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Spanish Journal of Finance and Accounting / Revista Española de Financiación y Contabilidad

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/refc20

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To cite this article: Vicente A. Sanchis , Francisca Pardo , José E. Farinós & David Conesa (2020) Do Spanish IPO firms fit the Continental European model for going public?, Spanish Journal of Finance and Accounting / Revista Española de Financiación y Contabilidad, 49:3, 345-369, DOI: 10.1080/02102412.2019.1650238

To link to this article: https://doi.org/10.1080/02102412.2019.1650238

SPANISH JOURNAL OF FINANCE AND ACCOUNTING
2020, VOL. 49, NO. 3, 345–369
https://doi.org/10.1080/02102412.2019.1650238

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ARTICLE

Do Spanish IPO firms fit the Continental European model for going public?

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ABSTRACT

This paper analyses the determinants of the going public decision of the non-financial firms that were listed in the Spanish Continuous Market through an Initial Public Offering of shares (IPO) in the period 1997–2013. We employ series of characteristics related to the firms and the economic environment and logit regression methods in order to find the model that best fits the firms that went public, using the firms that could have gone public in the same period, but opted not to, as a control sample. In Spain, the firms that went public were characterized by being relatively larger and riskier than those that did not. In addition, their IPOs came after a period of investment and growth, although it does not appear that they intended to rebalance their financial structure or reduce their financial costs. Likewise, our results are robust across different sensitivity analyses. Our results suggest that Spanish IPO firms do not fit the Continental European model for going public. Therefore, it seems that differences between the Continental European and the Anglo-Saxon model are fading.

ARTICLE HISTORY
Received 21 December 2018
Accepted 26 July 2019

KEYWORDS
Initial Public Offerings (IPO); going public decision; Spanish stock market

PALABRAS CLAVE
Oferta Pública Inicial (OPI); salida a bolsa; mercado bursátil español

¿SIGUEN LAS EMPRESAS ESPAÑOLAS EL MODELO EUROPEO DE SALIDA A BOLSA?

RESUMEN

Este trabajo analiza los determinantes de la decisión de salir a bolsa en el mercado español de una muestra de empresas no financieras que llevaron a cabo una oferta pública inicial (OPI) de acciones en el período 1997-2013. Para ello, empleamos una serie de características relacionadas con las empresas y el entorno económico y los métodos de regresión *logit* para obtener el modelo que mejor se ajusta a nuestros datos, utilizando como muestra de control las empresas que podrían haber salido a bolsa en el mismo período, pero optaron por no hacerlo. En España, las empresas que salieron a bolsa se caracterizaron por ser relativamente más grandes y más arriesgadas que las que no lo hicieron. Además, sus OPI se produjeron después de un período de inversión y crecimiento, aunque no parece que tuvieran la

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intención de reequilibrar su estructura financiera o reducir sus costes financieros. Asimismo, nuestros resultados son robustos a diferentes análisis de sensibilidad. La evidencia obtenida sugiere que las compañías españolas que realizaron una OPI no se ajustan al modelo de Europa continental para salir a bolsa. Por lo tanto, parece que las diferencias entre el modelo europeo continental y el modelo anglosajón se están desvaneciendo.

1. Introduction

Going public is one of the most important decisions in the life of a firm, since it permits the modification of its financial and ownership structure, facilitates access to a new source of financing, and allows its owners to earn capital gains and diversify their portfolios. However, an Initial Public Offering (IPO) involves costs, both monetary and in terms of the dissemination of information. Consequently, firms must assess whether the benefits of having their shares traded on the stock market will offset the IPO costs and those of maintaining the listing on the exchange. That is why going public cannot be seen as another stage in the evolutionary process of a firm, but rather as a choice.

