

# Signalling and the Long-run Performance of Spanish Initial Public Offerings (IPOs)

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**Abstract:** Academic research into firms that have gone public has focused on the study of two anomalies: initial underpricing and long-run underperformance. We analyse Spanish Initial Public Offerings to provide additional evidence on the long-run performance of IPOs and its relationship with initial underpricing. Results reveal the existence of negative long-run abnormal stock returns, in line with the international literature. Long-run performance presents a positive relationship with underpricing and the volume of funds obtained in seasoned offerings, in consonance with the predictions of Allen and Faulhaber (1989), Welch (1989) and Grinblatt and Hwang (1989).

**Keywords:** Initial Public Offering (IPO), underpricing, underperformance, long-run returns and signalling

## 1. INTRODUCTION

Academic research into firms that have gone public has focused on the study of two anomalies. Firstly, the shares of firms that have gone public have been offered to investors at prices that, on

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average, are considerably lower than the price that they later trade at on the stock market. Following Ibbotson (1975) and Ritter (1984a), numerous researchers have found that in different countries and at different points in time, the phenomenon of the underpricing of IPOs is a generalised phenomenon. Secondly, and more recently, different studies have analysed the long-run performance of IPOs. This analysis has revealed that investors seem to obtain losses due to holding shares in the firms that have recently carried out an IPO compared to those firms that have not done so. Taking as a starting point the work of Ritter (1991), several studies have shown the existence of negative long-run abnormal stock returns for firms at five years following the IPO. This phenomenon has been reported in both the USA and other markets. Recently, papers such as Brav et al. (2000) and Eckbo and Norli (2002) have shown that long-run underperformance disappears after controlling for the characteristics or risk of IPO firms. Brav et al. (2000) suggest that IPO returns are similar to non-issuing firm returns matched on the basis of size and book-to-market ratios. Additionally, Eckbo and Norli (2002) show that IPO abnormal returns reflect less risk exposures by both lower leverage and greater liquidity. Table 1 compiles some of the studies that have analysed the initial returns and long-run performance of IPOs and their results.

Less evidence exists regarding the relationship between the two anomalies: underpricing and long-run underperformance. The 'fads' explanation of initial underpricing suggests the existence of a link between initial returns and post-listing performance (Aggarwal and Rivoli, 1990), as do those explanations in which underpricing is modelled as a signal of future performance (Allen and Faulhaber, 1989; Grinblatt and Hwang, 1989; and Welch, 1989). These are the main explanations given in the literature for the relationship between the two anomalies of IPOs. As we shall explain later on in this paper, the relation between underpricing and long-run performance can be positive or negative, depending on the hypothesis.

Several papers have shown the existence of positive initial returns on Spanish IPOs, in the range of around 11%, in line with the reported evidence in other countries (Freixas and Inurrieta, 1991; Fernández et al., 1993; and Álvarez, 2001a). Evidence on the long-run performance of IPOs in Spain, however, is scarce. Farinós (2001) shows that IPO firms do not underperform within a period

**Table 1**

## International Evidence of IPO Underpricing and Long-run Performance

<i>Country</i>	<i>Study</i>	<i>Sample Period</i>	<i>Initial Returns (%)</i>	<i>Long-run Performance (%)</i>
United States	Ritter (1987)	1977–82	14.8	–
	Ibbotson et al. (1994)	1960–92	15.3	–
	Ritter (1991)	1975–84	14.3	–29.1
	Loughran (1993)	1967–87	–	–33.3
	Loughran and Ritter (1995)	1970–90	–	–30.0
	Brav et al. (2000)	1975–92	–	–31.1
Great Britain	Jenkinson and Mayer (1988)	1983–86	10.7	–
	Levis (1993)	1980–88	14.3	–8.1
France	Jacquillat (1986)	1972–86	4.8	–
Germany	Ljungqvist (1997)	1970–93	9.2	–12.1
Japan	Pettway and Kaneko (1996)	1989–93	46.2	–
	Cai and Wei (1997)	1971–90	–	–27.0
Sweden	Rydqvist (1993)	1970–91	39.0	–
	Loughran et al. (1994)	1980–90	38.2	1.2
Switzerland	Kunz and Aggarwall (1994)	1983–89	35.8	–6.1
Australia	Lee et al. (1996)	1976–89	11.9	–51.0
Brazil	Aggarwall et al. (1993)	1979–90	78.5	–47.0
Chile	Aggarwall et al. (1993)	1982–90	16.3	–23.7
Korea	Dhatt et al. (1993)	1980–90	78.1	–
	Kim et al. (1995)	1985–88	–	91.6
Hong Kong	Chen et al. (2001)	1993–96	19.0	–
	McGuinness (1993)	1980–90	–	–18.3
Singapore	Koh and Walter (1989)	1973–87	27.0	–
	Hin and Mahmood (1993)	1976–84	–	–9.2

*Notes:*

This table compiles the main studies on underpricing and long-run performance of IPOs. Initial returns (underpricing) may be measured between the (first) subscription day and the first trading day, or some day soon after going public. They may be initial returns or initial market adjusted returns. Long-run performance is calculated over the investment window and excludes the initial underpricing return. The investment window varies between two and six years. Some studies use a range of benchmarks; in these cases, the most representative result is shown. Computation methodologies vary among studies.

of 1 and 3 years after the IPO, but with a small sample size of 18 firms. Ansótegui and Fabregat (1999) report the existence of long-run underperformance in the 3-year period after the IPO using the market index and an industrial index as benchmarks.

This paper has two aims. We analyse the long-run performance of Spanish IPOs made during the 1987–1997 period, employing different benchmarks in order to lend more robustness to the results. We control for the size and book-to-market ratio, since these have been proposed as determinants of stock returns. We also study the influence of underpricing as a signalling mechanism in the post listing performance of IPOs. The interest of our paper lies in the fact that it goes deeper into the analysis and estimation of long-run abnormal returns compared to other papers about the Spanish IPO market. The paper also provides evidence on the influence of underpricing as a signal of the quality of the firm going public.

