

Insights on the long term performance of Greek IPOs

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Abstract

The Initial Public Offerings (IPOs) pricing has become a leading example of market inefficiency during the last decades. Although there is an extensive amount of work that provides some evidence for the existence of short-term excess performance, there are fewer studies, which document the long-term performance of IPOs. There is no conclusive evidence on the determinants of this phenomenon yet, despite its importance for shareholders and policy-makers. This study not only examines the long-term performance of IPOs in a small developing market - Athens Stock Exchange (ASE) - but also examines eleven factors that probably affect the performance of new issues in the long run.

The paper analyses the long-run price performance of 254 IPOs launched on the Greek stock market during the 1994–2002 period. The empirical analysis indicates differences from the international evidence and reveals long-term adjusted outperformance of first (40.82%), and second holding year periods (13.49%) and adjusted underperformance at the end of the third year of issues holding (-15.35%). The cross-section regression results provide further insights to the determinants that incur long-term performance of Greek IPOs. Seven factors appear to be significantly effective on their performance. The survey suggests that over the study period, the degree of high long-term returns is determined by the intensity of demand driven by investor sentiment and reveals that offering prices do not fully adjust to prevailing market conditions. However, this work breaks the rule of findings about long-term IPO returns extracted by a series of studies and provides a different perspective on long-term returns.

Keywords: *Initial Public Offerings, Long-term performance, Market Efficiency*

JEL classification: *G14, G32, G24*

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1.Introduction

One of the most important events in the life of a firm and one of particular interest to institutional investors is the transition from being private company to a public one through the initial public offering (IPO) process. An IPO is perceived as one of the most significant milestones in a firm's operating history, since it allows the firm to access the public capital markets in order to raise additional capital, which will be vital and necessary to fund its future growth. On top of that, IPOs are supposed to provide a venue for the initial shareholders to sell their ownership stake and become well-off, sharing the rewards of the growth of the firm.

Moreover, when firms decide to go public, they experience major advantages, as well as important disadvantages that might lead them to unexpected results. Emery and Finnerty (1997), claim that going public gives the opportunity to explore new resources of capital and bring higher price in the public market than in private placements. Current shareholders have the ability to liquidate their holdings and get cash in return, thus an IPO allows them to diversify their portfolios into different markets. In addition, an initial offering can make a common stock negotiable by creating a visible market value and firms that are publicly traded can find more flexible ways to finance their operations and enhance their corporate image.

On the other hand, going public is not without disadvantages. It is well known that firms that decide to sell their common stocks to the investing public are subject to significant regulations, and are required to report on regular basis information regarding their financial conditions and business developments. Public firms are accountable to the public shareholders and need to make quick short-term decisions, so as to start paying dividends relatively early. However, this might hamper the firm's operating flexibility at a great extent. Finally, existing shareholders lose a portion of their ownership interest to public shareholders, inducing them to lose also the voting control in the company's rights.

An empirical study, conducted by Pagano *et al.*(1998), on the factors that influence firms to go public, concluded that the decision to go public could be interpreted as an attempt to rebalance the firms' balance sheets after a period of extensive investments and growth. In contrast, Khurshed *et al* (2006) document that the manner in which a company is run before it is listed in the stock exchange, gives a strong signal of how its shares will float in the aftermarket.

Reflecting the importance of the IPO procedure, the academic literature on IPOs has been voluminous. Yet, perhaps surprisingly, the vast majority of empirical findings have ignored the underlying reasons why firms go public and they mainly focused on the determinants of the long-term underperformance or on the underpricing of IPOs, since their listing date. A large volume of research has demonstrated that investors purchasing IPOs of common stocks earn large positive abnormal returns in the early aftermarket period, whereas after three or five years of listing, their returns will be diminished.

The existing literature on the Athens Stock Exchange is limited, mainly focused on short-term performance and most of the studies examined relatively small samples and limited periods of time. Tsangarakis (2004) found that in the period 1993-1997, Greek offerings experience on average, large positive initial returns something that signals severe underpricing whereas Papaioannou and Travlos (2000) reported that the initial abnormal returns, in the period 1987-1993, were up to 34%. Kenourgios *et al* {2007} in contrast on 169 firms listed and traded on ASE during 1997-2002 found a first day adjusted return of 54.28%

The purpose of the present study is to examine the long-run performance of 254 IPOs listed in the Athens Stock Exchange (ASE) market, from 1994 to 2002. Specifically, the event-time method is going to be analyzed by calculating the buy-and-hold returns of the IPOs for the 6, 12, 18, 24, 30 and 36 months of listing in the market. In addition, the cross-section analysis of abnormal returns, with respect to different variables that will be used for the study is also included. Cross-sectional analysis of the stock returns by using broad company characteristics contributes to interesting results. Our work differentiates from the international literature as it introduces dummy variables, which search separately on the hot, cold and even in the flat market conditions.

The remainder of the paper is organized as follows. Section 2 includes the broad literature review on the long-term performance of IPOs, across the world, while some international evidence on the issue is outlined. Data and methodology are presented in Section 3, whereas Sections 4 and 5 provides, the empirical findings from the research in addition to an extensive analysis. Finally, Section 6 summarizes the main results and concludes the paper by offering further recommendations for future research.

2.1. International evidence on the long-run performance of IPOs

Theoretical Aspects on the long-term performance of IPOs

The long-run underperformance of IPOs has received considerable attention in the literature in recent years, leading to controversial results and conflicting findings with studies indicating negative, positive or even zero aftermarket performance. For instance, Ibbotson (1975), in his study on the price performance of the common stock issues in the US, report that there were no departures from market efficiency in the aftermarket and he did not reject the hypothesis that the abnormal returns in the long-run are zero. He concludes that IPOs underperform by an average of approximately 1% per month, over four years, suggesting that a general positive performance is reported in the first year, followed by a negative one in the next three years and a general positive trend in the fifth year.

In theory, if companies are successfully timing their offerings in periods when the cost of equity capital is assumed to be low, this should subsequently manifest low returns for the investors. A possible explanation for this, is the ability of the firms to identify when the market is overvalued, or else when investors are willing to overpay for a specific IPO relative to other firms. Under this justification, several authors have recently examined the behaviour of the IPOs during the three or five years after their listing (Loughran *et al*, 1994).

However, it would make sense to point out the variety of factors, which are correlated to the long-run performance of IPOs. Miller (1977) attributes IPO underperformance to the divergence of investor opinions, due to sales shortage. He implies that in early stock-offering periods, stock prices are generally higher with a greater differentiation of opinions about expected future returns. However, in the long-run prices decrease as the most optimistic investors lower the appraisal of firms.

Morris (1996) supports the view that the heterogeneity of beliefs can support the speculative bubble hypothesis, as well as the overvaluation of the IPOs immediately after their issuance. Accordingly, Loughran and Ritter (1995) and Rajan and Servaes (1997) also refer to the features that are related to long-run performance, giving emphasis to the “windows of opportunity” among investors and security analysts, that tend to be systematically overoptimistic about the earnings potential and long-term growth predictions

of IPOs. They document that IPOs have better future performance when analysts forecast lower growth prospects.

Others hypothesise that firms manipulate their accounting numbers and financial statements so as to make their offerings much more appealing to the public; therefore beguiled investors will pay a higher price than the fair one. However, this “window dressing” technique is not effective in the long-run since investors will be informed about the true value of the firm and its price will fall back according to Teoh *et al.* (1998).

More recently, Ma and Shen (2003) offer an alternative explanation with regards to the long-run performance of IPOs. They claim that “prospect theory”, can be applied and they proved that the underperformance of IPOs is not a puzzle. Their main assumption is that investors have utility functions and tend to overweight small probability events and underweight the intermediate and high probability outcomes. It is argued though by Kahneman and Tversky (1992), that IPOs are more likely to have extremely high returns. Therefore, according to the theory, the small probability outcomes of achieving high returns are valued more than in the standard expected utility setting, so even though the average returns of IPOs in the long-run are lower, investors are still willing to invest in IPOs because they will be compensated by the prospect of gaining more high positive returns.

2.2. Long-term performance of IPOs in Developed Countries

Ritter (1991) in his research on the long-term performance of 1,526 US IPOs, (issued between 1975-1984), found that they underperformed their market benchmarks by about -34.47% in the three year period, whereas Aggarwal and Rivoli (1990) reported that the NASDAQ index adjusted return reached -13.73% at the 250 post listing day for a sample of 1,598 US IPOs during 1977-1987. Similarly, Ritter and Welch (2002) indicated that three-year holding-period returns for an investor, buying at the offer price, would on average underperform the market significantly. In addition, Kooli and Suret (2001), found that investors who were buying IPOs immediately after listing and holding them for five years would make a loss of 24.66%, attributing this to the “hot issues” story. Their research was based on 445 Canadian IPOs, from 1991 to 1998.

Moreover, Leleux and Muzyka (1993) also examined the post-issue performance of IPOs issued in Belgium and France from 1988-1992. They found negative cumulative abnormal returns for the French IPOs, but not for the Belgian ones. In addition, Lee *et al.*, (1996) proved that the 36-month market-adjusted CARs for Australian IPOs were up to -51%, from 1976 to 1989, whereas Allen and Patrick (1996) also document significant aftermarket underperformance of -25.38%.

In the UK, Levis (1993) investigated the long-term performance of a sample of 712 IPOs issued during 1980-1988. He reported that the British IPOs underperformed the HGSC Index (Hoare Govett Small Companies Index) over a three-year period by -8.31%. Similarly, Espenlaub *et al.* (1998) re-examined the evidence on the long-run returns in the UK over the period 1985-1995 and they found significant negative returns of -8.12% at the same index.

Furthermore, a study of Finnish IPOs by Keloharju (1993) documented a -26.4% long-run cumulated market-adjusted returns for 79 issues that went public between 1984 and 1989. He also confirmed the presence of *winner's curse* developed by Rock (1986), however he claimed that the results reflected a temporary overoptimism by IPO investors that turned into disappointment when they learned more about the IPO firms' prospects. On the other hand, Jakobsen and Sorensen (2001), in their study on 76 Danish IPOs from 1984

to 1992, concluded that the market (Danish Total Stock Index) performed better than the IPO stocks and the volatility adjusted under performance of the IPOs, compared to the market, was -30.4% after five years, while compared to the stocks was -13.1% after the same period of time. Surprisingly though, IPOs in Sweden were found to have a long-run over performance, rather than negative long-term returns. Brounen and Eichholz (2002) found a positive overperformance equal to 18.89%.

Stehle *et al.*(2000), in their study on 187 German IPOs listed during 1960 - 1992, concluded that the average abnormal buy-and-hold returns were significant at 5% level supporting the view that IPOs listed in main market were performing less by 6% after three years of listing. On the other hand, Schalg and Wodrich (2004), found that IPOs listed in the secondary market in Germany, from 1884 to 1914, were performing worse than the market benchmark.

Additionally, Drobetz *et al* (2003) argued that the Swiss IPOs, from 1983 to 2000, were indicating average market-adjusted initial returns of 35%, whereas they were performing really bad in the long-run, yielding out -70.4% after three years of listing.

Studies have also been conducted with regards to the Mediterranean countries, such as Italy and Spain and significant results were presented. Arosio *et al.*,(2000) reported significance underperformance levels of -11.53% for 108 Italian IPOs, during 1985-1997, whereas Alvarez and Gonzalez (2001) found that the Spanish IPOs after five year of listing were performing by -37.05%.

In conclusion, most evidence appears to indicate negative long run IPO performance in developed markets, although notable exceptions are also observed.

2.3. Long-term performance of IPOs in Emerging Markets

In the emerging markets arena, many studies have been done on the existence of the long-term underperformance of IPO markets. Initially, Ahmad-Zaluki *et al.* (2004) report in their study on the long-run share price performance of 454 IPOs listed on the KLSE (Kuala-Lumpur Stock Exchange) during the period 1990 to 2000, that the Malaysian offerings were significantly overperforming their market benchmarks by 32.63%, when event time CARs and buy-and-hold returns are calculated for the 36-month period of time. They also argue that the IPOs performance varied from year to year and across industries, but there were no significant differences between the offerings that were listed in the Main or the Secondary board of the KLSE. However, in an earlier study, Yong (1995) reported higher average abnormal returns for three years at the level of 75%.

Moving to the north, in Shanghai, the China's financial hub, Mok and Hui (1998) examined the aftermarket inefficiency explanation by testing the speculative bubble hypothesis and they concluded that persistent and positive excess returns over a long period of time existed, something that was inconsistent with Aggarwal and Rivoli (1990).

Furthermore, Cheng and Shiu (2005), in their research in Taiwan during 1988-2002, claim that IPOs underperform the market by -22.73%, demonstrating that their result were significantly different than those presented by Chen *et al* (2001) who find that Taiwanese IPOs do not underperform in the long-run.

Allen *et al.*(1999) in an attempt to measure the long-run aftermarket performance of 151 IPOs in Thailand, from 1985 to 1992, report that the average initial returns were up to 63.49%, as documented also by Wethyavivorn and Koo-Smith (1991). However, the CARs for the three-year period were not statistically significant.

On the other hand, Bildik and Yilmaz (2007) support the view that the Turkish IPOs underperformed their market benchmarks by -84.5%, even if a short-term outperformance was detected (5.94%). Temporary large and positive initial returns of the firms listed in the Istanbul Stock Exchange, turned out to be perilous for the portfolio of their shareholders in the long-run. In contrast, Kiymaz (2000) found positive (44.1% at the end of 36 months) post listing abnormal returns for the period 1990-1995 (for 138 IPOs).

Finally, Aggarwal *et al.*, (1993) report three-year market-adjusted returns of -47%, -19.6% and -23.7% for Brazil, Mexico and Chile respectively, whereas Lyn and Zychowicz (2003) claim that the new equity offerings in Hungary and Poland reveal significant first-day underpricing but insignificant long-term results. The average returns, in the three-year period of time, were calculated positive in both countries; 19.59% in Hungary and 57.17% in Poland.

