Journal of Finance and Bank Management
June 2015, Vol. 3, No. 1, pp. 60-76
ISSN: 2333-6064 (Print), 2333-6072 (Online)

Published by American Research Institute for Policy Development
DOI: 10.15640/jfbm.v3n1a7
URL: http://dx.doi.org/10.15640/jfbm.v3n1a7

Pricing IPOs: An Approach for Spanish Firms

Susana Álvarez[1]

Abstract

The purpose of this paper is to analyse how IPO initial return volatility affects the valuation of firms that go public. The goal is to test whether the initial return volatility for evaluating the pricing of IPOs is relevant on the Spanish capital market, bearing in mind that the degree of *ex-ante* uncertainty regarding the value of the firm for IPOs in Spain is lower than in other countries, as is the level of underpricing. I also analyse how the main explanations found in the literature for the anomaly of underpricing are affected by this new metric of return volatility. The methodology used is maximum likelihood estimation (MLE) because it has important advantages. The main advantage of this approach is that it allows the estimation of the influence of each characteristic on both the level and the uncertainty of firm-level initial returns. The MLE affects positively to the efficiency of the estimations. Consistent with IPO theory, both the asymmetry of information hypothesis and the hot IPO market hypothesis are confirmed in this study. The results do not provide conclusive support for the signalling hypothesis for underpricing.

Keywords: Pricing, volatility, *ex-ante* uncertainty, IPOs (Initial Public Offerings)

JEL Classification: G100, G300, G320

1. Introduction

Prior studies on Initial Public Offerings (henceforth, IPOs) have reported a recurrent regularity at an international level, in the sense that firms that begin to quote on the capital market via an IPO offer high returns derived from a discount in the offering price. The financial literature has tried to find an explanation for this phenomenon via a considerable number of papers for different markets which, on the one hand, study the existence of such underpricing, while also attempting to build theoretical models to explain this price discount. A second anomaly or regularity resulting from the low long-term performance of these companies once they have gone public has likewise been found. In general, attempts to explain the anomaly of underpricing in IPO prices have focused on information asymmetries in the market resulting from information asymmetry between the firm and investors with respect to the current value and risk of its future cash flows, as well as from the existence of asymmetric information between informed and uninformed investors. The existing financial literature in this regard is extensive. Such studies, primarily those by Ritter (1984, 1991), opened the door to a large body of work aimed at analysing whether these anomalies or regularities typical of IPOs – both on the same day of going public and in the long term – are repeated in different markets. The financial literature has also explored the determinants of the decision to go public. A recent study in this respect is found in De Jong *et al.* (2012). Recent research on IPOs aims to find alternative methods for evaluating their pricing. For instance, Lowry *et al.* (2010) propose a new metric for evaluating the pricing of IPOs in traditional firm-commitment offerings: the volatility of initial returns on IPO stocks. Within this context, the present study has two main aims.

[1] Associate Professor of Finance. University of Oviedo (Spain), Jovellanos Faculty of Commerce, Tourism and Social Sciences, Luis Moya Blanco, 261, 33203 - Gijón. Asturias. (Spain). E-mail: saotero@uniovi.es, Telephone: +34-985182209, Fax: +34-985103708

The first is to analyse how this new method affects the valuation of firms that go public on the Spanish stock market. The goal is therefore to test whether this new metric for evaluating the pricing of IPOs is relevant on the Spanish stock market.

The degree of *ex-ante* uncertainty for IPOs in Spain is lower than in the United States due to the specific characteristics about the market itself and also due to a particular difference during the IPO process in Spain. I can therefore expect different results for this market. The reader will find this study of added interest due to the fact that the results provide additional evidence for comparison with other markets, especially with that of the United States. The second aim of this paper is to test how the main explanations found in the literature for the anomaly of underpricing are affected by this new econometric approach. Although Lowry *et al.* (2010) propose this new methodology, they do not explore how this novel approach affects existing theories in the financial literature for explaining the initial return on IPOs. This paper contributes to the financial literature on IPOs by providing an answer to this question and increasing what we know about IPO markets. All the IPOs carried out on the Spanish market during the period of study have been employed. The database used includes the firms that went public over the period 1993-2011. The broad sample time frame of 19 years allows for the analysis of the evolution of the return on the stocks in Spanish IPOs. I have selected firms that used the mechanism of the IPO to go public, via the book-building method, which allows greater adjustment of the final IPO price to the actual demand of shares existing on the market. The proposed model aims to determine whether the volatility of initial returns on Spanish IPO stocks is a relevant metric for evaluating the pricing of initial offerings. Consistent with IPO theory, both the asymmetry of information hypothesis and the hot IPO market hypothesis are confirmed in the study. The volatility of IPO initial returns changes over time and is larger during "hot" IPO markets. The results do not provide conclusive support for the signalling hypothesis for underpricing. The originality and main value of this paper is to apply a new methodology in a market with different characteristics. The differential aspects of the Spanish stock market give relevance to the results of this study in comparison with those obtained in other institutional contexts. The remainder of the paper is structured in the following way. Section 2 describes the characteristics of the Spanish market that justify a specific analysis for this country and based on the former, the hypotheses to be tested in the empirical study. Section 3 details the scope of the research, the data used and the model to be tested. The results of the estimations carried out are presented in detail in Section 4, while the main conclusions of the paper are summarized in the final section.

2. Specific Characteristics of the Spanish Market and Hypotheses

In the Spanish case, there are differences in the market that justify specific analysis. This analysis can reveal the extent to which the characteristics of the Spanish stock market influence the valuation and production of information throughout the process of IPOs in this market. This implies taking into consideration the Spanish corporate system, characterized by a lesser separation between property and control and a pronounced presence of family and banking groups among shareholders. Within this context, the degree of *ex-ante* uncertainty regarding the value of the firm for IPOs is lower in Spain, as should be the level of underpricing. Many studies have documented the relation between the *ex-ante* uncertainty in IPOs and the level of underpricing for firms that go public.[2] In this context, this paper contributes to broadening the international scope of empirical research on IPOs. The Spanish stock market differs from the Anglo-Saxon markets from the institutional point of view, among others. Therefore, it is not appropriate to extrapolate the empirical evidence found in the Anglo-Saxon stock markets to the Spanish context for several reasons. As the stock markets in Spain present a lesser degree of development than the British or North American markets, they therefore have less weight in company finance. This means that the majority of Spanish companies use bank financing much more than financing from capital markets. The first consequence of this is that the degree of information asymmetry between the issuer and the bank regarding the value of the company is lower. The second consequence is that Spanish companies depend too much on bank financing.

[2] See Ritter (1984), Beatty and Ritter (1986), Miller and Reilly (1987), James and Wier (1990), Slovin and Young (1990), Ritter (1991), Clarkson and Merkley (1994), Göppl and Sauer (1990), Wasserfallen and Wittleder (1994), Ljungqvist (1997) and Finn and Higham (1988), among others.

In addition, the types of company that usually go public in Spain are mature companies which are very well-known both by the market itself and by financial entities. This fact could provide an initial explanation of the lower levels of IPO underpricing that can be found in the Spanish market (Álvarez, 2001) in relation to those found in the numerous papers for the United States. Furthermore, in contrast with the United States or Great Britain, financial entities in Spain not only represent the main source of financing for quoted companies, but also maintain solid positions as control shareholders. If debt holders maintain both a shareholding as well as a debt holding, the agency costs associated with equity-debt tradeoffs are not so prevalent in Spanish firms. If the shareholding is also a controlling one, then manager-shareholder agency costs will also be reduced.

