JOURNAL OF EUROPEAN ECONOMY
Vol. 4 (№ 2). June 2005
Publication of Ternopil Academy of National Economy

Financial and Banking Services Market

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THE LONG-RUN PERFORMANCE OF GREEK INITIAL PUBLIC OFFERINGS

Abstract

This article examines the long run performance of initial public offerings (IPO's) in Greece, over the seven-year period of 1994–2000. After analyzing a sample of 176 IPO's, it was concluded that IPO's tend to outperform the market by 10,84% of cumulative market-adjusted return over the first three years from the listing day. The results are contradictory to empirical findings for many other developed markets. However, they are explained by such variables as initial returns, issue size and period and price volatility. Moreover, it was depicted that the «fads» hypothesis as well as the «windows of opportunity» and the «uncertainty and divergence of opinion» hypotheses can explain the long-term performance of the IPO's listed at the Athens Stock Exchange.

Key words

Initial public offerings, long-run performance, Greece.

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I. Introduction

Initial Public Offerings (IPO's) of common stock have been widely examined in the finance literature during the past two decades. However, academic interest in IPO's continues to exist. Numerous studies have documented the IPO's underpricing phenomenon (For an overview see Loughran, Ritter and Rydqvist, 2003). This anomaly was found to be present in a variety of countries, including Greece (Glezakos and Gotzageorgis, 2005; Kazantzis and Levis, 1995 etc.). Several theoretical models, highlighting different aspects of the relationships between issuing firms, investors and underwriters, have been proposed to account for this unexpected initial price reaction. Most of these models can be used simultaneously, given that they are not mutually exclusive. They are mainly based on the information asymmetries which exist in our market, as a consequence of its nature, legislation in force and other institutional factors (Kazantzis and Levis, 1995; Glezakos and Gotzageorgis, 2005). Over the years, research emphasis has shifted towards explaining a different IPO's anomaly documented originally by Ritter (1991), who utilized a sample of 1,526 IPO's in the 1975-1984 period and found an average return of 34.37 per cent in the three years after going public, as opposed to a return of 61.86 per cent for 1,526 other firms, matched by industry and size over the same period. Ritter offered three possible explanations for this anomaly: (a) Biased risk measurement (b) Bad luck and (c) Fads or overoptimism. The latter was supported by his empirical findings.

The purpose of this study is to investigate the price behavior of unseasoned new listings in the Athens Stock Exchange (ASE) on a long-term basis. Being unresearched, the Greek market allows for an independent test of the most well known issues described in the US literature. Also, should the long-term over- or under-performance be observed, the questions concerning the efficiency of the Greek market would arise.

The remainder of this study is organized as follows: In Section II the previous literature on long-run performance and various theoretical explanations for anomaly stated above are discussed. Section III describes the sample, and Section IV presents the methodology used. The results of the empirical analysis are reported in Section V. Finally, the conclusions of the study are included brought forward in Section VI.

II. Literature Review

The early study of the IPO's long-term performance was conducted by Ibbotson (1975) who reported negative relationship between initial returns of the US IPO's and their long-run performance for the period of 1960-1969. He re-

ported the performance to be generally positive during the first year, but negative during the next three years. Within the later studies, Ritter (1991) analyzed the performance of the US IPO's issued between 1975 – 1984 and concluded that they underperformed the benchmark by about 27.49 per cent for three years since their launch. Later, Loughran and Ritter (1995) examined IPO's for the period of 1970 –1990 and found that their average rate of return was only 5 per cent per year for the five years after issuance, as against 12 per cent per for the firms of comparable size. It should be noted that most of the US studies involve overlapping time periods, and to a large extent, they report on the same IPO's. The new issue effect observed in the literature is robust, given that different methodologies lead to similar conclusions, including methods of controlling for a range of other variables. The observed underperformance was not limited to the United States stock markets. Levis (1993) examined the data FOR 712 UK IPO's issued in 1980-1988 and confirmed the existence of the long-run underperformance (8.10 per cent and 23 per cent, depending on the benchmark used). Recently, Espenlaub and Tonks (1998) re-examined the evidence on the long-run underperformance of UK IPO's applying the data for 1985-1995. Like Levis, they compared abnormal returns using a number of alternative benchmarks and confirmed that, in the long run, the IPO's underperformed the market. Ljungqvist (1997) showed that over the initial three years since their listing date, German IPO's underperformed the market by 12.10 per cent. Finn and Higham (1988) examined 93 Australian IPO's over 1966-1978 and found that one could earn 6.52 per cent less the indices by buying at the end of the listing month and holding to the end of the first year. The underperformance effect is not limited to the developed countries, but it is even stronger in the emerging markets. Aggarwal, Leal and Hernandez (1993) found that Brazilian IPO's had 47 per cent underperformance over the first three years. For Chile, the corresponding underperformance was 23.7 per cent, while Mexico's IPO's underperformance after the first year was 19.6 per cent. Dawson (1987) estimated the one-year IPO's market-adjusted returns in Hong Kong and Singapore (during the period of 1978-1984) to be 9.3 per cent and 2.7 per cent correspondingly. In contrast, a positive, statistically significant, over-performance of 18.2 per cent was observed in Malaysia. Also, in India, Shah (1995) found that the IPO's outperformed the market for the first 200 trading days. Finally, Kim, Krinsky and Lee (1995) in Korea concluded that the IPO companies outperformed the market by 2 per cent.