On the whole, emerging market evidence appears to be mixed as far as long-term IPO performance is concerned.

3. Empirical Analysis of IPOs Long-Run Performance in the A.S.E. (1994-2002)

3.1. Data description

The purpose of the study is to examine the long-run performance of the Greek IPOs listed in the Athens Stock Exchange (A.S.E.) market, from 1994 to 2002. The sample includes only listings of common stocks in the stock market. Preference stocks as well as transfers from the Parallel to the Main market are not examined in the present paper.

The total number of new listed companies in the Main, Parallel and New Stock Market of the Athens Stock Exchange, 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 specialised web sites². Share prices and prices of the General A.S.E. Index are collected at pre-determined time points during the first three years of stocks' trading in the market.

Table 1 introduces the IPOs launched on the Athens Stock Market per year and totally, during the period 1994-2002. The year 2000 experienced the largest 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. We should point out that the distribution of IPOs takes into consideration the entrance day of common stocks in the A.S.E. and not according to the public offering time period.

Taking as a criterion of IPOs distribution the specification of the market that IPOs are listed in, the results of the survey gave the following outcome: During the examined period 1994-2002 the new listings in the Parallel Market were 128 - (50.3%) and in the Main Market 120 - (47.2%). Also, 6 (2.36%) issues were launched in the "New Market" during the first two years of its operation (2001-2002). The "New Market" is a market for small size innovative companies that were launched by the Athens Stock Exchange in 2001.

² www.ase.gr, www.naftemporiki.gr, www.in.gr, www.stockrally.gr, e.t.c.

Table 1

Number of issues in A.S.E. by year and by market ³ :Time period: 1/1/1994 – 31/12/2002

Year	Number of Issues	Main Market	Parallel Market	New 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 A.S.E

3.2 Methodology

There are several alternative explanations for the long-run underperformance of the IPOs, implying that one needs to employ a structured benchmark portfolio as well as a careful and particular length of the period over which the performance is measured, in order to avoid misleading results, as Ritter (1991) suggests.

Furthermore, Kooli and Suret (2001) argue that one major problem with long-run performance of IPOs is the non-standard distribution of their returns; whereas Barber and Lyon (1997), in their research study on long-run abnormal stock returns, claim that many of the common methods used to calculate the long-run returns are conceptually flawed and/or lead to biased test statistics. They also recommend that cumulative abnormal returns (CARs) are a biased predictor of long-run buy-and-hold abnormal returns, therefore they favour the use of buy-and-hold abnormal returns (BHARs) in tests designed to detect long-run abnormal returns. In addition, they propose that the distribution of the BHARs is positively skewed and does not have a zero mean.

On the other hand, Mitchell and Stafford (2000) and Brav.(2000) report that buy-and-hold abnormal returns tend to be more sensitive to the problem of cross-sectional dependence among sample firms, whereas Barber and Lyon (1997) emphasize that BHARs method is well-accepted if a researcher is interested in studying whether the offerings listed in the stock market, earned abnormal returns or not over a specific period of time, “measuring precisely the investor experience”.

Above all and for the purposes of the study, the measure of the buy-and-hold returns (BHARs) will be used so as to evaluate the long-run performance of the Greek IPOs. This methodology involves the calculation of the three years buy-and-hold returns assuming that

³ 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

the stocks are held from their public offering period or from the first trading day after their listing, to the three-year anniversary of their listings.

The long-run stock exchange returns of IPOs are calculated by using the two criteria that are used in international literature: the raw returns and the excess or adjusted returns. All closing stock prices were adjusted for share capital increases and stock splits that possibly happened during the three-year period. Based on the listing price of IPOs the returns were calculated by taking into consideration the following time points:

- i. The six month trading period in the A. S. E. (126th day of trading)
- ii. The one year trading period in the A. S. E. (250th day of trading)
- iii. The one and a half year trading period in the A. S. E. (376th day of trading)
- iv. The two-year trading period in the A. S. E. (500th day of trading)
- v. The two and a half year trading period in the A. S. E. (626th day of trading)
- vi. The three-year trading period in the A. S. E. (750th day of trading)

The raw returns are calculated as a percentage change of price that takes place between two time points.

Therefore, to illustrate, the raw return of the 126th day of trading is calculated as:

$$\frac{(\text{Closing price of 126}^{\text{th}} \text{ day of trading}) - (\text{Listing price})}{\text{Listing price}} * 100$$

Moreover, proportionate returns of the 126th day, 250th day, 376th day, 500th day, 626th day and 750th day of trading are calculated taking as a base of comparison the closing price of first day of trading of new listings in the stock market. In other words, proportionate returns are calculated as:

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

where:

n = the day of trading that the long-run calculated performance is based

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 special characteristics of each company but they also embody, at the process of their shaping, the ascending or descending trends of the stock market. So, the adjusted returns must be calculated, especially when the returns under consideration refer to a longer period, as it happens with the 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:

$$\text{Excess or Adjusted Return}_{i,t} = \text{Raw Return}_{i,t} - \text{Market Return}_{i,t}$$

The market return calculated is based on the Athens Stock Exchange General Index (ASEGI). The market return is calculated as follows:

$$\frac{\text{ASEGI}_1 - \text{ASEGI}_0}{\text{ASEGI}_0} * 100$$

where:

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

For the excess returns based on a listing price, as a base point (point 0) for the return's calculation is taken the last day of public offerings period, which is the ASEGI's closing price 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 titles. On the other hand, for the calculation of the excess returns, which are based on the closing price of the first trading day, as a base point (point 0) is taken the ASEGI's closing price of that day.

The next step involves the implementation of multivariate regressions, in order to check for explanation of cross-sectional differences of the long-run performance of the IPOs. Previous studies have identified a number of determinants for the long-term underperformance of the IPOs, however for the purposes of the study, eleven of them were chosen and their significance levels will be examined.

Table 2 summarizes the main explanatory variables, giving briefly their definition and type of measure that will be used. Therefore, the regression model is specified as follows:

Table 2

Summary of Explanatory Variables

$$\text{Model 1: } P_t = a + \beta_1 (\text{LBC}) + \beta_2 (\text{AGE}) + \beta_3 (\text{TLAG}) + \beta_4 (\text{PRIV}) + \beta_5 (\text{SIZE}) + \beta_6 (\text{OVER}) + \beta_7 (\text{UR}) + \beta_8 (\text{FDV}) + \beta_9 (\text{HDV}) + \beta_{10} (\text{CDV}) + \beta_{11} (\text{OC}) + \varepsilon_i$$

For **a**, the variable is classified as 0,1 where 0=main market, 1=parallel market, For **b**, the variable is defined as 0 and 1, where 0=privatizing public sector firm and 1= private sector firm, and for **c**, the variable is denoted as 0 and 1, where 0=medium or low reputation of underwriter and 1=high reputation underwriter, For **d**, the variable is denoted as 1 and 0, where 1=flat market (1994-1996) and 0=elsewhere, For **e**, the variable is denoted as 1 and 0, where 1= upward (hot) market (1997-1999) and 0=elsewhere, For **f**, the variable is denoted as 1 and 0, where 1= downward (cold) market (2000-2002) and 0=elsewhere

Variable Name in Abbreviation	Variable Definition	Type of Measure
LBC	Listing Board Classification (main or parallel market) ^a	Discrete
PRIV	Corporate Condition of the company ^b	Discrete
UR	Underwriters' Reputation ^c	Discrete
FDV	Flat Dummy Variable ^d	Discrete
HDV	Hot Dummy Variable ^e	Discrete
CDV	Cold Dummy Variable ^f	Discrete
TLAG	Time Lag	Continuous
AGE	Age of the company, prior to going public	Continuous
ISSUE SIZE	Size of the IPO firms, calculated as the number of shares, multiplied by the offer price	Continuous
OVER	Oversubscription rate	Continuous
OC	Ownership Concentration	Continuous

where $t = 12, 24$ and 36 months respectively and $\varepsilon_i =$ error term

4. Descriptive Statistics

4.1. Summary Statistics for the Raw and Excess Returns of IPOs in the A.S.E.

Table 3 provides the average raw and adjusted long-run returns of IPOs concerning the whole sample of new issues that took place in A.S.E. 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 issues 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 at the first day of their trading and the closing price of ASEGI at the same date.

As can be seen in Figure 1 and Table 3, Panel A, the mean raw and adjusted return of the 126th day of trading (six-month return) that calculated according to the listing price, was 44.76% and 45.18% respectively and the corresponding three-year return was -1.24% and -15.35% respectively. These results reveal that the new issues in the Greek stock market did not offer to investors' substantial long-run raw returns for the time period of 750 trading days and moreover the raw returns were higher than the corresponding of the market (the return of the General Index at the same period). Moreover, the initial raw return offered to the investors was also substantial and reached the level of 28.63 percent (29.26 percent).

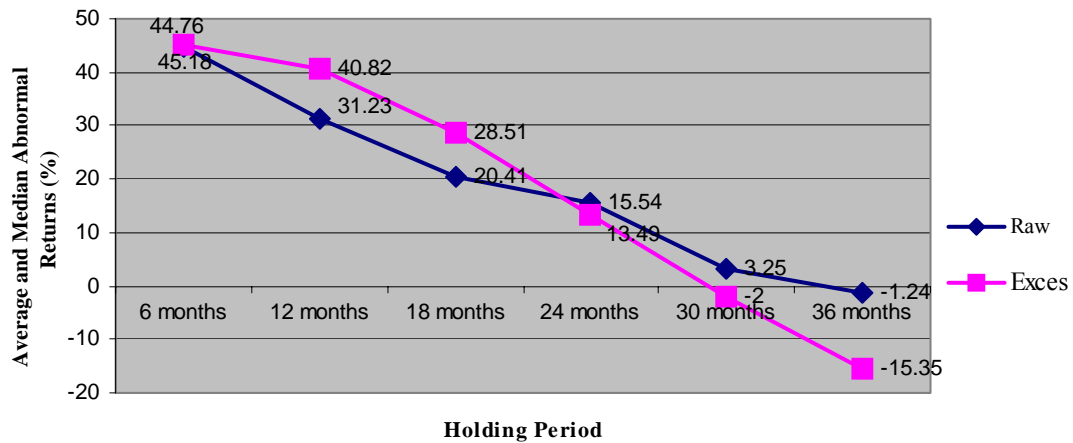


Fig. 1. The Raw and Excess Returns in the ASE (Listing price basis)

In other words, we show that investors who participated in the Greek IPO market during the period 1994-2002, buying stocks at the listing price and holding them for a three-year period, obtained marginally negative returns because the listing prices of IPOs were slightly higher than their equilibrium prices formed at the 750th day of trading. It is also notable that the range of the above IPO returns is wide, fluctuating from 44.76% to -1.24% (raw returns) and from 45.18%⁴ to -15.35% (adjusted returns). Analytically, all the long-run IPO returns calculated are figured out in Figure 1.

⁴ There were up 32 firms in various stages with abnormal long-term raw returns up to 5055.2% and extreme adjusted returns up to 4843.56%. We decided to exclude all IPOs with returns higher than 300%.

Table 3

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

Panel A: Returns from the offer price day						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	28.63***	39.09	245	8.00	-37.50	122.00
6 months	44.76***	80.67	235	19.96	-64.82	296.54
12 months	31.23***	81.51	223	8.68	-77.85	296.00
18 months	20.41***	81.07	218	1.13	-88.97	282.24
24 months	15.54***	86.16	221	-11.13	-91.40	281.31
30 months	3.25	88.67	217	-16.60	-95.61	293.99
36 months	-1.24	79.12	210	-24.30	-97.91	290.03
Excess and Adjusted Returns						
1st day	29.26***	37.22	237	17.30	-41.84	118.74
6 months	45.18***	70.34	232	26.75	-74.94	252.47
12 months	40.82***	82.73	228	18.03	-108.60	298.11
18 months	28.51***	83.29	222	8.79	-245.60	298.33
24 months	13.49***	13.49	222	3.66	-266.96	247.14
30 months	-2.00	88.82	222	-4.29	-246.93	286.93
36 months	-15.35**	101.34	218	-11.49	-395.22	275.82

Panel B: Returns from the end of 1 st day of trading						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
6 months	14.82***	60.22	242	-0.32	-78.29	207.13
12 months	17.18***	81.38	238	-4.37	-90.93	271.70
18 months	8.06	82.90	229	-11.58	-94.02	296.13
24 months	-6.76	70.35	223	-27.70	-95.19	226.41
30 months	-10.54**	78.40	223	-32.45	-96.63	297.85
36 months	-17.44***	72.56	213	-39.32	-98.58	238.46
Excess and Adjusted Returns						
6 months	12.16***	47.78	254	-0.58	-73.80	147.98
12 months	15.71***	68.82	247	0.289	-107.47	249.53
18 months	13.54**	82.01	241	-9.36	-241.24	282.61
24 months	-8.09**	63.30	240	-13.20	-262.22	208.38
30 months	-16.53***	84.98	237	-17.94	-286.76	294.43
36 months	-31.43**	97.45	231	-20.73	-437.01	249.82

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. Excess or Adjusted Return = Raw Return – Return of General Index of Athens Stock Exchange for the corresponding time period of raw return calculation

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

The early positive and late negative ‘net’ returns (excess or adjusted returns) that investors’ experiences from the “buy and hold” investment strategy are also confirmed by examining the excess returns taken from the secondary market of IPOs. In the secondary market, the working assumption of the present study is that investors bought the IPOs at the closing price of their first day in the A.S.E. and hold them till the three-year anniversary of their listing, or exactly until the 750th trading day. The long-run returns, which are introduced in the Table 3, Panel B and are shown in Figure 2, fluctuate between 14.82% (six-month return) and -17.44% (three-year return) for the raw returns and correspondingly between 12.16% (six-month return) and -31.43% (three-year return) for the excess returns.

