UNDERPRICING, PRICE STABILIZATION AND LONG RUN PERFORMANCE IN INITIAL PUBLIC OFFERINGS: A STUDY ON THE ITALIAN STOCK MARKET BETWEEN 1985 AND 1998

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Abstract. *The underpricing phenomenon in Initial Public Offerings (IPOs) has been analyzed by several empirical studies referring to the major international stock markets. This paper presents an empirical study conducted on 135 IPOs on the Milan Stock Exchange between 1985 and 1998. The resort to econometric analysis has allowed to point out some determinants of the phenomenon. Our research shows the existence of two periods characterized by different levels of the underpricing magnitude and different statistically significant determinants. The first period (between 1985 and 1993) offers results consistent with theoretical frameworks and previous analysis in other countries, such as a negative correlation between the underpricing and the size of the firm, and a positive correlation between the underpricing and the offering size, the market trend, the price volatility. Moreover, a significant positive correlation with the fraction of the equity capital maintained by the controlling shareholders is pointed out. In the second period, between 1994 and 1998, the underpricing is lower and the correlation is less significant. The difference between the two periods seems to confirm the "information gathering" theory and the importance of placing strategies. In fact, during the first period the IPOs were essentially fixed price offers, while in the second one an intermediate chose the final price after a pre-selling book-building activity with open price.*

Finally, some observations about long run performance are derived and evidence about price stabilization activity in the after-market is provided.

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1. Introduction

The existence of the underpricing phenomenon in Initial Public Offerings (IPOs) is well known by economic literature, and seems to be a common characteristic of most international markets, as highlighted by Loughran, Ritter and Rydqvist (1994).

The interpretations of this "anomaly" of the financial markets[2] are quite numerous and in most cases they attempt to interpret the underpricing as the outcome of an equilibrium consistently with modern financial theories; nevertheless other works (see for example Aggarwal and Rivoli, 1990) relate the underpricing existence to market "fads" or to irrational behaviors. Yet, the persistence of the phenomenon has induced the research towards theoretical models in which the underpricing is a rational solution to information asymmetries and agency problems when firms go public.

Mandelker and Raviv (1977) and Baron (1979) highlight the relationship between the firm's managers and the intermediates, therefore relating the underpricing to the buyers' risk-aversion. Mauer and Senbet (1992) propose an explanation based on stock pricing in segmented markets; in particular, they assert that in these markets problems of incomplete access and incomplete spanning do exist, causing a remarkably high risk for investors.

Baron and Holmstrom (1980) and Baron (1982) also state that the underpricing is caused by information asymmetry, since the intermediate has private information about the demand level and the seller is not able to verify the intermediate's effort in sponsoring the offer[3]. Grinblatt and Hwang (1989), Allen and Faulhaber (1989), Welch (1989) and Chemmanur (1993) instead identify the firm's managers as the informed party, and interpret the underpricing as a "signal" of a firm's quality[4] and as a mean to counterbalance the costs borne by the investors in collecting information. Rock (1986) imagines that investors endowed with different information exist, this causing a "winner's curse" for

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[2] Underpricing, long-run underperformance and hot-issue markets are often considered peculiar anomalies in IPOs' analyzing. See Ibbotson, Sindelar and Ritter (1994).

[3] On the contrary, this hypothesis is rejected by Muscarella and Vetsuypens (1989) who analyze IPOs in which the intermediate sells its own shares.

[4] Empirical evidence is provided by Jegadeesh, Weinstein and Welch (1991), Garfinkel (1993), Michaely and Shaw (1994) and Spiess and Pettway (1997).

not-informed investors, since informed investors neglect overpriced offerings. For this reason, in order to provide incentives to the latter, shares must be offered at a discounted price[5]. Benveniste and Spindt (1989) and Benveniste and Wilhelm (1990) state that the underpricing is a mean to induce informed investors to reveal private information in the pre-selling phase, thus allowing the intermediates to better evaluate the offering[6]. Tinic (1988), Hughes and Thakor (1992) and Drake and Vetsuypens (1993) analyze the underpricing phenomenon in the U.S. pointing out the role of litigation risk between the managers and the intermediates. In Welch's (1992) framework investors are not get in touch simultaneously; therefore, an offering may fail due to a "cascade" effect, since investors may be irrationally conditioned by other investors' behavior[7].

Among the above interpretations, the most influential have been the theories based on information asymmetry between firms and investors. In order to find empirical evidence about them, Beatty and Ritter (1986) introduced the concept of "ex-ante uncertainty" based on the positive correlation between the expected underpricing and the lack of information, which may be expressed by some proxy variables, the most common[8] being (ex-ante) the firm's age, size and assets typology, as well as (ex-post) the bid-ask spread, the price volatility and the fraction of equity capital held by the controlling shareholder. Therefore, the ex-ante uncertainty may be reduced through suitable placing strategies[9], by adequately selecting the intermediates and the auditors[10], or by the presence of a venture capitalist[11].

The underpricing phenomenon on the Italian Stock Market has been analyzed in detail by Cherubini and Ratti (1991) and Basile and De Sury (1997) who pointed out a problem of information asymmetry, particularly for small firms, and a signaling interpretation. Nevertheless, they adopted a

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[5] This hypothesis is empirically supported by Koh and Walter (1989), Levis (1990) and Michaely and Shaw (1994).
[6] See Weiss (1989), Hanley (1993) and Hanley and Wilhelm (1995).
[7] Actually there exist other hypotheses about the determinants of the underpricing. The most known is the "monopsony power hypothesis" described by Chalk and Peavy (1987) and Ritter (1984).
[8] See Miller and Reilly (1987) and Garfinkel (1993).
[9] See Loughran, Ritter and Rydqvist (1994) and Beneviste and Busaba (1997).
[10] See Booth and Smith (1986), Carter and Manaster (1990) and Carter, Dark and Singh (1995).
[11] See Megginson and Weiss (1991) and Barry, Muscarella and Vetsuypens (1991).

limited sample[12] characterized by a high heterogeneity (in terms of firms' sector, size and ownership structure), this creating complexity in the econometric analysis. Therefore, the aim of our research is to widen the sample size, to update the previous results and point out the role of the underpricing determinants. By carefully considering the market variables we obtain a remarkably high level of statistical significance in the empirical analysis and we point out the importance of the fraction of equity capital maintained by the controlling shareholders after the IPO and of the placing strategies, the latter confirming the information gathering theory by Benveniste and Spindt (1989) and Hanley (1993).

The paper is divided in six sections. Section 2 shows the results of the empirical analysis. In particular, Section 2.1 describes some basic characteristics of the survey, Section 2.2 specifically deals with the underpricing phenomenon, in Section 2.3 an econometric analysis is presented with the objective to determine the causes of the existence of the underpricing in IPOs. In Section 3 the findings of the analysis about the underpricing phenomenon are summarized and some observations are derived. Sections 4 reports the data about long run performance of the IPOs considered, while Section 5 shows evidence about price stabilization activity in the after-market. In Section 6 some concluding remarks are drawn.

2. Listings on the Italian Stock Exchange between 1985 and 1998 and the sample characterization

In this study 201 firms listed for the first time on the Milan Stock Exchange between 1985 and 1998 have been considered. Nevertheless, not all of them may be considered Initial Public Offerings. In particular, 41 of them simply transferred from other national Stock Markets (in 23 cases from the "Mercato Ristretto" and in 19 from other markets), 5 were already listed on other foreign Stock Markets, 9 simply made no public offerings, 2 have been re-admitted after a period of suspension and

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[12] Cherubini and Ratti (1991) consider 69 firms, while Basile and De Sury (1977) analyze 77 firms.

finally 8 are spin-offs. Therefore, the sample is made up of 135 offerings, summarized and classified in Table 1, where the number of cases excluded is also reported.

From several public sources we collected the relevant data about the sample firms relatively to the periods before and after the offering, and about the placement's strategies and techniques; the data are reported in the first part of the Section ahead, in which the underpricing magnitude has been computed for every operation. In the second part, we point out the determinants of the underpricing phenomenon and the causes of its variability across the period, which is remarkably long with respect to the few existing studies on the Italian Stock Market.

2.1 The sample

As Table 1 shows, in the years considered two different periods may be distinguished, in which the number of IPOS is relevantly high. The first is between 1985 and 1988, the second refers to the last five years. Therefore, a time-discrimination is immediately pointed out.

The 135 firms of the survey may also be classified with respect to their owners: 26 offerings are privatization operations, 37 are related to firms controlled by holding companies already listed (equity carve-outs). These operations are described in Tables 2 and 3; in the latter the controlling owner is also reported. Notice that the equity carve-outs operations are essentially related to the period between 1985 and 1988 and involve almost all the larger business groups listed on the Stock Market in those years[13]. Moreover, they represent about 50% of the IPOs in the same period.

With reference to the privatization operations, in the first period banks and assurance companies are especially at stake, whereas in the second public utilities are involved above all[14].

Considering the sector subdivision of the sample, we referred to a classification proposed by the Milan Stock Exchange (Borsa Italiana Spa), which distinguishes among three "macrosectors", i.e.

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[13] In fact, the phenomenon is imputable to the process of "financial dismantling" and separation between ownership and control experienced in Italy during the '80s by large business groups and documented by Brioschi, Buzzacchi and Colombo (1990).

"industrial" securities, "financial" securities and "utilities". Table 4 shows that the majority of the IPOs refers to "industrial" firms, even if "financial" companies have a relevant importance, especially in the first period.

It is interesting to observe that the offerings examined are concentrated in specific periods of the financial year. Table 5 reports their monthly distribution, with respect both to the month in which the shares start to be traded on the Stock Market, and to the month in which the offering is launched. Notice that offerings and listings are more frequent in the second half of the year: in particular, about 50% of them are concentrated in the months of May, June and July. Probably this happens because of the technical time needed in order to approve the year-end balance sheet, to draw up the prospectus and to accomplish the tasks imposed by the Market authorities.

Besides, it may be suitable the hypothesis that a correlation between the market trend and the offering period scheduled by the management does exist. In order to attempt a first analysis, we plotted the 90-days mobile average of the monthly returns of the market index (the historical MIB index), and we moved it on three months. Figures 1 and 2 report the results respectively for the period between 1985 and 1987 and between 1988 and 1998. The first is commonly known as the "hot period" for IPOs in Italy (Ritter, 1984). Notice that the months of June and July, characterized by a remarkable concentration of listings and offerings, are strongly correlated with the "peaks" of the mobile-average series[15].

2.2 *The underpricing level*

For each IPO considered, we computed two measures of underpricing:

i) the "simple" underpricing, defined as the difference in percentage between the official price of the share after the first day of listing and the offer price;

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[14] Actually also in the second period the privatization process in the banking sector has been relevant; nevertheless, it has been realized through public offerings of shares held by the State but already listed on the Stock Market.

ii) the "adjusted" underpricing, defined as the difference between the "simple" underpricing above and the market index return measured between the day of the admission to the trading and the beginning of the public offering; in our analysis the market index was assumed to be the historical MIB index.