The rest of the paper is structured in the following way. In Section 2 we discuss the relationship between underpricing and long-run performance. Section 3 presents the database under study and its fundamental characteristics. In Section 4, the methodology used to estimate long-run returns is commented on. The results obtained for long-run performance and its relationship with initial underpricing are presented in Section 5. The main conclusions of the study are drawn in Section 6.

## 2. LONG-RUN RETURNS OF IPOs

Ritter (1991) reports the low long-run returns on the stocks of those firms that carry out IPOs compared to those obtained by firms that have not performed IPOs. Ritter suggests that these low long-run returns of IPOs are caused by many firms simultaneously going public in hot sectors and implies that investors can be periodically over-optimistic as regards the potential profits of new firms. Many firms go public near the peak of industry-specific fads, which justifies the ‘fads’ explanation for initial underpricing. So, the ‘fads’ explanation will predict a negative relation between long-run returns and initial returns.<sup>1</sup>

<sup>1</sup> Aggarwal and Rivoli (1990) provide an analysis of the long-term aftermarket price behaviour of IPOs, concluding that IPOs seem to be subject to overvaluation or fads in early aftermarket trading.

Theoretical papers such as Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989) have analysed the signalling hypothesis. According to this hypothesis, the owner's incentive to leave a good taste is due to the possibility of coming back to the market to sell securities on more favourable terms. These studies model IPO underpricing as a signal from better-informed firm owners to less informed investors. The issuer is assumed to have better information about the firm's future cash flows than outside investors. In order to solve asymmetric information problem, the issuer signals the true value of the firm by offering shares at a discount and by retaining some of the new issue in his personal portfolio. This discount is an immediate loss to the initial owners. Hence, underpricing is a credible signal that the firm is a good investment to investors, because only good-quality firms can be expected to recoup this loss through seasoned offerings after their performance is realized. Low quality firms know they cannot recoup the initial loss from underpricing, and so they cannot afford to signal.

According to the signalling hypothesis, IPO firms pursue a multiple issue strategy when they choose both the price and the proportion of the firm they offer at their IPO. If information asymmetry exists between firm owners and investors, the high-quality firm owners can signal the 'true value' through the price and the proportion of the firm offered. Only 'high-quality' firms can recoup the initial loss from underpricing through seasoned offerings. To imitate high-quality firms, low-quality firms would not only have to incur the signalling costs but would also need to expend resources to imitate the observable real activities and attributes of high-quality firms. Underpricing can drive an additional wedge between the costs and benefits of low-quality firms' imitation tradeoffs inducing low-quality firms to reveal themselves.

In short, in the signalling hypothesis the firm that goes public considers the possibility of performing subsequent seasoned offerings, and the reason for the underpricing would be to get a better price in future seasoned offerings. Thus, signalling models of underpricing predict that IPO firms that underprice (high-quality firms) should exhibit superior operating performance and consequently superior long-run performance.

The signalling hypothesis makes two predictions regarding the long-run performance of IPOs:

- If firms underprice stocks to signal their quality to the market, those revealed to be of high quality in the future, and hence with high long-run performance, should have had high initial underpricing (Michaely and Shaw, 1994).
- If high-quality firms come back to the market in the future, the firms with high long-run performance will be those obtaining more funds in subsequent seasoned offerings.

These predictions can be considered as an argument to explain the relationship between the two anomalies of IPOs: underpricing and underperformance. It must be stressed that in the papers by Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989), the signal—underpricing—will lead to a separating equilibrium in which bad firms do not underprice because it is too costly for them. Hence, investors are able to distinguish between good and bad firms at the end of the first day of trading. In a previous study, following Allen and Faulhaber (1989), we documented the existence of a positive relationship between underpricing and recouping costs by issuing additional shares later on in a SEO (Alvarez, 2001b). Here in this paper and according to the two predictions of the signalling hypothesis regarding the long-run performance of IPOs, we wish to test whether firms that underprice stocks to signal their quality to the market are those of high quality revealed in the future, and thus with high long-run performance. Additionally, we verify if high-quality firms come back to the market in the future, then the firms with high long-run performance will be those obtaining more funds in subsequent seasoned offerings. In short, this is a test of the implications of the signalling hypothesis for the long run.

In consonance with these predictions, only firms whose stocks experience a good long-run performance should thus return to the capital market in a short period of time. This is the case in the United States (Michaely and Shaw, 1994), the United Kingdom (Levis, 1993) and Germany (Ljungqvist, 1996). Additionally, Welch (1989) provides empirical support that IPO firms issue a substantial amount of seasoned equity. Moreover, Lee et al. (1996) show that long-run returns are not associated with

underpricing in the negative manner that the overreaction or 'fads' explanations suggest.<sup>2</sup>

### 3. DATABASE

Our initial sample consisted of all the firms that went public in Spain during the period 1987–1997. These constituted 112 firms, but in this initial sample there were 20 direct exchanges, without a previous offer, 32 private placements, 2 mixed placements and 4 listing decisions of firms that were listed abroad. Thus, in order to compare our results with the international evidence, we selected the real IPOs, of which there were 54. We had to eliminate two firms because their shares were excluded before 12 months after the IPO, so the final number was 52. Taking into account the fact that the number of firms quoting on the Spanish Market is around 300, our sample represents approximately 17% of the population of quoted firms. However, the mean percentage of IPOs capitalization over market capitalization is 2.82%. In fact, IPO firms are small compared to listed firms.

