that IPOs returns it the first 3 years were 34,46% while other listed companies had an average total return of 61,86%. So, in the long run, IPOs underperformed.

Many researchers have investigated the phenomenon of 'hot IPO markets'. Ibbotson and Jaffe (1975) show that there are cycles in the number of new issues per month as well as in the average initial return per month. Further, it appears to be a lead-lag relation between the two series. Companies tend to go public following periods of high initial returns. According to Lowry and Schwert (2002), both IPO volume and average initial returns are highly autocorrelated. Further, more companies tend to go public following periods of high initial returns. Pastor and Veronesi (2005) argue that a number of firms going public change over time in response to time variation in market conditions. IPO waves tend to be preceded by high market returns and followed

by low market returns. Moreover, Ibbotson (1975), and Stern and Bornstein (1985) present evidence that at some point after going public, the abnormal returns on IPOs, may be negative. Only Buser and Chan (1987) do not find evidence of negative aftermarket performance after the initial return period. The finding that there is a tendency for the offerings with the highest initial returns to do worst in the long run may be a manifestation of a desire of issuers to avoid future lawsuits (Ibbotson, 1975; Tinic, 1988).

**1.4. Results of other empirical investigations of underpricing of IPOs.** Ibbotson (1975) first documented the large underpricing of Initial public offerings. Firms are forced to underprice their IPOs to compensate uninformed investors for adverse selection.

Ibbotson (1975), Ritter (1984) and Welch (1989) among others provide evidence suggesting that the existence of average initial returns of up to 22% has been a persistent feature of the US new issues market. But underpricing is not restricted to the US market. Numerous studies indicate high first day returns for the London Stock Exchange (Buckland et al., 1981; Levis, 1990).

Several authors find new issues to be underpriced, like Reilly (1977), and McDonald and Fisher (1972). Michaeli and Shaw (1994) tested the empirical implications of several models of IPO underpricing. Consistent with winner's curse hypothesis, they showed that in markets where investors know a priori that they do not have to compete with informed investors, IPOs are not underpriced.

**1.5. Previous research of IPO underpricing, relying on signalling theory and asymmetric information.** The basic idea behind the tests of the adverse selection models is quite simple. First, underpricing should decrease as information becomes less heterogeneous across investors' groups. Second, through the choice of the underwriter, the firm can reduce some of the uncertainty about its prospects and therefore reduce the need for underpricing (Carter and Manaster, 1990). Their model predicts that the initial return on the IPO is negatively correlated with the investment banker's reputation.

According to signalling hypothesis, good firms try to distinguish themselves from bad firms by incurring a cost that the less successful firms cannot profitably sustain (Welch, 1989). This cost is the underpricing of the initial issue. Allen and Faulhauber's model (1989) implies that better firms will underprice more. Welch (1989) and Grinblatt and Hwang (1988) show that there is a positive probability that a low-value firm would be detected after having imitated the high-value firm.

Ibbotson, Sindelar and Ritter (1988) report an average initial return of 16,4% for IPOs made during 1960 to 1987. An explanation of the underpricing is that it generates publicity about the firm making the IPO and induces investors to learn more about that firm. Chemmanur (1993) models the above hypothesis and developed a scenario in which underpricing is generated by the desire of firm insiders to induce information about their firm. His model demonstrates that costly information production by outside investors may be of equal importance in minimizing the impact of private information in IPOs.

Perceptions of legitimacy affect organizational access to resources, because 'the legitimate organization is perceived not only as more worthy, but also as a more meaningful, more predictable and more trustworthy' (Suchman, 1995). Pollock and Rindova (2003) argue that media provided information affect investors' impressions of newly public firms. Furthermore, the volume of available information about an activity reduces perception of its riskiness (Heath and Tverski, 1991). Certo (2003) suggests that boards of directors have a symbolic role that is independent of the boards' tangible activities. IPO firms are relatively unknown to investors and suffer from a liability of market newness. He proposes that board structures represent important nonfinancial information that IPO investors consider when making investment decisions.

## 2. Empirical investigation of IPO long-run underperformance in the Athens Stock Exchange

**2.1. IPOs' underperformance.** IPO underpricing in the Athens Stock Exchange has been subject of research in the past, as well. Papaioannou and Traulos (1995) found that the average initial returns of IPOs during 1987-1994 are about 34% higher than the average returns of the other stocks. Papamatthaiou (1996) found that the average excess return of IPOs during 1987-1995 is 20,34% higher than the ASE Index. Kazantzis and Levis (1995) found that the average first day return equals 48.5% during 1987-1991. All the above researches showed that IPOs in the Athens Stock Exchange are significantly underpriced.