Table 6 summarizes the results obtained in computing the "simple" and "adjusted" underpricing, along the years. The average value and the number of firms outstanding a positive underpricing is also reported; t-tests have been conducted in order to determine the statistical significance of the underpricing existence.

Table 6 clearly confirms the results obtained by Cherubini and Ratti (1991) and by Basile and De Sury (1997) who considered only the first period of our survey. Namely, the underpricing phenomenon is indeed common in IPOs also in the Italian case. The average "simple" underpricing, relatively to the whole sample of 135 firms, is equal to 23.9%, while it is equal to 20.3% if we consider the "adjusted" one. The values are statistically different from zero with a huge significance (99%)[16], nevertheless they do not appear to be homogeneously distributed across time. In particular, the analyses of the most recent IPOs seem to reveal a strong reduction of the phenomenon, with average values of about 10%.

2.3 The determinants of the underpricing phenomenon: an econometric analysis

For the econometric analysis' purpose, the sample has been reduced to 132 companies, since time proximity didn't allow us to collect all the data relatively to the last three offerings[17] in 1998.

The "adjusted" underpricing values[18] have been regressed in a linear multivariate model against some variables, in order to single out the determinants of the phenomenon[19]. In particular, from the

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[15] We may hypothesize that the managers of a company newly listed between June and July definitively adopted the decision to go public between March and April, being conditioned by the market performance in the first months of the year.

[16] The same result about the null hypothesis testing is obtained through the Tchebyceff inequality. The t-test implies a normal distribution of the stochastic variable and this may not be justified in our case.

[17] The interested offerings are: Class Editori, Richard Ginori and Cremonini.

analysis of the existing theoretical literature and of the empirical results, based either on the Italian market or on foreign markets, we considered the dependent variables reported in Table 7.

Tables 8a and 8b show the average and median values of the independent variables included in the model. First, it is evident a strong scattering of the firms' size, revealed by the high standard deviation; this is due to sectorial peculiarities, as shown by the comparison between the average and median data of banks and insurance companies and the data of industrial firms, and to the presence of very large companies (Enimont, ENI, Mediaset). The average age of the firms is 45 years. The fraction of equity capital held by the controlling shareholders after the IPO is on average equal to 62.1%, which is remarkably high in comparison with other European markets; 10 offerings has been reserved quite to existing shareholders and in 48 cases employees were entitled to underwrite shares.

The most interesting results of the regression analysis have been obtained considering a sample of 117 IPOs, once having rejected 7 IPOs in which only restricted-voting shares or non-voting shares have been offered, 3 auction-based IPOs, 3 privatization operations in which a bonus share provision was offered, 2 outlier cases (Banca Toscana and Sondel) characterized by a remarkably long period of time (more than 200 days) elapsed between the offering and the admission on the Stock Exchange. Table 9 summarizes the regression results. The firm's age[20], the price volatility in the first 10 days after the listing and the market trend in the 100 days before the listing are significantly correlated with the underpricing and the expected signs (positive or negative) are confirmed. The fraction of equity capital held by the controlling owner after the offering is also positively correlated. The R^2 statistics is equal to 28.8%.

In order to make a comparison between our findings and the results obtained by Cherubini and Ratti (1991) and Basile and De Sury (1997) we identified two sub-periods. In particular, the first includes

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[18] The resort to the "adjusted" underpricing is convenient, since on average 68 days (a remarkably long period) elapsed between the offering and the listing.

[19] First, we built a monovariate model on a wild set of variables and consequently we derived a multivariate model. For sake of brevity we report only the most significant processing. The variables reported in Tables 7, 8a and 8b and not considered in Tables 9, 10 and 11 are not statistically significant.

72 offerings occurred between 1985 and 1993. For the analysis of this panel a dummy variable has been introduced (AUCA3) which is equal to 1 if the firm raised new equity capital in the 3 years following the listing, and 0 otherwise. The result of this second regression analysis are summarized in Table 10.

Apart from the previous results, we find a correlation between the underpricing and the new dummy variable, which confirms the expected sign and has a remarkably high statistical significance (more than 90%). Coherently with Cherubini and Ratti (1991) a strong correlation between underpricing and offering size does exist, too. Moreover, notice that in this further model the coefficient R^2 is equal to 39%.

The results reported in Table 10 also suggest that offerings occurred in the following period, between 1994 and 1998, moreover outstanding a lower underpricing level, do exhibit some peculiarities and differences with respect to the relevance of the determinants pointed out in the regressions above. Thus, we distinguished among the listings between 1985 and 1993 and between 1994 and 1998: the variables explained in Table 9 have been split, so that the F_ variables refer only to the first sub-period, the S_ variables to the second sub-period.

Notice that, in comparison with the significance of the first analysis reported in Table 9, the coefficient R^2 grows up to 36.6%. Second, it is remarkable that some differences appear in the variables' explanatory power. In particular, in the second sub-period the underpricing level seems to be:

i)   less correlated with the price volatility in the 10 days after the listing;

ii)   not correlated with the offering's size, while in the first sub-period a positive correlation does exist;

iii)   negatively correlated (but with low significance) with the firm's age, while in the first sub-period the correlation is remarkably significant;

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[20] Since the firm's age and the accounting value of the assets (and in general size-related parameters) are auto-

iv)   positively correlated (with high significance) with the fraction of equity capital held by the controlling party after the offering, while between 1985 and 1993 this correlation is not statistically significant;

v)   not correlated with the market trend, while in the first sub-period an extremely significant correlation is found.

3. Implications of the results obtained

The results obtained seem to highlight differences in the market's behavior in the two sub-periods identified, namely between 1985 and 1993 and between 1994 and 1998. In fact, the determinants of the underpricing phenomenon (which is more limited in recent years) do not appear to be the same.

In the last few years, no (or less) importance seems to be attributed to the offering's size, and in general to size-related factors such as the firm's age, and equally to "market" variables, such as the market trend and the price volatility. On the contrary, a strong positive correlation, which is not statistically significant in the first sub-period, is pointed out between the underpricing level and the fraction of equity capital maintained by the controlling shareholders.

Which factors are able to explain this result ? Surely a role has been played by the development in these last few years in Italy of the financial market, whose rules and standards has deeply changed, even if the number of listed companies has not increased so much. An in-depth analysis goes well beyond the limits of the paper, but surely some remarks may be stated. It is not astonishing that in the last years the underpricing has been not sensitive to the offering's size: recently the market ability to absorb the equity offering did not seem to be a constraint in determining the placement strategies and the offer price. Similarly, the weak correlation between the firm's size and the underpricing is probably related to the increased ability of the underwriter to reduce ex-ante uncertainty and information asymmetry also for smaller size firms.

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correlated, the age represents the unique parameter of this kind considered.

It is harder to interpret other results above, referring to the market trend and to the price volatility; a deeper analysis is needed also about the role of the fraction of equity capital maintained by the controlling shareholder.

About the difference in the underpricing magnitude between the two sub-periods, an acceptable explanation may be derived from Hanley's (1993) results, who tests the "information gathering theory" by Benveniste and Spindt (1989) and the "partial adjustment theory" by Ritter (1988). He shows that the underwriter's institutional activity before the offering may reduce uncertainty and therefore the underpricing. Moreover, if the definitive offer price is selected in a pre-determined range, it may have a signaling effect, since the underpricing may be exploited to reward investors for having provided good information about the firm. Consequently, the more qualified the information gathered during the pre-selling activity, the higher will be the expected underpricing.

Actually in our survey the distinction between the two periods corresponds to a change of the offering method, from a "fixed offer price" strategy to a "book-building with open price" strategy, based on two distinct phases: the choice of a price band followed by a pre-selling activity, the final price being fixed only some days before the offering. In the period between 1985 and 1993 only 2 offerings among 72 provided for a book-building strategy, while between 1994 and 1998 44 among 45 did. Table 12 shows the underpricing levels, by offering strategy[21]; the underpricing is much lower in IPOs preceded by "book-building" activity, and the difference between the two levels is statistically significant. This result is consistent with Hanley (1993) and emphasizes the role of the underwriter as a well-informed intermediate, able to reduce information asymmetry through information spreading. Table 13 confirms this hypothesis: the choice of the maximum price in the ex-ante fixed band is interpreted by the market as good news resulted from the information gathering activity; on the contrary the choice of a low price reveals a less optimistic judgement of the investors

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[21] Notice that the time between the offer and the listing for "fixed price" offerings is on average equal to 101 days, while it is reduced to 15 days on average for offerings preceded by "book-building" activity.

reached during the book-building procedure: in this case notice that the underpricing is not statistically different from zero.

4. Long run performance

With reference to the underpricing phenomenon, stock market efficiency implies that market prices correctly express the "true value" of the firm from the first days of listing. Moreover, offered stock is not expected to offer, during the first weeks, or at least in the long-run, a return significantly different from the market performance. Yet, the literature shows that in several markets, particularly in the U.S., the market return of IPOs-backed stocks is significantly lower than the market portfolio performance. In this Section we establish whether the Italian IPOs analyzed in the previous Sections are also characterized by a long run underperformance. To this aim, for every firm of the survey we have collected the market prices in the three years after the listing[22]. In order to compute the performance, we have adopted the *buy and hold*[23] method; therefore, after T months from the admission to the listing, the buy-and-hold return BHR_{iT} of stock i is:

$$BHR_{iT} = \frac{P_{Ti}}{P_{0i}} - 1$$

where P_{0i} is the stock price at time 0 and P_{Ti} is the stock price at time T. The average return BHR_T of n IPO-backed firms will be:

$$BHR_T = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{P_{Ti}}{P_{0i}} - 1\right)$$

Adjusting the above values for the performance of the market index MIB[24], we have obtained the buy-and-hold adjusted return $BHAR_T$ at time T:

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[22] Obviuosly this was not possible for the 1997 and 1998 offerings; in this case we only have collected the available data.

[23] See Loughran et al. (1994).

[24] The historical MIB index is a weighted average of all listed stock returns, the weights being the fractions of the whole market capitalization of the single stocks (*legge Tremonti*).

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$$BHAR_{iT} = \frac{P_{Ti}}{P_{0i}} - \frac{MIB_{Ti}}{MIB_{0i}}$$

$$BHAR_T = \frac{1}{n} \sum_{i=1}^{n} \left(\frac{P_{Ti}}{P_{0i}} - \frac{MIB_{Ti}}{MIB_{0i}} \right)$$

The results of this first analysis are summarized in Table 14. Notice that already after 3 months from the listing date the IPOs portfolio underperforms the market (-5.23%) with a remarkably high significance level (99%). Nevertheless, in the following months, due also to the drop in the available data, the performance does not significantly change. As a consequence, after one year from the listing date, the adjusted return is substantially equal to the 3-months return; moreover, as shown in Table 15, the latter is largely determined by the performance of the first month.