In this situation, the degree of underpricing we can anticipate should be lower as compared with other countries where this is not the practice. The lesser development of Spanish stock markets also means that the property structure of companies presents a higher concentration index, being mainly in the hands of family groups, credit entities and companies of the same or other activity sectors. Another aspect of the Spanish context is the greater amount of information previous to the IPO in terms of publicity about the company. This aspect affects to the IPO process itself. This fact helps to reduce the asymmetry of information between the firm and the investors. This is a key difference in relation to other markets. In the US IPO market, for instance, there is "quite period" before an IPO and such a period does not exist in the Spanish market. Companies often begin their preparations for becoming public companies well before they launch the IPO process. A typical IPO execution process can take about 6-12 months. Advance preparation is a key success factor. In the US IPO market, once a company reaches a preliminary understanding with its underwriters, the IPO process starts in full force, and a "quiet period" begins during which a company is subject to SEC guidelines regarding the publication of information outside the prospectus. The opportunity to enhance awareness of a company, its name, products, and geographic markets will be limited, since any publicity that creates a favourable attitude toward the company´s securities could be considered illegal.

However, in the Spanish case this is not the situation about IPO publicity. According to the Spanish rule of publicity there are two moments to distinguish during the IPO process: before and after the registration of the IPO prospectus. Even before the registration of the IPO prospectus and during the preparation process, the company is allowed to promote the business to the markets and to the society. This period is thought to create expectations about the company. The only restriction that they have is to care about the information they give. This information cannot be confused with a public offer in itself. After the registration of the IPO prospectus, publicity about the company and the IPO process itself is allowed in Spain and in the US IPO market. My hypothesis is that this information previous to the IPO contributes to reduce the asymmetry of information between the firm and the investors and it is a positive characteristic of the Spanish IPO market. All these differential aspects of the Spanish stock market give relevance to the results of this study in comparison with those obtained in other institutional contexts. Based upon the implications of the particular characteristics of the Spanish capital market set out previously, I put forward three hypotheses to be tested in this research regarding the valuation of shares to be placed on the stock market. The underlying basis of the first of these hypotheses is the argument concerning the validity of existing information with respect to the stock market valuation of shares. If such information is considered to be good information by its users, the level and volatility of IPO underpricing should be lower in Spain than in other countries. The higher level of information about the company in the Spanish IPO process due to the publicity allowed to the company before and after the registration of the IPO prospectus helps to reduce the asymmetry of information about the share´s value. For this reason, the *Asymmetry of Information Hypothesis (H1)* may thus be formulated as follows:

H1: "The level and volatility of Spanish IPO underpricing is lower than in other countries due to the lesser degree of ex-ante uncertainty about the company before going public in the Spanish capital market. Moreover, there is a direct relationship between ex-ante uncertainty and the level of initial underpricing".

The existence of periods of high volumes of IPOs followed by an intense activity of IPOs – "hot issue" periods – has been considered as another regularity of IPOs in addition to initial underpricing and low long-term performance. This recurrent character, i.e. auto-correlation in the series of IPOs, means that underpricing is more clustered in these periods. There are few explanations for the link between the incidence of "hot issue" periods and stock market conditions. A possible approach is to argue that, as the costs of going public are lower and the benefits greater in certain periods, a flotation could become so attractive that a firm would be willing to accept higher than usual underpricing in order to take advantage of a good IPO climate. In fact, buoyant stock markets and economic upswings are good times to go public and hence may encourage greater tolerance of underpricing.

There is overwhelming evidence that underpricing is higher in buoyant stock markets: among others, Davis and Yeomans (1976) for the UK, Reilly (1977) in the US, McGuinness (1992) in Hong Kong and Rydqvist (1993) in Sweden all show that initial returns tend to be higher following periods of high returns on the market index. In Germany, IPOs are more heavily underpriced not only when the market is performing well, but also in macroeconomic upswings and when already-listed firms issue historically large amounts of seasoned equity (Ljungqvist, 1995).

Given this approach to "hot" IPO markets in the international context, we also propose a hypothesis to take into account the influence of these market conditions on the valuation of IPOs. On the basis of this idea, we propose the *Hot Markets Hypothesis (H2)* in this study:

H2: "Initial underpricing and volatility is higher for IPOs that take place during the hot issue period".

I also study the signalling mechanism of the firm's value, providing evidence on the influence of underpricing as a signal of the quality of the firm going public. 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 issuer is assumed to have better information about the firm's future cash flows than outside investors. In order to solve this 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 their 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 in the future. Low quality firms know they cannot recoup the initial loss from underpricing and so cannot afford to signal. 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. IPO firms pursue a multiple-issue strategy when they choose both the price and the proportion of the firm they offer at their IPO. In short, in the signalling hypothesis the firm that goes public considers the possibility of performing subsequent seasoned equity offerings (SEOs), and the reason for the underpricing would be to get a better price in future seasoned offerings. McGuinness (1993) shows that good quality firms with higher market value underprice shares more in the IPO. On the basis of this idea, we propose the *Signalling Hypothesis (H3)* as follows:

H3: "Initial underpricing is higher for high quality firms with high market value that recoup this loss in the future with new SEOs".

The test of these three hypotheses will be carried out using the dataset and methodology as laid out in the following section.

3. Database and Methodology

The dataset used in this study comprises the firms that began trading on the Spanish capital market between 1993 and 2011. Throughout this sample period, I have selected the firms that employed the book-building mechanism to go public, which allows the final IPO price to be better adjusted to the actual market demand for shares. There are different mechanisms for going public in the Spanish market, both prior and subsequent to the enactment of Stock Market Law 24/1988 (28th July), with legal effects in 1989. However, only IPOs are comparable with the results obtained in other countries. Furthermore, only book-building IPOs are used during the period of study. The database has considered IPOs carried out on the Continuous Market – Main Market– throughout the study period and also the companies that began trading on the Alternative Investment Market (henceforth, AIM). The AIM is an alternative to the Main Market and was promoted by the Spanish Stock Exchanges and Markets (BME) to facilitate the access of small and medium-sized enterprises to the securities markets. Its first year of effective operation was 2009. The analysed sample comprises 80 companies, 16 of which went public on the AIM and the other 64 on the Continuous Market. As to the number of observations, it should be noted that this consists of the entire available population of companies that went public on the Spanish markets following the book-building IPO method. The chosen period is long in order to make the sample as large as possible. No IPOs were chosen prior to this period because different mechanisms for going public were used previously which might have empirical consequences arising from the process of establishing the initial offering price. As already stated, the issues chosen comprise IPOs via the book-building method, which makes them homogeneous and therefore comparable in terms of their initial market valuation. Should different methods be mixed together, it would not be possible to properly isolate the effect that we wish to measure.

The database was designed with the information contained in the prospectus for admission to the stock market drawn up by companies in their application to start trading on the market. This information was obtained from the website of the CNMV (Spanish National Securities Market Commission). The economic-financial information is taken from the informative prospectus for the offering by the close of the year prior to the firm going public. In order to evaluate the hypotheses proposed in the previous section, and on the basis of the variables for which significant differences in the results may be expected, the following model is tested in this study:

$$IR = C + \alpha_1 \cdot AIM + \alpha_2 \cdot BUBBLE + \alpha_3 \cdot TIME + \alpha_4 .MARKET + \alpha_5 .AGE + \alpha_6 .SHARES + \alpha_7 .UPDATE + \alpha_8 .VC + \alpha_9 .TECH + \alpha_{10} MKVALUE + \alpha_{11} .SEOs + \varepsilon \quad [1]$$

$$LogVar(\varepsilon) = C + \beta_1 \cdot AIM + \beta_2 \cdot BUBBLE + \beta_3 \cdot TIME + \beta_4 .MARKET + \beta_5 .AGE + \beta_6 .SHARES + \beta_7 .UPDATE + \beta_8 .VC + \beta_9 .TECH + \beta_{10} .MKVALUE + \beta_{11} .SEOs \quad [2]$$