**2.2. Sample of the research.** Unfortunately, there are only few IPOs during the examined period of years in Athens Stock Exchange Market. In general, 32 companies entered the stock market from 2002 to 2005, while in the previous 4-year period, from 1998 to 2001, this number ascends to 135. This fact obligates us to include in our sample the whole

number of the firms, even if we would like to exclude stocks with small capitalization.

In Table 1 we can see the number of IPOs taken place per year. It is noticeable that this number is descending as we move from 2002 to 2005.

Table 1. Number of IPOs taken place per year

| | |
|---|---|
| During 2002 | 13 |
| During 2003 | 8 |
| During 2004 | 6 |
| During 2005 | 5 |
| Sum | 32 |

Finally, Table 2 presents the symbols of the 32 firms in both their Greek symbol, used to be represented in Athens Stock Exchange, and in their English symbol, used to be represented in this article and the first day the share was offered in Athens Stock Exchange.

Table 2. Greek and English symbols of the firms of the sample

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| English | Esimv | Kepen | Dixth | Alsin | Galax | Komp | Ygeia | Kanak |
| Greek | ΕΣΥΜΒ | ΚΕΠΕΝ | ΔΙΧΘ | ΑΛΣΙΝ | ΓΑΛΑΞ | ΚΟΜΠ | ΥΓΕΙΑ | ΚΑΝΑΚ |
| 1st day of transactions | 7/1/2002 | 8/1/2002 | 18/2/2002 | 14/3/2002 | 20/3/2002 | 2/4/2002 | 7/6/2002 | 18/7/2002 |
| | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| English | Zinon | Livan | Sentr | Alti | Elain | Nious | Logos | Infis |
| Greek | ΖΗΝΩΝ | ΛΙΒΑΝ | ΣΕΝΤΡ | ΑΛΤΙ | ΕΛΑΙΝ | ΝΙΟΥΣ | ΛΟΓΟΣ | ΙΝΦΙΣ |
| 1st day of transactions | 19/7/2002 | 26/7/2002 | 2/8/2002 | 16/8/2002 | 114/02/2002 | 27/1/2003 | 14/3/2003 | 30/7/2003 |
| | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| English | Astra | Kri | Olp | Marak | Prof | Klm | Spri | Ilyda |
| Greek | ΑΣΤΡΑ | ΚΡΙ | ΟΛΠ | ΜΑΡΑΚ | ΠΡΟΦ | ΚΛΜ | ΣΠΡΙ | ΙΛΥΔΑ |
| 1st day of transactions | 31/7/2003 | 6/8/2003 | 8/8/2003 | 14/10/2003 | 29/10/2003 | 16/2/2004 | 24/2/2004 | 26/2/2004 |
| | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| English | Elin | Eybrk | Agkri | Sidma | Pea | Moto | Abe | Pro |
| Greek | ΕΛΙΝ | ΕΥΒΡΚ | ΑΓΚΡΙ | ΣΙΔΜΑ | ΠΕΑ | ΜΟΤΟ | ΑΒΕ | ΠΡΟ |
| 1st day of transactions | 10/3/2004 | 8/4/2004 | 20/4/2004 | 10/5/2005 | 28/6/2005 | 30/6/2005 | 12/7/2005 | 10/3/2004 |

**2.3. Methodology of the research.** The first aim of this article, as stated above, is to examine the stocks in Greek Stock Exchange Market entered with an underpriced offering price. For this purpose, we calculate the returns between the offering price and the closing price of the first day for every stock, as stated below:

$$R_{i1} = \frac{P_{io} - P_{ic1}}{P_{ic1}}, \quad (1)$$

where $R_{i1}$ is the return of the $i$ stock during the $1^{st}$ day of transactions, $P_{io}$ is the offering price of the $i$ stock and $P_{ic1}$ is the closing price of the $i$ stock in the $1^{st}$ day of transactions. Through a t-test, we examine if these returns are positive and statistically significant, which would suggest that the shares offered are underpriced.