As before, the market behavior after the listing is different considering the survey of IPOs between 1985 and 1993 and between 1994 and 1998. Table 16 shows that in the latter case the initial underpricing is offset by the market underperformance after three years, while in the former case the return after 3 months remains positive; it is only partially counterbalanced by the market underperformance, since the initial underpricing is largely higher.

In the long run (after three months) the underperformance persists and it is equal to 7% after one year (see Figure 3 and Table 17, where the statistics about 109 firms whose market prices after one year are available are summarized).

The most interesting results are obtained considering the performance after 3 years, and dividing the IPOs of the "hot period" from the others[25]. The results are reported in Table 18 and Figure 4.

It is clear that a different market behavior in the two periods exists. The reasons may be numerous; yet, we must take into account that among the 64 IPOs of the "hot period" 30 are equity carve-outs

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[25] In particular we refer to the 1995 IPOs; in this year medium-size firms have been encouraged to go public by tax incentives granted in the following three years.

made by firms already listed. By contrast, almost all firms going public in the second period are independent companies belonging to the manufacturing sector [26].

Summing up, the major findings about long run performance are:

1. the negative return of the IPOs portfolio in the period immediately following the listing;

2. the different behavior of the IPO-backed firms on the market in the two periods considered: 1985-1989 and 1990-1995; the latter exhibits (as registered in other markets) a remarkable underperformance (up to -50%), while the former shows positive abnormal returns after 3 years from the listing.

Finding 2. may be explained by the different company type (equity carve-out as opposed to independent firm), whereas finding 1. deserves more careful attention. In particular, it is necessary to consider the behavior of several agents in the after-market period. The next Section is devoted to this aim.

5. Price stabilization in the after-market

On the Italian stock market the underwriter may engage in the activity of price stabilization during the first months of listing of an IPO firm. Yet, only after 1995 the IPOs prospectus started to provide information about the underwriter's behavior in the 30-45 days after the listing. In this Section we investigate the relationship between the initial underpricing and the objectives of the stabilization activity.

Following Ruud (1993), first we have analyzed the distribution of the "simple underpricing" values with reference to the day of listing, then after one, two, three and four weeks. We have distinguished between IPOs before and after 1995 (as said, price stabilization is disclosed in the prospectus since 1995). Tables 19, 20 and 21 show the main characteristics of the underpricing distribution for the

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[26] It will be worth investigating if this result is confirmed including in the survey the 1996 and 1997 IPOs, which have benefited from tax reductions, too.

first sub-period (1985-1994), for the second sub-period (1995-1998) and for the whole period, respectively.

By considering the skewness and the kurtosis statistics, we may notice that only in the 1995-1998 sub-period the distribution gradually changes, since these values tend to decrease[27]; we may assume that this is the outcome of a price stabilization activity, whose effects tend to disappear over time. On the contrary, the skewness and the kurtosis statistics are constantly high in the first sub-period and in the whole survey, not allowing us to advance any presumption about the occurrence of price stabilization.

A further confirmation of the likely existence of price stabilization between 1995 and 1998 may be obtained by considering that the minimum underpricing, not so high immediately after the listing (-8.55%), doubles after one week (-16.57%) and it goes on decreasing in the following weeks (-29% after four weeks). On the contrary, over the 1985-1994 period the minimum value is reached immediately after the listing. This may confirm a price support activity, aimed at pushing the underpricing distribution towards positive values and at limiting the short-run underperformance. Figure 5 shows the underpricing distribution over the period 1995-1998 for four weeks after the listing.

Notice that on the listing day only 9 firms exhibit a negative underpricing while, coherently with the underpricing phenomenon, 26 firms exhibit returns higher than 10%. After a week the situation is more balanced, since some firms, after an initial positive return, exhibit a negative return; in fact, 5 firms have switched from the group characterized by a low positive return (between 0% and 5%) to the group with negative returns and 4 firms have turned from the group with higher returns to the 0%-5% group. Thus, we may think that price stabilization is aimed at reaching average positive (but low) levels of return; after four weeks, the distribution appears to be symmetrical around a positive

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[27] After three weeks these statistics are not significantly different from the parameters of a normal distribution.

but low average value; 19 firms exhibit high positive returns, in 19 cases the return is negative and in 7 cases the return is lower than 5%.

6. Concluding remarks

In this paper we have shown the main results of a research aimed at analyzing the market price at the listing and after the listing of IPOs on the Italian stock market between 1985 and 1998. We have presented some interesting results about the determinants of the underpricing phenomenon in the last years. We also have analyzed the long run performance on the market and have investigated the role of underwriters in stabilizing prices after the listing.

We pointed out that offering procedures, tax incentives, underwriters activity likely affect the market behavior of IPO-backed firms. Surely the Euro integration and the establishment of a new stock market in Italy for fast-growing small firms (the "*Nuovo Mercato*") will add new elements to consider in the analysis. These certainly represent a main issue in the authors' research agenda.

References

Aggarwal, R. and P. Rivoli, 1990, Fads in the initial public offering market ?, *Financial Management*, 19, 45-57.

Allen, F. and G. R. Faulhaber, 1989, Signalling by underpricing in the IPO market, *Journal of Financial Economics*, 23, 303-323.

Baron, D. P., 1979, The incentive problem and design of investment banking contracts, *Journal of Banking and Finance*, 3, 157-175.

Baron, D. P., 1982, A model of the demand for investment banking advising and distribution services for new issues, *Journal of Finance*, 37, 955-976.

Baron, D. P. and B. Holmstrom, 1980, The investment banking contract for new issues under asymmetric information: delegation and the incentive problem, *Journal of Finance*, 35, 1115-1138.

Barry, C., Muscarella, C., Peavy, J. and M. Vetsuypens, 1990, The role of venture capital in the creation of public companies: Evidence from the going public process, *Journal of Financial Economics*, 27, 447-471.

Basile, I. and P. De Sury, 1997, La determinazione del prezzo delle azioni destinate alla quotazione, *Cariplo S.p.A.-Laterza*.

Beatty, R. and J. R. Ritter, 1986, Investment banking, reputation, and the underpricing of initial public offerings, *Journal of Financial Economics*, 15, 213-232.

Benveniste, L. M. and W. Y. Busaba, 1997, Bookbuilding vs. Fixed Price: An Analysis of Competing Strategies for Marketing IPOs, *Journal of Financial and quantitative analysis*, 32, 383-403.

Benveniste, L. M. and P. A. Spindt, 1989, How investment bankers determine the offer price and allocation of new issues, *Journal of Financial Economics*, 24, 343-361.

Benveniste, L. M. and W. J. Wilhelm, 1990, The comparative analysis of IPO proceeds under alternative regulatory enviroments, *Journal of Financial Economics*, 28, 134-165.

Booth, J. R. and R. L. Smith, 1986, Capital raising, underwriting and the certification hypothesis, *Journal of Financial Economics*, 15, 261-281.

Brioschi F., Buzzacchi L. and M. G. Colombo, 1990, *Gruppi di imprese e mercati finanziari*, La Nuova Italia Scientifica.

Carter, R. B. and S. Manaster, 1990, Initial public offerings and the underwriter reputation, *Journal of Finance*, 45, 1045-1067.

Carter, R. B., Dark, F. H. and A. K. Singh, 1998, Underwriter reputation, Initial Returns, and the Long-Run Performance of IPO Stocks, *Journal of Finance*, 45, 1045-1067.

Chalk, A. and J. Peavy, 1987 Initial Public Offerings: daily returns, offering types and the price effect, *Financial Analysis Journal*, 43, 65-69.

Chemmanur, T. J., 1993, The pricing of initial public offerings: A dynamic model with information production, *Journal of Finance*, 48, 285-304.

Cherubini, U. and M. Ratti, 1991, Quanto valgono le matricole? L'underpricing nelle prime quotazioni: teorie economiche e analisi empirica, in "*Il rischio azionario e la Borsa*", a cura di A. Penati, Milano: EGEA, 249-288.

Drake, P. D. and M. R. Vetsuypens, 1993, IPO underpricing and insurance against legal liability, *Financial Management*, 64-73.

Fabrizio, S., 1998, La formazione dell'underpricing negli IPO: il ruolo degli underwriters, dei prospetti informativi e degli analisti. Una verifica empirica del caso italiano, *Working Paper* (Consob)

Feltham, G. A., Hughes, J. S. and D. A. Simunic, 1991, Empirical assessment of the impact of auditor quality on the valuation of new issues, *Journal of Accounting and Economics*, 14, 375-399.

Garfinkel, J. A., 1993, IPO underpricing, insider selling and subsequent equity offerings; is underpricing a signal of quality?, *Financial Management*, 22, 74-83.

Grinblatt, M. and C. Hwang, 1989, Signalling and the underpricing of new issues, *Journal of Finance*, 24, 13-31.

Hanley, K. W., 1993, The underpricing of Initial Public Offerings and the Partial Adjustment Phenomenon, *Journal of Financial Economics*, 34, 231-250.

Hanley, K. W. and W. J. Wilhelm, 1995, Evidence on the strategic allocation of IPOs, *Journal of Financial Economics*, 37, 239-257.

Hughes, P. and A. Thakor, 1992, Litigation risk, Intermediation and the underwriting of initial public offerings, *Review of Financial Studies*, 5,709-742.

Ibbotson, R. G., 1975, Price performance of common stock new issues, *Journal of Financial Economics*, 2, 235-272.

Ibbotson, R. G. and J. F. Jaffe, 1975, Hot issue markets, *Journal of Finance*, 4, 1027-1042

Ibbotson, R. G., Sindelar, J. L. and J. R. Ritter, 1988, Initial Public Offerings, *Journal of Applied Corporate Finance*, 1, 37-45.

Ibbotson, R. G., Sindelar, J. L. and J. R. Ritter, 1994, The market's problem with the pricing of initial public offerings, *Journal of Applied Corporate Finance*, 7, 66-74.

Jegadeesh, N., Weinstein, N. and I. Welch, 1993, An empirical investigation of IPO returns and subsequent equity offerings, *Journal of Financial Economics*, 34, 153-175.

Koh, F. and T. Walter, 1989, A direct test of Rock's model and the pricing of unseasoned issue, *Journal of Financial Economics*, 23, 251-272.

Levis, M., 1990, The winner's curse problem, interest costs and the underpricing of initial public offerings, *Economic Journal*, 100, 76-89.

Loughran, T., Ritter, J. R. and K. Rydvist, 1994, Initial Public Offerings: International Insights, *Pacific-Basin Finance Journal*, 2, 165-199.

Mandelker, G. and A. Raviv, 1977, Investment banking: An analysis of optimal underwriting contracts, *Journal of Finance*, 32, 683-694.

Mauer, D. C. and L. W. Senbet, 1992, The effect of the secondary market on the pricing of initial public offerings: theory and evidence, *Journal of Financial and Quantitative Analysis*, 27, 55-79.

Megginson, W. L. and K. A. Weiss, 1991, Venture capitalist certification in initial public offerings, *Journal of Finance*, 46, 879-903.