The variance of the error from the regression model in [1] is assumed to be related to the same firm- and offer-specific characteristics that are posited to affect the level of initial returns. In order to compare the results, following Lowry *et al.* (2010) and Greene (1993, pp. 405-407), I assume that the log of the variance of the regression error follows the model shown in [2]. The Maximum Likelihood Estimation (MLE) of [1] and [2] is essentially the weighted least squares estimation of [1] using the standard deviations of the error as weights. This new methodology has important advantages. The main advantage of this approach is that it allows the estimation of the influence of each characteristic on both the level and the uncertainty of firm-level initial returns. The MLE affects the efficiency of the estimations. The idea is to obtain minimum variance estimators whenever they are unbiased. It constitutes a strategy of robustness to check the efficiency of the results. In this model, the variable IR is measured as the initial return on going public, estimated as the difference between the final price at the close of the first day of trading on the market and the offering price divided by the latter. As the initial return is a permanent component of the stock price (at least over a horizon of a few months), it is very highly correlated with the returns over other short-term horizons. Initial returns are also highly visible and easily comparable. This idea is also supported by Kaustia and Knupfer (2008). The independent variables have been selected in order to test the hypotheses proposed in the previous section. As for the *Asymmetry of Information Hypothesis (H1),* I have considered the following variables: AIM is a dichotomous variable that takes the value 1 if the IPO takes place in the Alternative Investment Market, and zero otherwise. In this sense, the AIM is an alternative to the Continuous Market and was promoted to facilitate the access of small and medium-sized enterprises to the securities markets. The degree of *ex-ante* uncertainty for these companies is supposed to be higher than for companies that go public in the Continuous Market, which are usually bigger and older companies. TIME is the number of days elapsed between the depositing of the IPO prospectus before the CNMV (Spanish National Securities Market Commission) and the initial day of trading. A longer period in this process can be related to a higher degree of uncertainty and more difficulty in valuing the firm.

The variable AGE is the logarithm of the number of years since the firm was founded at the time of the IPO plus one. In relation to this variable, we state that there is likely to be more uncertainty regarding the secondary-market pricing of the stocks of young firms. The variable SHARES is measured as the logarithm of the number of shares offered in the IPO. As regards this variable, less information tends to be available about smaller offerings, suggesting that underwriters will have more difficulty valuing such issues. Following the argument of Lowry *et al.* (2010), the absolute value of the percentage change between the offer price and the middle of the range of prices in the prospectus (UPDATE) is a proxy for the amount of learning that occurs during the registration period when the IPO is first marketed to investors. Substantial learning (i.e. a higher absolute value of price update) is more likely for firms whose value is more uncertain.The variable VC is a dichotomous variable that takes the value 1 if the firm received financing from venture capitalists prior to the IPO, and zero otherwise. If venture capitalists (VC) share information about the firm with underwriters, then underwriters may be better able to estimate firm value for such issues. This means a lower level of uncertainty. Finally, TECH is a dichotomous variable that takes the value 1 if the firm is in a high-tech industry (chemical, mechanical, electronics or communications), and zero otherwise. The value of technology firms (TECH) tends to be much harder to estimate because it depends on growth options. In order to test the *Hot Markets Hypothesis (H2)* of this research study, we have included the variable BUBBLE. This is a dichotomous variable that takes the value 1 if the IPO takes place during the hot IPO market period (between January 1997 and December 1999), and zero otherwise.

The differentiation between "hot" and "cold" periods as regards IPOs is considered in the financial literature for its possible influence on the level of IPO underpricing (Ritter, 1984). The definition of the "bubble" period depends on the market. Coakley *et al.* (2006) and Hoque (2011) – both for the UK IPO market – respectively define the bubble period 1999-2000 and 1998-2000 in their papers. The model also includes the variables MKVALUE and SEOs in order to test the *Signalling Hypothesis (H3)* proposed in Section 2.

MKVALUE is measured as the market value of the company at the end of the initial day of trading and SEOs is the number of seasoned equity offerings performed by the firm after going public during the period of analysis. According to this hypothesis, there is a direct relationship between underpricing and these two variables – MKVALUE and SEOs – because only good-quality firms with high market value can be expected to recoup the loss of initial underpricing in the future. The market return (MARKET), defined as the return on the Spanish market in the first day of trading, is included to discount the influence of this variable on the initial valuation of the securities. In alternative model estimates, we include control variables such as the PROCEEDS obtained in the IPO, estimated as the number of shares placed times the price of each. The model estimates are likewise enhanced via the inclusion of dichotomous variables representing years and industry sectors – not only high-tech industries – in order to analyse the possible influence of the firm's activity sector on its level of initial underpricing.[3] The composition of the sample is presented in Table I. This table shows the name of the company that went public, the initial day of trading, the market in which the firm went public (Continuous Market or Alternative Investment Market) and the level of underpricing for each IPO. The distribution of the number of IPOs and the average initial market return during the period of study (1993-2011) is shown in Figures 1 and 2 respectively. The graph shows the concentration of IPOs during the hot issue market period (1997-1999). The increase in IPOs in 2010 is due to the incorporation of firms to the Alternative Investment Market (AIM). The graph in Figure 2 shows the increase in average initial market return when the number of IPOs is higher. The characteristics of the companies and the main parameters of the IPOs are listed in Table II.

Table I: Composition of the Sample

Name of the Company	Initial Day of Trading	Market	Initial Return
ARGENTARIA	12/05/1993	CON	11,32%
CENTROS COMERCIALES CONTINENTE	17/03/1994	CON	2,64%
CORTEFIEL	08/07/1994	CON	3,92%
SOL MELIA	02/07/1996	CON	18,70%
TELE PIZZA	13/11/1996	CON	38,95%
MIQUEL Y COSTAS	22/11/1996	CON	-6,45%
ABENGOA, S.A.	29/11/1996	CON	5,76%
ADOLFO DOMINGUEZ, S.A.	18/03/1997	CON	97,87%
BARON DE LEY, S.A.	16/07/1997	CON	25,53%
CVNE.	17/07/1997	CON	28,46%
BODEGAS RIOJANAS, S.A.	30/09/1997	CON	29,20%
ALDEASA	01/10/1997	CON	1,22%
ACS	10/11/1997	CON	4,29%
IBERPAPEL GESTIÓN, S.A.	28/11/1997	CON	1,71%
ACERALIA CORP. SIDERURGICA S.A.	10/12/1997	CON	0,48%
DINAMIA CAPITAL PRIVADO. S.C.R. S.A.	15/12/1997	CON	4,69%
SUPERDIPLO	14/05/1998	CON	7,97%
BEFESA MEDIO AMBIENTE	01/07/1998	CON	23,57%

[3] For the sake of brevity, these variables have finally not been included in the results of the estimates presented in the next section due to not being statistically significant.

PAPELES Y CARTONES DE EUROPA	10/07/1998	CON	4,81%
FEDERICO PATERNINA	16/09/1998	CON	0,00%
ENACO	11/12/1998	CON	-4,33%
FUNESPAÑA	11/12/1998	CON	6,44%
TRANSPORTES AZKAR	03/02/1999	CON	30,04%
FERROVIAL	05/05/1999	CON	0,00%
MECALUX	06/05/1999	CON	0,10%
PARQUES REUNIDOS	26/05/1999	CON	-4,42%
TPI	23/06/1999	CON	26,67%
SOGECABLE	21/07/1999	CON	19,36%
AMADEUS	19/10/1999	CON	5,04%
INMOBILIARIA COLONIAL	27/10/1999	CON	-1,58%
TERRA NETWORKS	17/11/1999	CON	184,62%
PRISA	28/06/2000	CON	18,32%
RECOLETOS COMPAÑÍA EDITORIAL	25/10/2000	CON	-3,33%
TELEFÓNICA MÓVILES	22/11/2000	CON	0,00%
IBERIA	03/04/2001	CON	-1,68%
INDITEX	23/05/2001	CON	22,45%
ENAGAS	26/06/2002	CON	-5,38%
FADESA INMOBILIARIA	30/04/2004	CON	4,44%
GESTEVISION TELECINCO	24/06/2004	CON	18,23%
CINTRA CONC. INFRA. DE TRANSPORTE	27/10/2004	CON	-10,80%
DERMOESTÉTICA	13/07/2005	CON	18,90%
RENTA CORPORACIÓN	05/04/2006	CON	5,52%
PARQUESOL	05/05/2006	CON	-5,43%
GRIFOLS	17/05/2006	CON	15,68%
GAM (General de Alquiler de Maquinaria)	13/06/2006	CON	-7,88%
TÉCNICAS REUNIDAS	21/06/2006	CON	1,47%
BME(Bolsas y Mercados Españoles)	14/07/2006	CON	-4,03%
RIOFISA	19/07/2006	CON	8,39%
VOCENTO	08/11/2006	CON	4,00%
VUELING AIRLINES	01/12/2006	CON	9,97%
CLINICA BAVIERA	03/04/2007	CON	27,72%
REALIA	06/06/2007	CON	0,92%
SOLARIA	19/06/2007	CON	25,26%
ALMIRALL	20/06/2007	CON	7,14%
CRITERIA CAIXA CORP.	10/10/2007	CON	0,00%
CODERE	19/10/2007	CON	4,76%
FLUIDRA	31/10/2007	CON	4,15%
RENTA 4	14/11/2007	CON	-7,03%
LABORATORIOS ROVI	05/12/2007	CON	-1,56%
IBERDROLA RENOVABLES	13/12/2007	CON	-2,83%
CAM	23/07/2008	CON	0,00%
ZINKIA ENTERTAIMENT	15/07/2009	AIM	27,60%