The existing variations in the magnitude of the observed long-term performance are explained, between others, by methodological reasons. For example, Ritter (1991) suggested that the selection of a benchmark portfolio, the length of the period over which the performance is measured, and the sample selection criteria should explain the differences in the observed performances. Sefcik and Thompson (1986), Brav and Gompers (1997), Barber and Lyon (1997) and Kothari and Warner (1997) among others, also argued that t-tests are mis-specified because of potential important violations of the underlying statistical assumptions. Brav Geczy and Gompers (1998) also questioned the underperformance of IPO's and found that the issuing firms performed similarly to the non-issuing ones, but the differences appear due to other factors, such as

the firm size. Dimson and Marsh (1986), Ritter (1991), Fama and French (1996), and Fama (1998) among others demonstrated that the measurement of the long run performance of the IPO's is sensitive to the benchmark employed therefore, imperfect benchmarks could be responsible for poor long-run returns.

Theoretical Explanations of the Long-Term Performance of IPO's

Aggarwal and Rivoli (1990) asserted that stock markets do not value effectively the new issues, at least for a time period after their listings. Thus, abnormal returns that ensue to IPO investors are the result of a temporary overvaluation in the early trading period. This is consistent with the ***fads hypothesis*** or the *impresario's hypothesis* (Shiller, 1990), which argues that the market for IPO's is subject to fads and that IPO's are underpriced by the investment bankers (the impresarios) to stimulate excess demand. This hypothesis suggests that the greater is the initial return, the greater is the degree of subsequent IPO's price correction.

Ritter (1991) introduced ***the windows of opportunity hypothesis*** to explain the aftermarket performance of IPO's. That is, when the new issue occurs in high volume periods, it is more likely to be overvalued than v. v. The testable implication of this hypothesis is that high volume periods should be associated with low long-term returns [Loughran and Ritter (1995) confirmed Ritter's hypothesis for US IPO's].

According to Miller (2000), the key fact is that investors' opinions differ about the valuation of securities («*the uncertainty and divergence of opinion hypothesis*»). This is not surprising, given the complexity of pricing a security. In particular, while there is general agreement among theoreticians that a security's value should be equal to the present value of all its future cash flows, a disagreement occurs about a proper discount rate, which, in turn, depends upon the perceived ex-ante risk. Therefore by, testing this hypothesis, it is expected to find negative correlation between the ex-ante uncertainty and the aftermarket performance.

III. The Sample

The original sample included 211 IPO's listed and traded at the Athens Stock Exchange between January 1994 and December 2000. Out of these 211 companies, 35 had to be excluded due to data availability reasons or to certain industry specifics[1]. Table 1, which presents the distribution of the IPO's in the sample over the seven-years period of 1994-2000, shows that 55.68 per cent of new issues occupy within the three most active years (1998, 1999, 2000). This result is consistent with the notion of the hot issues market (Ibbotson, 1975; Ritter, 1991).

The primary source of data is the «Annual Statistical Report 2001» of ASE, which reports offering dates, offering prices and issue sizes. Information concerning details for each particular offering was obtained from the data file of the Athens Stock Exchange. The source «Effect Financial Services» was also helpful in cross-checking the data. The age of the issuing firms at the time of the offering was obtained by contacting the companies in the sample. Finally, the time period between the establishment and the first trading day was defined as the age of the issuing company.

IV. The Methodology

Measurement of Returns

Three-year returns were calculated by assuming that each month includes 21 successive trading days. For IPO's that were delisted before their three-year anniversary, the three-year return ended with their last listing.