Michaely, R. and W. H. Shaw, 1994, The pricing of initial public offerings: Tests of adverse selection and signaling theories, *Review of Financial Studies*, 7, 279-315.

Miller, R.E. and F. K. Reilly, 1987, An examination of mispricing, returns, and uncertainty for initial public offerings, *Financial Management*, Summer, 33-38.

Muscarella, C. and M. Vetsuypens, 1989, A simple test of Baron's model of IPO underpricing, *Journal of Financial Economics*, 24, 125-135.

Ritter, J. R., 1984, The 'hot isssue' market of 1980, *Journal of Business*, 32, 215-240.

Rock, K., 1986, Why new issues are underpriced, *Journal of Financial Economics*, 15, 187-212.

Ruud, J. S., 1993, Underwriter price support and the IPO underpricing puzzle, *Journal of Financial Economics*, 34, 135-152.

Spiess, D. K. and R. H. Pettway, 1997, The IPO and first seasoned equity sale: issue proceeds, owner/manager's wealth, and the underpricing signal, *Journal of Banking & Finance*, 21, 967-988.

Tinic, S. M., 1988, Anatomy of initial public offerings of common stock, *Journal of Finance*, 43, 789-822.

Titman, S. and B. Trueman, 1986, Information quality and the valuation of new issues, *Journal of Accounting and Economics*, 8, 159-172.

Weiss, K.H., 1989, The relationship of the offer price to preliminary file range and the use of the overallotment option in initial public offerings, unpublished manuscript, University of Michigan, Ann Arbor, MI.

Welch, I., 1989, Seasoned offerings, imitation costs and the underpricing of initial public offerings, *Journal of Finance*, 44, 421-449.

Welch, I., 1992, Sequential sales, learning and cascades, *Journal of Finance*, 47, 695-732.

White, H. S., 1980, A heteroskedastic consistent covariance matrix estimator and a direct test of heteroskedasticity, *Econometrica*, 48, 817-838.

	Year														
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Total
Firms newly listed (#)	12	42	23	14	6	4	8	5	4	17	14	14	13	25	201
… already listed on the "Mercato Ristretto"	2	3	1	1	-	-	-	2	1	5	2	-	1	5	23
… already listed in other national markets	-	4	4	1	-	1	1	-	-	8	-	-	-	-	19
… already listed in other foreign markets	-	-	-	-	-	-	2	1	1	-	-	-	-	1	5
… with no public offering	1	2	1	1	-	-	1	-	-	-	-	1	-	2	9
… re-admitted after a period of suspension	-	1	-	-	-	-	-	-	-	1	-	-	-	-	2
… after a spin-off	-	-	-	-	-	-	-	-	2	-	1	1	2	2	8
Sample of IPOs	**9**	**32**	**17**	**11**	**6**	**3**	**4**	**2**	**-**	**3**	**11**	**12**	**10**	**15**	**135**

TABLE 1 - Firms newly listed on the Milan Stock Exchange between 1985 and 1998 and IPOs considered in the sample.

Company	Year	Controlling shareholder / Seller
Credito Fondiario e Industriale	1985	Credit - Comit - Banco di Roma
Sirti	1985	STET (IRI group)
Aeritalia	1986	Finmeccanica (IRI group)
Ansaldo Trasporti	1986	Finmeccanica (IRI group)
Assitalia	1986	INA (Treasury)
Banca Nazionale del Lavoro	1986	INA (Treasury)
Banca Toscana	1986	MPS (Treasury)
Banco di Sardegna	1986	Fondazione Banco di Sardegna
Compagnia Assicuratrice Unipol	1986	Lega Nazionale Cooperative e Mutue
Nuovo Pignone	1986	ENI (Treasury)
Autostrade	1987	IRI (Treasury)
Banca Manusardi & C.	1987	IMI (Treasury)
Banco di Napoli	1987	(Treasury)
Credito Lombardo	1988	Monte Paschi Siena (Treasury)
Enichem Augusta	1988	ENI (Treasury)
Fata Assicurazioni	1988	Federazione Italiana Consorzi Agrari
Immobiliare Metanopoli	1988	ENI (Treasury)
Enimont	1989	ENI - Montedison
Elsag Bailey	1991	Finmeccanica (IRI group)
Istituto Bancario S.Paolo di Torino	1992	Fondazione San Paolo
IMI	1994	Treasury
INA	1994	Treasury
ENI	1995	Treasury
AMGA	1996	Municipality of Genua
Aeroporti di Roma	1997	IRI (Treasury)
AEM	1998	Municipality of Milan
Total (#)		26

TABLE 2 – Sample offerings related to privatization operations.

Company	Year	Controlling group
Cofide	1985	De Benedetti Group
Fiar	1985	Setemer (Ericsson Group)
Sabaudia Finanziaria	1985	CIR (De Benedetti Group)
Sorin Biomedica	1985	Fiat (Agnelli Group)
Calcestruzzi	1986	Cementi Ravenna (Ferruzzi Group)
Cementerie di Merone	1986	Société Suisse de Ciment Portland
Comau Finanziaria	1986	Fiat (Agnelli Group)
Gruppo Editoriale Fabbri	1986	IFI (Agnelli Group)
Industrie Zignago S. Margherita	1986	Marzotto Group
Poligrafici Editoriale	1986	Editoriale Monti
Saes	1986	IFIL (Agnelli Group)
SAES Getters	1986	IFI (Agnelli Group)
Snia Fibre	1986	Snia Bdp (Agnelli Group)
Snia Tecnopolimeri	1986	Snia Bdp (Agnelli Group)
Sogefi	1986	CIR (De Benedetti Group)
Sondel	1986	Falck Group
Teknecomp	1986	Ing.C. Olivetti (De Benedetti Group)
Valeo	1986	CIR (De Benedetti Group)
Vianini Industrie	1986	Caltagirone Group
AME Finanziaria	1987	Mondadori - CIR (De Benedetti Group)
Cementeria Augusta	1987	Unicem - IFI (Agnelli Group)
Cementerie di Sardegna	1987	Italcementi (Pesenti Group)
Cementerie Siciliane	1987	Italcementi (Pesenti Group)
Grassetto	1987	Infinro (Ligresti)
Isefi	1987	Cofide-Ing.C.Olivetti (De Benedetti Group)
Tecnost	1987	Ing.C. Olivetti (De Benedetti Group)
Vianini Lavori	1987	Vianini (Caltagirone Group)
Cartiera di Ascoli	1988	AME (Mondadori - De Benedetti Group)
Cementeria di Barletta	1988	Unicem - IFI (Agnelli Group)
Bassetti	1989	Vincenzo Zucchi (Marzotto-Zucchi Group)
Finarte Casa D'Aste	1990	Finarte (Micheli Group)
Gottardo Ruffoni	1990	SEFIN (Tripcovich)
Gifim	1991	SOPAF (Vender)
Fincasa 44	1992	Pacchetti (Bocchi)
Banca Popolare di Spoleto	1996	Credit
Lazio	1998	CIRIO (Cragnotti Group)
Richard Ginori	1998	Pagnossin
Total (#)		37

TABLE 3 – Sample equity carve-outs and private offerings

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Total
"Industrial" sector (total #)	6	18	11	8	5	0	2	0	0	0	9	7	9	9	84
- Foodstuff	-	-	-	-	-	-	-	-	-	-	1	-	-	1	2
- Cars	-	2	-	-	-	-	-	-	-	-	2	-	1	-	5
- Papermaking	-	-	-	1	-	-	-	-	-	-	-	1	-	-	2
- Chemicals	1	2	2	3	1	-	-	-	-	-	2	1	1	2	15
- Building	-	4	4	1	-	-	1	-	-	-	-	-	1	-	11
- Electronics and electromechanics	3	4	4	1	2	-	1	-	-	-	1	5	1	6	28
- Mechanics	2	3	-	-	-	-	-	-	-	-	1	-	1	-	7
- Others	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
- Metallurgy and mineral	-	1	-	-	-	-	-	-	-	-	1	-	1	-	3
- Textile & Clothes	-	2	1	1	2	-	-	-	-	-	1	-	3	-	10
"Financial" sector (total #)	3	8	4	3	-	2	2	2	-	3	2	2	-	1	32
- Assurance	-	2	-	1	-	-	-	-	-	1	-	1	-	1	6
- Banking	1	3	2	1	-	-	-	1	-	1	2	1	-	-	12
- Estate	-	-	-	1	-	1	-	1	-	-	-	-	-	-	3
- Holding companies	2	2	1	-	-	-	1	-	-	-	-	-	-	-	6
- Financial services	-	1	1	-	-	1	1	-	-	1	-	-	-	-	5
"Services" sector (total #)	-	6	2	-	1	1	-	-	-	-	-	3	1	5	19
- Delivery	-	2	-	-	-	-	-	-	-	-	-	-	-	1	3
- Media	-	2	1	-	-	-	-	-	-	-	-	1	-	2	6
- Public utilities	-	1	-	-	-	-	-	-	-	-	-	1	-	1	3
- Tourism and transport	-	1	1	-	1	1	-	-	-	-	-	1	1	1	7
Total (#)	9	32	17	11	6	3	4	2	-	3	11	12	10	15	135

TABLE 4 - The firms of the survey, by sector and by offering year.

Month	IPOs-listing (#)	IPOs-offer (#)
January	3	2
February	11	8
March	13	6
April	1	6
May	9	8
June	13	22
July	28	27
August	7	3
September	9	15
October	12	9
November	11	11
December	18	18
Total	135	135

TABLE 5 - Monthly distribution of offers and listings.
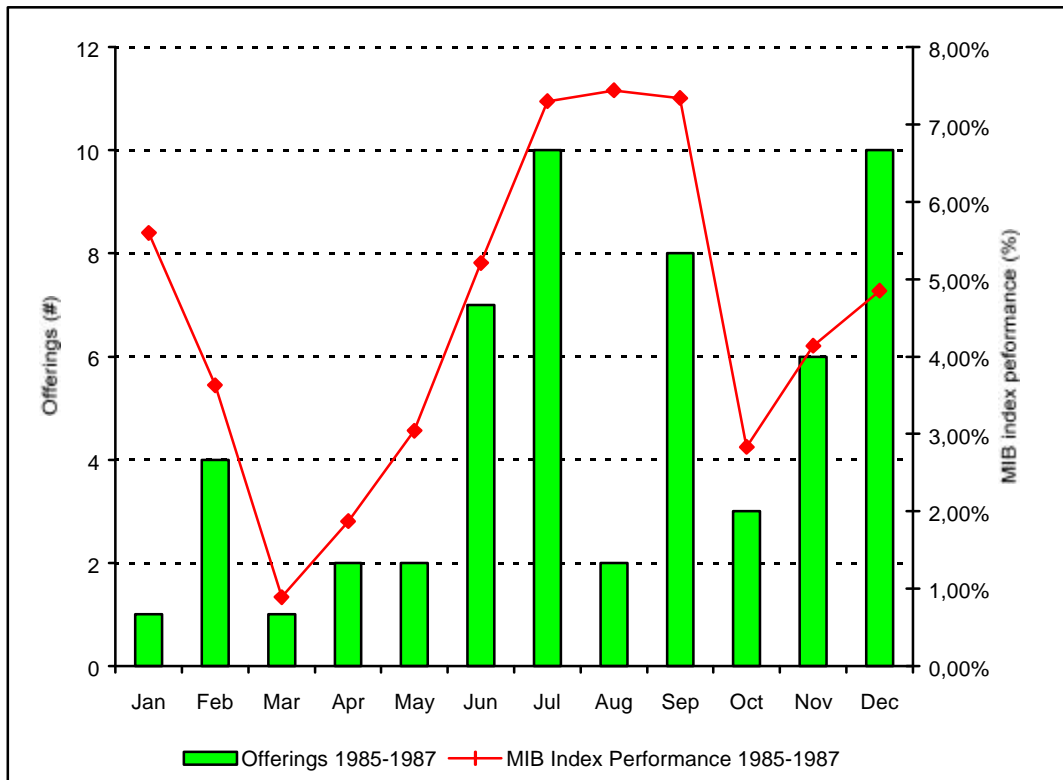
FIGURE 1 – IPOs and MIB[a] index yearly distributions between 1985 and 1987