IMAGINARIUM, S.A.	15/07/2009	AIM	4,41%
LET´S GOWEX	12/03/2010	AIM	21,14%
MEDCOMTECH	25/03/2010	AIM	29,79%
AMADEUS	29/04/2010	CON	8,18%
NEGOCIO Y ESTILO DE VIDA	07/06/2010	AIM	7,14%
BODACLICK, S.A.	30/06/2010	AIM	0,00%
NEURON BIOPHARMA,S.A.	01/07/2010	AIM	5,26%
AB-BIOTICS	20/07/2010	AIM	4,74%
GRUPO NOSTRUM RNL, S.A.	10/11/2010	AIM	4,94%
ALTIA CONSULTORES	01/12/2010	AIM	2,21%
EURONA WIRELESS TELECOM	15/12/2010	AIM	11,82%
COMMCENTER, S.A.	30/12/2010	AIM	2,50%
CATENON	06/06/2011	AIM	-1,25%
DIA	05/07/2011	CON	-8,57%
LUMAR	06/07/2011	AIM	1,96%
BANKIA	20/07/2011	CON	0,00%
SECUOYA GRUPO COMUNICACIÓN	28/07/2011	AIM	2,38%
GRIÑÓ ECONOLOGIC	29/07/2011	AIM	0,44%

This table reports the composition of the sample. First column: name of the company. Second column: initial day of trading. Third column: the market where the company goes public (CON,-continuous market (Main Market); AIM, alternative investment market). Fourth column: level of IPO initial underpricing.

Table II: Summary Statistics

	Mean	***Median***	***Standard Deviation***	***Maximum***	***Minimum***
Offering Price **(OFFP)**	8.67	7.54	5.78	23.09	0.79
Initial Return **(%IR)**	10.48%	4.42%	24.76%	184.62%	-10.80%
Age **(AGE)**	23.87	15.10	24.68	115.00	0.08
Shares placed **(%PLACED)**	35.83%	30.07%	21.64%	100%	6.00%
Update **(%UPDATE)**	7.18%	5.06%	8.18%	43.03%	0.00%
Proceeds **(PROCEEDS)**	2342945.42	251162.52	6663696.88	40858798.29	1415.33
Market Value **(MKVALUE)**	1834637.15	349888.34	5072242.75	39753502.10	6615.45
Duration of the offer **(TIME)**	17.23	18.00	7.18	30.00	0.00

This table reports summary statistics for the sample of firms that went public through an IPO during the period 1993-2011. The number of cases is 80. Initial return, shares placed and return update are expressed in percentages. Proceeds and market value are expressed in thousands of euros. OFFP is the final offer price in euros; IR is the firm's initial return on going public; AGE is the number of years since the firm was founded at the time of the IPO; %PLACED is the percentage of shares offered in the IPO; UPDATE is the absolute value of the percentage change between the middle of the range of prices in the initial registration statement and the offer price; PROCEEDS is the number of shares placed times the price of each; MKVALUE is the market value of the company at the end of the initial day of trading; and TIME is the number of days elapsed between the depositing of the IPO prospectus before the CNMV (Spanish National Securities Market Commission) and the initial day of trading.

Figure 1: Distribution of the Number of IPOs during the Period of Study (1993-2011)

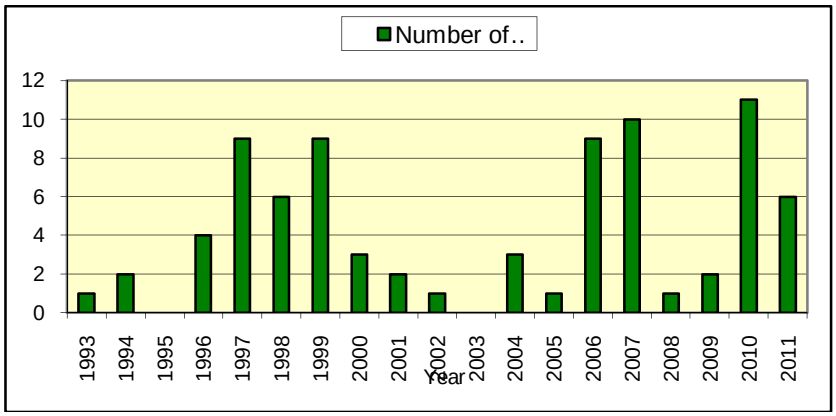
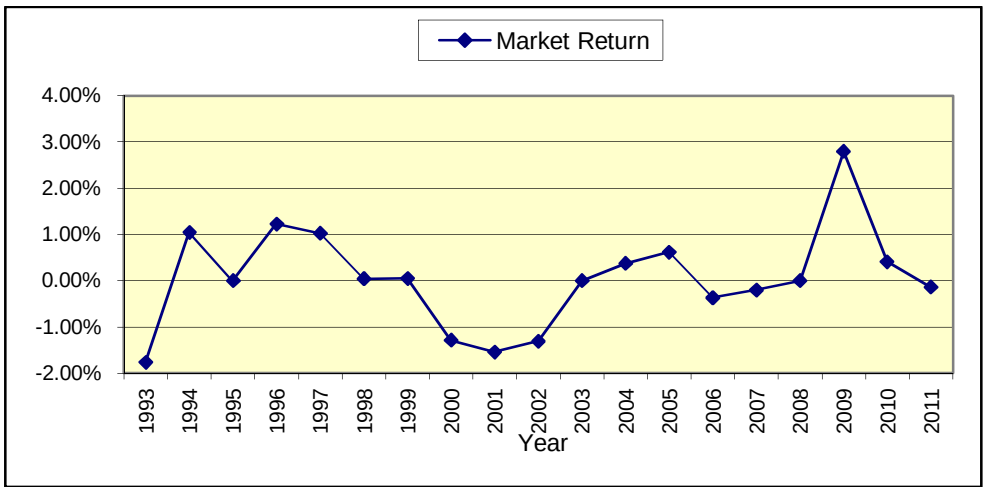


Figure 2: Average Initial Market Return during the Period of Study (1993-2011)



The statistics in Table II refer to the 80 firms that went public through an IPO during the period 1993-2011. Initial return, shares placed and return update are expressed in percentages. Proceeds and market value are expressed in thousands of euros. Age is expressed in years and the duration of the offer in days. In order to monitor the effect of inflation on these figures, the amounts have been deflated using the GDP deflator, which was obtained through the Bank of Spain's Statistical Bulletin. On average, the level of underpricing for the companies in the sample under analysis is 10.48 % for the period 1993-2011. This level of underpricing is close to that obtained by Álvarez and Férnandez (2003), who reported an initial return of 11.63 % for the period 1985-1997. It would therefore appear that this anomaly or regularity persists in the Spanish stock market to a similar degree, presenting average values for the entire period. In this respect, the mean underpricing in the case of the Spanish stock market is lower than the US market based on data provided by Ritter (2008), who reports an average initial return of 22.3 % for the period 1990-2008. However, significant fluctuations exist in the US market, throughout the said period of study for the level of initial return, ranging from 70.9 % in 1999 to 6 % in 2008. A cooling of the market is also seen in the latter year in terms of the number of IPOs: only 19, compared to 675 for the year 1996 or with average numbers of IPOs of between 100 and 300 for the majority of the years in the study period in this market. More recent studies for the US market like Lowry *et al.* (2010) report an average initial return of 22% for the period 1965-2005. This fact demonstrates that underpricing in Spain is approximately half the underpricing found for the US market, regardless of the period considered. This is a first result, with this new period of study, in favour of the *Asymmetry of Information Hypothesis (H1).* The greater amount of information about the company due to the publicity allowed before the IPO process helps to reduce the asymmetry of information between the firm and the investors in the Spanish IPO market in comparison with the US IPO market.