Moreover, the second aim of this article is to examine the aftermarket performance of the stocks of the IPOs. This means that the stocks should perform in a worse way than the whole market during a period of 3 years. For this purpose, we calculate the daily differences between the returns of the General Index of the Athens Stock Exchange and the returns of the stocks, as stated below:

$$D_{it} = R_{Mt} - R_{it}, \quad (2)$$

where $D_{it}$ is the calculated difference, $R_{Mt}$ is the daily return of the market for the day $t$ and the $R_{it}$ is the daily return of the stock $i$ for the day $t$. We examine whether the thirty two series of differences for each of the thirty two stocks perform positive statistical means which are statistically significant for five different subsequent periods: first 30 days, first 90 days, first 1 year, first 2 years and first 3 years. These means would support the theory of the aftermarket underperformance. We should mention that we follow the example of Ritter (1991) for our statistical analysis with the only difference that he used the returns per month while we are using the daily returns.

The fact, though, that the means do not support the aftermarket performance theory motivated us to move on testing the proportions of the positive differences (D) with a binomial test. More specifically, we examined if the frequency of the positive differences is equal to, larger or smaller than fifty percent. We wondered if the days that the market performed better than every examined share are equal to the days that the market performed worse than every examined share for the whole period of the three years. We should stress, however, that if the frequency of the positive differences is more than fifty percent, we could support that there is the tendency to the existence of the aftermarket underperformance.

**2.4. Statistical analysis.** *2.4.1. Statistical analysis of the underpricing of IPOs during the first day of transactions.* Table 3 presents the results of the first statistical test of our paper.

Table 3. Descriptive statistics and t-test for the returns of the 1st day

| | | | |
|---|---|---|---|
| Returns less than -50% | 7 | Mean | -7.15% |
| Returns between -50% and 0% | 11 | Median | -7.52% |
| Returns between 0% and 50% | 11 | t | -0.876 |
| Returns more than 50% | 3 | p-value | 0.388 |
| SUM | 32 | df | 31 |

What is clearly demostrated both from the descriptive statistics (frequencies, mean and median) and the t-test is the fact that there is no trend to underprice the IPOs in Athens Stock Exchange, since the frequency of the positive returns is bigger than that of the negative returns and the p-value is even larger than 10% pointing out that the mean is accepted to equal zero.

*2.4.2. Statistical analyses of the aftermarket performance of IPOs.* The results of statistical tests on the aftermarket performance of IPOs during 5 different subsequent to the 1st day of transactions periods appear below. Moreover, the results of the binomial test, we have already referred to, appear in the end of this paragraph.

*2.4.2.1. The first 30 days of transactions.* Table 4 includes the results of the t-test for the aftermarket performance of the IPOs during the first thirty days of transactions of the shares.

Table 4. Results of the t-test for the first 30 days of transactions

| | t | df | p-value | | t | df | p-value |
|---|---|---|---|---|---|---|---|
| Esimv | -0.2417 | 30 | 0.8107 | Astra | 0.8738 | 30 | 0.3892 |
| Kepen | 0.0905 | 30 | 0.9285 | Kri | 1.3472 | 30 | 0.1880 |
| Dixth | 1.9309 | 30 | 0.0630* | Olp | 0.6252 | 30 | 0.5366 |
| Alsin | 0.4756 | 30 | 0.6378 | Marak | -0.2803 | 30 | 0.7812 |
| Galax | 0.1200 | 30 | 0.9053 | Prof | 0.6988 | 30 | 0.4901 |
| Komp | -0.4131 | 30 | 0.6825 | Klm | 1.7993 | 30 | 0.0820* |
| Ygia | 0.6366 | 30 | 0.5292 | Spri | 0.4029 | 30 | 0.6899 |
| Kanak | 1.7700 | 30 | 0.0869* | Ilyda | 0.5792 | 30 | 0.5668 |
| Zinon | 1.6829 | 30 | 0.1028 | Elin | -1.1924 | 30 | 0.2424 |
| Livan | 1.0646 | 30 | 0.2955 | Eybrk | -0.1163 | 30 | 0.9082 |
| Sentr | -0.6072 | 30 | 0.5483 | Agkri | -0.3997 | 30 | 0.6922 |
| Alti | 0.3159 | 30 | 0.7543 | Sidma | 0.9859 | 30 | 0.3321 |
| Elain | 1.0580 | 30 | 0.2985 | Pea | -0.6327 | 30 | 0.5317 |
| Nious | 0.2977 | 30 | 0.7680 | Moto | 1.8990 | 30 | 0.0672* |
| Logos | -0.8135 | 30 | 0.4223 | Ave | 1.6606 | 30 | 0.1072 |
| Infis | 0.6499 | 30 | 0.5207 | Pro | -1.8810 | 30 | 0.0697 |

Note: * 10% level of significance.