We estimate the long-run returns in the different windows: one, three and five years, bearing in mind that the sample period ends in 1997 and our quoting data ends in 2000. The data used come from the IPO prospectuses drawn up by firms in order to request their listing on the Stock Exchange and was provided by the Madrid Stock Exchange for the issues taking place between 1987 and 1989 and by the Spanish Securities and Exchange Commission (C.N.M.V.) for the years after 1989.

The firms making up the database are listed in the Appendix, in which we indicate the date of going public and the sector to which they belong according to the classification made by the Madrid Official Stock Exchange Bulletin. Most of the issues are concentrated in the period 1989/1991, whereas from 1991 onwards the number progressively decreases, beginning to rise again in 1997.

This concentration of IPOs in relatively short periods of time, after which there are years in which the number of IPOs is

<sup>2</sup> The existing evidence related to the signalling hypothesis is however contradictory, as there are papers that do not support the predictions of this hypothesis.

minimal, is not a situation that is exclusive to Spain and has been reported for various countries. Ritter (1984a) analyses IPOs in the United States in the period 1960/82, observing that these were much more numerous during the years 1960/61, 1968/73 and 1980/81 than in 1962/67 and 1973/79. In European economies, Loughran et al. (1994) show this particular evolution of IPOs in the United Kingdom (1985/88), Italy (1986/87) and France (1985/87), among other countries.

Table 2 reports the descriptive statistics of the sample. A relevant aspect is that IPOs in Spain are carried out by firms with an average operating history of 32 years, which is the time elapsed since the firm's foundation to the time of its listing on the Stock Exchange. This feature coincides with the evidence contributed by Loughran et al. (1994), who in their comparative study of IPOs performed in 25 countries, show that in the countries of Continental Europe, most of the firms that enter the market are more mature, larger and more established than those of the United States or the United Kingdom. The average age of IPO firms in Continental Europe is 50 years, which contrasts with the case of the USA where IPO firms have an average of 6 years' operating history.

The average institutional participation does not exceed that of the retail investor in Spanish IPOs: the average percentage of the placement among institutional investors is 30.01%, indicating that institutional investor participation is not favoured in Spain, contrary to what occurs in the United States (Hanley and Wilhelm, 1995; and Aggarwal et al., 2002) and the United Kingdom (Jenkinson, 1990). These studies show that institutions are favoured in the IPO allocation process.

The average price of IPOs is 24.66 euros, the average percentage of shares offered is 35.53% and the level of over-subscription of Spanish IPOs is, on average, 18.35 times the offer. The median number of days from the inscription of the offer on the C.N.M.V. to the first trading day is 44, although this becomes 57 when it is a fixed price offer and 15 days when there is a book-building process. According to Spanish Market Law, after the registration of the IPO prospectus on the C.N.M.V., the period of subscription is opened. The maximum period allowed for the offer is one year, although in practice the most recent IPOs do not take more than 20 days.



**Table 2**  
Descriptive Statistics of the Database

	<i>Average</i>	<i>Median</i>	<i>Maximum</i>	<i>Minimum</i>
Offer's size*	63,152	19,383	455,825	2,969
Firm's size (total assets)*	866,497	50,245	34,260,123	8,267
Percentage of leverage	0.48	0.46	1.62	0.00
Sales in the year prior to the IPO*	201,795	34,107	3,511,180	360
ROA in the year prior to the IPO	0.11	0.08	0.52	0.00
ROE in the year prior to the IPO	0.27	0.20	2.40	0.00
Market value of common equity*	408.91	120.38	3964.43	13.97
Book-to-market Ratio	0.41	0.36	1.19	0.02
Age of the firm	32	25	115	0
Offer price	24.66	18.07	91.11	2.82
Price at the end of the first day of trading	27.38	19.58	99.17	2.43
Number of shareholders with more than 25% (before the IPO)	1	1	2	0
Percentage of shares offered	35.53	33.18	100.00	1.33
Percentage of shares for institutional investors	30.01	0.00	100.00	0.00
Level of oversubscription	18.35	16.5	35	6
Days from the inscription of the offer on the C.N.M.V. to the first trading day	66	44	447	1

*Note:*

\*Data in thousands of Euros.

#### 4. METHODOLOGY

Long-run abnormal returns have been calculated as the return on a buy-and-hold investment in the sample firm minus the return on a buy-and-hold investment in a benchmark. Long-run event studies of stock returns aim to assess the value of investing in the average

sample firm with respect to an appropriate benchmark over the horizon of interest; that is why the correct measure is the buy-and-hold return (Barber and Lyon, 1997). Long-term investor experience is better captured by compounding short-term returns to obtain long-term buy-and-hold returns.

The long-run returns are calculated monthly compounding during 1, 3 or 5 years after the IPO and are adjusted by the expected return:

$$\text{BHAR} = \frac{1}{N} \sum_{i=1}^N \left[ \prod_{t=t_i}^{T_i} (1 + R_{it}) - 1 \right] - \left[ \prod_{t=t_i}^{T_i} (1 + E(R_{it})) - 1 \right]. \quad (1)$$

Where  $R_{it}$  is the return on security  $i$  in month  $t$  adjusted for dividends,  $N$  is the number of securities,  $T$  is the number of months (12, 36 or 60 months),  $t_i$  is the date of the closing price on the first day of trading and  $E(R_{it})$  is the expected return. The approach of this paper is to examine the robustness of IPO performance with respect to various benchmarks:

- A value-weighted market index (IGBM) and an equally-weighted market index, embracing over 95% of capitalization on the Madrid Stock Exchange.
- Size and/or book-to-market portfolios. We measure firm size as the market value of common equity – shares outstanding multiplied by closing price – and we use the book value of common equity reported on the firm's balance sheet divided by the market value of common equity. Following Fama and French (1993), we match on size and book-to-market portfolios in order to capture relevant cross-firm variation in average returns due to expected returns or sample-specific patterns in average returns.
- A control firm approach, in which sample firms are matched to a control firm on the basis of size and book-to-market ratio. Barber and Lyon (1999) showed that matching sample firms to control firms of similar size and book-to-market ratios yield well-specified test statistics in all sampling situations considered.