The firms that went public during this period of study (1993-2011) have an average age of 23.87 years, although there is considerable variability in this factor (maximum of 115 years and minimum of 0.08). In general, the companies that began trading on the Spanish stock market were usually well-established firms. However, in the most recent period, the majority of the companies were younger, not exceeding 20 years, which supposes a reduction in the average age with respect to the type of business that traditionally decided to take the step of going public. As regards the percentage of shares placed, this is around 36 % in the initial offer. That is, companies follow a strategy of selling in stages, placing a significant, credible percentage at the time of going public and the remainder in subsequent SEOs. This is a first result in favour of the *Signalling Hypothesis (H3)* proposed in Section 2. The average offer price is 8.67 euros and the update of the offer price with respect to the range of prices is 7.18%. The update is the absolute value of the percentage change between the middle of the range of prices in the initial registration statement and the offer price. The average proceeds of the offer and the average market value of the companies that went public during this period are 2.34 bn and 1.83 bn Euros respectively. The next section presents the results of the proposed model, followed by the conclusions to be drawn from these results regarding the hypotheses set out in Section 2 of this paper.

4. Results of the Valuation of Initial Public Offerings

The results of the estimation of the model proposed in [1] and [2] are given in Tables IV, V, VI and VII. As a benchmark against which to compare the MLE results, Tables IV, V, VI and VII show cross-sectional OLS regressions of initial returns on this same set of firm- and offer-specific characteristics (i.e. Equation [1]). Tables IV, V, VI and VII show both OLS and MLE results for the different specifications. The results in Table IV correspond to the estimations of the model with all the dependent variables described in the previous section. The results in Tables V and VI respectively exclude the coefficients of the variables PROCEEDS and AIM in order to control for correlation problems between the variables – see Table III – and improve the efficiency of the results. The results in Table VII exclude the coefficients of the variables PROCEEDS, AIM and MKVALUE for the same reason.

Table III: Correlation Matrix

	AIM	BUBBLE	TIME	MARKET	AGE	SHARES	UPDATE	VC	TECH	PROCEEDS	MKVALUE	SEOS
AIM	1.000											
BUBBLE	-0.327*** (0.003)	1.000										
TIME	0.136 (0.227)	-0.035 (0.757)	1.000									
MARKET	0.098 (0.384)	0.077 (0.493)	-0.033 (0.773)	1.000								
AGE	-0.121 (0.283)	0.053 (0.639)	-0.060 (0.596)	0.007 (0.952)	1.000							
SHARES	-0.616*** (0.000)	-0.058 (0.609)	0.069 (0.543)	-0.258** (0.021)	-0.076 (0.501)	1.000						
UPDATE	-0.088 (0.438)	-0.084 (0.457)	-0.013 (0.911)	-0.003 0.979	-0.037 0.744	0.274** 0.014	1.000					
VC	0.619*** 0.000	-0.203* (0.071)	0.171 (0.130)	0.297*** (0.007)	-0.112 (0.322)	-0.415*** (0.000)	-0.115 (0.308)	1.000				
TECH	0.166 (0.141)	-0.312*** 0.005	0.231** (0.039)	-0.096 (0.397)	-0.022 (0.843)	0.075 (0.509)	-0.059 (0.597)	0.198* (0.077)	1.000			
PROCEEDS	-0.812*** 0.000	0.255** (0.023)	-0.369*** (0.001)	-0.067 (0.551)	-0.000 (0.998)	0.618*** (0.000)	0.037 (0.741)	-0.495*** (0.000)	-0.163 (0.148)	1.000		
MKVALUE	-0.687*** (0.000)	-0.000 0.999	0.017 0.882	-0.218* 0.052	-0.047 0.676	0.887*** 0.000	0.198* 0.077	-0.401*** (0.000)	0.026 (0.822)	0.652*** (0.000)	1.000	
SEOS	-0.241** (0.031)	0.307*** 0.005	-0.155 0.168	-0.191* 0.090	0.036 0.752	0.241** (0.032)	0.133 0.239	-0.189* (0.092)	0.023 (0.836)	0.264** (0.018)	0.244** (0.029)	1.000

This table reports the correlations for the variables used in the regressions. AIM is a dichotomous variable that takes the value 1 if the IPO takes place in Alternative Investment Market and zero otherwise; BUBBLE is a dichotomous variable that takes the value 1 if the IPO takes place during the hot IPO market period (between January 1997 and December 1999), and zero otherwise; TIME is the number of days elapsed between the depositing of the IPO prospectus before the CNMV (Spanish National Securities Market Commission) and the initial day of trading; MARKET is the return on the Spanish market in the first day of trading; AGE is the logarithm of the number of years since the firm was founded at the time of the IPO plus one; SHARES is the logarithm of the number of shares offered in the IPO; UPDATE is the absolute value of the percentage change between the middle of the range of prices in the initial registration statement and the offer price; VC is a dichotomous variable that takes the value 1 if the firm received financing from venture capitalists prior to the IPO, and zero otherwise; TECH is a dichotomous variable that takes the value 1 if the firm is in a high-tech industry (chemical, mechanical, electronic or communications), and zero otherwise; PROCEEDS is the number of shares placed times the price of each; MKVALUE is the market value of the company at the end of the initial day of trading; and SEOs is the number of seasoned equity offerings performed by the firm after going public during the period of analysis.

The market return on the day of going public is included in the model to take into account the influence of this variable on the initial valuation of the securities. Considered in general, the results of the model estimations corroborate *Hypothesis 1* and *Hypothesis 2* as proposed in Section 2 of this paper and partly corroborate *Hypothesis 3.* Focusing first on the mean effect in the MLE results, most findings are consistent with the OLS regressions and with prior literature, except for the *Signalling Hypothesis (H3).* Turning to the variance portion of the MLE, we find that the firm and offer characteristics that predict average underpricing are even more strongly related to the volatility of underpricing. The signs of the coefficients in the mean equations are almost always the same as in the variance equation. The change of sign for the variable SEOs in Table IV is an exception to this result. The level of significance of the coefficients is generally much higher in the variance equation. The first result of this study is that the variable BUBBLE is positive and statistically significant both for OLS and for the variance portion of the MLE regressions presented in Tables V, VI and VII. This result confirms the *Hot Markets Hypothesis (H2)*, according to which initial underpricing and volatility is higher for IPOs that take place during the hot issue market period; i.e. between January 1997 and December 1999. This result is in line with the result obtained in other markets, including the US market (Ritter, 1984).