From the table above, we notice that four stocks out of 32 present a positive and statistically different from zero statistical mean of differences. This result does not suggest a trend of the stocks to perform in a worse way than the market during the first thirty days of transactions.

*2.4.2.2. The first 90 days of transactions.* Table 5 includes the results of the t-test for the aftermarket performance of the IPOs during the first ninety days of transactions of the shares.

Table 5. Results of the t-test for the first 90 days of transactions

| | t | df | p-value | | t | df | p-value |
|---|---|---|---|---|---|---|---|
| Esimv | 0.3910 | 90 | 0.6967 | Astra | 0.3113 | 90 | 0.7563 |
| Kepen | 0.7536 | 90 | 0.4530 | Kri | 0.8396 | 90 | 0.4034 |
| Dixth | 1.7658 | 90 | 0.0808* | Olp | 0.7329 | 90 | 0.4655 |
| Alsin | 1.0085 | 90 | 0.3159 | Marak | 0.8403 | 90 | 0.4030 |
| Galax | 1.2415 | 90 | 0.2177 | Prof | 1.5596 | 90 | 0.1224 |
| Komp | 0.8419 | 90 | 0.4021 | Klm | 1.7844 | 90 | 0.0777* |
| Ygia | 0.3297 | 90 | 0.7424 | Spri | 0.8663 | 90 | 0.3886 |
| Kanak | 0.0709 | 90 | 0.9437 | Ilyda | 1.1599 | 90 | 0.2491 |
| Zinon | 0.2116 | 90 | 0.8329 | Elin | -1.8698 | 90 | 0.0648* |
| Livan | 0.5039 | 90 | 0.6156 | Eybrk | 0.7452 | 90 | 0.4581 |
| Sentr | -1.3366 | 90 | 0.1847 | Agkri | 0.5107 | 90 | 0.6108 |
| Alti | 0.6833 | 90 | 0.4962 | Sidma | 2.4378 | 90 | 0.0167** |

Table 5 (cont.). Results of the t-test for the first 90 days of transactions

| | t | df | p-value | | t | df | p-value |
|---|---|---|---|---|---|---|---|
| Elain | 1.1909 | 90 | 0.2368 | Pea | 0.1422 | 90 | 0.8872 |
| nious | -0.7426 | 90 | 0.4597 | Moto | 1.8909 | 90 | 0.0619* |
| Logos | -1.8466 | 90 | 0.0681* | Ave | -0.1908 | 90 | 0.8491 |
| Infis | 0.9744 | 90 | 0.3325 | Pro | -2.6953 | 90 | 0.0084*** |

Notes: * 10% level of significance, ** 5% level of significance, *** 1% level of significance.

Only four stocks out of 32 present a positive and statistically different from zero statistical mean of differences in this period of time, as we may see in the above table. We should notice though that there are three more stocks that have a statistically significant, but negative mean. As a result, according to the theory, aftermarket performance of the stocks is not observed in 90-day period.

*2.4.2.3. The first 1 year of transactions.* Table 6 presents the results of the t-test for the aftermarket performance of the IPOs during the first year of transactions.

Table 6. Results of the t-test for the first 1 year of transactions

| | t | df | p-value | | t | df | p-value |
|---|---|---|---|---|---|---|---|
| Esimv | 1.0143 | 247 | 0.3115 | Astra | 0.8347 | 248 | 0.4047 |
| Kepen | 0.9710 | 246 | 0.3325 | Kri | 1.5158 | 248 | 0.1308 |
| Dixth | 0.6257 | 247 | 0.5321 | Olp | 0.7168 | 248 | 0.4742 |
| Alsin | 0.5500 | 244 | 0.5828 | Marak | 0.4342 | 249 | 0.6645 |
| Galax | -1.0797 | 244 | 0.2814 | Prof | 1.4780 | 249 | 0.1407 |
| Komp | 0.4755 | 245 | 0.6348 | Klm | 1.5319 | 252 | 0.1268 |
| Ygia | 1.0610 | 244 | 0.2897 | Spri | 1.3944 | 251 | 0.1644 |
| Kanak | -0.2402 | 244 | 0.8104 | Ilyda | 1.8359 | 250 | 0.1676 |
| Zinon | -0.1491 | 244 | 0.8816 | Elin | 0.2638 | 250 | 0.7921 |
| Livan | -0.7468 | 245 | 0.4559 | Eybrk | 1.1165 | 249 | 0.2653 |
| Sentr | -1.0167 | 244 | 0.3103 | Agkri | 0.9990 | 252 | 0.3188 |
| Alti | 0.4963 | 245 | 0.6201 | Sidma | 0.7411 | 248 | 0.4593 |
| Elain | 0.7709 | 243 | 0.4415 | Pea | -0.4515 | 248 | 0.6521 |
| Nious | -1.4273 | 248 | 0.1548 | Moto | 0.6639 | 247 | 0.5074 |
| Logos | 0.3775 | 247 | 0.7061 | Ave | -0.9892 | 244 | 0.3235 |
| Infis | 1.4912 | 248 | 0.1372 | Pro | -1.5689 | 247 | 0.1179 |