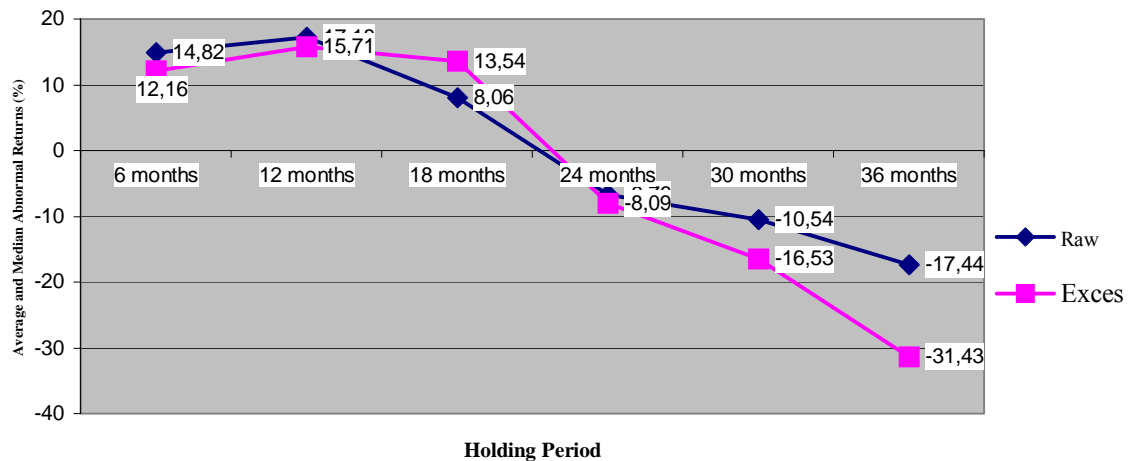


Fig. 2. The Raw and Excess Returns in the ASE (First day closing price basis)

4.2. The Average Returns of IPOs across the Listing Board Classification of IPOs

In this sub-section, the long-run returns of IPOs are calculated taking as a criterion the type of the market (Main, Parallel or New Stock Market) that the new issues listed in during the period 1994-2002. Tables 4 and 5 present the raw and excess returns of IPOs, according to the above listing board classification.

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). Firms that decide to go public must have a net equity of at least €12 million. Those companies need to disclose their financial statements for at least three years preceding their listing application and additionally they have to be audited for that period.

On the other hand, in the parallel market (established in 1990), IPOs should have at least a net equity of €3 million. 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 have 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, (2003)).

Table 4, Panel A contains raw and excess returns taken from the Main Market by those investors who bought the new stocks of this market. In particular, the mean raw return of the 126th day was 24.79%, the mean raw return of the 250th day was 21.99%, the mean raw return of the 376th day was 11.56%, the mean raw return of the 500th day was

11.17%, the mean raw return of the 626th day was 3.59% and the mean raw return of the 750th day was 4.26%. The mean excess returns were 26.82%, 27.66%, 20.34%, 5.15%, -5.27% and -21.39% accordingly. The initial raw return taken from the Main IPO market was 24.29% (and 26.16% the excess one).

Table 4, Panel B contains the raw and excess returns that the Main IPO Market offered to those investors who bought the new issues at the end of the first day of trading. These returns are found to be much lower than those referring in Panel A, ranged from 12.98% (six-month period) to -4.55% (three-year period), the raw returns and from 9.60% (six-month period) to -33.61% (three-year period), the excess returns. Those findings show that the majority of IPOs launched on the stock market are underpriced initially and, as a result, investors who purchase new stocks secondarily lose part of their initial capital gain since they buy at higher price compared to the listing price.

On the other hand, the main characteristic of the Parallel IPO Market was its overall better long-run performance in relation with the corresponding of the Main Market, during the period 1994-2002. In particular, as Table 5, Panel A and Figure 3 shows, the mean raw return of the 126th day was 64.73% (64.42% the excess one), the mean raw return of the 250th day was 39.91% (52.70%), the mean raw return of the 376th day was 28.83% (38.60%), the mean raw return of the 500th day was 22.06% (28.79%), the mean raw return of the 626th day was 6.03% (6.77%) and the mean raw return of the 750th day was -3.91% (-3.56%). As far as the initial returns is concerned, they are found to be more almost double comparing with those taken from the Main IPO Market (42.95% the raw and 42.75% the excess first day return).

Table 5, Panel B presents the raw and adjusted long-run returns taken from the Parallel IPO Market when the titles of the new listings were bought at the end of the first trading day (at the closing price) and not at the listing price during the public offerings period. The general finding is the same as recorded in Panel A and denotes the downward trend of IPO returns in the long-run. In other words, the returns – both the raw and excesses – is reducing as the time goes by after stocks' listing in the A.S.E.

The parametric and non-parametric tests shown in Panel C for 'Main' and 'Parallel' markets confirm that there is high significant difference between the means and medians of the IPOs listed in the two boards of Athens Stock Exchange. Further look on the analysis of the long-run performance of IPOs listed in the "New Market" of the A.S.E. gives some different results. However, it must be underlined that this particular market is a new market of A.S.E., and the number of its IPOs listed to date was very small.

The findings (Table 6) reveal that the IPOs of this market yielded substantial initial returns and positive medium-term returns but negative long-run returns. More specially, the raw and the abnormal returns calculated for the 1st, the 126th, the 250th, the 376th, the 500th, the 626th and the 750th trading day were 108.54% (111.44%), 41.71% (64.47%), 54.96% (77.01%), 33.69% (47.33%), -18.67% (-10.92%), -51.06% (-56.45%) and -60.29% (-89.17%) respectively.

Table 4

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

Panel A: Returns from the offer price day						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	24.29***	46.81	120	8.00	-37.50	252.67
6 months	24.79***	62.99	114	9.52	-64.82	288.47
12 months	21.99***	70.36	113	3.64	-77.85	275.47
18 months	11.56*	67.18	108	2.68	-88.97	281.53
24 months	11.17	74.63	110	-8.34	-91.40	252.71
30 months	3.59	75.31	107	-12.17	-95.61	267.50
36 months	4.26	76.23	103	-13.60	-97.91	232.83
Excess and Adjusted Returns						
1st day	26.16***	45.99	119	12.72	-41.84	253.69
6 months	26.82***	56.23	113	16.95	-68.86	244.34
12 months	27.66***	73.67	114	10.45	-108.60	290.50
18 months	20.34***	68.39	110	6.71	-155.61	298.33
24 months	5.15	61.64	110	0.26	-202.87	172.20
30 months	-5.27	83.12	110	-7.89	-230.48	256.26
36 months	-21.39**	102.44	108	-14.58	-395.22	267.93
Panel B: Returns from the end of 1 st day of trading						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
6 months	12.98**	56.33	119	0.00	-65.65	216.44
12 months	5.33	57.87	115	-3.69	-81.72	244.44
18 months	8.62	78.41	112	-5.61	-91.54	296.13
24 months	1.53	74.56	111	-14.28	-93.40	295.65
30 months	-0.72	79.23	110	-19.75	-96.63	297.85
36 months	-4.55**	77.15	104	-18.33	-98.40	261.78
Excess and Adjusted Returns						
6 months	9.60**	44.36	118	0.06	-73.80	145.33
12 months	5.06	54.20	116	-2.50	-95.54	240.03
18 months	11.90	72.06	115	-6.29	-161.97	281.34
24 months	-2.66	67.20	114	-8.98	-209.31	297.15
30 months	-15.82**	78.90	113	-14.24	-225.31	209.13
36 months	-33.61***	103.97	110	-22.05	-437.01	249.82

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. Excess or Adjusted Return = Raw Return – Return of General Index of Athens Stock Exchange for the corresponding time period of raw return calculation

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

Table 5

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

Panel A: Returns from the offer price day						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	42.95***	48.54	124	22.56	-24.38	272.34
6 months	64.73***	92.36	115	46.44	-63.18	296.54
12 months	39.91***	90.55	104	14.69	-70.60	296.00
18 months	28.83***	91.01	104	-1.87	-80.01	282.24
24 months	22.06**	97.90	105	-13.67	-90.29	281.31
30 months	6.03	89.21	104	-22.38	-89.68	293.99
36 months	-3.91	82.84	102	-29.25	-94.13	290.03
Excess and Adjusted Returns						
1st day	42.75***	47.27	124	26.33	-27.42	270.79
6 months	64.42***	81.55	114	46.17	-74.94	280.18
12 months	52.70***	89.23	108	26.69	-91.74	298.11
18 months	38.60***	91.22	105	11.31	-189.65	269.86
24 months	28.79***	89.95	106	8.41	-154.88	291.89
30 months	6.77	92.64	106	1.97	-231.08	286.93
36 months	-3.56	97.98	104	-2.87	-255.53	275.82
Panel B: Returns from the end of 1 st day of trading						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
6 months	29.71***	79.66	123	2.73	-78.29	284.71
12 months	29.85***	97.13	117	-1.29	-90.93	271.70
18 months	8.46	85.96	111	-18.93	-94.02	288.13
24 months	-10.15	71.59	107	-34.52	-95.19	226.41
30 months	-17.01**	77.69	107	-42.71	-96.40	235.90
36 months	-18.97**	81.63	107	-50.66	-98.58	275.38
Excess and Adjusted Returns						
6 months	33.19**	73.14	125	9.63	-65.27	294.87
12 months	33.68**	86.12	117	3.91	-75.80	273.92
18 months	18.15**	87.75	114	-9.91	-212.91	282.61
24 months	-1.48	71.55	109	-15.59	-182.88	255.69
30 months	-11.10	88.06	111	-17.98	-226.66	294.43
36 months	-23.76**	88.76	108	-16.30	-252.91	231.66
Panel C: Differences in means and median						
t-Statistics for difference in means - Wilcoxon test for difference in median						
	Raw Mean	Adj Mean		Raw Median	Adj Median	
1st day	-4.8 [0.000]***	-4.2 [0.000]***		-5.6 [0.000]***	-4.3 [0.000]***	
12 months	-3.1 [0.002]***	-3.1 [0.002]***		-3.9 [0.000]***	-3.2 [0.001]***	
36 months	-2.9 [0.003]***	-3.2 [0.002]***		-1.9 [0.055]*	-3.1 [0.002]***	

As far as the secondary IPO market of the “New Market” is concerned, almost all the calculated mean returns were found to be negative. Actual returns ranged from -2.73% to 82.22% (the raw returns) and from 16.37% to -98.65% (the excess returns), underlying the fact that the firms listed in the “New Market” included firms without established reputation and more uncertainty about their future performance in relation with the firms listed in the Main and the Parallel Market of the A.S.E.

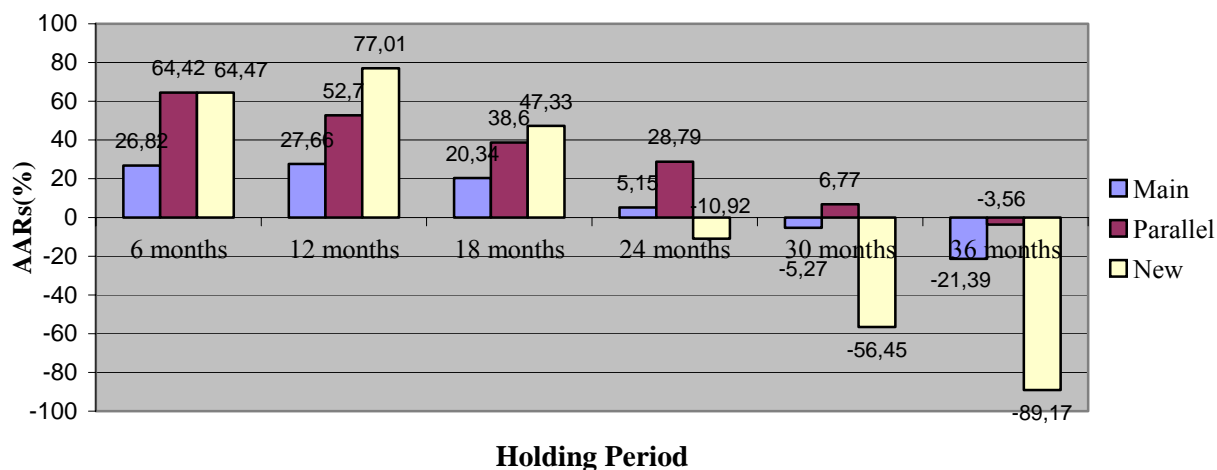


Fig. 3 Average Excess Returns of IPOs across the Listing Board Classification

4.3. The Average Returns of IPOs based on the Condition of the Market

The period of 1994-2002 is a critical one in the history of the Greek capital market. On one hand, this is a period during which the institutional environment of the market underwent radical change: A new regulatory commission – the Capital Market Commission – was organized and staffed during this period; important European legislation, notably the Investment Services Directive (ISD), was embodied in to Greek legislation enabling a new reorganization of producers of financial services and the Stock Exchange itself; The Athens Stock Exchange was also reorganized, shedding the form of a public law entity and becoming a corporation which was privatized. Self-regulatory responsibilities of the Exchange were transferred to the Capital Market Commission; new markets, notably the Athens Derivatives Exchange, were launched by the Stock Exchange; traded shares were fully converted from paper to electronic accounts. Finally, modern regulations in line with European best practice were also introduced in areas of trading, transparency, corporate governance and the sanctioning of abusive practice.

On the other hand, the period under review here experienced a huge cycle of overvaluation and subsequent devaluation, following in large measure the international movement that enveloped world equity markets at the end of the previous century and the beginning of the new one. During the mid-nineties the Greek economy underwent significant macroeconomic progress and simultaneous high growth, creating valid expectations of Greek entry in the EMU. These expectations led a wave of optimism on the stock exchange, which was also in tandem with over-optimism in other markets. However, in Greece as elsewhere, market valuations by far exceeded what was warranted by valid positive expectations and inevitably the market went into a long decline in the period 2000-2003, again in tandem with world trends.