Daily returns were calculated by the following formula:

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100.$$

According to Brown and Warner (1985), the abnormal return (AR) was calculated by subtracting the market return (market-adjusted return):

$$AR_{jt} = R_{jt} - R_{mt},$$

where:

R_{jt} = the return on the stock of firm j on day t;

[1] Mainly financial companies.

R_{mt} = the return on the General Index and the Index of Parallel Market of the Athens Stock Exchange, which were used as benchmarks.

This approach implies that the beta for all new listings is 1, which is a simplifying (but widely used in the relevant empirical studies) assumption[2].

The average abnormal returns (AR) are then computed (for each security class) by the following equation:

$$AR_t = \frac{1}{n_t}\sum_{j=1}^{n_t} AR_{jt},$$

where n is the number of stocks in the sample on day t.

Additionally, the cumulative[3] abnormal return (CAR) from the start day, t_s, until the end day, t_e, is calculated as:

$$CAR_{j(t_e,t_s)} = \sum_{t=t_s}^{t_e} AR_{jt}.$$

In order to evaluate the statistical significance of CAR, we use cross-sectional t-statistics with standard errors from cross-section data of sample IPO's cumulative abnormal returns according to the following formula:

$$t-test = \frac{CAR_t}{\left(S.D._t / \sqrt{n}\right)}.$$

Alternatively, using cumulative returns, which implicitly assumes monthly portfolio rebalancing, the buy-and-hold abnormal return (*BAHAR*) from the start day, t_s, until the end day, t_e, is estimated within the following equation:

$$BAHAR_{(t_e,t_s)} = \left[\prod_{t=t_s}^{t_e}(1+R_{jt})-1\right] - \left[\prod_{t=t_s}^{t_e}(1+R_{mt})-1\right].$$

BAHAR measures total return for the buy-and-hold strategy, where a stock is purchased at closing price of the fifth trading day and held until its three-year anniversary or delisting.

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[2] For a discussion see Travlos, Trigeorgis and Vafeas (2001), Khurshed, Mudambi and Goergen (1999), Ritter (1991), Clarkson and Thompson (1990), Ibbotson (1975).

[3] When a firm is delisted from the benchmark, the portfolio return for the next month is an equally weighted average of the remaining firms in the portfolio. The cumulative market-adjusted return, thus, involves monthly rebalancing, with the proceeds of a delisted firm equally allocated among the surviving members of the portfolio in each subsequent month. For the month in which an IPO is delisted, the return for both the IPO and the benchmark includes the days until delisting.

To test the null hypothesis of BAHAR, the skewness-adjusted t-test was used [it was suggested by Neyman and Pearson (1928) and recently used by Lyon, Barber and Tsai (1999) and Kooli and Suret (2001)]:

$$t = \sqrt{n_t} \times \left(S + \frac{1}{3}\hat{\gamma}S^2 + \frac{1}{6n_t}\hat{\gamma} \right),$$

where: $S = \frac{BAHAR_t}{\left(\sigma_t / \sqrt{n_t}\right)}$, and $\hat{\gamma}$ is an estimate of the skewness coefficient.

Formation of the Validity Tests

The validity of the above mentioned *fads*, *windows of opportunity*, and *uncertainty and divergence of opinion* hypotheses (suggested to explain the long-term performance of IPO's) was tested as follows (see Table 2):

(a) The three-year IPO's return was chosen as a proxy for their long-term performance. Thus, it was set as a dependent variable in all the regressions performed.

(b) IPO's performance between offering price and closing price at the fifth trading day was used as a proxy for the degree of overvaluation of the new issue. If the **fads hypothesis** holds, the two parameters must be negatively correlated.

(c) The hot market periods were expressed by the unity of the relevant dummy variable, while 0 designated the cold period. Negative correlation is expected to be observed between the dependent and the explanatory variable if the **windows of opportunity hypothesis holds**.

(d) As stated in Section II, the poorest long-term performance should be exhibited by the IPO's with the greatest initial uncertainty about their true value at the time of initial public offering. Since ex-ante uncertainty is unobservable, the issue size, the firm's age and the price volatility are used as proxies. Miller (2000) measured volatility by daily standard deviation of returns during the first 20 days after the initial public offerings. Thus, size, age and stock price volatility consist the explanatory variables in testing the validity of the *uncertainty and divergence of opinion hypothesis.*