[a] Mobile average on a 3-months basis, translated in advance of 90 days
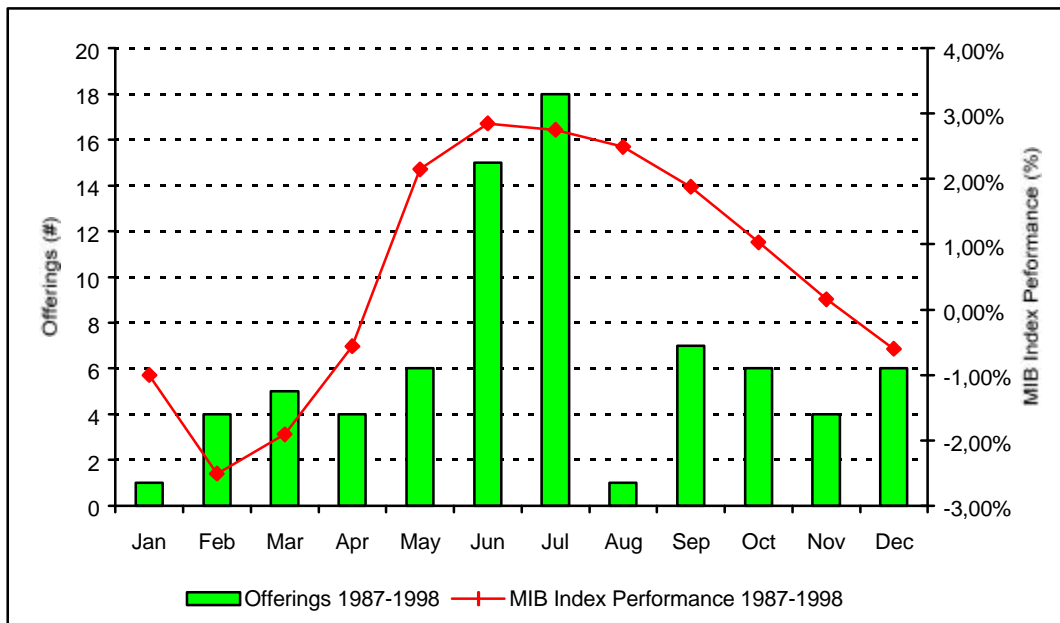
FIGURE 2 – IPOs and MIB[a] index yearly distributions between 1987 and 1998

[a] Mobile average on a 3-months basis, translated in advance of 90 days

Year	IPOs (#)	Underpricing (%)			Adjusted underpricing (%)		
		Average	Positive (#)	Negative (#)	**Average**	Positive (#)	Negative (#)
1985	9	80.825%***	9	0	61.208%***	9	0
1986	32	40.404%***	27	5	26.627%***	25	7
1987	17	11.936%	11	6	17.030%**	12	5
1988	11	-0.346%	5	6	8.284%	6	5
1989	6	56.205%	6	0	49.856%*	6	0
1990	3	71.933%**	3	0	77.131%**	3	0
1991	4	0.211%	3	1	3.225%	3	1
1992	2	-9.657%	1	1	-3.710%	0	2
1993	0	--	--	--	--	--	--
1994	3	6.824%	2	1	5.562%	2	1
1995	11	7.846%***	10	1	8.379%**	9	2
1996	12	10.470%*	9	3	10.732%*	8	4
1997	10	11.178%**	9	1	8.397%**	7	3
1998	15	9.376%*	10	5	7.831%*	11	4
Total	135	23.871%***	105	30	20.337%***	101	34

TABLE 6 - IPOs average underpricing, by listing year.

* Statistically different from zero at the 90% level.

** Statistically different from zero at the 95% level.

*** Statistically different from zero at the 99% level.

Parameter	Adopted measures	Expected correlation
Company's size [a]	***Accounting value of consolidated assets***	-
	Accounting value of consolidated equity	-
	Gross sales	-
	Income from investments (banks)	-
	Total premia (insurance)	-
Company's age	Difference between the listing year and the foundation	-
Offering size [a]	Offerings countervalue	?
Price volatility	Standard deviation of adjusted daily returns	+
Ownership structure [b]	Equity fraction maintained by the controlling agent	?
	Equity fraction held before the IPO	?
	Equity fraction offered to new shareholders, as a percentage of capital before the IPO	?
	Equity fraction offered to new shareholders, as a percentage of capital before the IPO	?
Offering typology	Dummy variable (0=OPS, 1=OPVS, 2=OPV) [c]	+
Intermediate quality	Intermediate market share, as a percentage of total offerings countervalue	-
	Intermediate market share, as a percentage of total offerings number	-
Presence of foreign intermediates	Dummy variable (1=yes, 0=no)	-
Offering strategy	Dummy variable (1=book building, 0=fixed price)	-
Offering allocation	Dummy variable (1=offer reserved to employees, 0=otherwise)	?
	Dummy variable (1=offer reserved to controlling shareholders, 0=otherwise)	+
	Fraction of the offer reserved to institutional investors	?
Oversubscription level	Ratio between total demand and supply	+
	Ratio between institutional investors' demand and supply	+
	Ration between public demand and supply	+
Market trend	MIB index performance before the listing (100 days)	+
	Standard deviation of MIB index performance (10/60 days)	-
	Market volatility (1=high, 0=low)	-
Privatization	Dummy variable (1=yes, 0=no)	+
Equity carve-out	Dummy variable (1=yes, 0=no)	?

TABLE 7 – Parameters of the regression models.

[a] Deflated values have been considered – 1998 purchasing power.

[b] This parameter is not relevant for 7 companies offering non-voting or restricted-voting shares.

[c] OPS = Exchange Public Offering, OPV = Sale Public Offering, OPVS = Exchange and Sale Public Offering.

Parameter	Variables	Average	Median	Standard deviation	Minimum value	Maximum value	Observations (#)
Company size (whole sample)	*Company's assets(millions ₣) (ASSETS)*	2540.35	119.16	4.259	5.48	6694.73	132
	Consolidated assets (millions ₣)	2982.15	159.35	3.900	16.65	80383.48	132
	Equity capital (millions ₣)	268.80	38.88	3.143	5.48	6694.73	132
Company size (banks / insurance companies)	*Consolidated assets (millions ₣)*	16246.77	2821.28	1.585	154.30	80383.48	18
	Equity capital (millions ₣)	1009.03	322.73	1.709	32.80	6694.73	18
	Income from investments (millions ₣)	1900.16	673.54	1.207	112.18	6187.83	12
	Total premia (millions ₣)	645.32	381.38	1.078	4.73	1882.24	6
Company size (other companies)	*Consolidated assets (millions ₣)*	887.74	144.68	5.585	16.65	51415.49	114
	Equity capital (millions ₣)	151.92	32.59	3.476	5.48	4394.30	114
	Gross sales (millions ₣)	807.74	131.80	5.720	14.41	44809.56	100
Company age (AGE)	Whole sample *(years)*	45.37	36.5	1.043	2	448	132
	Banks/insurance *(years)*	82.78	65.5	1.177	4	448	18
	Other companies *(years)*	39.46	33.00	0.764	2	159	114

TABLE 8a – Some descriptive characteristics of the sample (I).

Parameter	Variables	Average	Median	Standard deviation	Minimum value	Maximum value	Observations (#)
Offering size	Public offering (millions ₤)	95.96	29.30	2.441	4.66	1824.83	132
	Total offering (millions ₤) (SIZE OFFER)	142.31	42.06	2.746	6.54	2932.51	132
Price volatility	(VOL10DDCO)	2.286%	1.728%	0.686	0.500%	8.090%	132
Fraction of equity capital held by the controlling shareholders…	… before the IPO (HELDPRE)	73.15%	75.00%	0.238	27.88%	100.00%	125
	… after the IPO (HELDPOST)	62.10%	64.79%	0.226	19.45%	89.00%	125
Equity offered to new shareholders as a percentage of …	"old" capital before the IPO (OFFPRE)	13.17%	8.22%	1.102	0.00%	50.17%	125
	"total" capital after the IPO (OFFPOST)	24.21%	24.61%	0.475	0.00%	57.13%	125
Offer reserved to institutional investors	(FRAIST%)	61.52%	63.55%	0.220	31.74%	91.07%	45
Oversubscription level: ratio between …	… total demand and supply (OVERTOT)	7.75	5.67	0.777	0.920	25.390	42
	… institutional investors' demand and supply (OVERIST)	8.910	5.30	1.233	0.920	52.750	45
	… public demand and supply (OVERPUB)	8.226	6.650	0.806	1.340	24.330	39
Market trend	(MIB100DD)	9.836%	8.300%	2.140	-30.59%	75.500%	132
Market volatility	(VOL60DD / VOL10DD)	1.367%	1.150%	0.460	0.647%	3.216%	132
Days between the offering and the listing	(GIO-OFLI)	69	59	0.909	2	311	132

TABLE 8b – Some descriptive characteristics of the sample (II).

Variable	Coefficient	t-test [a]	Significance level
Constant	-0.14710	-0.918 (-1.091)	*0.361 (0.275)*
VOL10DDCO	7.53040	3.546 (3.166) ***	*0.000 (0.001)*
SIZE OFFER	-2.12 E-008	-0.207 (-0.324)	*0.836 (0.746)*
AGE	-2.18 E-003	-2.489 (-3.136) ***	*0.014 (0.002)*
HELDPOST	6.61 E-003	3.050 (3.208)***	*0.003 (0.001)*
ASSETS	-8.75 E-010	-0.367 (-0.929)	*0.715 (0.353)*
MIB100DD	0.51080	2.915 (2.161) **	*0.004 (0.031)*
VOL60DD	-11.6590	-2.244 (-2.074) **	*0.027 (0.038)*
Observations (#)	117	Periods	1985-1998
$R^2 =$	33.05%	$F(7,109) =$	7.69 ***
R^2(adj.) =	28.75%		

TABLE 9 – The regression results: determinants of the underpricing phenomenon.