For the purposes of our analysis, and in order to capture the possible effects on IPO returns of investor overreaction during the early years, we divide the period in two sub intervals: 1994-1999 and 2000-2002. In other words, our sample was split up into two sub-periods so as to estimate the effect market condition exerted on the long-run performance of IPOs. The first sub-period concerns the normal and upward phase of the Greek stock market (hot market) and covers the period 1994-1999 and the second one covers the falling or downward period of the A.S.E. (cold market), which was the period 2000-2002.

During the first period (Table 7 & Figure 4), the mean raw (excess) return was very important in the long-run, ranged from 63.85% (53.95%) at the end of first six months of trading to 29.35% (-18.10%) at the end of three years. Moreover, the secondary purchase and following long-term holding of IPOs by investors was also offered high capital profits. According to this investment strategy, the mean raw (excess) return ranged from 40.76% (13.27%) at the end of first six months of trading to 32.18% (-37.48%) at the long-run period of three years.

On the other hand, during the cold market period (2000-2002), the long-run raw returns were negative, contrary to the initial returns that were high (Table 8). The three-year mean raw and excess return was -42.85% and -11.28% correspondingly. The corresponding returns raised from the secondary IPO market were -51.69% (raw) and -22.26% (excess).

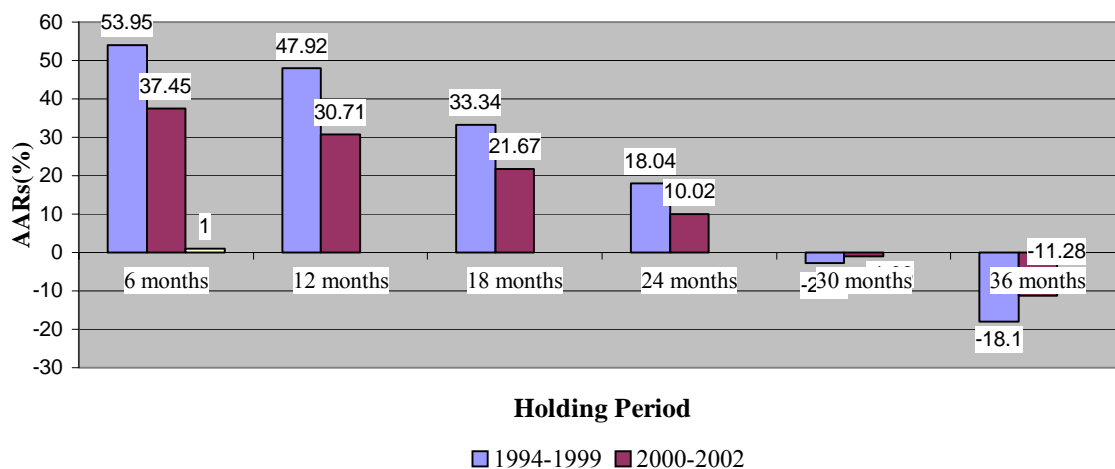


Fig. 4 – Average Excess Returns of IPOs across the phase of the market (hot/cold period)

4.4. The Average Returns of IPOs based on Underwriter's Quality

Differentiating reputable and non-reputable banks and syndicates depicts underwriter's quality. This distinction presumes that reputable banks have higher capabilities in assessing fair listing prices. For the purposes of the study five major Greek banks will be thought of as the most reputable underwriters in the Greek market. These are: National Bank of Greece (1841), Commercial Bank of Greece (1907), Alpha Bank (1925), EFG Eurobank (1924) and Piraeus Bank (1916). Table 9 depicts the returns taken from new listings that were undertaken by the above five old Greek banking institutions which afford substantial reputation within the investment society.

The findings (Table 9) reveal that IPOs underwritten by banks provide smaller positive returns for the first three year, compared to the IPOs underwritten by non-reputable underwriters. More specifically, the long-run raw (excess) returns for those IPOs covered by reputed underwriters were 47.21% (51.31%) for the 126th trading day, 28.65% (42.55%)

Table 6

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

Panel A: Returns from the offer price day						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	108.54***	90.91	6	101.39	14.76	233.69
6 months	41.71**	46.96	6	41.93	-17.37	114.00
12 months	54.96	105.08	6	32.71	-34.60	254.98
18 months	33.69	121.11	6	-10.01	-42.77	277.79
24 months	-18.67	56.16	6	-34.65	-62.25	88.18
30 months	-51.06	-70.34	6	-53.22	-70.34	-27.56
36 months	-60.29	18.48	6	-65.86	-84.90	-41.27
Excess and Adjusted Returns						
1st day	111.44***	85.13	6	102.51	28.52	216.77
6 months	64.47***	44.79	6	65.26	8.49	131.81
12 months	77.01*	95.39	6	46.56	3.42	258.55
18 months	47.33	111.78	6	12.28	-36.88	268.24
24 months	-10.92	50.82	6	-7.67	-62.75	76.23
30 months	-56.45	45.45	6	-42.55	-121.19	-13.31
36 months	-89.17	48.35	6	-78.66	-159.23	-43.25
Panel B: Returns from the end of 1 st day of trading						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
6 months	-25.41***	29.29	6	-31.63	-51.89	28.57
12 months	-2.73	106.01	6	-48.41	-72.77	209.32
18 months	-9.81	118.09	6	-49.10	-82.31	229.19
24 months	-49.24	55.99	6	-69.03	-86.69	63.97
30 months	-75.28	5.62	6	-74.91	-82.98	-66.46
36 months	-82.22	6.28	6	-79.09	-89.83	-76.09
Excess and Adjusted Returns						
6 months	-5.20	27.46	6	-10.12	-32.91	45.90
12 months	16.37	89.22	6	-16.18	-37.35	197.52
18 months	-0.04	99.59	6	-36.51	-60.16	202.18
24 months	-45.70**	42.00	6	-57.44	-79.50	34.17
30 months	-85.30***	33.93	6	-72.54	-128.05	-46.94
36 months	-98.65***	28.30	6	-88.57	-134.19	-66.57

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. Excess or Adjusted Return = Raw Return – Return of General Index of Athens Stock Exchange for the corresponding time period of raw return calculation

Table 7

Raw and Adjusted Returns for Initial Public Offerings from the Athens Stock Exchange –
Time Period 1994-1999

Panel A: Returns from the offer price day						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	35.94***	44.68	158	8.00	-8.00	252.67
6 months	63.85***	81.54	140	34.79	-47.87	296.54
12 months	54.28***	87.24	128	24.97	-66.36	296.00
18 months	45.68***	85.46	125	31.75	-80.01	282.24
24 months	45.41***	92.61	128	20.89	-90.29	281.31
30 months	32.92***	87.17	124	11.27	-90.34	293.99
36 months	29.35***	85.05	121	15.66	-92.44	290.03
Excess and Adjusted Returns						
1st day	36.05***	43.03	158	19.66	-41.84	253.69
6 months	53.95***	74.60	140	37.64	-74.94	280.18
12 months	47.92***	94.64	134	25.40	-108.60	94.64
18 months	33.34**	97.42	130	14.85	-245.60	298.33
24 months	18.04	91.57	131	9.98	-266.96	291.89
30 months	-2.66	106.13	131	-2.25	-246.61	286.93
36 months	-18.10	123.65	130	-11.15	-395.22	275.82
Panel B: Returns from the end of 1 st day of trading						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
6 months	40.76***	70.64	153	23.16	-62.43	284.71
12 months	43.20***	86.43	143	20.00	-83.09	271.70
18 months	34.22***	89.68	136	17.29	-89.94	296.13
24 months	19.62***	78.64	131	1.42	-95.14	295.65
30 months	15.58**	85.86	130	-7.20	-94.21	297.85
36 months	13.27**	87.11	127	-7.29	-96.20	275.38
Excess and Adjusted Returns						
6 months	32.18***	67.06	155	17.91	-73.80	294.87
12 months	27.58***	85.15	145	4.74	-107.47	273.92
18 months	20.68**	98.11	143	-5.83	-241.24	282.61
24 months	-2.21	84.38	137	-11.06	-262.22	297.15
30 months	-18.14**	102.74	138	-18.32	-286.76	294.43
36 months	-37.48***	117.95	135	-27.11	-437.01	249.82

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. Excess or Adjusted Return = Raw Return – Return of General Index of Athens Stock Exchange for the corresponding time period of raw return calculation

Table 8

Raw and Adjusted Returns for Initial Public Offerings from the Athens Stock Exchange –
Time Period 2000-2002

Panel A: Returns from the offer price day						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	34.92***	60.44	92	12.29	-37.50	272.34
6 months	16.64**	70.92	95	-3.16	-64.82	286.47
12 months	0.19	60.92	95	-15.29	-77.85	254.98
18 months	-13.56**	60.20	93	-28.55	-88.97	277.79
24 months	-25.57***	54.45	93	-35.85	-91.40	194.82
30 months	-36.31***	52.29	93	-49.04	-95.61	235.20
36 months	-42.85***	44.36	89	-54.20	-97.91	184.00
Excess and Adjusted Returns						
1st day	37.50***	59.77	91	17.54	-34.46	270.79
6 months	34.50***	66.22	93	21.06	-46.22	220.32
12 months	30.71***	60.99	94	11.16	-41.18	268.48
18 months	21.67***	57.55	92	1.80	-54.51	268.24
24 months	10.02	57.18	92	-3.60	-77.90	247.14
30 months	-1.06	56.15	92	-7.56	-121.19	244.56
36 months	-11.28	54.02	88	-11.49	-126.11	201.62
Panel B: Returns from the end of 1 st day of trading						
Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
6 months	-12.52**	52.37	95	-28.50	-78.29	207.13
12 months	-21.98***	53.24	95	-33.03	-90.93	209.32
18 months	-30.21***	52.34	93	-47.54	-94.02	229.19
24 months	-40.66***	45.22	93	-58.05	-95.19	134.43
30 months	-47.05***	46.71	93	-64.95	-96.63	118.63
36 months	-51.69***	44.94	89	-66.36	-98.58	176.95
Excess and Adjusted Returns						
6 months	5.19	50.92	95	-8.59	-61.61	231.25
12 months	5.46	49.43	95	-5.53	-50.78	247.30
18 months	2.55	46.06	93	-12.96	-60.16	202.18
24 months	-7.50*	44.26	93	-16.57	-79.50	182.31
30 months	-14.14***	48.22	93	-15.72	-128.05	131.71
36 months	-22.26***	52.32	89	-17.81	-134.19	199.15

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. Excess or Adjusted Return = Raw Return – Return of General Index of Athens Stock Exchange for the corresponding time period of raw return calculation

Table 9
Raw and Adjusted IPO Returns – Reputable Underwriters Time Period 1994-2002

Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	39.97***	49.98	145	14.76	-22.36	252.67
6 months	47.21***	82.57	135	23.11	-64.82	286.47
12 months	28.65***	88.05	130	3.19	-77.85	296.00
18 months	16.25**	87.16	128	-6.50	-88.97	282.24
24 months	12.59	92.51	130	-18.71	-91.40	281.31
30 months	-2.59	87.59	130	-36.50	-95.61	293.99
36 months	-8.45	78.77	127	-35.18	-97.91	288.99
Excess and Adjusted Returns						
1st day	40.04***	48.33	144	24.07	-41.84	253.69
6 months	51.31***	75.54	135	26.67	-54.91	280.18
12 months	42.55***	87.91	134	11.40	-108.60	298.11
18 months	29.78***	79.04	131	6.27	-189.65	298.33
24 months	20.67***	74.93	131	5.69	-202.87	291.89
30 months	3.19	84.05	132	-2.14	-246.61	286.93
36 months	-9.78	94.68	130	-5.13	-395.22	267.93

Table 10
Raw and Adjusted IPO Returns – Non Reputable Underwriters Time Period 1994-2002

Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	29.48***	51.84	105	8.00	-37.50	272.34
6 months	41.47***	78.34	100	18.11	-58.26	296.54
12 months	34.85***	71.68	93	18.54	-58.71	285.33
18 months	26.32***	71.59	90	15.72	-80.01	281.53
24 months	19.75**	76.48	91	-0.65	-77.48	268.41
30 months	11.97	71.54	87	-2.59	-86.18	242.41
36 months	9.78	78.86	83	-12.12	-94.13	290.03
Excess and Adjusted Returns						
1st day	31.83***	51.35	105	16.14	-37.50	270.79
6 months	39.12***	66.19	98	28.17	-74.94	234.26
12 months	38.35***	75.11	94	27.30	-91.74	290.50
18 months	26.67***	89.46	91	11.57	-245.60	276.83
24 months	6.28	84.51	92	-2.90	-266.96	234.42
30 months	-9.55	95.29	91	-11.66	-231.08	252.96
36 months	-23.56**	110.50	88	-22.56	-289.37	275.82

Differences in means and median based on underwriters reputation

	t-Statistics for difference in means		- Wilcoxon test for difference in median	
	Raw Mean	Adj Mean	Raw Median	Adj Median
12 months	-2.9 [0.004]***	9.0 [0.000]***	-5.7 [0.000]***	-8.4 [0.000]***
24 months	-4.6 [0.002]***	-0.65 [0.512]	-5.1 [0.000]***	-2.5 [0.010]**
36 months	-4.4 [0.003]***	-0.54 [0.591]	-5.6 [0.000]***	-1.4 [0.144]

for the 250th, 16.25% (29.78%) for the 376th, 12.59% (20.67%) for the 500th, -2.59% (3.19%) for the 626th and -8.45% (-9.78%) for the 750th day of trading.

On the other hand, the corresponding returns (Table 10) from IPOs underwritten by non-bank underwriters were 41.47% (39.12%) for the 126th trading day, 34.85% (38.35%) for the 250th, 26.32% (26.67%) for the 376th, 19.75% (6.28%) for the 500th, 11.97% (-9.55%) for the 626th and 9.78% (-23.56%) for the 750th day of trading.

4.5. *The Average Returns of IPOs based on Ownership Type*

Tables 11 and 12 present the IPOs classification under the ownership type variable. It is observed that privatized firms experience higher average initial and smaller long-run returns compared to the IPOs that concern state-owned enterprises. However, it is noted that in our sample the number of the private firms is larger than the public companies. In particular, as from the total number of 254 IPOs only 14 are public or state-owned companies.