Despite the relevance of this topic, research is scarce, particularly with regard to the Continental European markets. Moreover, previous literature finds divergent results, leading some academics (Pagano, Panetta, & Zingales, 1998; among others) to suggest the existence of two models: the Anglo-Saxon model and the Continental European model. In the first, represented by the US and UK markets, listed firms are relatively young companies in innovative sectors with a significant growth potential and the strong presence of risk capital. In the second model, which includes the Italian, German and Swedish markets, among others, the IPOs are for older firms from more mature sectors and in which there is a high concentration of ownership and little separation between ownership and control.

In the Spanish market, previous research only tangentially touches the determinants of the going public decision when addressing (i) the IPO underpricing (Acedo-Ramírez & Ruiz-Cabestre, 2018; Álvarez-Otero, 2001, 2015; Álvarez-Otero & Fernández, 2003; Farinós, García, & Ibáñez, 2007b); (ii) the post-IPO long-run performance (Álvarez-Otero, 2001; Álvarez-Otero & González, 2005a; Farinós, 2001,; Farinós, García, & Ibáñez, 2007a; Farinós et al., 2007b); (iii) the post-IPO operating performance (Álvarez-Otero & González, 2005b; Farinós et al., 2007b); or (iv) the role of the ownership structure and the board of directors in the valuation of Spanish IPOs (Álvarez-Otero & López-Iturriaga, 2018). Therefore, as far as we know, this is the first research in the Spanish market that focus on the determinants of the going public decision.

In this context, we analyse the underlying reasons for the listing of Spanish non-financial firms that carried out an IPO in the Spanish continuous market (SIBE) in the period 1997–2013, using a control sample made up of firms that could potentially have gone public in the said interval, but did not. Thus, our objective is twofold: (i) to expand the limited empirical evidence on the Continental European capital markets

regarding the determinants of going public and, consequently, (ii) to assess whether Spanish IPO firms fit the European Continental model.

After the slowdown in IPOs with the international financial crisis in 2008, Spain is no stranger to the revival in the global interest in IPOs since 2016. In fact, in the first four months of 2017 there were three IPOs in the Spanish market that led the European market by volume of funds raised in the offer (EY, 2017). As a bank-oriented economy, Spain is an interesting example of the European capital markets, such as Italy or Germany. In recent decades, the Spanish financial regulation has been intensely adapted to bring them into conformance with European legislation. This process has led the country to modernize its stock market and integrate it with other stock markets in Continental Europe. In addition, according to the International Monetary Fund (IMF, 2018) Spain has led GDP growth rates, both in the Eurozone and globally, so one might expect to see a wider business perspective of Spanish firms that leads them to seek more resources to finance their growth. In this search for funds, own capital would be essential, given the process of banking disintermediation that Spanish firms have been carrying out since the beginning of the international financial crisis (Bank of Spain, 2017). Therefore, for those firms that might consider going public in the future, it may be of interest to ascertain what the reasons were that prompted Spanish firms to go through the stock market listing process.

This information could also be relevant for potential investors, both national and international, given the international opening up of the Spanish economy and, in particular, of the firms listed on the Spanish stock market. On the other hand, the percentage of foreign investment participation in the ownership of shares of Spanish firms has maintained an upward trend over the last three decades, going from 30.6% in the year 1992 to 43.1% at the end of 2016 (BME, 2017). Consequently, the greater international visibility of Spanish firms and the growing interest of foreign investors in the Spanish capital market is an additional incentive to undertake this study.

Our results, which are robust for different sample sizes, indicate that the non-financial firms that went public in the Spanish capital market were relatively larger and riskier than the firms that did not. In addition, their market access occurred after a period of investment and growth in sales, although they did not seem to go public to rebalance their financial structure or to reduce their financial costs. Unlike previous research on Continental European markets, our evidence suggests that Spanish IPO firms do not fit any of the two model, neither the Anglo-Saxon nor the Continental European model.