** Statistically different from zero at the 95% level.

*** Statistically different from zero at the 99% level.

[a] The statistics in parentheses are adjusted using White (1980) heteroskedastic-consistent standard error.

Variable	Coefficient	t-test [a]	Significance level
Constant	-0.16410	-0.622 (-0.774)	*0.536 (0.439)*
VOL10DDCO	9.94240	3.276 (2.799) ***	*0.002 (0.005)*
AUCA3	0.16040	1.772 (1.889) *	*0.081 (0.059)*
OFFER SIZE	1.11 E-006	2.383 (2.517) **	*0.020 (0.012)*
ASSETS	-1.26 E-008	-0.645 (-0,740)	*0.521 (0.459)*
HELDPOST	5.87 E-003	1.653 (2.006) **	*0.103 (0.045)*
AGE	-3.26 E-003	-2.425 (-3.086) ***	*0.018 (0.002)*
MIB100DD	0.5509	2.414 (2.163) ***	*0.019 (0.031)*
VOL10DD	- 18.2639	-2.431 (-2.408) **	*0.018 (0.016)*
Observations (#)	72	Period	1985-1993
$R^2 =$	45.81%	$F(8,63) =$	7.41 ***
R^2(adj.) =	38.93%		

TABLE 10 – Determinants of the underpricing phenomenon: restriction to the period between 1985 and 1993.

* Statistically different from zero at the 90% level.

** Statistically different from zero at the 95% level.

*** Statistically different from zero at the 99% level.

[a] The statistics in parentheses are adjusted using White (1980) heteroskedastic-consistent standard error.

Variable [a]	Coefficient	t-test [b]	Significance level
F_Constant	-2.50 E-003	0.011 (-0.012)	*0.991 (0.990)*
S_Constant	-0.03120	-0.102 (-0.264)	*0.919 (0.791)*
F_VOL10DDCO	8.79300	3.527 (2.664)***	*0.000 (0.007)*
S_VOL10DDCO	5.07410	1.299 (2.425) **	*0.197 (0.015)*
F_OFFER SIZE	9.225 E-007	2.400 (1.912) *	*0.018 (0.056)*
S_OFFER SIZE	2.738 E-008	0.250 (0.759)	*0.803 (0.447)*
F_AGE	-3.528 E-003	-3.225 (-3.358) ***	*0.002 (0.000)*
S_AGE	-8.405 E-004	-0.534 (-1.507)	*0.594 (0.131)*
F_HELDPOST	4.825 E-003	1.626 (1.628)	*0.107 (0.103)*
S_HELDPOST	2.748 E-003	0.722 (2.449) **	*0.472 (0.014)*
F_ASSETS	-8.134 E-009	-0.512 (-0.573)	*0.609 (0.566)*
S_ASSETS	-1.058 E-009	-0.449 (-2.386) **	*0.654 (0.017)*
F_MIB100DD	0.71760	3.825 (2.666) ***	*0.000 (0.007)*
S_MIB100DD	7.194 E-003	0.017 (0.045)	*0.987 (0.964)*
F_VOL60DD	-15.10020	-2.706 (-2.065) **	*0.008 (0.038)*
S_VOL60DD	-7.08300	-0.561 (-1.559)	*0.576 (0.119)*
Observations (#)	117	Period	1985-1998
$R^2 =$	44.82%	$F(15,101) =$	5.47 ***
R^2(adj.) =	36.63%		

TABLE 11 – Determinants of the underpricing phenomenon: difference between the two periods.

* Statistically different from zero at the 90% level.

** Statistically different from zero at the 95% level.

*** Statistically different from zero at the 99% level.

[a] The variables are taken from Table 9 and adjusted by a dummy variable: F_ refers to the period 1985-1993, B_ to the period 1994-1998.

[b] The statistics in parentheses are adjusted using White (1980) heteroskedastic-consistent standard error.

Placing strategy and periods	Auction (1986)	Fixed Price (1985-1993)	Book-Building (1994-1998) [a]
Offerings (#)	3	70	46
Underpricing	9.138%	32.417%	11.426%
Standard deviation	0.693	1.572	1.250
t-test		2.692 ***	
Adjusted underpricing	6.439%	30.300%	10.597%
Standard deviation	0.819	1.402	1.365
t-test		2.999 ***	

TABLE 12 – The relationship between the underpricing and the placing strategies.

*** Statistically different from zero at the 99% level.

[a] Two offerings (preceded by book-building activity) refer to 1992.

Adjusted underpricing		Observations (#)	Average	Standard deviation	t-test
Offerings in which the offer price is higher than the expected one [a]	The offer price is equal to the maximum price	12	20.921%	0.794	4.362 ***
	The offer price is however lower than the maximum price	18	11.877%	1.128	3.653 ***
Offerings in which the offer price is lower than the expected one [a]	The offer price is equal to the minimum price	1	5.03%	-	-
	The offer price is however higher than the minimum price	15	1.06%	7.132	0.528

TABLE 13 – The relationship between the underpricing, the effective offer price and the offer price range.

*** Statistically different from zero at the 99% level.

[a] The expected offer price is defined as the average of the minimum and maximum prices of the range.

Month	Average BHR	Average BHAR	Median BHAR	Standard deviation	Maximum BHAR	Minimum BHAR	T-statistics	Observations (#)
1	-2.68%	-4.35%	-5.44%	11.52%	-35.86%	34.00%	-4.220 ***	125
2	-2.39%	-4.59%	-6.12%	16.23%	-44.76%	53.31%	-3.165 ***	125
3	-2.88%	-5.23%	-8.04%	19.38%	-68.29%	57.22%	-3.018 ***	125
4	2.08%	-3.06%	-4.59%	23.77%	-85.85%	83.36%	-1.364	112
5	2.42%	-3.28%	-5.13%	28.30%	-125.43%	126.55%	-1.221	111
6	2.74%	-3.66%	-6.22%	29.57%	-89.94%	138.74%	-1.296	110
7	4.23%	-4.92%	-7.25%	33.75%	-96.77%	155.18%	-1.522	109
8	3.93%	-5.49%	-9.25%	39.44%	-116.51%	171.88%	-1.454	109
9	4.60%	-5.48%	-8.73%	42.01%	-146.48%	166.78%	-1.362	109
10	4.80%	-5.25%	-10.61%	42.16%	-108.32%	157.55%	-1.299	109
11	2.59%	-5.54%	-9.81%	43.08%	-110.15%	162.93%	-1.343	109
12	1.85%	-7.49%	-7.70%	45.12%	-132.02%	155.74%	-1.732 *	109
13	4.00%	-5.00%	-8.44%	46.17%	-116.60%	165.41%	-1.109	105
14	4.37%	-3.43%	-6.42%	51.10%	-132.92%	219.14%	-0.688	105
15	5.20%	-3.23%	-6.09%	53.54%	-121.18%	211.94%	-0.606	101
16	5.49%	-3.83%	-9.42%	54.59%	-120.65%	220.32%	-0.706	101
17	5.84%	-5.39%	-12.37%	57.78%	-123.81%	222.18%	-0.937	101
18	8.18%	-4.63%	-10.85%	61.13%	-121.02%	224.48%	-0.761	101
19	8.75%	-6.93%	-13.66%	61.49%	-129.55%	219.48%	-1.132	101
20	9.42%	-6.33%	-11.42%	62.09%	-139.20%	222.54%	-1.009	98
21	9.33%	-7.14%	-10.91%	62.39%	-143.16%	216.74%	-1.126	97
22	11.33%	-6.27%	-10.21%	65.29%	-142.47%	225.87%	-0.946	97
23	9.77%	-4.99%	-11.62%	68.17%	-143.71%	309.13%	-0.722	97
24	10.49%	-6.11%	-8.46%	66.75%	-127.69%	272.05%	-0.902	97
25	10.84%	-1.92%	-8.73%	69.81%	-154.75%	318.62%	-0.262	91
26	10.44%	-2.17%	-6.74%	68.56%	-152.91%	322.34%	-0.301	91
27	11.78%	-1.52%	-6.23%	68.90%	-149.34%	338.81%	-0.207	88
28	12.06%	-0.69%	-6.33%	62.26%	-155.64%	220.52%	-0.102	86
29	11.77%	-2.11%	-5.84%	67.12%	-167.11%	251.63%	-0.290	85
30	12.34%	-2.62%	-13.79%	67.91%	-153.87%	267.85%	-0.355	85
31	11.84%	-3.95%	-10.15%	70.03%	-166.55%	285.57%	-0.520	85
32	12.66%	-2.53%	-10.95%	70.41%	-168.97%	269.92%	-0.329	84
33	13.37%	-2.34%	-12.33%	70.86%	-201.54%	252.33%	-0.302	84
34	13.97%	-1.87%	-8.48%	69.71%	-192.42%	251.05%	-0.246	84
35	14.43%	-0.89%	-7.16%	68.63%	-193.14%	247.87%	-0.118	84
36	14.69%	-2.55%	-6.16%	70.08%	-205.95%	238.40%	-0.333	84

TABLE 14 - Descriptive statistics about BHARs and BHRs in the three years after the listing (period 1985-1998). T-tests have been conducted on the null hypothesis BHAR=0.

*** Statistically different from zero at the 99% level.

* Statistically different from zero at the 90% level.

Month	Average return	Median return	Standard deviation	Minimum value	Maximum value	T-statistics	Observations (#)
AR_1	-4.35%	-5.44%	11.52%	-35.86%	34.00%	-4.220 ***	125
AR_2	-0.47%	-0.46%	8.95%	-23.26%	34.66%	-0.583	125
AR_3	-0.98%	-0.93%	8.82%	-34.93%	30.78%	-1.240	125

TABLE 15 - IPOs adjusted returns computed after the first, second and third month of listing (period 1985-1998).

*** Statistically different from zero at the 99% level.

Underpricing at time t (UND_t)	Listings between 1985 and 1993			Listings between 1994 and 1998		
	Observations (#)	Average	T-statistics	Observations (#)	Average	T-statistics
UND_1	77	27.642%	5.521 ***	48	9.328%	4.700 ***
UND_{10}	77	24.648%	4.728 ***	48	7.164%	2.706 ***
UND_{20}	77	22.543%	4.289 ***	48	4.598%	1.590
UND_{30}	77	20.912%	4.048 ***	48	3.691%	1.211
UND_{40}	77	20.474%	3.874 ***	48	4.380%	1.276
UND_{50}	77	19.306%	3.662 ***	48	2.959%	0.817
UND_{60}	77	19.693%	3.613 ***	48	3.740%	0.954

TABLE 16 - Significance of the underpricing level computed after t days of listing in the periods 1985-1993 and 1994-1998.