The initial raw and excess returns are 36.57% (37.52%) for the private IPOs and 18.57% (20.66%) for the state-owned IPOs. The long-run excess returns ranged from 46.67% (six months) to -16.16% (three years) for the private IPOs and from 37.25% (six months) to 26.63% (three years) for the state owned enterprises listed in the A.S.E..

4.6. *The Average Returns of IPOs based on the firms' Issue Size*

Tables 13 and 14 present the results from the analysis of the raw and excess returns, with regard to firm issue size. Particularly, the sample was segregated in two parts; the first includes all issues with capitalization smaller than €10 million and the second one that consisted of all the IPOs with capitalization over €10 million. The result is inconsistent with what we expected to find and especially that IPOs issued by large firms, tend to perform better in the long-run, gaining higher and significant returns.

On the contrary, we find that the small new issues (those with size of issue smaller than €10 million) offered to investors positive three-year raw returns, whereas the big IPOs (those with raised capital bigger than €10 million) registered negative returns in the long-run. In sum, in the 36-month period of trading in the A.S.E. large firms present a -21.06% rate of raw return and a -3.26% rate of excess return. On the other hand, underpricing in the small sized firms seems to be obvious as the three-year returns found to be 2.64% and -22.78% correspondingly. The common characteristic between large and small capitalization firms is the significant and almost same rate of initial raw and excess returns that offered to the investors, reaching the level of about 35%.

4.7 *The Average Returns of IPOs based on the Demand Multiple Variable (Oversubscription rate)*

Table 15 (16) summarizes the raw (excess) returns of the IPOs, dependent on demand multiple taking as a criterion of data separation the 100 times of issues' oversubscription. In other word, the sample is divided in two parts according to the above criterion and taking also into consideration that the mean rate of oversubscription is 114 times for the 254 IPOs that are examined in the 1994-2002 period.

The findings highlight that those firms with low oversubscription rates experience moderate positive initial returns and small negative returns after the 30-month period,

Table 11
Raw and Adjusted IPO Returns – Private enterprises - Time Period 1994-2002

Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	36.57***	51.75	236	8.00	-37.50	272.34
6 months	45.70***	80.59	223	23.11	-64.82	296.53
12 months	30.29***	81.20	210	8.34	-77.85	296.00
18 months	19.65***	81.68	204	0.91	-88.97	282.24
24 months	15.27**	87.56	207	-11.70	-91.40	281.31
30 months	3.01	82.78	203	-19.90	-95.61	293.99
36 months	-2.18	79.14	196	-25.41	-97.91	290.03
Excess and Adjusted Returns						
1st day	37.52***	50.60	235	19.75	-41.84	270.79
6 months	46.67***	72.10	221	26.83	-74.94	280.18
12 months	39.65***	82.34	215	16.56	-108.60	298.11
18 months	27.54***	84.98	208	7.58	-245.60	298.33
24 months	13.75**	81.13	209	2.22	-266.96	291.89
30 months	-3.37	90.24	209	-5.54	-246.61	286.93
36 months	-16.16**	98.88	204	-14.27	-334.04	275.82

Table 12
Raw and Adjusted IPO Returns – State-owned enterprises - Time Period 1994-2002

Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	18.57**	30.77	14	6.30	-7.24	84.86
6 months	27.41	83.93	14	8.39	-31.88	286.47
12 months	46.52*	88.37	13	11.05	-37.88	254.38
18 months	31.39	73.39	14	21.81	-61.09	182.97
24 months	19.47	64.20	14	8.72	-68.35	156.07
30 months	6.90	65.84	14	-9.15	-82.19	96.85
36 months	11.84	80.72	14	-11.00	-71.49	184.00
Excess and Adjusted Returns						
1st day	20.66***	27.06	14	10.39	-3.76	77.87
6 months	37.25*	69.67	12	20.17	-23.93	244.34
12 months	60.20**	90.21	13	27.94	-20.74	268.48
18 months	42.87***	51.87	14	44.87	-29.67	126.59
24 months	29.38***	38.08	14	32.30	-40.01	94.64
30 months	18.41	62.71	14	19.18	-135.97	118.86
36 months	-3.50	24.29	14	13.87	-133.08	201.62

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. Excess or Adjusted Return = Raw Return – Return of General Index of Athens Stock Exchange for the corresponding time period of raw return calculation

Table 13
Raw and Adjusted IPO Returns – Firms with size of issue <10 mil. Euros Time Period
1994-2002

Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	33.86***	49.57	163	8.00	-37.50	272.34
6 months	50.50***	79.14	151	24.81	-62.40	296.54
12 months	42.45***	84.04	140	15.90	-65.55	296.00
18 months	35.09***	81.74	134	19.27	-80.01	282.24
24 months	31.62***	87.64	136	3.68	-89.59	281.31
30 months	17.80**	82.42	133	-1.10	-90.34	293.99
36 months	2.64	79.78	138	-15.62	-91.06	257.75
Excess and Adjusted Returns						
1st day	35.26***	47.87	163	18.31	-34.46	270.79
6 months	48.77***	70.52	150	35.17	-74.94	252.47
12 months	46.56***	87.33	145	25.84	-91.74	298.11
18 months	33.04***	95.44	138	14.30	-245.60	298.33
24 months	15.39**	90.58	139	7.19	-266.96	291.89
30 months	-8.28	99.28	139	-2.25	-246.61	267.93
36 months	-22.78**	113.72	135	-18.62	-334.04	275.82

Table 14
Raw and Adjusted IPO Returns – Firms with size of issue >10 mil. Euros Time Period
1994-2002

Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	38.85***	53.84	86	12.29	-15.75	252.67
6 months	35.49***	82.83	83	11.78	-64.82	286.47
12 months	13.29	73.66	82	-5.04	-77.85	275.47
18 months	-1.97	74.50	83	-25.95	-80.32	235.31
24 months	-9.22	77.48	84	-38.56	-90.29	252.71
30 months	-18.88**	75.34	83	-48.40	-92.37	267.50
36 months	-21.06**	69.53	83	-51.41	-93.76	184.00
Excess and Adjusted Returns						
1st day	39.07***	53.16	86	21.42	-41.84	253.69
6 months	41.52***	74.42	83	20.35	-54.91	280.18
12 months	30.79***	73.45	83	7.66	-108.60	274.93
18 months	21.05***	57.85	84	-0.78	-71.86	226.23
24 months	13.65**	55.80	84	0.26	-73.31	237.20
30 months	8.37	67.36	84	-6.10	-166.84	286.93
36 months	-3.26	76.21	83	-8.06	-395.22	246.34

Differences in means and median based on firms size

	t-Statistics for difference in means - Wilcoxon test for difference in median			
	Raw Mean	Adj Mean	Raw Median	Adj Median
12 months	-3.6 [0.000]***	6.1 [0.000]***	-2.7 [0.006]***	-7.8 [0.000]***
24 months	-1.3[0.163]	1.09 [0.276]	-1.9 [0.049]**	-3.7 [0.010]***
36 months	-2.4 [0.018]**	-0.109 [0.914]	-2.1 [0.031]**	-2.0[0.036]**

Table 15

Raw and Adjusted IPO Returns – Firms with small oversubscription, Time Period 1994 -2002

Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	19.53***	38.45	170	8.00	-37.50	223.69
6 months	28.24***	71.05	169	8.10	-64.82	286.47
12 months	22.38**	73.94	161	3.72	-77.85	295.18
18 months	10.92*	71.88	151	-7.36	-80.32	281.53
24 months	2.61	75.01	147	-21.86	-89.59	278.59
30 months	-2.95	82.58	141	-29.70	-92.37	280.02
36 months	-5.21	81.30	135	-27.18	-94.13	290.03
Excess and Adjusted Returns						
1st day	20.64***	37.99	170	10.56	-41.84	216.77
6 months	28.08***	62.96	168	16.91	-74.94	231.14
12 months	30.79***	83.23	167	8.50	-108.60	298.11
18 months	14.20**	80.87	155	-3.02	-245.60	267.83
24 months	-5.49	72.30	150	-11.43	-266.96	291.89
30 months	-16.89**	91.61	148	-17.54	-246.61	256.26
36 months	-33.31***	110.27	144	-21.32	-395.22	275.82

Table 16

Raw and Adjusted IPO Returns – Firms with high oversubscription , Time Period 1994 -2002

Return of	Mean Return (%)	Standard Deviation (%)	Number of observations	Median (%)	Minimum Return (%)	Maximum Return (%)
Raw Returns						
1st day	70.13***	57.51	79	86.36	-14.19	272.34
6 months	89.20***	87.64	65	77.45	-56.76	296.54
12 months	56.21***	94.85	61	19.50	-66.36	296.00
18 months	43.79***	95.23	66	16.27	-75.89	282.24
24 months	43.80***	100.04	73	7.96	-90.29	281.31
30 months	16.23*	78.69	75	1.17	-88.48	293.99
36 months	7.29	74.57	74	-7.34	-93.76	193.38
Excess and Adjusted Returns						
1st day	70.86***	54.58	79	76.92	-22.77	270.79
6 months	92.99***	72.73	65	93.30	-37.55	280.18
12 months	68.27***	75.38	61	44.41	-36.92	291.66
18 months	61.60***	79.84	67	33.36	-54.30	298.33
24 months	56.30***	76.79	73	31.78	-58.88	247.14
30 months	27.37***	75.35	75	9.75	-148.44	286.93
36 months	19.62**	69.53	74	13.66	-147.00	246.34

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 ASE 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 ASE at the first day of trading of new issues in the stock market

3. Excess or Adjusted Return = Raw Return – Return of General Index of Athens Stock Exchange for the corresponding time period of raw return calculation

reaching -5.21% (-33.31%) in year three. IPOs with high demand multiple ratios, are following a downward trend, leading to lower under-pricing as the time goes by and until the third anniversary of their listing, but offer substantial initial returns. Particularly, the raw (excess) returns taken from these IPOs were 70.13% (70.86%) the first day, 89.20% (92.99%) the first six months, 56.21% (68.27%) the first year, 43.80% (56.30%) the second year and 7.29% (19.62%) the third year.

On the other hand, the raw (excess) returns taken from IPOs with low demand multiple ratios, were 19.53% (20.64%) the first day, 28.24% (28.08%) the first six months, 22.38% (30.79%) the first year, 10.92% (14.20%) the second year and -5.21% (-33.31%) the third year.

5. Cross Sectional Regression

5.1. Formulation of Hypotheses-Determinants of the long run IPO performance in Greece

In this study we hypothesize that the long-run IPO performance is a function of the managerial decisions and performance of the firm prior to going public. Decisions such as when to go public i.e. the percentage of the ownership that prelisting shareholders will keep in the firm, after how many years of operating history the management decides to go public and the market that the firm will be able to achieve listing, could have an effect on the long-run performance. To test this proposition, we have used a number of characteristics (Listing Board Classification, Age, Time Lag, Ownership Type, Size, Oversubscription, Underwriters' Reputation, Market Condition, Ownership Concentration) of the firms in our sample. These characteristics have been used as proxies for quality and reputation of the firms, proxy for listing classification after the IPO and proxy for market condition.

In the subsequent paragraphs, we provide in detail the eleven variables of our multivariate regression model. We will concentrate on preceding evidence and consider the hypotheses for the Greek case. In order to find out the possible determinants of raw and adjusted long-term returns and to explore their relative relationships, a subsequent series of conjectures are constructed.

Listing Board Classification

Initially we search in the market classification. The Greek stock exchange market consists of three markets, the Main, the Parallel and the New market. The Main market is the oldest one, dating back to the foundation years of the Athens Stock Exchange, whereas the Parallel market was formed in 1990 and the New market in 2001.

Schlag and Wodrich (2004) found that IPOs traded in the primary market yield significantly high returns in the long-run, whereas those that are listed in the secondary market, tend to underperform their market benchmarks by more negative results. Additionally, Ahmad-Zaluki *et al.*, (2004), in their study on IPOs in Malaysia, argue that IPOs listed in the main board, underperformed their market benchmark, by -7.54%, while those listed in the secondary market, have overperformed their benchmarks by nearly 0.39%.

Regarding the Greek stock market, firms that are listed mainly in the Parallel board, are those with less developed structure and the information they might have available for public use is limited. As a result of this uncertainty, the titles of these new-listed firms are expected to present positive short-run returns, compared to the IPOs listed in the Main

market, and negative long-run returns. Looking in a long period the IPOs are expected to receive their fair prices as the investors will be able to assess their actual value.

Hypothesis 1: We expect negative returns in the long run for those IPOs that are listed in the Parallel and New Markets of the ASE.

Age

The operating history of a firm prior to going public plays a significant role to its stock price performance. The age of the firm has been suggested as a proxy for the risk (i.e. quality) of the IPO firm (Ritter (1984), Michaely and Shaw (1994), Carter et al. (1998), Khurshed et al (2006)).

Ritter (1991), documented a more pronounced long-run under-performance for younger IPOs and interpreted their evidence as being consistent with the over-optimism explanation. He maintains the view that riskier issues, listed by relatively young firms, are those that experience higher initial underpricing, as well as the worse aftermarket performance and he concludes that this is consistent with the fads hypothesis and investor overoptimism.

In contrast, Allen *et al.*, (1999) find that the age of the firms that went public in the Thailand stock exchange market, is positively related to the initial underpricing. In the long-run however, after excluding outliers, age is considered to be significant and negatively associated with the long-term performance, implying that young firms expose the highest long-run abnormal returns. Nevertheless, Kiymaz (2000) points out that older firms have more information available for the public interest, compared to young ones, thus they are expected to have lower *ex ante* uncertainty, and as a result lower underpricing levels.

Hypothesis 2: The older the firm, the more stable is the IPO and the better can be the long-run performance in the future.