Table 6 includes the results of the t-test for the means during the first 1 year of trading. In one-year period, we have no positive and statistically significant mean of differences. The expected mean is equal to zero. We may conclude that the stocks of the IPOs do not perform in a worse way than the General Index of the Athens Stock Exchange.

*2.4.2.4. The first 2 years of transactions.* Table 7 presents the results of the t-test for the aftermarket performance of the IPOs during the first two years of transactions.

Table 7. Results of the t-test for the first 2 years of transactions

| | t | df | p-value | | t | df | p-value |
|---|---|---|---|---|---|---|---|
| Esimv | 0.8963 | 498 | 0.3705 | Astra | 1.1880 | 499 | 0.2354 |
| Kepen | 0.6226 | 497 | 0.5338 | Kri | 2.3342 | 499 | 0.0200** |
| Dixth | -0.1669 | 498 | 0.8675 | Olp | 0.1686 | 499 | 0.8662 |
| Alsin | 0.6956 | 495 | 0.4870 | Marak | 1.4831 | 500 | 0.1387 |
| Galax | 0.5163 | 495 | 0.6058 | Prof | 1.8482 | 500 | 0.0652* |
| Komp | 1.7422 | 496 | 0.0821* | Klm | 0.8752 | 502 | 0.3819 |
| Ygia | 1.3965 | 495 | 0.1632 | Spri | 1.4260 | 501 | 0.1545 |
| Kanak | 0.2832 | 495 | 0.7772 | Ilyda | 1.0242 | 501 | 0.3062 |
| Zinon | 0.1841 | 495 | 0.8540 | Elin | 0.2159 | 501 | 0.8292 |
| Livan | 0.7957 | 496 | 0.4266 | Eybrk | 0.7527 | 500 | 0.4520 |
| Sentr | 0.2848 | 495 | 0.7759 | Agkri | 0.5717 | 503 | 0.5678 |
| Alti | 0.6686 | 496 | 0.5041 | Sidma | -0.1460 | 499 | 0.8840 |
| Elain | 1.7713 | 494 | 0.0771* | Pea | 0.2278 | 499 | 0.8199 |
| Nious | -1.1373 | 499 | 0.2560 | Moto | 0.3214 | 498 | 0.7480 |

Table 7 (cont.). Results of the t-test for the first 2 years of transactions

| | t | df | p-value | | t | df | p-value |
|---|---|---|---|---|---|---|---|
| Logos | 1.1226 | 498 | 0.2621 | Ave | -0.8893 | 495 | 0.3743 |
| Infis | 2.1907 | 499 | 0.0289** | Pro | -0.9765 | 498 | 0.3293 |

Notes: * 10% level of significance, ** 5% level of significance.

Only four stocks demonstrate aftermarket performance consistent with the theory, as we may observe from the table above. This number does not allow us to claim that aftermarket performance of IPOs appears in Athens Stock Exchange during the first two years of transactions of the shares.

*2.4.2.5. The first 3 years of transactions.* Table 8 presents the results of the t-test for the aftermarket performance of the IPOs during the first three years of transactions.