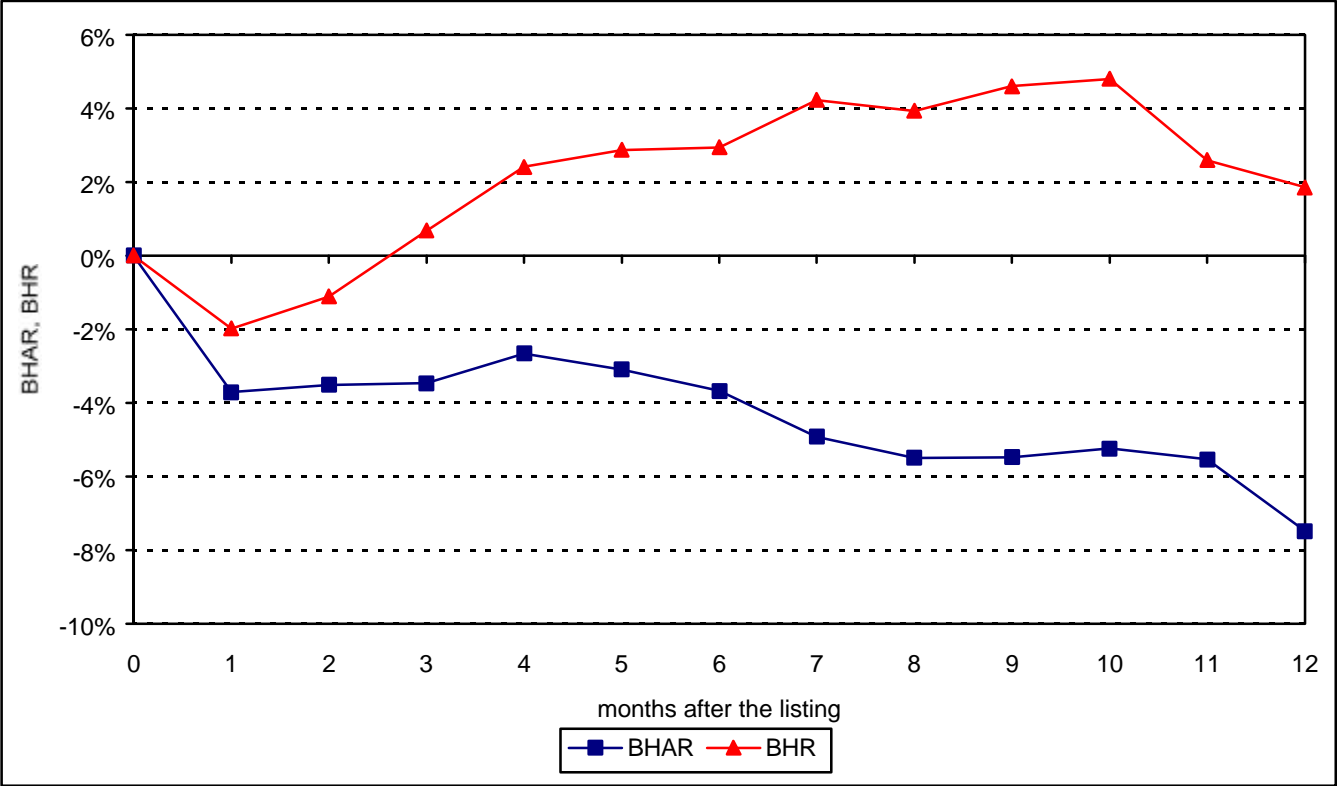*** Statistically different from zero at the 99% level.

FIGURE 3 - BHAR and BHR after the listings computed for 109 IPOs (period 1985-1997).

Month	Average BHR	Average BHAR	Median BHAR	Standard deviation	Minimum BHAR	Maximum BHAR	T-statistics	Observations (#)
1	-1.98%	-3.71%	-4.45%	11.37%	-35.86%	34.00%	-3.408 ***	109
2	-1.11%	-3.51%	-4.50%	16.07%	-44.76%	53.31%	-2.280 ***	109
3	0.68%	-3.47%	-5.78%	19.52%	-68.29%	57.22%	-1.854 ***	109
4	2.41%	-2.66%	-3.87%	23.92%	-85.85%	83.36%	-1.160	109
5	2.87%	-3.10%	-4.91%	28.52%	-125.43%	126.55%	-1.134	109
6	2.94%	-3.68%	-6.57%	29.71%	-89.94%	138.74%	-1.292	109
7	4.23%	-4.92%	-7.25%	33.76%	-96.77%	155.18%	-1.521	109
8	3.93%	-5.49%	-9.25%	39.44%	-116.51%	171.88%	-1.453	109
9	4.60%	-5.48%	-8.73%	42.01%	-146.48%	166.78%	-1.361	109
10	4.80%	-5.25%	-10.61%	42.17%	-108.32%	157.55%	-1.298	109
11	2.59%	-5.54%	-9.81%	43.08%	-110.15%	162.93%	-1.343	109
12	1.85%	-7.49%	-7.70%	45.12%	-132.02%	155.74%	-1.732*	109

TABLE 17 - Descriptive BHAR statistics for a survey of 109 IPOs (period between 1985 and 1997).

T-tests have been conducted on the null hypothesis BHAR=0.

*** Statistically different from zero at the 99% level.

* Statistically different from zero at the 90% level.

	Period 1985-1989				Period 1990-1995			
Month	Average BHR	Average BHAR	T-statistics	Obs. (#)	Average BHR	Average BHAR	T-statistics	Obs. (#)
1	-1.25%	-3.36%	-2.027 *	64	-1.83%	-2.45%	-1.722 *	23
2	-0.87%	-3.28%	-1.576	64	1.68%	1.99%	0.563	23
3	0.62%	-3.60%	-1.508	64	2.62%	4.98%	1.031	23
4	2.72%	-1.63%	-0.548	64	1.39%	5.82%	1.007	23
5	4.95%	-0.68%	-0.181	64	0.49%	5.46%	0.884	23
6	4.35%	0.09%	0.024	64	1.05%	3.98%	0.622	23
7	6.85%	1.35%	0.314	64	0.32%	1.93%	0.285	23
8	5.22%	0.18%	0.037	64	0.03%	3.27%	0.408	23
9	8.09%	2.14%	0.398	64	-2.59%	2.78%	0.329	23
10	7.79%	3.19%	0.617	64	1.41%	3.27%	0.356	23
11	4.91%	4.36%	0.868	64	0.57%	2.66%	0.275	23
12	4.46%	4.61%	0.882	64	-2.56%	0.68%	0.071	23
13	4.48%	5.32%	1.006	64	-1.39%	0.15%	0.014	23
14	5.16%	7.62%	1.347	64	0.96%	2.25%	0.181	23
15	4.92%	8.07%	1.327	64	-1.19%	-0.74%	-0.061	23
16	4.38%	7.44%	1.202	64	-3.55%	-3.88%	-0.317	23
17	5.23%	8.07%	1.250	64	-5.48%	-7.26%	-0.578	23
18	5.44%	8.69%	1.301	64	-1.81%	-7.98%	-0.594	23
19	5.54%	7.73%	1.169	64	-0.28%	-12.62%	-0.961	23
20	6.07%	7.63%	1.172	63	-0.73%	-12.64%	-0.928	23
21	5.21%	8.67%	1.402	63	-1.06%	-17.86%	-1.267	23
22	6.87%	9.22%	1.471	63	2.39%	-18.07%	-1.208	23
23	5.21%	9.87%	1.586	63	2.47%	-16.03%	-0.900	23
24	6.55%	11.07%	1.816 *	63	2.59%	-21.28%	-1.289	23
25	5.52%	10.20%	1.634	63	5.27%	-23.95%	-1.275	23
26	5.67%	10.72%	1.766 *	63	7.19%	-25.98%	-1.354	23
27	7.48%	10.34%	1.702 *	63	16.50%	-26.35%	-1.263	23
28	9.81%	11.65%	1.845 *	63	11.92%	-34.23%	-2.057 *	23
29	10.98%	12.47%	1.830 *	63	12.97%	-37.99%	-2.162 **	23
30	11.73%	12.85%	1.849 *	63	12.95%	-42.14%	-2.394 **	23
31	10.05%	11.73%	1.636	63	15.90%	-46.32%	-2.465 **	23
32	9.58%	12.30%	1.766 *	63	20.00%	-47.02%	-2.359 **	23
33	10.70%	13.58%	1.981 **	63	19.54%	-50.10%	-2.493 **	23
34	11.50%	13.93%	2.018 **	63	19.55%	-49.28%	-2.570 **	23
35	12.49%	15.48%	2.186 **	63	18.50%	-49.99%	-2.866 ***	23
36	12.97%	15.74%	2.173 **	63	18.13%	-57.42%	-3.418 ***	23

TABLE 18 - Descriptive statistics about BHARs and BHRs in the periods 1985-1989

and 1990-1995. T-tests have been conducted on the null hypothesis BHAR=0.

* Statistically different from zero at the 90% level.

** Statistically different from zero at the 95% level.

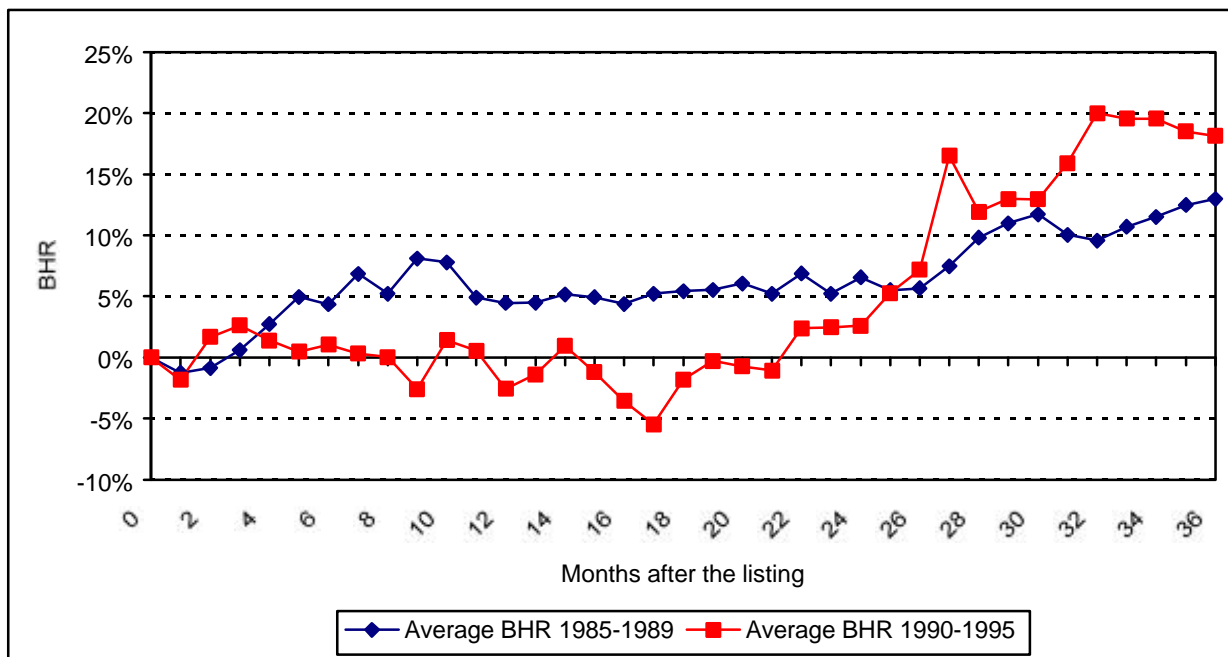*** Statistically different from zero at the 99% level.