Portfolios are constructed in terms of size and book-to-market ratio and are reconstituted in July of each year, following

Lyon et al. (1999). Size is measured in June of each year as the market value of equity, calculated as the number of shares outstanding times the stock price the last day of June of each year and the book-to-market ratio is calculated in December of each year.<sup>3</sup> We measure the book-to-market ratio using the book value of common equity reported on the firm's balance sheet in year  $t - 1$  divided by the market value of common equity in December of year  $t - 1$ .

Size portfolios were obtained by classifying the firms listed on the Madrid Stock Exchange in the period 1987–1997 according to the market value of equity in June of each year and creating size quintiles. In order to avoid the portfolios being contaminated by the same firms that form the sample under study, we eliminated the firms that carried out an IPO from the portfolios during the five years subsequent to going public. In July of each year, the firm that has carried out an IPO in the previous five years is allocated to a size quintile, taking as a benchmark the mean return of the firms included in the corresponding quintile. The procedure followed in order to form portfolios in terms of the book-to-market ratio was similar; the only difference being that the book-to-market ratio was calculated in December of each year.

We likewise used the following procedure for the formation of portfolios in terms of both criteria taken together. First, the firms were divided according to their size in June of each year into tertiles,<sup>4</sup> and within each size tertile the firms were once more classified into tertiles created in terms of the book-to-market ratio in December of the previous year. Then, each firm that had carried out an IPO in the previous five years was allocated in July of each year to one of the 9 portfolios formed.

<sup>3</sup> Rankings based on the market value of equity in June of year  $t$  are used from July of year  $t$ , to June of year  $t + 1$ , and rankings according to book-to-market ratios in December of year  $t - 1$  are used from July of year  $t$  through to June of year  $t + 1$  (Barber and Lyon, 1997; and Lyon et al., 1999). The reason to use the book-to-market ratio calculated in December of year  $t - 1$  to classify firms is to ensure that financial statements are known on the date on which the estimation of returns starts, namely July of year  $t$ . These moments in time to construct portfolios are standard in the literature, following Fama and French (1993).

<sup>4</sup> The reason for using tertiles and not quintiles for portfolio formation is to place a minimum number of firms in each of the portfolios formed in terms of both criteria.

We have examined the size and book-to-market characteristics of our sample. For IPOs, the market value of equity is calculated using the stock price at the end of the first month subsequent to going public. The book value of equity of IPO firms is obtained from the information prospectuses registered on the C.N.M.V. and correspond to December of the year prior to going public. The distribution of the firms into size and book-to-market portfolios in the month following the IPO can be seen in Table 3.

IPOs tend to be concentrated in the portfolio of smaller size and lower book-to-market ratio: a total of 24 IPOs out of the 52 that make up the sample. In particular, 75% of the firms in the sample form part of the lower book-to-market ratio segment. Hence, if size and book-to-market ratio are determinants of stock returns (Fama and French, 1993), the use of market indexes or portfolios formed in terms of different criteria to approximate the expected stock returns is inappropriate. Two explanations may be used to explain the low book-to-market

**Table 3**

Firms Classification in Portfolios According to Size and Book-to-Market Ratio

		<i>Book-to-Market Ratio</i>			
		<i>Low</i>	<i>Medium</i>	<i>High</i>	<i>Total</i>
Market Value of Equity	Small	24	7	1	32
	Medium	9	1	1	11
	Large	6	1	2	9
	Total	39	9	4	52

*Notes:*

The table shows the distribution of firms according to size and book-to-market portfolios in the month after the IPO. Size is measured in June each year as the market value of common equity, computed as the number of shares outstanding multiplied by the closing price the last day of June each year. Book-to-market ratio is computed in December each year. Portfolios have been constructed by classifying firms listed on the Madrid Stock Exchange between 1987–1997 according to market value of common equity in June each year. We form tertiles according to size. In each size tertile, firms are classified according to their book-to-market ratio. IPOs are assigned to each of the corresponding portfolios and their return is compared with the portfolio's return to obtain the abnormal return. IPO's market value of equity is computed with the closing price at the end of the first month after the IPO. Book value of common equity for IPO firms is obtained from IPO prospectuses registered on the C.N.M.V. (Spanish SEC) and these values correspond to December of the previous year to the IPO.

grouping. On the one hand, the book-to-market ratio may represent future growth opportunities for which IPO firms need to raise funds. On the other hand, it may be due to the fact of overpricing, in line with 'fad' arguments.

Barber and Lyon (1997) recommend matching the sample firm to control firms of similar size and book-to-market ratios in order to obtain abnormal returns. In this sense, we used control firms as an alternative to the use of portfolios to estimate abnormal stock returns. Following similar criteria to the construction of portfolios, we chose a control firm for each firm in the sample (IPO). First of all, firms are placed in the appropriate size tertile on the basis of their June equity market value. Secondly, we chose the firm with the book-to-value ratio closest to that of the sample firm. This process is carried out in July of each year.

When the abnormal stock returns are estimated using a market index, portfolios or control firms, we estimate the statistical significance of the abnormal stock returns. To test the null hypothesis that the mean buy-and-hold abnormal return is equal to zero for the sample of IPO firms, we first employ a conventional *t*-statistic:

$$t = \frac{\overline{AR}_T}{\sigma(AR_T)/\sqrt{n}} \quad (2)$$

where  $\overline{AR}_T$  is the sample mean and  $\sigma(AR_T)$  is the cross-sectional sample standard deviation of abnormal returns for the sample of *n* firms. We also use a nonparametric Wilcoxon signed rank test statistic.