Table IV: Explanation of the Mean and Variance of Initial Returns (I)

Variable	OLS	MLE (mean)	MLE (variance)
Intercept	-0.2801	0.1442	0.0085
	(-0.7560)	(1.2610)	(0.5910)
AIM	0.1229	0.0210	0.4335
	(1.2660)	(0.5700)	(0.4890)
BUBBLE	0.1065**	-0.0311	0.2916
	(2.1680)	(-1.4070)	(0.6500)
TIME	0.0152	0.0053	1.3749***
	(0.4450)	(0.4180)	(4.4000)
MARKET	-0.0396	0.7265	13.5432
	(-0.0460)	(1.5880)	(1.7270)
AGE	-0.0225	-0.0363***	-0.8608***
	(-1.5960)	(-5.8320)	(-6.6650)
SHARES	-0.0633***	-0.0380***	-2.1699***
	(-2.7490)	(-5.9530)	(-10.3060)
UPDATE	0.4512*	0.0328	10.4622***
	(1.9460)	(0.4340)	(4.9380)
VC	-0.0476	-0.0048	-2.1772***
	(-0.5600)	(-0.1710)	(-2.8010)
TECH	0.0071	0.0743***	2.3677***
	(0.0178)	(3.4820)	(6.4940)
PROCEEDS	0.0181	0.0142	0.5726***
	(1.2520)	(1.4960)	(4.3240)
MKVALUE	0.0507**	0.0174***	1.3823***
	(2.4290)	(2.4480)	(7.2410)
SEOs	-0.0173	0.0116	-1.3447***
	(-0,6220)	(1.2240)	(-5.2840)
R^2	23.37%		
Log-likelihood	42.8688	70.8821	
Chi-squared		56.0266	
Prob (Chi-squared)		0.0000	

The table presents the relation between the mean and variance of initial returns and the explanatory variables proposed in models [1] and [2]. The table shows the values of the coefficients in the regression models estimated by means of Ordinary Least Squares (OLS) in the first column and by Maximum Likelihood Estimation (MLE) – mean and variance – in the second and third column, respectively. The dependent variable is the IR (the firm's initial return on going public). The independent variables are: AIM, a dichotomous variable that takes the value 1 if the IPO takes place in Alternative Investment Market, and zero otherwise; BUBBLE, a dichotomous variable that takes the value 1 if the IPO takes place during the hot IPO market period (between January 1997 and December 1999), and zero otherwise; TIME, the number of days elapsed between the depositing of the IPO prospectus before the CNMV (Spanish National Securities Market Commission) and the initial day of trading; MARKET the return on the Spanish market in the first day of trading; AGE, the logarithm of the number of years since the firm was founded at the time of the IPO plus one; SHARES, the logarithm of the number of shares offered in the IPO; UPDATE, the absolute value of the percentage change between the middle of the range of prices in the initial registration statement and the offer price; VC, a dichotomous variable that takes the value 1 if the firm received financing from venture capitalists prior to the IPO, and zero otherwise; TECH, a dichotomous variable that takes the value 1 if the firm is in a high-tech industry (chemical, mechanical, electronic or communications), and zero otherwise; MKVALUE, the market value of the company at the end of the initial day of trading; and SEOs, the number of seasoned equity offerings performed by the firm after going public during the period of analysis. Control variables: PROCEEDS, the number of shares placed times the price of each; and other dichotomous variables representing industry sectors.

***, **, * Significantly different to zero for a 1%, 5% and 10% level of significance. –*t*-statistic in parentheses.

Table V: Explanation of the Mean and Variance of Initial Returns (II)

Variable	OLS	MLE (mean)	MLE (variance)
Intercept	0.0091	0.2033	0.0563
	(0.0310)	(1.2870)	(0.7550)
AIM	0.0535	-0.0050	-0.5116
	(0.6690)	(-0.1160)	(-0.7020)
BUBBLE	0.1135**	0.0242	1.4206***
	(2.3180)	(0.7310)	(3.1860)
TIME	-0.0080	-0.0036	0.9235***
	(-0.2790)	(-0.3590)	(3.5190)
MARKET	0.0617	0.1929	13.0949
	(0.0720)	(0.2950)	(1.6770)
AGE	-0.0250*	-0.0204**	-0.8161***
	(-1.7830)	(-2.0430)	(-6.3830)
SHARES	-0.0547**	-0.0418***	-1.1743***
	(-2.4780)	(-4.5450)	(-5.8440)
UPDATE	0.3913*	0.1689**	4.0962**
	(1.7180)	(1.9750)	(1.9760)
VC	-0.0403	-0.0302	-1.2304
	(-0.4730)	(-0.7710)	(-1.5870)
TECH	0.0064	0.0410	0.7039**
	(0.1590)	(1.4880)	(1.9310)
PROCEEDS			
MKVALUE	0.0508**	0.0306***	1.0201***
	(2.4260)	(3.0710)	(5.3470)
SEOs	-0.0170	-0.0166	-0.7960***
	(-0,6100)	(-0.6490)	(-3.1290)
R^2	21.58%		
Log-likelihood	41.9435	56.7718	
Chi-squared		29.6565	
Prob (Chi-squared)		0.0018	

The table presents the relation between the mean and variance of initial returns and the explanatory variables proposed in models [1] and [2]. The table shows the values of the coefficients in the regression models estimated by means of Ordinary Least Squares (OLS) in the first column and by Maximum Likelihood Estimation (MLE) – mean and variance – in the second and third column, respectively. The dependent variable is the IR (the firm's initial return on going public). The independent variables are: AIM, a dichotomous variable that takes the value 1 if the IPO takes place in Alternative Investment Market, and zero otherwise; BUBBLE, a dichotomous variable that takes the value 1 if the IPO takes place during the hot IPO market period (between January 1997 and December 1999), and zero otherwise; TIME, the number of days elapsed between the depositing of the IPO prospectus before the CNMV (Spanish National Securities Market Commission) and the initial day of trading; MARKET, the return on the Spanish market in the first day of trading; AGE, the logarithm of the number of years since the firm was founded at the time of the IPO plus one; SHARES, the logarithm of the number of shares offered in the IPO; UPDATE, the absolute value of the percentage change between the middle of the range of prices in the initial registration statement and the offer price; VC, a dichotomous variable that takes the value 1 if the firm received financing from venture capitalists prior to the IPO, and zero otherwise; TECH, a dichotomous variable that takes the value 1 if the firm is in a high-tech industry (chemical, mechanical, electronic or communications), and zero otherwise; MKVALUE, the market value of the company at the end of the initial day of trading; and SEOs, the number of seasoned equity offerings performed by the firm after going public during the period of analysis. Control variables: PROCEEDS, the number of shares placed times the price of each; and other dichotomous variables representing industry sectors.

***, **, * Significantly different to zero for a 1%, 5% and 10% level of significance. –*t*-statistic in parentheses.

Table VI: Explanation of the Mean and Variance of Initial Returns (III)

Variable	OLS	MLE (mean)	MLE (variance)
Intercept	0.1427	0.2528**	0.1176
	(0.6780)	(2.0270)	(1.0400)
AIM			
BUBBLE	0.1020**	0.0167	1.5612***
	(2.2340)	(0.5350)	(3.7400)
TIME	-0.0055	-0.0026	0.6751***
	(-0.1940)	(-0.2470)	(2.5940)
MARKET	-0.0417	0.2007	15.1683**
	(-0.0500)	(0.3180)	(1.9750)
AGE	-0.0266**	-0.0178*	-0.6953***
	(-1.9270)	(-1.8210)	(-5.5140)
SHARES	-0.0558**	-0.0399***	-1.1307***
	(-2.5490)	(-4.5130)	(-5.6450)
UPDATE	0.4059*	0.1472*	3.1903
	(1.7980)	(1.8020)	(1.5460)
VC	-0.0143	-0.0355	-2.0282***
	(-0.1900)	(-0.9980)	(-2.9390)
TECH	0.0069	0.0331	1.0124***
	(0.1740)	(1.2520)	(2.7780)
PROCEEDS			
MKVALUE	0.0454**	0.0259***	0.9204***
	(2.3610)	(2.6700)	(5.2370)
SEOs	-0.0164	-0.0063	-0.9665***
	(-0,5900)	(-0.4120)	(-3.8000)
	21.07%		
R^2			
Log-likelihood	41.6813	60.9411	
Chi-squared		38.5195	
Prob (Chi-squared)		0.0003	

The table presents the relation between the mean and variance of initial returns and the explanatory variables proposed in models [1] and [2].