Table 8. Results of the t-test for the first 3 years of transactions

| | t | df | p-value | | t | df | p-value |
|---|---|---|---|---|---|---|---|
| Esimv | 1.2680 | 749 | 0.2052 | Astra | 0.5747 | 750 | 0.5656 |
| Kepen | 1.0736 | 748 | 0.2834 | Kri | 1.5759 | 750 | 0.1155 |
| Dixth | -0.0670 | 749 | 0.9466 | Olp | 0.1845 | 750 | 0.8537 |
| Alsin | 0.8808 | 746 | 0.3787 | Marak | 1.3821 | 750 | 0.1673 |
| Galax | 1.0336 | 746 | 0.3017 | Prof | 1.8627 | 754 | 0.0629* |
| Komp | 2.4199 | 747 | 0.0158** | Klm | 0.4843 | 753 | 0.6283 |
| Ygia | 1.9218 | 746 | 0.0550* | Spri | 0.6295 | 752 | 0.5292 |
| Kanak | 0.8015 | 746 | 0.4231 | Ilyda | 0.4651 | 752 | 0.6420 |
| Zinon | 1.1694 | 746 | 0.2426 | Elin | 0.4249 | 752 | 0.6710 |
| Livan | 1.0629 | 747 | 0.2882 | Eybrk | 0.2227 | 751 | 0.8238 |
| Sentr | 0.9284 | 746 | 0.3535 | Agkri | -0.4032 | 754 | 0.6869 |
| Alti | 0.9603 | 747 | 0.3372 | Sidma | 0.1431 | 750 | 0.8863 |
| Elain | 1.5235 | 745 | 0.1281 | Pea | 0.1597 | 750 | 0.8732 |
| Nious | -0.6514 | 750 | 0.5150 | Moto | 0.6254 | 749 | 0.5319 |
| Logos | 0.3082 | 749 | 0.7580 | Ave | -0.5440 | 746 | 0.5866 |
| Infis | 1.4979 | 750 | 0.1346 | Pro | 1.2632 | 749 | 0.2069 |

Notes: * 10% level of significance, ** 5% level of significance.

During the three years, the performance of differences of only two shares is positive and statistically significant at 10% level of significance and of only one at 5% level of significance.

*2.4.2.6. Binomial test for the equality of the proportion between the positive and the negative differences.* The results appeared in the above sections are absolutely inconsistent with the theory for the IPOs aftermarket underperformance and they are surely not supportive to it. This inconsistency motivated us to move on by testing the proportion between the positive and the negative differences during the whole 3-year period. The results of the binomial test appear in Table 9.

Table 9. Results of the binomial test for the equality of the proportions between the positive and the negative differences

| | p-value | | p-value | | p-value | | p-value |
|---|---|---|---|---|---|---|---|
| Kepen_f | 0,0022*** | Livan_f | 0,0005*** | Kri_f | 0,0004*** | Eybrk_f | 0,0087*** |
| Dixth_f | 0,0493*** | Sentr_f | 0,0028*** | Olp_f | 0,0240** | Agkri_f | 0,1666 |
| Alsin_f | 0,0108** | Alti_f | 0,0687* | Marak_f | 0,0000*** | Sidma_f | 0,0584* |
| Galax_f | 0,0584* | Elain_f | 0,0289** | Prof_f | 0,0045*** | Pea_f | 0,0940* |
| Komp_f | 0,0000*** | Nious_f | 0,0415** | Klm_f | 0,0162** | Moto_f | 0,1666 |
| Ygia_f | 0,0000*** | Logos_f | 0,0108** | Spri_f | 0,4233 | Ave_f | 0,0415** |
| Kanak_f | 0,1092 | Infis_f | 0,0133** | Ilyda_f | 0,0687* | Esimv_f | 0,0000*** |
| Zinon_f | 0,0003*** | Astra_f | 0,1901 | Elin_f | 0,1092 | Pro_f | 0,3440 |

Notes: * 10% level of significance, ** 5% level of significance, *** 1% level of significance.

Table 9 allows us to find out that the days the General Index of Athens Stock Exchange performs better than the shares are much more than the days that the opposite occurs for the most of the IPOs. This way we may exact a general attitude of the shares of the examined IPOs to perform in a worse way than the market.

## Conclusions

There are some main results from all the above pre-

sented statistical analyses. In Athens Stock Exchange, neither IPO underpricing nor an aftermarket underperformance occur during the 4-year period, from 2002 to 2005.

As to IPO underpricing, Table 2 showed that 18 out of 32 firms (56,25%) performed negatively, while only 14 out of 32 firms (43,75%) performed positively. The majority of the stocks do not act according to the theory examined, while previous researches about the same theory in the same markets arrived at quite the opposite conclusion.