V. The Results

Table 3 reports monthly cumulative average returns and average buy-and-hold returns, commencing from the fifth listing day. The equally weighted CAR for month 36 is 10.84 per cent. A positive mean abnormal return is observed if the buy-and-hold methodology is employed (0.21 per cent). The results are not in line with the most similar studies for the developed markets. They also differ from the findings of i. e. Kazantzis and Levis (1995) for the new listings at the ASE. However, they are similar to those found in Asian countries, such as Korea (Kim, Krinsky and Lee, 1995), India (Shah, 1995) and Malaysia (Paudyal, Saadouni and Briston, 1998). A possible explanation for the observed variation in the aftermarket performance of the Greek IPO's could be the radical change of legal restrictions on the stock price limits during the first days after the listing. Up to 1992 in particular, there were no restrictions at all; however, from December 1992, the daily change of the IPO's price was confined to 8 per cent. So, the studies of Kazantzis and Levis (1995) and Papaioannou, Safieddine, Travlos and Filippas (1997) included only 2 out of the 8 periods with price restrictions, as opposed to 7 out of the 7 periods in the present study. As a result, higher initial returns (which were more likely to occur) could be followed by stronger corrections, thus favouring the appearance of the underperformance in the subsequent periods.

Identification of the Long-Run Performance Explanatory Variables

The identification of explanatory variables of the long-term performance of the Greek IPO's was persued by applying the models 1 to 4 of Table 2. The results of the analysis presented in Table 4 reveal that issue size (ISS) is clearly the strongest explanatory variable (–0.508 / *t*-test –7.358), while statistically significant are also the initial performance (INI), the issue period (ISP) and the price volatility (PRV) of the first 20 days of trading. Company's age (AGE) is insignificantly correlated with the long-term IPO's returns, although the expected (negative) sign is confirmed. Model 1 fits satisfactorily with the specific set of data, since most of the estimated parameters are statistically significant, and moreover, the adjusted multiple coefficient of determination (adj. R^2 = 0.454) is by far the highest in the relevant literature. See for example Kooli and Suret (2001) adj. R^2 = 0.051 for Canada, Loughran and Ritter (1995) adj. R^2 = 0.106 for the USA, How (1999) adj. R^2 = 0.053 for Australia, Khurshed, Mudambi and Goergen (1999) adj. R^2 = 0.084 for the UK and Corhay (2002) adj. R^2 = 0.17 for Malaysia.

Table 4 reveals also that initial performance (INI) is a strong explanatory variable (Model 2) when it is used in isolation, thus suggesting the validity of the fads hypothesis. Similar results were presented by DeBondt and Thaler (1985), Ritter (1991), Levis (1993) and Kooli and Suret (2001). The significance of the

issuing period (ISP) provides support to the validity of the «windows of opportunity» hypothesis – Model 3. The model was run assuming that years 1990–1997 consisted the cold period, and years 1998–2000 the hot period, of the Athens Stock Exchange. The negative relationship between the issuing period (hot or cold) and the long-run performance, which is evident in Table 4, suggests that firms choose to go public when investors do not hesitate to pay relatively high price multiples (Ritter, 1991; Teoh, Welch and Wong, 1998).

Contrary to the findings of Ritter (1991) and Carter and Singh (1998), no significant relationship is found between the age of the firm and its long-term performance (Model 4). Similar results were obtained by Khurshed, Mudambi and Goergen (1999) for the UK market. However, two other variables, namely, issue size (ISS) and price volatility (PRV), which are used as proxies for the ex-ante uncertainty, are significantly negatively correlated with the three-year IPO's return. The findings support the validity of the «uncertainty and divergence of opinion» hypothesis.

Finally, low inter-variable correlation of Table 5 suggests that multicollinearity is not expected to significantly affect the results of the analysis.

VI. Conclusions

The present study examines the long-term performance of Greek IPO's during the period 1994–2000. In order to overcome problems related to the choice of the performance measurement (Loughran and Ritter, 1995; Brav, Geczy and Gompers, 1998; Kooli and Suret, 2001), two different methods were employed, including the cumulative abnormal returns and the buy-and-hold returns methods. The results show that Greek IPO's earned positive returns during the first three years after the new issue. Their performance is explained by certain variables, suggested in the relevant literature. Specifically, it was shown that initial return, issue period, issue size, and price volatility seriously affected the performance of Greek IPO's during the period of 1994-2000. The results imply that the «fads hypothesis» as well as the «windows of opportunity» and the «uncertainty and divergence of opinion» hypotheses provide satisfactory explanation of the long-term performance of the IPO's listed at the Athens Stock Exchange.

Finally, the first days' price limitations, which were introduced in 1992, might be responsible for the observed great differences in the long-run performance of ASE's IPO's.

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