Time Lag

The time lag, the period between the official date of the prospectus announcement (or offer price date) and the listing date of an IPO, in many countries is assumed to be short, however in this particular study it lies between 5 days and 70 days at maximum. During this period of time, changes in the market conditions of the economy might affect the price performance of the IPOs, as well as the initial and aftermarket returns. Finn and Higham (1988) suggest adjusting the initial returns and take into account “the effect of the opportunity cost of capital”.

Mok and Hui (1998), in their study on the Chinese IPOs at the Shanghai Stock Exchange, concluded that the time lapse between the listing and offering initial public offers was long, on average 200 days, indicating that the chance of an immediate sell-off aftermarket was high. Similarly, Baron (1982) and Rock (1986) argued that due to the asymmetric information distribution among issuers, underwriters and investors, lengthy time gaps between offering and listing might occur, leading to increases in the investors' risk and low levels of long term returns.

We can conclude therefore, that the larger the time gap, the longer the time of flotation, the lower will be the long term returns and consequently the more uncertainty is associated with the offer.

Hypothesis 3: It is assumed that long period of waiting for a firm to go public, will result in a negative long-run performance.

Ownership structure (Privatizations)

Since the late 1970s, the transformation of formerly state-owned-enterprises (SOEs) has provided another important source to the study of IPOs. For instance, the privatization of SOEs was a key element of Margaret Thatcher's economic strategy for the United Kingdom in the early 1980s, giving out significant results to the British economy. Following that, Huang and Levich, (1998) argue that privatization contributes for the purposes of value maximization of IPOs and increases the gross proceeds of the firms involved.

Moreover, Hensler *et al.* (2000) in their study on the long-term performance of Mexican IPOs, argue that privatized IPOs might be motivated by various non-market incentives, relative to competitive market issues and they conclude that the Mexican privatization program yielded high initial returns, especially for banking IPOs, whereas its long-term results proved to be promising as well.

Additionally, Perotti and Guney (2001) claim that underpricing of private-owned firms is greater than privatizations, since the proceeds of the privatized companies will go to the government instead of firms. On the other hand, they support the view that public enterprises are managed poorly and the main objective of privatization is to increase the profitability and productivity of these firms. Therefore, better performance is expected in the long term after the privatization process.

Hypothesis 4: IPOs issued by state (privatizations), perform significantly better in the long-run.

Issue size

The size of an IPO can be used as a proxy variable for *ex ante* uncertainty about the *ex post* value of IPOs. Keloharju (1993), in his research on the pricing of Finnish IPO, concludes, that small firms depict negative abnormal performance, whereas medium & large sized firms have positive abnormal returns. Khurshed et al (2006) report that the larger firms perform better in the long run. This result is similar to Levis (1993) conclusions. Moreover, Bildik and Yilmaz (2007) point out that larger firms are expected to have lower uncertainty than smaller ones and as a result better long-run performance.

Hypothesis 5: There is positive relationship between the size of a firm at the going public period and its long-term performance.

Demand Multiple (Magnitude of issue oversubscription)

Several of the existing theoretical models have been formulated with regards to the "oversubscription" variable and its characteristics. Aggarwal *et al* (2003) report large oversubscription in all cases where investors are aware on the quality of the issuing company. They point out that high-demand of IPOs would not only exhibit relatively higher returns during the first trading days, but also continue to outperform in the long-run.

McGuinness (1993) also posits the speculative bubble hypothesis as an alternative perspective of explaining the post-listing return behaviour of IPOs. When investors do not behave rationally, they could over -or under- react to the information about IPO prospects and they can temporarily over -or under- value the price of the initial offerings. As a result, investors' demand will be high in the short-run, leading to positive returns; while in the long-term negative outcomes will be expected. This is because the IPO prices tend to receive the fair value in the long-run as investors have fully evaluated the real value of IPOs.

Hypothesis 6: The relation between oversubscription and long-term performance of IPOs is expected to be negative

Underwriters' reputation

Another size benchmark that is used to categorize the IPOs sample is the underwriters' reputation. Most of the theoretical studies, with regards to long term performance of IPOs and the role of underwriters' during the going public period, concentrate on asymmetric information and their effects on the stock price performance. Baron (1982) argues that asymmetric information exists between the better-informed underwriters and the less informed issuers, therefore underwriters are able to price new issues below the market equilibrium to reduce the probability that they will absorb losses due to unsold shares.

Following that, Logue (1973) and Beatty and Ritter (1996) were among the first that developed the model for measuring underwriter reputation, indicating proxies for signifying it. Michaely and Shaw (1994) find that IPOs managed by high prestige investment bankers tend to have smaller initial returns and less negative long-run returns than do IPOs handled by lower reputation underwriters.

Consistently, Carter *et al.*, (1998) point out that the underperformance of the IPOs, for the three-year holding period, is less severe for those that are managed by significantly reputable underwriters, using in their research the Carter-Manaster (CM) measure of performance. They also claim that big financial providers, such as Merrill-Lynch and Rooney Pace, are evaluated under the CM and MW (Megginson-Weiss) measures, indicating that the long-run market-adjusted returns of Merrill-Lynch, for their managed IPOs, were up to -19.41% against the -78.35% of Rooney-Pace. It is easy to conclude therefore, that reputable underwriters are able to help the issuer to get a higher price for its shares, earning as a consequence, more money from the IPO. As a result the rate of returns for the investors will be lower because the listing price is set near to the fair one by the prestigious underwriters.

We consider, five major Greek banks as the most prestigious in the Greek market, taking into consideration their operational years and their number of underwritings (ranged between 20 and 47 or the 62% of the total) during the period under consideration (1994-2002). These are, National Bank of Greece, Commercial Bank of Greece, Alpha Bank, EFG Eurobank and Piraeus Bank.

Hypothesis 7: There is a positive relationship between underwriters' reputation and good long-term performance.

Flat, Upward or Downward Phase of the Market (Flat, Hot or Cold Period)

There is some evidence in the literature that points out the effect of the phase of the market on the long-run performance of newly listed firms. Bildic and Kiyamaz (2007) report that IPOs, which go public in hot market periods, are expected to offer larger returns in the first few trading days comparing with the IPOs listed on cold periods. The prices of hot market IPOs reverse in the long term as a result of change in beliefs of investors who realize much optimism that is attributed to the new issues under the hot market conditions after sometime following the IPO. This reversion in prices relative to the market generates underperformance of IPOs made on hot market. On the other hand, cold market IPOs, which might have lower initial returns due to weaker interest of investors, keep their expectations for outperformance in the long-run.

Krigman *et al.* (1999) argue that first-day winners continue to be winners over the first year, and first day losers continue to be loser. An exception is the extra-hot IPOs, which are severely underpriced, and provide the worst future performance since large informed investors sell shares on the first trading day. Thus, sales of insiders indicate long-run negative performance. Schuster (2003) points out that some IPOs are issued in 'hot' markets when long term expectations are low and the general level of the stock market is decreasing, while other IPOs are issued in 'cold' markets when long term returns are better and the general stock market level is stable or declining.

Hypothesis 8: Hot period IPOs are associated with high negative long-term returns. Additionally cold period IPOs are associated with better (positive or less negative) returns in the long run.

Ownership concentration

A number of studies point out a significant high correlation between long-term returns and ownership concentration. Consistent to the agency theory, Leland and Pyle (1977) predict that the current value of a firm depends on the proportion of the equity retained by the entrepreneurs in the firm. They assume that by retaining a significant ownership stake in the firm, entrepreneurs can signal project quality. IPOs with greater insider ownership should have better long-run performance.

Allen and Faulhaber (1989) report that the public can see the best information about a company's future prospects by the fraction of shares retained by owners after the IPO. Hansen and Torregrosa (1992) extend the study and find direct relationship between the proportion of shares retained by owners and the long term returns. Jain and Kini (1994) argue that the long-run underperformance can be partly explained by the worsening managerial incentives following the IPO. Field (1995) shows that IPOs with large institutional shareholdings significantly outperform those with low level of shareholdings by institutional investors. In addition, if the investor sentiment is an important factor in the long-term underperformance of IPOs, small IPOs may be more affected.

Hypothesis 9: The higher the percentage of shares retained by the founders of the issuing firms, the more positive will be the long-term IPO returns.

Having introduced the working hypothesis, we now present the empirical model used for the econometric analysis:

$$P_t = a + \beta_1 (\text{LBC}) + \beta_2 (\text{AGE}) + \beta_3 (\text{TLAG}) + \beta_4 (\text{PRIV}) + \beta_5 (\text{SIZE}) + \beta_6 (\text{OVER}) + \beta_7 (\text{UR}) + \beta_8 (\text{FDV}) + \beta_9 (\text{HDV}) + \beta_{10} (\text{CDV}) + \beta_{11} (\text{OC}) + \varepsilon_i \quad (1)$$

where $t = 12, 24$ and 36 months respectively and $\varepsilon_i =$ error term

Before we will proceed in testing we search the correlation between the independent variables. The Pearson Correlation matrix in Table 17 suggests that no multi-collinearity problem exists among the control variables in this study.

Table 17

Pearson Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10	11
1.LBC	1										
2.AGE	-0.189**	1									
3.TLAG	-0.072	-0.113	1								
4.PRIV	-0.213**	0.164**	-0.063	1							
5.SIZE	-0.301**	0.257**	-0.229**	0.259**	1						
6.OVER	0.241**	0.008	-0.021	-0.119	-0.099	1					
7.UR	0.053	-0.130*	-0.031	-0.029	-0.301**	-0.099	1				
8.FDV	-0.221**	-0.010	-0.304**	-0.100	-0.349**	-0.185**	0.137	1			
9.HDV	0.074	0.051	-0.094	0.040	0.119	0.378**	-0.165**	-0.454**	1		
10.CDV	0.150*	-0.034	0.385**	-0.136*	0.233**	0.172**	-0.016	0.487**	0.491**	1	
11.RO	0.350**	0.012	-0.240**	0.240**	-0.043	0.178**	-0.023	-0.285**	0.114	0.170**	1

5.2. Empirical Results

In our effort to investigate possible explanations for the long run underperformance of IPOs we run a series of multiple regression models, using the long term returns as dependent variables for one, two or three years after going public. The results of the OLS estimations can be found in Tables 18 and 19.

5.2.1. A Regression analysis of raw long-term returns from offer price day

The first set of regressions tests the raw long-term returns from the offer price day until the end of first, second and third year of trading in the Athens Stock Exchange. The findings (Table 18) indicate that the variables, Size, Privatization and all dummies concerning the state of the market (flat, hot or cold period) are statistically significant for all the years that were examined, while oversubscription is significant for the second and third year, Tlag is significant for the first and third year and ownership concentration and classification of the market are significant only in the period of three years.

Specifically the result for listing board classification variable is statistically significant in the long run and confirms the positive returns taken for those IPOs listed in the Parallel and New market of ASE. This result is in line with what was found in section 4 of this paper (descriptive statistics analysis) but it is opposite to our theoretical hypothesis.

The second variable, which seems to affect the long-term IPO returns, is the time lag or the period of time between the listing date of an IPO and the period of its public offering. The negative sign confirms our hypothesis that the larger the time gap the lower will be the long term returns as more uncertainty is associated with the offer.

Study on the companies partially or fully owned by the Greek state before going public reveals significantly better long-term returns in comparison with firms totally owned by individuals. Our finding is consistent with the positive hypothesised sign supporting the general idea that state's involvement in firms' ownership brings higher stock valuation in the future for such kind of firms.

The result for 'size' contradicts with the rationale, revealing positive relationship between small firms and raw long-term returns but on the other hand it corroborates the statistical findings of section 4. The findings opposes with evidence reported for neighborhood Istanbul Stock Exchange by Bildik and Yilmaz (2007) as well as with a series of studies, which suggest that investing in large IPOs offer more secure return in the long term. Investigation on the long-term returns by small firm reveals that good pricing by the underwriters during the offer price period and high level of underpricing in the immediate aftermarket creates loyal investors who contribute in the good long-term IPO performance.

Turning to oversubscription we observe that there is no specific significance for one-year raw long-term returns. The positive sign confuses us as it opposes the hypothesis for high long term returns on IPOs with low demand multiple during the pre-listing period. Though, there is a total turnaround for longer periods of holding stocks. We find that oversubscription is significantly related to 2 and 3 years long-term returns with the expected sign indicating that IPOs with low demand during the subscription period experience better returns in the long term. In this case our results are similar to McGuinness (1993) so we conclude that high investor demand in the short-run, may lead to negative long-term outcomes.

The sixth variable, which significantly explains long-term returns, is the classification of IPOs according to the state of the market (Flat/Hot/Cold Period) that they were listed in ASE. The results show high significance of the variable with raw long-term returns for 12, 24 and 36 months. The positive sign is opposite to our hypothesis concerning the 'Hot Period' IPOs, indicating that these IPOs offer better returns to the long-term oriented investors and is in line with our hypothesis concerning the 'Cold Period' IPOs, which offer worse returns in the long run (positive relation). The last result affirms the statistical findings of section 4 and also supports the Krigman *et al.* (1999) proposition that first-day winners continue to be winners over the first year, and first day losers continue to be loser.

The final variable with significant result is the ownership concentration by pre-listed shareholders. Results on the IPOs raw long-term performance for 1 and 2 year after going public do not reveal any significance. The coefficient is positive as hypothesized revealing that in firms where pre-IPO shareholders signal loyalty to the firm we expect better long-term returns. Everything changes in the three-year buy and hold period where significance appears. We can see from this finding that the pre-IPO shareholders decision to keep their capital remains a signal to the investors in a far long term and influence the performance of the firm.

The remaining two variables and specifically the age of firms going public and underwriters' reputations, do not provide any signal relating the long-term performance of newly listed firms in the stock exchange.

5.2.2. Regression analysis of Adjusted long-term returns from offer price day

In the previous section we looked on the raw long-term returns from offer price day. In this second section we focus on the long term adjusted returns from offer price day. Specifically we highlight the main differences that the adoption of general index can bring to our results. As it seems there are not many differences in relation with the statistically significant factors. The differences are focused on the range of factors' significance in the three-year period under consideration.