The table shows the values of the coefficients in the regression models estimated by means of Ordinary Least Squares (OLS) in the first column and by Maximum Likelihood Estimation (MLE) – mean and variance – in the second and third column, respectively. The dependent variable is the IR (the firm's initial return on going public). The independent variables are: AIM, a dichotomous variable that takes the value 1 if the IPO takes place in Alternative Investment Market, and zero otherwise; BUBBLE, a dichotomous variable that takes the value 1 if the IPO takes place during the hot IPO market period (between January 1997 and December 1999), and zero otherwise; TIME, the number of days elapsed between the depositing of the IPO prospectus before the CNMV (Spanish National Securities Market Commission) and the initial day of trading; MARKET, the return on the Spanish market in the first day of trading; AGE, the logarithm of the number of years since the firm was founded at the time of the IPO plus one; SHARES, the logarithm of the number of shares offered in the IPO; UPDATE, the absolute value of the percentage change between the middle of the range of prices in the initial registration statement and the offer price; VC, a dichotomous variable that takes the value 1 if the firm received financing from venture capitalists prior to the IPO, and zero otherwise; TECH a dichotomous variable that takes the value 1 if the firm is in a high-tech industry (chemical, mechanical, electronic or communications), and zero otherwise; MKVALUE, the market value of the company at the end of the initial day of trading; and SEOs, the number of seasoned equity offerings performed by the firm after going public during the period of analysis. Control variables: PROCEEDS, the number of shares placed times the price of each; and other dichotomous variables representing industry sectors.

***, **, * Significantly different to zero for a 1%, 5% and 10% level of significance. –*t*-statistic in parentheses.

Table VII: Explanation of the Mean and Variance of Initial Returns (IV)

Variable	OLS	MLE (mean)	MLE (variance)
Intercept	0.3159	0.3080**	0.1319
	(1.5510)	(2.6810)	(1.1090)
AIM			
BUBBLE	0.1055**	0.0654**	1.4392***
	(2.2390)	(1.9550)	(3.4500)
TIME	-0.0095	-0.0009	0.7328***
	(-0.3240)	(-0.0810)	(2.8210)
MARKET	0.0473	0.4446	12.2387
	(0.0550)	(0.7810)	(1.5950)
AGE	-0.0254*	-0.0298***	-0.5385***
	(-1.7870)	(-2.6920)	(-4.2730)
SHARES	-0.0116	-0.0101	-0.0737
	(-0.9890)	(-1.4850)	(-0.7120)
UPDATE	0.3486	0.0874	0.1047
	(1.5040)	(0.7980)	(0.0510)
VC	-0.0194	-0.0428	-1.6004**
	(-0.2490)	(-1.2370)	(-2.3200)
TECH	0.0018	0.0150	0.3557
	(0.0450)	(0.6000)	(0.9780)
PROCEEDS			
MKVALUE			
SEOs	-0.0116	-0.0138	-0.3517
	(-0.4060)	(-0.9010)	(-1.3870)
	14.69%		
R^2			
Log-likelihood	38.5729	61.8885	
Chi-squared		46.6311	
Prob (Chi-squared)		0.0000	

The table presents the relation between the mean and variance of initial returns and the explanatory variables proposed in models [1] and [2]. The table shows the values of the coefficients in the regression models estimated by means of Ordinary Least Squares (OLS) in the first column and by Maximum Likelihood Estimation (MLE) – mean and variance – in the second and third column, respectively. The dependent variable is the IR (the firm's initial return on going public). The independent variables are: AIM, a dichotomous variable that takes the value 1 if the IPO takes place in Alternative Investment Market, and zero otherwise; BUBBLE, a dichotomous variable that takes the value 1 if the IPO takes place during the hot IPO market period (between January 1997 and December 1999), and zero otherwise; TIME, the number of days elapsed between the depositing of the IPO prospectus before the CNMV (Spanish National Securities Market Commission) and the initial day of trading; MARKET, the return on the Spanish market in the first day of trading; AGE, the logarithm of the number of years since the firm was founded at the time of the IPO plus one; SHARES, the logarithm of the number of shares offered in the IPO; UPDATE, the absolute value of the percentage change between the middle of the range of prices in the initial registration statement and the offer price; VC, a dichotomous variable that takes the value 1 if the firm received financing from venture capitalists prior to the IPO, and zero otherwise; TECH, a dichotomous variable that takes the value 1 if the firm is in a high-tech industry (chemical, mechanical, electronic or communications), and zero otherwise; MKVALUE, the market value of the company at the end of the initial day of trading; and SEOs, the number of seasoned equity offerings performed by the firm after going public during the period of analysis. Control variables: PROCEEDS, the number of shares placed times the price of each; and other dichotomous variables representing industry sectors.

***, **, * Significantly different to zero for a 1%, 5% and 10% level of significance. –*t*-statistic in parentheses.

The second result of this paper is that the *Asymmetry of Information Hypothesis (H1)* is confirmed, taking into account the results for some of the variables included in the estimations. The existence of more publicity in the Spanish IPO market helps to reduce the level of asymmetry of information between the firm and the investors in relation to the US IPO market with a "quiet period" previous to the public offer. The variable SHARES has a negative and statistically significant sign. This result supports the idea that less information tends to be available about smaller offerings, suggesting that underwriters will have more difficulty valuing such issues in line with the second argument of the *Asymmetry of Information Hypothesis (H1).* The result obtained for the variable UPDATE is positive and statistically significant, except for the variance portion of the MLE in Table VI and the results in Table VII. This variable represents a proxy for the amount of learning that occurs during the registration period when the IPO is first marketed to investors. Substantial learning (i.e., a higher absolute value of price update) is more likely for firms whose value is more uncertain. This result also confirms the argument of the *Asymmetry of Information Hypothesis (H1).* The negative and statistically significant result for the variable AGE confirms that there is more uncertainty regarding the secondary-market pricing of the stocks of young firms. In consequence, the AGE of the firm is also coherent with the *Asymmetry of Information Hypothesis (H1)* and this result is consistent in all the specifications (Tables IV, V, VI and VII). In line with this argument, the results for the variable TECH, especially in the variance portion of the MLE, suggest that the value of technology firms tends to be harder to estimate and they accordingly show a higher degree of underpricing. The results for the VC variable are not conclusive regarding the fact that receiving finance from venture capitalists can help to estimate firm value for such issues (Chahine and Goergen, 2011). Comparing the results with those obtained by Lowry *et al.* (2010) for the US market, the result they obtained for the variable SHARES is exactly the opposite of the result obtained in this paper. On the other hand, the result for the UPDATE variable is the same result as obtained by Lowry *et al.* (2010) for the US market. The rest of the variables considered in the model are not statistically significant in the Spanish case. Regarding the *Signalling Hypothesis (H3)* put forward in this paper, the variable MKVALUE is positive and statistically significant in all regressions without exception. The initial underpricing is higher for high quality firms with high market value. 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 in the future. The signal –underpricing– leads to a separating equilibrium in which bad firms do not underprice, because it is too costly for them. The results in Table VII show the estimations without MKVALUE in order to test the robustness of the results. On the other hand, the results for the variable SEOs do not help to confirm this hypothesis due to the changes in sign and the reduced level of significance. An explanation for this result could be the fact that Spanish firms do not need "to leave so much money on the table" the first day because of the lower degree of *ex ante* uncertainty about IPOs in the Spanish capital market.

With respect to the other variables included in the estimates, it should be noted that neither the AIM (Alternative Investment Market) nor the control variable PROCEEDS – estimated as the number of shares placed times the price of each – are statistically significant. The result for the variable AIM allows us to conclude that there are no statistically significant differences in the level of underpricing between the IPOs that take place in the Continuous Market and those in the Alternative Investment Market. All the regressions presented in Tables IV, V and VI show a coefficient of determination of around 20% for the OLS estimations (being lower in Table VII at 14.69%). The Probability of the Chi-squared test is 0.00 for the mean and variance of the MLE results. These results highlight the goodness of fit of the estimates carried out.