## 5. LONG-RUN PERFORMANCE OF IPOs

Table 4 shows the return obtained by the investor when purchasing the IPO stocks at the closing price on the first trading day and holding them for a time horizon of 1, 3 or 5 years. As can be seen in this table, different alternatives were used in the calculation of the expected returns: a value-weighted market index (IGBM), an equally-weighted index of the Madrid Stock Exchange, a size portfolio of firms, a book-to-market portfolio of firms, a size and book-to-market portfolio of firms and control firms selected in terms of the same criteria.

**Table 4**  
Long-run Buy and Hold Abnormal Return (BHAR) on IPOs

	<i>Abnormal Return (%)</i>	<i>T Student</i>	<i>Wilcoxon Test</i>	<i>%AR &lt; 0</i>	<i>Wealth Ratio</i>
<b>Panel A: 1 year BHARs</b>					
IGBM ( <i>N</i> = 52)	6.11	0.72	-0.17	50.00	1.06
BM Equally Weighted Index ( <i>N</i> = 52)	8.55	1.01	-0.37	46.15	1.08
Size Portfolio ( <i>N</i> = 52)	1.93	0.22	-0.52	51.92	1.02
Book/Market Ratio Portfolio ( <i>N</i> = 52)	-0.04	-0.00	-0.98	53.85	1.00
Book/Market Ratio and Size Portfolio ( <i>N</i> = 52)	3.36	0.40	-0.68	53.85	1.03
Control Firms ( <i>N</i> = 52)	0.16	0.01	-0.57	57.69	1.00
<b>Panel B: 3 year BHARs</b>					
IGBM ( <i>N</i> = 37)	-28.24	-1.69*	-2.74***	78.38	0.78
BM Equally Weighted Index ( <i>N</i> = 37)	-18.59	-1.12	-2.32**	78.38	0.84
Size Portfolio ( <i>N</i> = 37)	-31.62	-2.03**	-2.81***	72.97	0.76
Book/Market Ratio Portfolio ( <i>N</i> = 37)	-32.16	-2.14**	-2.95***	78.38	0.75
Book/Market Ratio and Size Portfolio ( <i>N</i> = 37)	-27.84	-1.68*	-2.25**	75.68	0.78
Control Firms ( <i>N</i> = 37)	-24.56	-1.10	-1.43	62.16	0.80
<b>Panel C: 5 year BHARs</b>					
IGBM ( <i>N</i> = 34)	-20.98	-0.69	-2.40**	79.41	0.85
BM Equally Weighted Index ( <i>N</i> = 34)	-1.98	-0.06	-1.99**	76.47	0.98
Size Portfolio ( <i>N</i> = 34)	-21.42	-0.72	-2.64***	79.41	0.85
Book/Market Ratio Portfolio ( <i>N</i> = 34)	-37.05	-1.20	-2.56***	81.82	0.75
Book/Market Ratio and Size Portfolio ( <i>N</i> = 34)	-17.76	-0.65	-2.09**	76.47	0.87
Control Firms ( <i>N</i> = 34)	-24.37	-0.72	-1.99**	67.65	0.83

*Notes:*

The table shows the results of a buy-and-hold strategy on IPOs, after 12, 36 and 60 months from the first day of trading. Long-run returns are computed monthly up to the investment horizon considered (12, 36 and 60 months). Returns are adjusted by the return considered normal, which is alternatively: the Madrid Stock Exchange General Index (value weighted index); an equally weighted index; a size portfolio return (size is measured by market value of common equity); a book-to-market portfolio return; a size and book-to-market portfolio return; and, finally, control firms return. The differences in the number of firms in each panel are due to companies that stopped quoting or to not having the data for the period of analysis to estimate three and five year returns.

\*\*\*, \*\*, \* Statistically significant at the 1%, 5% and 10% level, respectively.

Independently of the benchmark used, the results reveal the existence in the first year after the IPO of abnormal returns that are mostly positive though not statistically significant. These results show that, on average, the firms have not underperformed one year after going public.

However, in the other two horizons considered, i.e. 3 and 5 years, we observe the existence of negative abnormal returns, with values between  $-18.59\%$  and  $-32.16\%$  for the case of 3 years and between  $-1.98\%$  and  $-37.05\%$  when the horizon is 5 years. Thus, it can be appreciated that these negative abnormal returns are not determined by only a few observations, but rather that approximately three quarters of the sample presents negative returns. There are in fact a few cases in which the abnormal stock returns are highly positive, which means that, on average, we do not obtain significant negative abnormal returns. However, we obtain significant negative abnormal returns when we use the Wilcoxon signed rank test.

Table 4 also compiles the wealth relative ratios, which are the ratios of the mean returns of the IPO for a period and of the mean return of the respective benchmark in the same period and which are calculated according to the following expression:

$$WR_T = \frac{\frac{1}{N} \sum_{i=1}^N \left( \prod_{t=1}^T (1 + R_{it}) \right)}{\frac{1}{N} \sum_{i=1}^N \left( \prod_{t=1}^T (1 + E(R_{it})) \right)}. \quad (3)$$

Where  $WR_T$  is the wealth relative ratio for the period between  $t=1$  and  $t=T$ ,  $T$  being alternatively 12, 36 or 60 months;  $R_{it}$  is the market return of firm  $i$  in month  $t$  after going public;  $E(R_{it})$  is the return on the index, portfolio of firms or control firm in month  $t$  after firm  $i$  going public; and  $N$  is the number of IPOs.

It can be seen that independently of the benchmark used, the wealth relative ratios in the periods of 3 and 5 years are less than one. In particular, the relative wealth ratio at 3 years is 0.76 using a size portfolio as a benchmark and 0.78 using a size and book-to-market portfolio. This result is consonance with those obtained in other works. Ritter (1991) reports a wealth relative ratio, 3 years after the IPO, of 0.831 for the 1,526 IPOs analysed, using a size and industry portfolio as a benchmark.