Analytically, study of 'size' reveals that small IPOs have significantly better long-term adjusted returns. This result is similar with the one reported in raw returns case and contradicts with the hypothesis, which predicts better long-term performance for large IPOs. The reasons for the exceptional performance of small IPOs can be the good pricing by underwriters, the high growth rate in the listing years and the promising investment plans for the future. Athens Stock Exchange has experienced the rapid growth of many small IPOs over the years during the period of our study and their transformation in market leaders into their local sector.

Turning to the period that firms decide to go public, we find that the adjusted long-term IPO returns are affected by the different phases of the market. The regression result is highly significant while the positive coefficient is inconsistent with the hypothesis for negative sign. It appears that the prices of hot market IPOs remain high as a result of the beliefs of investors who realize many opportunities for the new issues in the long-run. This increase in prices relative to the market generates overperformance in the long term of IPOs issued in hot market.

Similar to raw long-term returns case we find significance (with the correct negative sign) between the time lag (or the period of time between the listing date of an IPO and the period of its public offering) and the first-year and three year adjusted IPO return. Moreover, the ownership concentration variable exerts the same influence to the long-term IPO adjusted returns in a three-year period as those reported in raw returns case.

Moreover, the listing board classification variable is statistically significant in the long run (three-year period) and confirms the positive returns taken for those IPOs listed in the lower capitalisation markets (Parallel and New Market of ASE). The rest variables used in the analysis do not seem to affect the long-run adjusted returns, as it also proved in raw returns case. Also, a separate regression of these seven statistical significant variables on the three-year IPO returns affirms the impact that these factors exert on prices' formation in the long-run.

5.2.3. Regression analysis of Raw and Adjusted long-term returns from 1st day of trading

So far we have focused on the long-term returns from offer price day. In this section we study the returns from the closing of 1st day of trading and find out if there are any differences in the significance and the way that the variables used affect the returns in the secondary IPO market.

An interesting part of this study is the results of time lag variable. In both cases, raw and adjusted long-term, returns do not present any significance in one and two years buy and hold periods from the end of 1st day of trading. Everything seems to change in the third holding year for the where the high statistical significance indicate that short period in waiting to go public is an indication for good adjusted returns. Any delay in the start trading decision after the completion of the shares allocation may cause damage in the

Table 18: Results of multivariate regression analysis of cross sectional variation in Raw and Adjusted Long term returns as dependent variables in comparison with offer day price for IPOs listed on ASE over the 1994-2002 period

(1) LBC, IPOs are classified among three markets. We insert the value '1' if listed in Main Market, and '2' if listed in Parallel or New Market (2) AGE, The age of the issuing firm. The age has been calculated as the number of years that each listing firm is in operation since its constitution. (3) TLAG, Time lag between the last date of public offering period and first day of stocks' listing in the stock market. (4) PRIV, Companies partially or fully owned by the Greek state before going public get the value '1' and private companies get the value '0' (5) Size, the logarithm of the total market capitalisation of IPO (6) OVER, demand multiple on the number of shares issued, (7) UR, Underwriters reputation: '1' for reputable underwriters and '0' for non reputable, (8) FDV, IPOs listed in the flat Period (1994-1996) get the value '1' and IPOs listed later get the value '0', (9) HDV, IPOs listed in the Hot Period (1997-1999) get the value '1' and IPOs listed in other time get the value '0' (10) CDV, IPOs listed in the Cold Period (2000-2002) get the value '1' and IPOs listed in other time get the value '0' (11) OC, proportion retained ownership by the pro listing shareholders, (12) R1Y, Raw returns from offer price day to 1 year after going public (13) R2Y, Raw returns from offer price day to 2 years after going public, (14) R3Y, Raw returns from offer price day to 3 years after going public (15) ER1Y, Adjusted returns from offer price day to 1 year after going public (16) ER2Y, Adjusted returns from offer price day to 2 years after going public (17) ER3Y, Adjusted returns from offer price day to 3 years after going public (18) *** Significant at the one per cent level. **Significant at the five per cent level. *Significant at the ten per cent level. t-statistics are robust for heteroskedasticity using the White (1980) process

Specifications	(1) R1Y	(2) R2Y	(3) R3Y	(4) ER1Y	(5) ER2Y	(6) ER3Y
LBC	2.51 (0.927)	-21.18 (-0.37)	138.37 (2.06)**	9.40 (0.37)	-14.23 (-0.27)	124.47 (1.97)**
AGE	0.91 (0.93)	1.38 (1.09)	-1.19 (-0.71)	0.71 (0.78)	1.42 (1.24)	-1.19 (-0.77)
TLAG	-2.70 (-1.79)***	-1.08 (-0.70)	-7.75 (-2.54)**	-2.79 (-2.02)**	-1.69 (-1.02)	-7.44 (-2.67)***
PRIV	119.26 (2.63)***	108.34 (1.82)*	189.45 (1.90)*	109.63 (2.55)**	85.56 (1.86)*	141.60 (1.52)
SIZE	-61.41 (-3.96)***	-88.41 (-3.03)***	-74.99 (-2.80)**	-52.35 (-3.58)***	-70.44 (-2.62)***	-55.88 (-2.23)**
OVER	0.09 (0.98)	-0.22 (-1.72)*	-0.50 (-2.32)**	0.15 (1.57)	-0.08 (-0.94)	-0.29 (-1.75)*
UR	14.04 (0.42)	9.02 (0.20)	-31.48 (-0.37)	12.31 (0.38)	-0.22 (-0.00)	-42.88 (-0.54)
FDV	1028.27 (3.96)***	1422.25 (2.51)**	1060.51 (1.9109)*	891.93 (3.68)***	1145.39 (2.20)**	709.97 (1.33)
HDV	1344.14 (4.51)***	1745.94 (2.74)**	978.04 (1.80)*	1154.80 (4.13)***	1427.72 (2.44)**	723.63 (1.38)
CDV	1019.88 (3.67)***	1422.25 (2.31)**	667.24 (2.43)**	910.72 (3.51)***	1196.39 (2.13)**	448.07 (0.93)
OC	0.17 (0.15)	0.56 (0.29)	6.69 (2.43)**	-0.06 (-0.05)	0.13 (0.08)	5.51 (1.99)**
Adj. R ²	0.28	0.25	0.15	0.24	0.19	0.11
No. of IPOs	253	246	241	253	246	241

Table 19: Results of multivariate regression analysis of cross sectional variation with Raw and Adjusted Long term returns as dependent variables in comparison with the end of 1st day of trading price for IPOs listed on ASE over the 1994-2002 period

(1) LBC, IPOs are classified among three markets. We insert the value '1' if listed in Main Market, and '2' if listed in Parallel or New Market (2) AGE, The age of the issuing firm. The age has been calculated as the number of years that each listing firm is in operation since its constitution. (3) TLAG, Time lag between the last date of public offering period and first day of stocks' listing in the stock market. (4) PRIV, Companies partially or fully owned by the Greek state before going public get the value '1' and private companies get the value '0' (5) Size, the logarithm of the total market capitalisation of IPO (6) OVER, demand multiple on the number of shares issued, (7) UR, Underwriters reputation: '1' for reputable underwriters and '0' for non reputable, (8) FDV, IPOs listed in the flat Period (1994-1996) get the value '1' and IPOs listed later get the value '0', (9) HDV, IPOs listed in the Hot Period (1997-1999) get the value '1' and IPOs listed in other time get the value '0' (10) CDV, IPOs listed in the Cold Period (2000-2002) get the value '1' and IPOs listed in other time get the value '0' (11) OC, proportion retained ownership by the pro listing shareholders, (12) R1Y, Raw returns from offer price day to 1 year after going public (13) R2Y, Raw returns from offer price day to 2 years after going public, (14) R3Y, Raw returns from offer price day to 3 years after going public (15) ER1Y, Adjusted returns from offer price day to 1 year after going public (16) ER2Y, Adjusted returns from offer price day to 2 years after going public (17) ER3Y, Adjusted returns from offer price day to 3 years after going public (18) *** Significant at the one per cent level. **Significant at the five per cent level. *Significant at the ten per cent level. t-statistics are robust for heteroskedasticity using the White (1980) process

Specifications	(1) R1Y1D	(2) R2Y1D	(3) R3Y1D	(4) ER1Y1D	(5) ER2Y1D	(6) ER3Y1D
LBC	-2.12 (-0.12)	-27.39 (-0.57)	117.49 (1.93)*	6.41 (0.40)	-19.05 (-0.44)	106.30 (1.86)*
AGE	0.62 (1.05)	0.81 (0.93)	-1.19 (-0.82)	0.38 (0.78)	0.81 (1.09)	-1.20 (-0.92)
TLAG	-1.93 (-1.69)	-1.18 (-1.17)	-7.29 (-2.62)***	-1.92 (-1.87)*	-1.68 (-1.79)*	-6.92 (-2.72)***
PRIV	60.56 (2.09)**	80.45 (1.82)*	161.81 (1.78)*	47.78 (1.86)*	54.57 (1.75)*	112.40 (1.32)
SIZE	-36.48 (-3.89)***	-62.43 (-2.64)***	-62.13 (-2.59)**	-26.97 (-3.18)***	-44.00 (-2.08)**	-43.33 (-1.93)*
OVER	-0.02 (-0.34)	-0.23 (-2.02)***	-0.50 (-2.43)***	0.04 (0.84)	-0.10 (-1.37)	-0.29 (-1.84)*
UR	9.90 (0.46)	-4.80 (-0.14)	-42.99 (-0.57)	7.69 (0.39)	-14.47 (-0.47)	-54.62 (-0.76)
FDV	619.19 (0.46)	999.01 (2.30)***	912.88 (1.82)*	470.07 (3.43)***	710.04 (1.76)*	560.66 (1.15)
HDV	763.84 (4.36)***	1165.53 (2.30)***	758.39 (1.55)	575.37 (3.68)***	848.50 (1.88)*	519.03 (1.08)
CDV	574.73 (3.47)***	956.92 (1.95)*	529.76 (1.10)	455.99 (3.12)***	722.85 (1.65)	356.61 (0.75)
OC	0.43 (0.62)	1.23 (0.95)	6.03 (2.35)***	0.16 (0.27)	0.73 (0.71)	4.76 (1.83)*
Adj. R ²	0.21	0.21	0.15	0.13	0.13	0.10
No. of IPOs	253	246	253	253	246	241

long-term performance of the IPO as it signals that management is not ready for this big step in firms' history.

The first variable in this set of regressions with significant results in the three-year period of the study is the size of initial public offerings. This finding is opposite to our hypothesis revealing that small firms offer better long-term returns in a range between one to three years. It does not appear any constraint in the results from the fact that the first day of trading has been excluded. The last remark reveals how powerful variable is the size of the IPO and the potential that small firms have got after reaching a list in the stock market.

A factor that proves to affect the newly listed firms' long term returns from the end of the first day of trading is the condition of the market during the period of an IPOs' operation. We distribute all the firms into hot, cold and flat periods based on the timing they chose to go public. The findings show that 'hot' IPOs have significantly better raw and adjusted long-term returns. Positive sign indicates that IPO issuers should be very careful with the timing of the listing and they should decide to go public only when bullish periods are prevailed in the market.

This last finding raises the following question. Is there a difference between low and high-oversubscribed IPOs? To answer this question we introduce and test the demand multiple of all the IPOs that were listed in the A.S.E. during the period of our study. Regression statistics show that there is no significance for year one raw and adjusted results. On the other hand there are significant findings for a holding period of two and three years from 1st day of trading indicating that low oversubscribed IPOs experience better long-term returns. The rationale behind the good long term returns for low oversubscribed IPOs is the low offer price the underwriters decide to apply in order to be in the safe side of full subscription and the efforts of the management to make the firms attractive to future investors by implementing promising investment plans.

As Table 19 reveals, the results confirm those found in primary IPO market case as they give similar findings as far as the statistical significance of the examined variables is concerned. Specifically, listing board classification, time lag, ownership structure, size, demand multiple, ownership concentration and market condition variables are accounted for good long-term IPO performance in the secondary IPO market (investors buy new listings not at their listing price but at the end of the first trading day and hold them in the long-run). In contrast, the age of the IPOs and underwriters' reputation do not provide explanations for the good long-term returns of IPOs in the secondary market.

6. Conclusion

This study aims to examine the performance of IPOs in the Greek stock market by providing additional evidence from a small-developed market and also to scrutinize the factors that might be effective on the performance of IPOs. Specifically, using a sample of 254 IPOs launched on the Athens Stock Exchange over the 1994-2002 period, this study documents an average adjusted first day return of 29.26%. The results of the study reveal that IPOs listed in the Greek market continue to outperform on a number of relevant benchmarks, in the 12 and 24 months holding period following their listing in the market. On average, the Greek IPOs were outperforming their market benchmark by 40.82%, and 13.49%, after one and two years and were underperforming by -1.24% after three years of listing correspondingly. These rates of returns are considered very interesting, as they are quite higher than those found for other markets.

In particular, according to the existing literature, the long-run IPO returns recorded in other capital markets were either slightly positive or negative (mainly) in the long-run. On the other hand, underperformance is higher when we record from the end of the first day of trading. The returns for investors who follow a strategy of investing in IPOs at the end of the first day of public trading and holding them for one year is reduced to 15.71% while investors start registering negative returns after the two and three-year holding time period (-8.09% and -31.43% respectively).

Furthermore, in order to detect the long-run performance phenomenon a more meticulous study was initiated. The IPOs were classified under different characteristics, as discussed in the methodology part, and their significance was examined. Regression statistics searching the possible explanations for the performance of IPOs reveals that all the factors used for this purpose are, more or less, effective on the post-issue performance of stocks.