5. Conclusions

In this study we analyse how IPO initial return volatility affects the valuation of firms that go public on the Spanish stock market in order to test whether this new metric with regard to initial return volatility for evaluating the pricing of IPOs is relevant for the Spanish stock market. I choose this market because the degree of *ex-ante* uncertainty for IPOs in Spain is lower than in other countries due to its specific characteristics, mainly due to the fact that publicity is allowed in Spain before the registration of the IPO prospectus, opposite to the "quiet period" in the US IPO market. I also analyse how the main explanations found in the literature for the anomaly of underpricing are affected by this new metric of the initial return on IPOs. This paper contributes to the financial literature on IPOs by providing an answer to this question and increasing our understanding on what we know about IPO markets. All the IPOs carried out on the Spanish market during the period of study 1993-2011 have been employed. I have selected the firms that used the mechanism of the IPO to go public, via the book-building method, which allows greater adjustment of the final IPO price to the actual demand of shares existing on the market. The results show that with this method the level of underpricing is 10.48%, which is a lower level of underpricing than in the US market. Lowry *et al.* (2010) demonstrate for the US market that the process of marketing a new issue to institutional investors, for example, during the road-shows, appears unable to resolve much of the uncertainty regarding aggregate market demand for the stock of IPO firms. Or in the case of the firms and the underwriter having the information about the real demand for shares, they do not include it when they fix the final IPO price. On the other hand, the level of underpricing found for the Spanish market is half that found in the US IPO market, regardless of the period considered. This is a consequence of the lower degree of *ex ante* uncertainty for IPOs in Spain. The greater amount of information in the Spanish IPO market due to the publicity allowed during the process and before the registration of the IPO prospectus could explain this lower degree of *ex ante* uncertainty. The proposed model determines whether the volatility of initial returns on Spanish IPO stocks is a relevant metric for evaluating the pricing of initial offerings. Focusing on the mean effect in the Maximum Likelihood Estimation (MLE) results, most findings are consistent with the OLS regressions and with prior literature. The results for the variance portion of the MLE show that the firm and the offer characteristics that predict average underpricing are even more strongly related to the volatility of underpricing. The level of significance of the coefficients is generally much higher in the variance equation. Consistent with IPO theory, both the asymmetry of information hypothesis and the hot IPO market hypothesis are confirmed in this study. On the other hand, the results do not provide conclusive support for the signalling hypothesis for underpricing. The explanation for this finding resides in the fact that Spanish firms do not need "to leave so much money on the table" on the first day of trading because of the lower degree of *ex ante* uncertainty about IPOs in the Spanish capital market.

Acknowledgements

I am grateful to David Roibás, University of Oviedo, for his help with the econometric approach and to Sushanta K. Mallick, Professor of International Finance in Queen Mary University of London, for his useful comments. I thank the participants of the 19th Global Finance Conference held in Chicago in May 2012, the *ACEDE XXII National Congress* held in Cádiz (Spain) in September 2012 and the 20th Finance Forum in Oviedo (Spain), for their comments. This work has received financial support from the Spanish Ministry of Economy, Project ECO2012-31772.

References

Allen, F., Faulhaber, G. (1989). "Signalling by Underpricing in the IPO Market". Journal of Financial Economics, 23, 303-323.

Álvarez, S. (2001). "Las salidas a bolsa en España: características y rentabilidades iniciales". Cuadernos de Economía y Dirección de la Empresa (CEDE), 9, 303-325.

Álvarez, S. and Fernández, A. I. (2003). "La explicación de la infravaloración de las salidas a bolsa". Revista de Economía Aplicada 33 (XI), 49-64.

Beatty, R. and Ritter, J. (1986). "Investment Banking, Reputation, and the Underpricing of Initial Public Offerings", Journal of Financial Economics 15, 213- 232.

Chahine, S. and Goergen, M. (2011). "VC Board Representation and Performance of US IPOs", Journal of Business Finance and Accounting 38 (3) & (4), 413-445.

Clarkson, P. and Merkley, J. (1994). "Ex Ante Uncertainty and the Underpricing of Initial Public Offerings: Further Canadian Evidence", Revue Canadienne des Sciences de l'Administration 11 (1), 54- 67.

Coakley, J., Hadass L. and Wood, A. (2006). "UK IPO Underpricing and Venture Capitalists". Working Paper University of Essex, 1-26.

Davis, E. and Yeomans, K. (1976). "Market Discount on New Issues of Equity: The Influence of Firm Size, Method of Issue and Market Volatility". Journal of Business Finance and Accounting 3, 27- 42.

De Jong, A., Huijgen, C.A., Marra T.A. and Roosenboom, P. (2012). "Why Do Firms Go Public? The Role of the Product Market", Journal of Business Finance and Accounting 39 (1) & (2), 165- 192.

Finn, F. and Higham, R. (1988). "The Performance of Unseasoned New Equity Issues-cum-Stock Exchange Listings in Australia". Journal of Banking and Finance 12, 333-351.

Göppl, H. and Sauer, A. (1990). "Die Bewertung von Börsenneulingen am Deutschen Aktienmarkt: Eine empirische Notiz" in W. R. Heilmann et al (eds), Geld, Banken und Versicherungen 1, Karlsruhe: VVW.

Green, W.H. (1993). "Econometric Analysis". Second Edition. Prentice Hall. New York.

Grinblatt, M. and Hwang, C. (1989). "Signalling and the Pricing of New Issues". The Journal of Finance 44 (2), 393-420.

Hoque, H. (2011). "The Choice and Role of Lockups in IPOs: Evidence from Heterogeneous Lockup Agreements". Financial Markets, Institutions and Instruments, New York University Salomon Center 20 (5), 191-220.

James, C. and Wier, P. (1990). "Borrowing Relationships, Intermediation, and the Cost of Issuing Public Securities". Journal of Financial Economics 28, 149-171.

Kaustia, M. and Knupfer, S. (2008). "Do Investors Overweight Personal Experience?. Evidence from IPO Subscriptions". The Journal of Finance LXIII (6), 2.679-2.702.

Ljungqvist, A. (1995). "When Do Firms Go Public". Poisson Evidence from Germany. Mimeograph. Oxford University School of Management Studies.

Ljungqvist, A. (1997). "Pricing Initial Public Offerings: Further Evidence from Germany". European Economic Review 41 (7), July, 1.309- 1.320.

Lowry, M., Officer, M. and Schwert, G. W. (2010). "The Variability of IPO Initial Returns". The Journal of Finance, 65 (2) April, 425-465.

McGuinness, P. (1992). "An Examination of the Underpricing of Initial Public Offerings in Hong Kong: 1980-90". Journal of Business Finance and Accounting 19 (2) January, 165-186.

McGuinness, P. (1993). "The Market Valuation of Initial Public Offerings in Hong Kong". Applied Financial Economics, 3, 267-281.

Miller, R. and Reilly, F. (1987). "An Examination of Mispricing, Returns, and Uncertainty for Initial Public Offerings". Financial Management, summer, 33-38.

Reilly, F. (1977). "New Issues Revisited". Financial Management, 6, winter, 28-42.

Ritter, J. (1984). "The "Hot Issue" Market of 1980". Journal of Business, 57, 215 - 240.

Ritter, J. (1991). "The Long-Run Performance of Initial Public Offerings". The Journal of Finance, 46, (1), 3-28.

Ritter, J. (2008). "Some Factoids about the 2008 IPO Market". Working paper. University of Florida.

Rydqvist, K. (1993). "Initial Public Offerings in Sweden". Working paper, nº 48, Stockholm School of Economics.

Slovin, M. and Young, J. (1990). "Bank Lending and Initial Public Offerings". Journal of Banking and Finance, 14, 729-740.

Wasserfallen, W. and Wittleder, C. (1994). "Pricing Initial Public Offerings: Evidence from Germany". European Economic Review 38, 1.505-1.517.

Welch, I. (1989). "Seasoned Offerings, Imitation Costs, and the Underpricing of Initial Public Offerings". The Journal of Finance, 44 (2), 421-44.