In short, the long-run returns of Spanish IPOs reveals that, on average, the firms have not underperformed at 12 months with respect to the different benchmarks considered. If we consider the periods of 36 and 60 months, we likewise observe negative abnormal stock returns that reach significant values, though only in some cases. This result is consistent with the literature on long-run underperformance in the international context.

*(i) Anomalies and Subsequent Equity Offerings*

In order to analyze the relation between the two anomalies associated with IPOs, we calculated the initial returns of the Spanish IPOs between 1987 and 1997 as the difference between the closing price of the stock on the first day of trading and the issue price of the IPO divided by the latter. As shown in Table 5, the average underpricing of IPOs in the Spanish capital market during the study period is 14%. This percentage indicates the return that would be obtained, on average, by an investor who had bought the stocks in the offer and sold them at the end of the first day's trading. The initial returns adjusted for the market return, measured as the return obtained by the General Index of the Madrid Stock Exchange (IGBM) in the same period, is 13%. This result is consistent with the initial return obtained by most of the studies mentioned in Section 1 of this paper.

In an initial analysis of the signalling hypothesis, we divided the sample of IPOs into three groups. The first group comprises all firms that issue additional equity in the year following the IPO, and the second group comprises all firms that issue additional equity from the second to the fifth year after going public. All firms that do not have an equity offering are included in the third group.

The results in Table 6 confirm the validity of the signalling hypothesis for Initial Public Offerings (IPOs) in the case of Spain. In fact, 21% of the IPO firms reissue shares during the first year after the IPO, and 42% of the firms from the second to the fifth year after the IPO. These data confirm the argument that IPO firms follow a strategy consisting of selling part of the shares in the initial offering and the rest in seasoned equity



**Table 5**  
Underpricing of Spanish IPOs

<i>Year</i>	<i>No.</i>	<i>Initial Return</i>	<i>Initial Market Return</i>	<i>Initial Market-Adjusted Return</i>
1987	3	0.10	-0.01	0.11
1988	2	-0.07	0.02	-0.09
1989	14	0.13	0.04	0.10
1990	6	0.08	-0.05	0.13
1991	6	0.31	0.04	0.27
1992	3	-0.06	-0.02	-0.04
1993	1	0.11	-0.02	0.13
1994	4	0.07	0.00	0.07
1996	4	0.14	0.01	0.13
1997	9	0.22	0.01	0.20
<i>Total</i>	52	0.14	0.01	0.13

*Notes:*

The table shows the initial returns on Spanish IPOs for each year. Initial returns are measured between the first subscription day and the first trading day. The first column shows initial returns and the third column shows the initial market adjusted returns.

offerings at higher prices than the IPO. As we can see in the table, the initial return for the first group of firms that reissue equity during the first year is 15%, while for the second group it is 13%. The argument mentioned above is also supported by the result of the total SEO proceeds divided by the IPO proceeds, which is on average 1.55 for the first group of firms reissuing and 3.81 for the second. This last figure indicates that firms obtain proceeds in subsequent SEOs that are, on average, more than three and a half times higher than the IPO proceeds. This result is extremely important because only if the cost of the IPO firms associated with the underpricing is offset either by higher issue proceeds or in greater wealth for the firm's initial owners is the signalling hypothesis affirmed. In short, in the Spanish capital market, IPO firms underprice the initial offering in order to signal their quality to the investors and to obtain higher proceeds from the capital market in the future. This fact is essential for the acceptance of the signalling hypothesis, as it requires good firms to potentially gain in later SEOs, and that is supported by the figures.

**Table 6**  
Descriptive Statistics for Issuing Firms

<b>Panel A:</b>		
	<i>Total Initial Public Offerings (IPOs)</i>	
Number of IPOs	52	
IPO Proceeds (in thousands of euros)	63,152.08 (2,969.11/455,824.82)	
Initial Return	0.14 (−0.20/1.00)	
1-Year BHAR	0.03 (−0.83/3.10)	
3-Year BHAR	−0.28 (−3.35/3.04)	
5-Year BHAR	−0.18 (−2.37/7.50)	
<b>Panel B:</b>		
	<i>Corresponding Seasoned Equity Offerings in One Year (SEOsI)</i>	<i>Corresponding Seasoned Equity Offerings from the Second to the Fifth Year (SEOsII)</i>
Number of IPO Firms Reissuing	11	22
Total Number of SEOs	14	66
Initial Return of IPO Firms Reissuing	0.15 (−0.06/1.00)	0.13 (−0.20/0.99)
1-Year BHAR	0.29 (−0.44/3.10)	0.22 (−0.44/3.10)
3-Year BHAR	−0.24 (−1.86/3.04)	0.01 (−1.47/3.04)
5-Year BHAR	0.39 (−2.37/7.50)	0.14 (−2.37/7.50)
Total SEO Proceeds/IPO Proceeds	1.55 (0.08/9.26)	3.81 (0.03/28.83)
<b>Panel C:</b>		
	<i>IPOs Without Seasoned Equity Offerings (SEOs)</i>	
Number of IPO Firms NOT Reissuing	25	
Initial Return	0.12 (−0.20/0.98)	
1-Year BHAR	−0.15 (−0.83/0.52)	
3-Year BHAR	−0.52 (−3.35/0.17)	
5-Year BHAR	−0.61 (−2.28/−0.10)	

*Notes:*

Panel A in the table shows the characteristics for Initial Public Offerings (IPOs) from 1987 to 1997 on the Spanish Capital Market. Panel B lists the characteristics of the Seasoned Equity Offerings (SEOs) for these IPOs in one year, and from the second to the fifth year. The total SEO Proceeds/IPO Proceeds statistics are only for firms that had reissued. Panel C lists the characteristics of the IPOs without Seasoned Equity Offerings (SEOs). For the final rows in the three panels, the first cell entry is the mean, and the subsequent numbers (in parenthesis) are the range of the series. All Euro series have been normalized to 1987 prices.