Results show positive relationship between IPOs launched in the parallel and new market and their long run returns and negative relationship between large firms launched in the stock market and their returns in the long run. Findings show positive relationship between IPOs listed in hot market period and their future returns. Ownership concentration is a positive signal for investors to participate in new listings and significantly affects their returns in a three-year period. Surprisingly, there is no evidence for the fraction of ownership concentration and the 12 and 24 months holding period.

One more variable that becomes powerful over the years, is the demand multiple. Despite the insignificant results in holding IPOs for 12 months, our findings indicate that significance appears for low oversubscribed IPOs in 2 and 3 years after going public. High levels of investor demand initially lead to negative aftermarket performance. This is caused because it can be assumed that investors were not informed sufficiently during the first trading months and as a result they overvalued the price of the offerings.

Overall, the results of the multivariate regressions concerning the long-run IPO performance revealed that “listing board classification”, “tlag”, “ownership category”, “demand multiple” and “ownership concentration” variables were statistically significant and consistent with the coefficients predicted in the hypotheses. On the other hand, the variables of “issue size” and “condition of the market at listing time” were statistically significant but not consistent with the predicted sign.

To understand the Greek IPO market in depth, further study should be implemented on the issue, focusing mainly on the variables that affect its performance. It would be advisable to suggest that a reduction in the time gap between the offering and the listing days of IPOs, better investor protection and improvement in companies’ disclosure and market efficiency are salient considerations for the future development of the Greek stock exchange market.

The question that remains is how Greek case differentiates from many markets and provides positive (up to 2 ½ years) long-term returns to its investors. One interpretation might be the lower information asymmetry comparing with other cases causing the market to be pragmatic about the initial public offerings. This finding contradicts with Ritter’s view (1991) that investors pay too much in the immediate aftermarket period for an IPO and then discover their “mistake” in the following years. Another interpretation might be the ability of managers to judge the suitable timing for IPO listing by observing the willingness of the market to pay too much for their stocks. Negative three-year returns for those IPOs listed in the hot market period support this argument.

References

- Aggarwal, R. Leal, and L. Hernandez, 'Activities by underwriters performance of Initial public offerings Latin America', *Financial Management*, Vol. 22, 1993, pp. 42-53.
- Aggarwal, R., and L. Klapper, 'Ownership structure and IPOs', World Bank Policy *Working Paper*, 2003, No 3103
- Aggarwal, R., and P. Rivoli, 'Evaluating the costs of raising capital through an initial public offering', *Journal of Business Venturing*, Vol. 6, 1990, pp. 351-361.
- Ahmad-Zaluki, N., K. Campbell, and A. Goodacre, 'The long run share price performance of Malaysian Initial Public Offerings', *Journal of Business Finance and Accounting*, Vol. 34, 2004, pp. 78-110.
- Allen, D., N. Morkel-Kingsbury, and W. Piboonthanakiat, 'The long-run performance of initial public offerings in Thailand', *Applied Financial Economics*, 1999, Vol. 9, pp. 215-232
- Allen, D., and M. Patrick, 'Some Further Australian Evidence on the Long-Run Performance of Initial Public Offerings: 1974-1984', *Advances in Pacific Basin Financial Markets*, Vol. 2A, 1996, pp. 133-155.
- Allen, F., and G. Faulhaber, 'Signaling by underpricing in the IPO market', *Journal of Financial Economics*, Vol. 23, 1989, pp. 303-323.
- Alvarez, S., and V. Gonzalez, 'Long run performance of initial public offerings (IPOs) in the Spanish capital market', 2001, European Financial Management Association (Lugano).
- Arosio, R., G. Guidici, and S. Paleari, 2000, 'What drives the initial market performance of Italian IPOs? An empirical investigation on underpricing and price support', *Working Paper* (University of Bergamo, 2000).
- Barber, B., and J. Lyon, 'Detecting long-run abnormal stock returns: The empirical power and specification of test statistics', *Journal of Financial Economics*, Vol. 43, 1997, pp. 341-372.
- Baron, D., 'A model of the demand for investment banking advising and distribution services for new issues', *Journal of Finance*, Vol. 37, 1982, pp. 955-976.
- Beatty, R., and J. Ritter, 'Investment banking, reputation, and the underpricing of initial public offerings', *Journal of Financial Economics*, Vol. 15, 1986, pp. 213-232.
- Beatty, R., and I. Welch, 'Issuer expenses and legal liability in Initial Public Offerings', *Journal of Law and Economics*, Vol. 34, 1996, pp. 542-602.
- Bildik, R., and M. Yilmaz, 2007, 'The market performance of Initial Public Offerings in the Istanbul Stock Exchange', *Working paper* (Istanbul Stock Exchange)
- Brav, A., 'Interference in long-horizon event studies: A Bayesian approach with applications to initial public offerings', *Journal of Finance*, Vol. 55, 2000, pp. 1979-2016.
- Brounen, D., and P. Eichholtz, 'Initial Public Offerings: Evidence from the British, French & Swedish property share markets', *Journal of Real Estate Finance & Economics*, Vol. 24, 2002, pp. 103-117.
- Carter, B., F. Dark, and R. Singh, 'Underwriter reputation, initial returns, and the long run performance of IPO stocks', *Journal of Finance*, Vol. 53, 1998, pp. 285-311.
- Chen, G., M. Firth, and G. Krishnan, 'Earnings forecast errors in IPO prospectuses and their associations with initial stock returns', *Journal of Multinational Financial Management*, Vol. 11, 2001, pp. 225-240.
- Cheng, S., and C. Shiu, 'Examination the Long-Run Performance of Taiwanese Initial Public Offerings', *Information and Management Sciences*, Vol 16, 2005, pp. 17-34.
- Drobtz, W., M. Kammermann, and U. Waelchli, 2003, 'Performance of Initial Public Offerings: The evidence from Switzerland', *Working Paper*, (University of Pennsylvania-Wharton Business School, 2003).
- Emery, D., and J. Finnerty, 1997, 'Risk and returns: Financial Securities', in Prentice-Hall, ed.: *Corporate Financial Management*.
- Espenlaub, S., A. Gregory, and I. Tonks, 'Testing the Robustness of Long-Term Under-Performance of UK Initial Public Offerings', 1998, *European Financial Management*, Vol 6, 2000,.

- Field, L., 'Is institutional investment in initial public offerings related to long run performance of these firms?', *Working paper*, (UCLA, 1995).
- Hansen, R., and P. Torregrosa, 'Underwriter compensation and corporate monitoring', *Journal of Finance*, Vol. 47, 1992, pp. 1537-1555.
- Hensler, D., M. Herrera, and L. Lockwood, 'The performance of initial public offerings in the Mexican stock market', 1987-1993, *Journal of International Money and Finance*, 2000, Vol. 19, pp. 93-116.
- Huang, K., and Levich. R., 'Underpricing of new equity offerings by privatised firms: an international test', *Working Paper*, (New York University, 1998).
- Ibbotson, R., 'Price performance of common stock new issues', *Journal of Financial Economics*', Vol. 2, 1975, pp. 235-272.
- Jain, B., 'The underpricing of 'unit' initial public offerings', *The Quarterly Review of Economics and Finance*, Vol. 34, 1994, pp. 309-325.
- Jakobsen, J., and O. Sorensen, 'Decomposing and testing Long-Run returns - with an application to Initial Public Offerings in Denmark', *Working paper*, (Copenhagen Business School, 1999).
- Kahneman, D., and A. Tversky, 'Advances in prospect theory: Cumulative representation of uncertainty', *Journal of Risk and Uncertainty*, Vol. 5, 1992, pp. 297-323.
- Keloharju, M., 'The winner's curse, legal liability, and the long-run price performance of initial public offerings in Finland', *Journal of Financial Economics*, Vol. 34, 1993, pp. 251-277.
- Kenourgios, D., S. Papathanasiou and E. Melas, 'Initial performance of Greek IPOs, underwriter's reputation and oversubscription', *Managerial Finance*, Vol. 33, 2007, pp. 332-343
- Khurshed, A., R. Mudambi, and M. Goergen, 'The Long Run Performance of IPOs: can it be predicted', *Managerial Finance*, 2007, pp. 401-419
- Kiyamaz, H., 'Long run performance of IPOs: Case of Istanbul Stock Exchange', Working paper, (University of Houston, 2000).
- Kooli, M., and J. Suret, 'The underpricing of initial public offerings: Further Canadian Evidence', *Working Paper*, (University of Laval, 2001).
- Kooli, M., and J. Suret, 'The aftermarket performance of Initial Public Offerings in Canada', *Working Paper*, (University of Laval, 2001).
- Krigman, L., W. Shaw, and K. Womack, 'The persistence of IPO mispricing and the predictive power of flipping', *Journal of Finance*, Vol. 54, 1999, pp. 1015-1044.
- Kunz, M., and R. Aggarwal, 'Why initial public offerings are underpriced: evidence from Switzerland', *Journal of Banking & Finance*, Vol. 18, 1994, pp. 705-723.
- Lee, Philip J., Stephen L. Taylor, and Terry S. Walter, 'Australian IPO pricing in the short and long-run', *Journal of Banking & Finance*, Vol. 20, 1996, pp. 1189-1210.
- Leleux, B., and D. Muzyka, 'The Demise of European IPO Market: A Post Issue Performance Study', *Working paper*, (Insead, 1993).
- Levis, M., 'The long-run performance of IPOs: The UK experience 1980-1988', *Financial Management*, Vol. 22, 1993, pp. 28-41.
- Logue, D., 'On the pricing of the unseasoned equity issues: 1965-1969', *Journal of Financial and Quantitative Analysis*, Vol. 8, 1973, pp. 91-103.
- Loughran, T., and J. Ritter, 'The new issues puzzle', *Journal of Finance* 50, 1995, pp. 23-51.
- Loughran, T., J. Ritter, and K. Rydqvist, 'Initial public offerings: International insights', *Pacific-Basin Finance Journal*, Vol. 2, 1994, pp. 165-199.
- Lyn, E., and E. Zychowicz, 'The performance of new equity offerings in Hungary and Poland', *Global Finance Journal*, Vol. 14, 2003, pp. 181-195.
- Ma, T., and Y. Shen, 'Prospect Theory and the Long-Run Performance of IPO Stocks', *Working paper*, (University of Texas, Dallas, 2003)
- McGuinness, P., 'The Post-Listing Return Performance of Unseasoned Issues of Common Stock in Hong Kong', *Journal of Business Finance and Accounting*, Vol. 20, 1993, pp. 167-194.
- Michaely, R., and W. Shaw, 'The pricing of initial public offerings: tests of adverse-selection and signaling theories', *Review of Financial Studies*, Vol. 7, 1994, pp. 279-319

- Miller, R., 'Risk, Uncertainty and divergence of opinions', *Journal of Finance*, Vol. 32, 1977, pp 1151-1168.
- Mitchell, M., and E. Stafford, 'Managerial Decisions and Long-Term Stock Price Performance', *Journal of Business*, Vol. 73, 2000, pp. 287-329.
- Mok, H., and Y. Hui, 'Underpricing and aftermarket performance of IPOs in Shanghai', China, *Pacific-Basin Finance Journal*, Vol. 6, 1998, pp. 453-474.
- Morris, S., 'Speculative investor behavior and learning', *Quarterly Journal of Economics*, Vol. 111, 1996, pp. 1111-1133.
- Pagano, M., F. Panetta, and L. Zingales, 'Why do companies go public? An empirical analysis', *Journal of Finance*, Vol. 53, 1998, pp. 27-64.
- Papaioannou, G.J., and N.G. Travlos, 'The initial public offerings in Greece', *Multinational Finance Journal*, 2000, vol. 4, no. 1&2, pp. 1-4
- Papaioannou, N., and G. Travlos, 1995, 'New listings in the Athens Stock Exchange: A theoretical and empirical analysis. The Greek Financial System-Trends and Perspectives', *Foundation for Economic & Industrial Research – Alpha Bank* pp., 215-278.
- Perotti, E., and S. Gelfer, 'Red barons or robber barons? Governance and investment in Russian financial-industrial groups', *European Economic Review*, Vol. 45, 2001, pp. 1601-1617
- Rajan, F., and H. Sarvaes, Analyst following of initial public offering, *Journal of Finance* 52, 1997, pp. 507-529.
- Ritter, J., 'The hot issue market of 1980', *Journal of Business*, Vol. 57, 1984, pp. 215-240.
- Ritter, J., 'The long performance of Initial Public Offerings', *Journal of Finance*, Vol. 46, 1991, pp. 3-28.
- Rock, K., 'Why new issues are underpriced', *Journal of Financial Economics*, Vol. 15, 1986, pp. 187-212.
- Schlag, C., and A. Wodrich, 'Has There Always Been Underpricing and Long-Run Underperformance? - IPOs in Germany', *Center for Financial Studies*, 2005, NO 2000/12
- Schuster, J., 2003, 'IPOs insight from seven European countries', *Working paper*, (Financial Market Group, 2003)
- Stehle, R., O. Ehrhardt, and R. Przyborowsky, 'Long-run stock performance of German initial public offerings and seasoned equity issues', *European Financial Management*, Vol. 6, 2000, pp. 173-196
- Teoh, H., I. Welch, and T. Wong, 'Earning management and the long-term market performance of initial public offerings', *Journal of Finance*, Vol. 53, 1998, pp. 421-449.
- Tsangarakis, N., 'The price performance of Initial Public Offerings in Greece', *Managerial Finance*, Vol 30, 2004, pp. 26-44
- Wethyavivorn, K., and Y. Koo-Smith, 'Initial public offerings in Thailand', 1988-89: Price and return patterns, in S.G. Rhee and R.P. Chang, eds, *Pacific-Basin Capital Markets Research 2*, 1991.
- White, H., 'Heteroskedasticity-consistent covariance matrix estimator and a direct test of heteroskedasticity', *Econometrica*, Vol. 48, 1980, pp. 817-838.
- Yong, O., 'Initial Public Offerings: the Malaysian Experience:1990-1994', *Advances in Pacific Basin Financial Markets*, Vol. 3, 1997, pp. 313-328.