The rest of the paper is structured as follows. In Section 2, we propose the hypotheses and frame them within the theories in the literature regarding the reasons for going public. After referring to the selection of the samples and the variables considered, Section 3 addresses the methodology used, while Section 4 contains the results of the analysis. In order to study the robustness and sensitivity of our results, in Section 5 we extend the sample of the analysis, consider the behaviour of the model obtained in light of the different sizes of the IPO and the control samples. Section 6 concludes.

2. Literature review and hypothesis development

Prior literature on the determinants of an IPO generally approach the reasons to go public as a trade-off between the advantages and disadvantages of trading in a regulated market. In this regard, the papers that stand out are the pioneering studies of Rydqvist & Högholm (1995) in Sweden; Pagano et al. (1998) in Italy; Fischer (2000) and Boehmer & Ljungqvist (2004) in Germany; Gill de Albornoz & Pope (2004) in the UK; and Pannemans (2002) in Belgium. More recently, other authors following the same approach, have focused on emerging capital markets, such as Chorruk & Worthington (2010) in Thailand, Mayur & Kumar (2013) in India, or Cals de Oliveira & Martelanc (2014) in Brazil.

As indicated by Holmström & Tirole (1993), one of the main reasons for a firm to initiate an IPO is to obtain resources to finance investment and growth. Accordingly, as a consequence of the role played by the market in the valuation of firms, it is likely that those firms that need more financing to support their growth decide to go public in order to make use of the stock market as a rating mechanism and to obtain a 'collateral' when requesting these resources.

For Gill de Albornoz & Pope (2004), the reason for the IPO in the UK market is this capture of external resources. However, this result is not corroborated in the studies of Pagano et al. (1998), Boehmer & Ljungqvist (2004) or Fischer (2000). Given this discrepancy in results, and in order to test the influence of this need for financing in the Spanish market, we formulate the following hypothesis:

H1: *The higher the level of investment of a firm and the sale growth rate, the greater its probability of going public.*

Another of the main reasons mentioned in the literature for going public is the rebalancing of the financial structure of firms after periods of intense investment and growth (Pagano et al., 1998; Rydqvist & Högholm, 1995). In this regard, Rajan (1992) notes that with the IPO of a firm there is an increase in competition among lenders, which improves the firm's negotiating position with financial institutions, resulting in a reduction in costs and an increased supply of external resources. The explanation lies in the reduction of the information asymmetry (Leland & Pyle, 1977) borne by suppliers of financial resources, since the IPO increases the firm's visibility and the monitoring by the market.

Consequently, it is expected that those companies with higher leverage, interest coverage, and financing costs are more prone to go public, which leads us to formulate the second hypothesis:

H2: *The greater the leverage, the interest coverage and/or the cost of debt of a company, the greater the probability that it will go public in order to rebalance its financial structure.*

Also in relation to the reduction of information asymmetry, when a firm goes public through an IPO, potential investors are generally more poorly informed about the firm than its managers, leading to an adverse selection cost, which translates into a deterioration in the average quality of those firms that go public and in the price at

which their shares are placed (underpricing). These costs of adverse selection can be an obstacle to companies' access to the market, especially in the case of younger and smaller companies, as indicated by Chemmanur & Fulghieri (1999). Consequently, it is expected that these costs will be mitigated by the size and age of the firm. However, the positive effect of both variables on the IPO may have other explanations, such as liquidity, the reduction in relative terms of the costs of listing and maintenance on the stock market, or the loss of confidentiality.

One of the main functions of secondary markets is to provide liquidity to the securities traded in them, but the liquidity depends on the volume traded. Therefore, if the objective pursued with the IPO is to improve the liquidity of the firm's securities, we would expect a greater incentive in the IPOs of larger firms (Pagano et al., 1998).

The costs of the IPO vary according to the market in which the offer is made and as a function of the size and characteristics of this offer. Ritter (2014) notes that, 'it is common for a company going public in the US to give away 5% of its value on the day of the IPO.' Within this amount, Ritter (2014) includes both direct costs (such as fees for the underwriter and the external auditor, and for legal and financial reporting advice) and the money left on the table in the IPO (defined as the number of shares issued multiplied by the capital gain per share on the first day of trading). Abrahamson, Jenkinson, & Jones (2011) find that costs in European countries are lower and usually represent 4% on average.