*(ii) Relationship Between Long-run Performance and Underpricing*

The second aim of this study is to determine whether the initial underpricing at the time of the IPO may be considered as a signal of the quality of the firm that goes public. However, the initial return could be the consequence of mispricing on the part of investors – the ‘fads’ explanation. In the latter case, there would be a negative relationship between the initial return and the long-run return. Investors overprice stocks when the firm goes public, and this originates a high positive return at the time of the IPO. However, this mispricing would be revealed in the future and the long-term return would be negative. Thus, according to the ‘fads’ explanation the relationship between short-term and long-term IPO returns would be negative.

The signalling hypothesis predicts a positive relationship between initial underpricing and long-run performance of IPOs. According to this hypothesis, underpricing is a signal of the quality of the firm. High quality firms underprice at the moment of going public, because they will recoup this loss in the future when the true quality is revealed. A higher stock price – one closer to the true value – in seasoned offerings after the IPO will be the way to recoup the loss from underpricing. Consequently, according to the signalling hypothesis, high-quality firms that underprice their stocks in the IPO should present better long-run performance. This would explain a positive relationship between initial underpricing and long-run return. Moreover, firms that were revealed as good quality firms would issue equity.

Grinblatt and Hwang (1989) argue that firm value will be positively related to the degree of underpricing. In this context, and following Michaely and Shaw (1994), we estimate the firm’s value/quality as its long-run performance. Once initial returns and long-run returns have been calculated, we study the relationship between initial underpricing and long-run performance by estimating different logit models using as dependent variable a dummy variable that takes a value of 1 when the firm is a winner and a value of 0 when it is a loser. We define a winner/loser as the firm whose long-run abnormal return is positive/negative. A logit model was run both for each benchmark considered and each period, 1, 3 or 5 years.

The independent variables we used to test the signalling hypothesis were the underpricing of the IPO (LNARI), the number of SEOs that the firm carries out during the one year-period after the initial offer (SEOs I), and the number of SEOs that the firm carries out from the second to the fifth year (SEOs II), as well as the percentage of stocks retained in the offer (ALPHA). We included control variables for firm and offer characteristics. On the one hand, we incorporate size (ASSETS) and the return on assets in the year prior to the IPO (ROA) as firm variables. If the greater uncertainty associated with smaller firms and the firm's profitability exert an influence on long-term performance, we would expect the coefficients of these variables to be significant.

On the other hand, we incorporate an offer variable, namely the size of the issue (OFFER). Smaller issues are usually more speculative; consequently, it could be these issues which obtain worse long-run returns.

Table 7 compiles the results of the relationship between long-run performance and underpricing when the dependent variables are the BHARs calculated using a size and book-to-market portfolio. The results are similar when other benchmarks are used.

The level of underpricing and the number of SEOs made by the firm after the first year of quoting are positively related to the five-year performance of the IPOs. The performance of the firm during the three-year period subsequent to the offer is only affected by the number of SEOs performed by the firm from the second to the fifth year. It should be noted that in both cases only the SEOs performed after the first year are significant, though not those made during the following 12 months after the initial offer. While these results are not consistent with the 'fads' explanation, they do provide support to the signalling hypothesis. Although underpricing is not significant for the three-year period at conventional levels, it has the correct sign and, more importantly, underpricing is significant when long-run underperformance is stronger, i.e. for the five-year period. It should be noted that for one year, underperformance is not documented.

The percentage of stocks retained in the offer (ALPHA) presents a positive relationship with long-run performance:

**Table 7**  
Long-run Performance and Underpricing of Spanish IPOs

	<i>BHAR1 (1)</i>	<i>BHAR3 (2)</i>	<i>BHAR5 (3)</i>
C	-3.48 (0.34)	-8.44 (0.79)	-15.71 (0.44)
LNARI	0.73 (0.21)	1.28 (0.34)	<b>8.62*</b> <b>(2.57)</b>
SEOsI	0.18 (0.12)	-0.05 (0.01)	0.96 (1.00)
SEOsII	0.09 (0.29)	<b>0.41**</b> <b>(3.90)</b>	<b>1.89**</b> <b>(3.98)</b>
ALPHA	1.66 (0.61)	4.54 (1.49)	15.03 (1.55)
ASSETS	0.10 (0.13)	-0.02 (0.01)	-1.37 (1.13)
ROA	6.56 (2.19)	-2.22 (0.08)	5.59 (0.19)
OFFER	-0.05 (0.02)	0.16 (0.10)	1.32 (0.65)
-2 Log ( <i>L</i> )	71.04	40.57	17.71
Cox and Snell $R^2$	8.3%	19.0%	39.8%
Nagelkerke $R^2$	11.1%	31.0%	70.6%
<i>P</i> -value	0.69	0.12	0.00

*Notes:*

The table shows the results of logistic regression analysis using offer characteristics and firm characteristics as independent variables. The long-run returns of IPOs are corrected for the returns of a comparable portfolio of firms in terms of size (market value of equity) and book-to-market ratio.  $BHAR_t$  is a dummy variable that takes on a value of 1 if the firm is a winner and 0 if it is a loser, using a  $t$  years post-IPO window. LNARI is the natural logarithm of one plus the initial market-adjusted return. SEOsI is the number of all seasoned equity offerings made by the firm during the one-year period after the IPO. SEOsII is the number of all seasoned equity offerings made by the firm after the one-year period to the five-year period after the IPO. ALPHA is the fraction of shares retained by the initial owners. ASSETS is the natural logarithm of total firm assets in the year before the IPO. ROA is the return on assets in the year before the IPO. OFFER is the natural logarithm of the actual offering size.