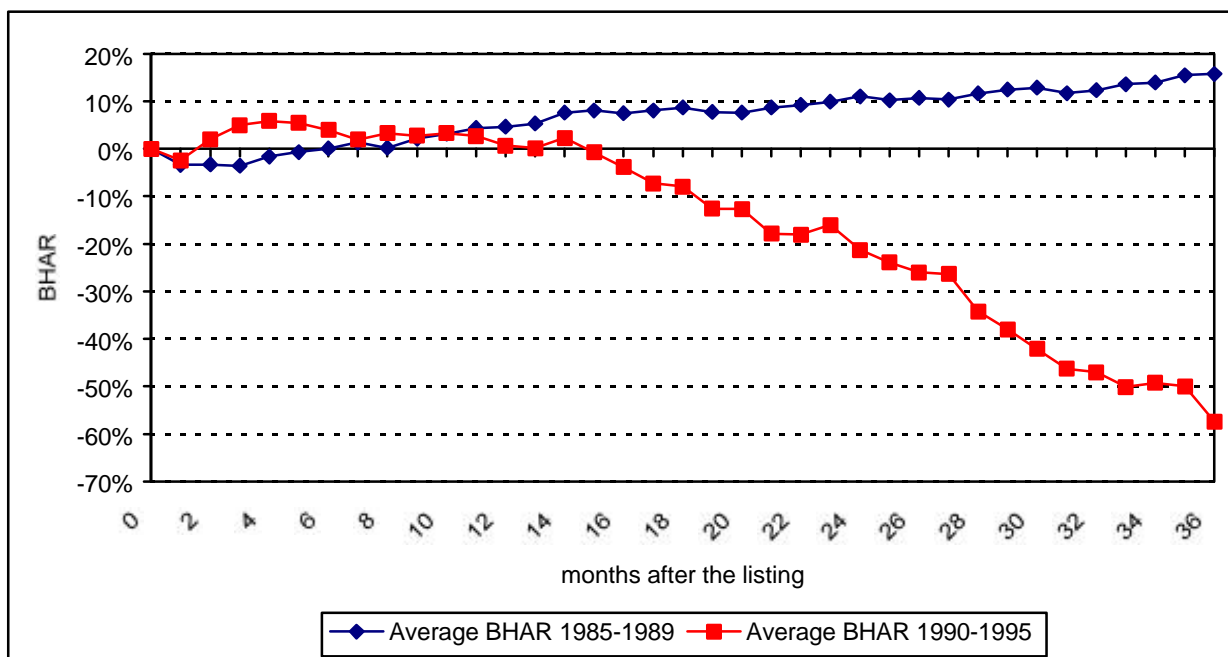FIGURE 4a - BHR in the periods 1985-1989 and 1990-1995 after three years of listing.

FIGURE 4b - BHAR in the periods 1985-1989 and 1990-1995 after three years of listing.

Period 1985-1994 (87 observations)					
Simple underpricing	1 day	1 week	2 weeks	3 weeks	4 weeks
Average	31.606% ***	31.002% ***	30.117% ***	31.601% ***	30.994% ***
Median	15.967%	14.720%	11.696%	12.387%	13.192%
Standard deviation times average value	1.547	1.591	1.718	1.784	1.857
Minimum value	-38.750%	-38.750%	-40.000%	-39.813%	-41.875%
Maximum value	239.487%	213.235%	252.941%	282.353%	300.000%
Skewness [a]	1.710 ***	1.598 ***	1.853 ***	2.136 ***	2.266 ***
Kurtosis [b]	3.739 ***	2.920 ***	4.416 ***	5.979 ***	6.897 ***

TABLE 19 - Simple underpricing distribution after one day, one week, two weeks and four weeks of listing, in the period 1985-1994.

[a] Skewness is defined by the ratio $\dfrac{m_3^2}{m_2^3}$ where m_i represents the i-th distribution moment. If the distribution is symmetrical, the parameter is equal to zero; if it is positive, the distribution is asymmetrical and exhibits higher probability for positive values

[b] Kurtosis is defined by the ratio $\dfrac{m_4}{m_2^2} - 3$ where m_i represents the i-th distribution moment. If the parameter is equal to zero, the distribution is similar to a normal distribution.

*** Statistically different from zero at the 99% level.

Period 1995-1998 (45 observations)					
Simple underpricing	1 day	1 week	2 weeks	3 weeks	4 weeks
Average	10.317% ***	9.455% ***	8.561% ***	7.887% ***	6.436% **
Median	7.000%	3.791%	3.962%	1.759%	0.710%
Standard deviation times average value	1.305	1.790	2.127	2.270	2.804
Minimum value	-8.556%	-16.569%	-21.276%	-22.191%	-29.009%
Maximum value	56.103%	69.504%	61.770%	58.822%	49.308%
Skewness [a]	1.437 ***	1.239 ***	1.038 ***	0.840 **	0.463
Kurtosis [b]	2.698 ***	2.157 ***	1.316 *	0.506	-0.425

TABLE 20 - Simple underpricing distribution after one day, one week, two weeks and four weeks of listing, in the period 1995-1998.

[a] Skewness is defined by the ratio $\dfrac{m_3^2}{m_2^3}$ where m_i represents the i-th distribution moment. If the distribution is symmetrical, the parameter is equal to zero; if it is positive, the distribution is asymmetrical and exhibits higher probability for positive values

[b] Kurtosis is defined by the ratio $\dfrac{m_4}{m_2^2} - 3$ where m_i represents the i-th distribution moment. If the parameter is equal to zero, the distribution is similar to a normal distribution.

* Statistically different from zero at the 90% level.

** Statistically different from zero at the 95% level.

*** Statistically different from zero at the 99% level.

Period 1985-1998 (whole survey - 132 observations)					
Simple underpricing	1 day	1 week	2 weeks	3 weeks	4 weeks
Average	24.402% ***	23.711% ***	22.823% ***	23.577% ***	22.685% ***
Median	9.911%	10.733%	8.000%	7.938%	12.833%
Standard deviation times average value	1.709	1.791	1.949	2.047	2.172
Minimum value	-38.750%	-38.750%	-40.000%	-39.813%	-41.875%
Maximum value	239.487%	213.235%	252.941%	282.353%	300.000%
Skewness [a]	2.250 ***	2.063 ***	2.310 ***	2.642 ***	2.776 ***
Kurtosis [b]	6.747 ***	5.360 ***	7.271 ***	9.548 ***	10.762 ***

TABLE 21 - Simple underpricing distribution after one day, one week, two weeks and four weeks of listing, for the whole survey (period 1985-1998).

[a] Skewness is defined by the ratio $\dfrac{m_3^2}{m_2^3}$ where m_i represents the i-th distribution moment. If the distribution is symmetrical, the parameter is equal to zero; if it is positive, the distribution is asymmetrical and exhibits higher probability for positive values

[b] Kurtosis is defined by the ratio $\dfrac{m_4}{m_2^2} - 3$ where m_i represents the i-th distribution moment. If the parameter is equal to zero, the distribution is similar to a normal distribution.

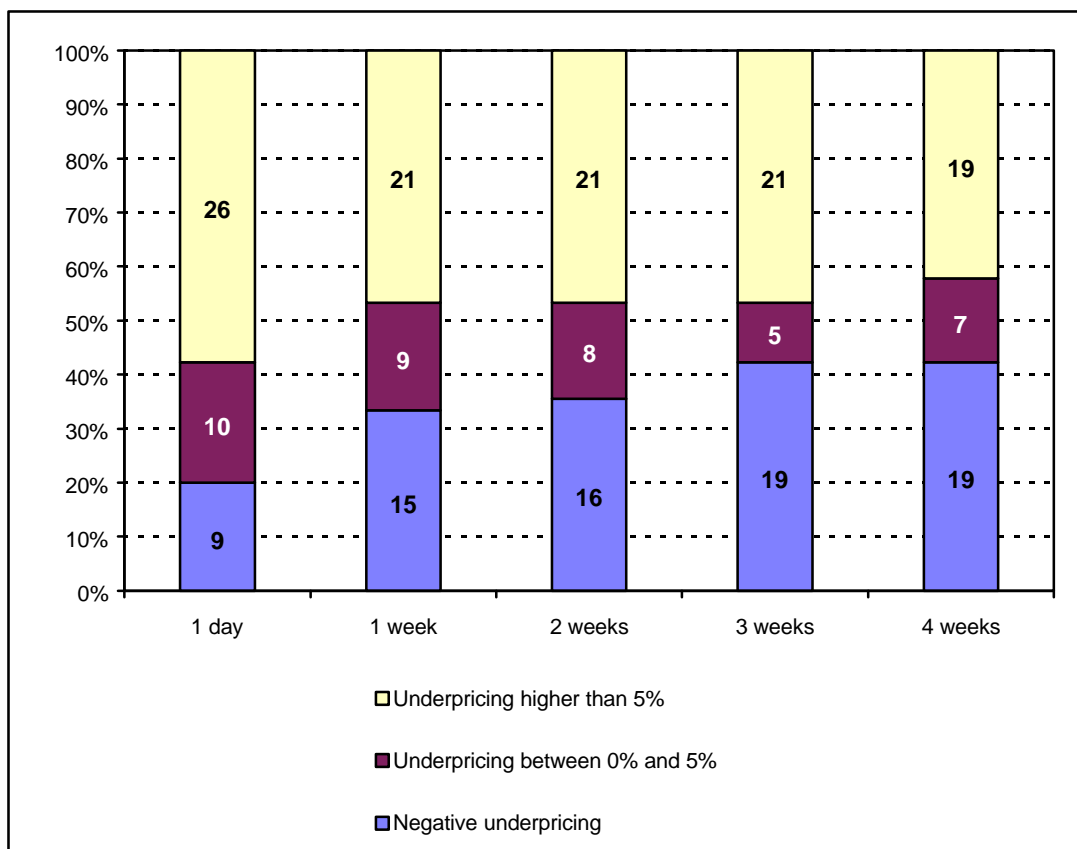*** Statistically different from zero at the 99% level.

FIGURE 5 - Distribution of underpricing magnitude after one day, one week, two weeks, three weeks, four weeks (period 1995-1998).