As to the aftermarket underperformance, we have already seen that only a few shares appear consistent with the theory. More specifically:

- only three firms (Dixth, Klm and Moto) perform consistently in both short time periods;
- only two firms (Komp and Prof) perform consistently in all long time periods;
- only five firms (Kanak, Logos, Elain, Infis, Kri, Ygia) perform consistently in only one examined period;
- three firms (Elin, Logos and Pro) perform in opposite way in 90-day period;
- twenty firms do not perform in a way that should be commented.

The main reason we may propose for the inconsistent performance of the IPOs in Athens Stock Exchange is the fact that the Greek stock market was coming out of a serious-crisis, the crisis of 2000. The firms, which are willing to enter the market, are too few as it is clearly shown in Table 1. A total number of companies entered the stock market through a 4-year period under study is 32, while in the previous 4-year period, from 1998 to 2001, this number ascends to 135. This fact supports the "Hot Issue Market Hypothesis". As a result, according to this theory, since the Athens Stock Exchange was recovering from the crisis of 2000 till 2004, we may assume that the hesitation of the firms to enter the market acts as a major reason for both the exact pricing of the shares during their first day and their following inconsistent performance.

Another supportive evidence for the accusation against the crisis is Table 10 below.

Table 10. Frequencies of positive and negative returns of the 1st day of trading per year

| Year | Positive return | | Negative return | | Total | |
|---|---|---|---|---|---|---|
| Frequency | Absolute | Relative | Absolute | Relative | Absolute | Relative |
| 2002 | 5 | 38% | 8 | 62% | 13 | 100% |
| 2003 | 3 | 38% | 5 | 63% | 8 | 100% |
| 2004 | 3 | 50% | 3 | 50% | 6 | 100% |
| 2005 | 3 | 60% | 2 | 40% | 5 | 100% |
| Total | 14 | 44% | 18 | 56% | 32 | 100% |

From the above table, we can see that as we proceed from 2002 to 2005 the frequency of the positive returns of the first day of trading becomes equal to or even larger than the frequency of the negative ones. This fact is supportive to our claim that during the first years of the examination the Greek stock market still operated under unusual conditions.

Moreover, nine out of the ten firms that laid above for their consistent behavior to the theory of aftermarket underperformance behave inconsistently with the theory of IPO underpricing. This indicates that these firms were fully overpriced by both the investment bankers and their owners. The investors realized this and reacted in an opposite way during the whole 3-year period. The only firm that exhibited a positive return on the first day is Elain.

For the rest of the companies, we could assume that, the investment bankers in Greece estimate shares in an objective way. This may be a result of their attempt to support the reliability of the Greek Stock Market and the fact that the investors were not willing to buy a new share without a large amount of information about it. The result of this demand for a big amount of information did not allow shares to enter the market overpriced or underpriced.

It is also significant to point out that the shares that most of the companies entered in the Stock Market during the period under study are the whole equity of theirs. If a company knows that it will need the investors again in the future, then it tries to satisfy the buyers of its shares from the first offering. As the whole equity entered the Stock Exchange Market, we understand that this motivation for the companies is absent during the examined period. The hypothesis above, moreover, is consistent with the opinion that the less frequently a firm turns to stock market to raise funds the more underpriced the stocks are.

Concerning the binomial test, although we are aware of the inadequacy of the statistical analysis of proportions between the negative differences and the positive ones, we believe that the fact that in the cases of most shares the proportion of the positive differences is larger than the proportion of the negative ones comprises an indicator of the existence of the aftermarket underperformance of IPOs. It seems that the stocks had the tendency to perform better than the Index on everyday basis, but this was not enough in order to have clearly and significantly positive differences. However, it is an indication, which needs more examination.

Finally, there are two more factors, except for the trend that is founded through the binomial test, that need more examination. The first one should be the role of capitalization. Are the IPOs that appear consistent with the theory the ones with the largest capitalization? And if not, what is the role of it in reference to the IPOs in Athens Stock Exchange? The second is the impact of the IPOs firms management on their behavior. The kind of the management of the firms with consistent and inconsistent behavior may be a major factor.

In conclusion, it would be difficult for anyone to claim that IPOs underpricing or aftermarket underperformance occur in Athens Stock Exchange. We strongly believe that this is a result of the crisis of 2000 and the arguments in favor of our belief have been analytically documented. However, we appreciate that this inconsistent performance is absent today. And this is the reason why we strongly recommend that a research about IPOs in Athens Stock Exchange should be conducted in the future.

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