Many of the costs related to the IPO and subsequent trading in the market are fixed, so in relative terms their effect will be less for larger firms, which leads us to suggest the existence of a positive relationship between the probability of going public and the size of the firm.

As a result of their IPOs, firms disclose information to the public in general and to competitors in particular. In the admission to trading prospectus, a firm must detail many aspects, such as the type of business, its markets, its present and future strategies, its research and development activities, its efficiency levels, etc. This loss of privacy can be especially sensitive in the case of smaller and more efficient firms.

These arguments lead us to consider the following hypothesis regarding the impact of size and age on the IPO:

H3: *The larger the size or the greater the age of the firm, the greater the probability of going public.*

Another advantage of going public is the diversification of risk, which must be understood in a double sense. For the firm itself, the existence of a secondary market facilitates the issuance of new shares, either to raise funds or to use them as currency to finance the purchase of shares in other companies and the consequent diversification of the business. For the owners of the firm, the listing of their shares may allow them to divest and transfer part of their risk. There are several studies that point to diversification as a reason for going public (Chemmanur & Fulghieri, 1999; Pagano, 1993; Stoughton & Zechner, 1998). In any case, it is expected that riskier firms (for example, firms with significant investments in R&D) have a greater predisposition to go public, which leads us to formulate the following hypothesis:

H4: *The riskier the business activity of the firm, the greater the probability of going public.*

As Ritter (1991) suggested, firms can link their IPO to the moment when they perceive that similar companies are overpriced in the market. According to this hypothesis, a positive relationship can be expected between the market-to-book ratio of the market and the probability of going public in order to take advantage of a window of opportunity.

As noted by Myers & Majluf (1984), corporate management can take advantage of the information asymmetry that external investors face and, if they consider that their firm is at the peak of its performance, they can try to go public in order to take advantage of a higher valuation by the market or to facilitate the departure of the owners of firms with poor growth prospects (Jain & Kini, 1999).

On the other hand, Diamond (1991) argues that profitability can signal the quality of the firm that goes public, mitigating the problems derived from adverse selection. In any case, we can expect a direct relationship between the profitability of the firm or the stock market and economic situation, in general, and the probability of going public, giving rise to the following hypothesis:

H5: *The higher the profitability of the firm and the better the economic situation, the market or the industry, the greater the probability of getting listed on the stock market in order to take advantage of a windows of opportunity.*

3. Research design

3.1. Requirements for going public in the Spanish market: building the non-IPO sample

In order to perform our research, we need to divide the sample into two groups: the sample of firms that went public through an IPO in the period 1997–2013 (IPO sample) and the control sample (non-IPO sample), which includes those firms that could have gone public in the same period, but remained private. Therefore, a critical question is the criteria to build the non-IPO sample. Obviously, our starting point should be the current legal requirements over the period under study. In this sense, our sample period can be split into two different stages. First, until 2005, the Spanish Securities Market Act, the Royal Decree 291/1992, and the Stock Exchange Regulations of 1967 established the following requirements to go public:

(a) Being a public limited company.[1]
(b) Having a minimum share capital of €1.202.025 (without considering in that calculation the direct or indirect shareholdings that equal or exceed 25%).
(c) Having enough profits in the last two years, or in three non-consecutive years within a five-year period, to distribute a dividend of at least 6% of paid-in capital stock, after deducting taxes and legal reserves.
(d) There must be at least 100 shareholders with a participation of less than 25% of the capital.