\*\*\*, \*\*, \* significant at the 1%, 5% and 10% confidence level respectively.

Wald-test values are shown in parenthesis.

the firms that retain more equity achieve better long-run performance. However, the coefficients for this variable are not statistically significant at conventional levels. The rest of the variables are not statistically significant. That is to say, neither the size of the firms nor their returns on assets enable

conclusions to be drawn as to what their long-run performance will be. The same occurs with respect to the size of the offer.

In summary, our results have economic importance since they offer favourable evidence to confirm the signalling hypothesis used to explain the anomalies associated with IPOs – underpricing and underperformance. Spanish IPO firms pursue a multiple issues strategy when they choose both the price and the proportion of the firm they offer at their IPO. Firms that go public consider the possibility of performing subsequent seasoned offerings, and the reason for underpricing would be to get a better price in future seasoned offerings, after ‘leaving a good taste in the investor’s mouth’.

## 6. CONCLUSIONS

This paper has two aims. We analyse the long-run performance of Spanish IPOs made during the 1987–1997 period and also study the influence of underpricing as a signalling mechanism in the post-listing performance of IPOs.

In general, the results of the long-run performance of the IPOs made between 1987 and 1997 in event windows of three and five years reveal the existence of negative abnormal returns. This result is in line with the international evidence about the long-run performance of IPOs. As regards the second goal of the paper, the results reveal that IPO firms obtain higher proceeds from the capital market after going public. Thus, the performance of IPOs in the five-year period subsequent to the initial offer is positively related to initial underpricing, as well as to the number of SEOs made by the firm from the second to the fifth year after the IPO. The SEOs made during the first year are not statistically significant. This result confirms the signalling hypothesis for explaining the initial underpricing and long-run underperformance of IPOs in the Spanish capital market. Firms choose to undervalue with the aim of selling more stocks in seasoned offerings, at a higher price than they could obtain in the absence of the signal. Consequently, there should exist a positive relation between the level of underpricing of IPOs and the long-run performance of the firm, which is confirmed by the results of this paper. This

relationship is consistent with the predictions of Allen and Faulhaber (1989), Welch (1989) and Grinblatt and Hwang (1989).

## APPENDIX

**Composition of the Sample**

<i>Admission Date</i>	<i>Company</i>	<i>Industry</i>
13/04/87	Prosegur	Other Industries and Services
18/05/87	Autopistas, Concesionaria Española	Communications
17/06/87	Papelera de Navarra	Chemical
11/04/88	Empresa Nacional de Celulosas	Chemical
19/09/88	Europistas, Concesionaria Española	Communications
30/03/89	Lingotes Especiales	Metal- Mechanical
20/04/89	Grupo Anaya	Other Industries and Services
21/04/89	Financiera Sotogrande	Other Industries and Services
21/04/89	Liwe Española	Other Industries and Services
11/05/89	Repsol	Chemical
19/05/89	Nicolás Correa	Metal- Mechanical
23/05/89	Industrias del Besós	Metal- Mechanical
12/06/89	Informes y Proyectos	Other Industries and Services
21/07/89	Algodonera de San Antonio	Other Industries and Services
25/07/89	Key	Other Industries and Services
01/08/89	Marco Ibérica Distribución de Ediciones	Other Industries and Services
05/10/89	Radiotrónica	Metal- Mechanical
28/11/89	Bodegas Bobadilla	Food
30/11/89	Uniland Cementera	Construction
14/02/90	Avidesa. Luis Suñer	Food
04/06/90	Tipel	Other Industries and Services
06/06/90	Leisa	Construction
01/08/90	Obras y Construcciones Industriales	Construction
20/08/90	Interclisa Carrier	Other Industries and Services
27/12/90	Banco Mapfre	Banks and Other Financial Institutions
09/05/91	Banco de Ibiza	Banks and Other Financial Institutions
14/08/91	Construcciones Laín	Construction
02/09/91	Obras y Construcciones	Construction
09/09/91	Banco Simeón	Banks and Other Financial Institutions
10/10/91	Centros Comerciale Pryca	Other Industries and Services
24/10/91	Cementos Portland	Construction

## APPENDIX (Continued)

<i>Admission Date</i>	<i>Company</i>	<i>Industry</i>
09/03/92	Fomento de Construcciones y Contratas	Construction
27/07/92	Omsa Alimentación	Food
21/12/92	Inversiones Ibersuizas	Investment
12/05/93	Argentaria	Banks and Other Financial Institutions
17/03/94	Centros Comerciales Continente	Other Industries and Services
08/07/94	Cortefiel	Other Industries and Services
17/11/94	Ginés Navarro Construcciones	Construction
23/12/94	Mapfre Vida	Banks and Other Financial Institutions
02/07/96	Sol Meliá	Other Industries and Services
13/11/96	Tele Pizza	Other Industries and Services
14/11/96	Miquel y Costas	Chemical
29/11/96	Abengoa	Other Industries and Services
18/03/97	Adolfo Domínguez	Other Industries and Services
16/07/97	Barón de Ley	Food
17/07/97	Compañía Vinícola del Norte de España	Food
30/09/97	Bodegas Riojanas	Food
01/10/97	Aldeasa	Other Industries and Services
10/11/97	ACS, Actividades de Construcción	Construction
28/11/97	Iberpapel Gestión	Chemical
10/12/97	Aceralía Corporación Siderúrgica	Metal- Mechanical
15/12/97	Dinamia Capital Privado	Investment

*Notes:*

This table shows the firms that have carried out an IPO on the Madrid Stock Exchange between 1987 and 1997. IPO firms are classified according to the Madrid Stock Exchange Official Bulletin classification.

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