In 2005, the Royal Decree 1310/2005 updated the Spanish regulation and transposed the European directive in terms of information requirements for issuers.[2] Although the

governing bodies of the stock exchanges were urged to approve in a maximum period of 6 months their own rules for admission to trade in their markets, they did not do it.[3] Thus, the Regulations of the Official Stock Exchanges remained in force in what did not contradict the provisions of Royal Decree 1310/2005. In short, in addition to the above requirements, some requirements concerning the suitability either of the issuers or the securities admitted to trading, and the information provided were incorporated. Specifically:

(e) The minimum amount of the shares admitted to trading had an expected market value of €6.000.000.
(f) At least 25% of the shares were distributed among the public.

Nevertheless, we face with two crucial problems for the construction of the non-IPO sample: i) the regulations established that the requirements for dissemination and minimum social capital could be met with the public offering itself (therefore, its compliance was not necessary prior to the IPO); ii) the regulations allow the Spanish Security Commission (*Comisión Nacional del Mercado de Valores* – CNMV) to avoid compliance with the requirement of enough profits. As a result, some firms that actually went public during our sample period did not meet the requirements established in the regulations previously to the IPO.[4]

Consequently, we built the non-IPO sample following the operative criteria with the restriction of available data in SABI database. Therefore, from the total private Spanish firms (that is, not a state-owned enterprise),[5] a firm needs to meet the following criteria to remain in the non-IPO sample:[6]

(i) The firm is a public limited company.
(ii) The firm is active.
(iii) The firm is not listed in a stock market.
(iv) The main activity of the firm is not financial intermediation, nor insurance, nor does it carry out public administration activities or defence or social security or any associated activities.
(v) We eliminated those firms whose majority shareholders were foreigners.
(vi) The firm must have a minimum share capital of €1.202.025.
(vii) The firm must have enough profits in the last two years, or in three non-consecutive years within a five-year period, to distribute a dividend of at least 6% of paid-in capital stock, after deducting taxes and legal reserves.

3.2. Samples

We divide the sample into two groups: the sample of firms that went public through an IPO in the period 1997–2013 (IPO sample) and the control sample (non-IPO sample), which includes those private firms that could have gone public in the same period.

In this period, 64 firms went public through an IPO in Spain. However, from the IPO sample we exclude: (i) one firm because it is foreign; (ii) firms that went public through a privatization (8 cases);[7] (iii) firms without financial data two years prior to the IPO (4 cases); and (iv) firms in the financial or insurance industry and firms that

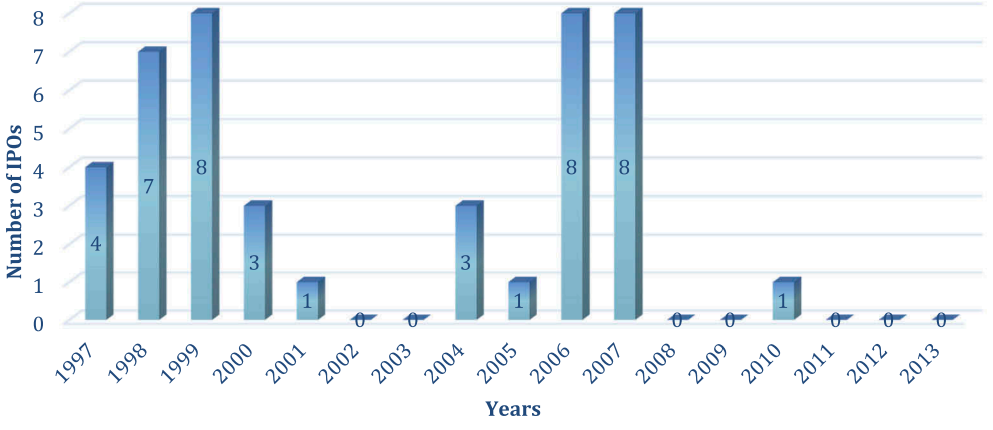

Figure 1. Time profile of Spanish IPOs in the period 1997–2013.

were an investment portfolio (7 cases). Thus, the final sample is made up of 44 IPOs, the last one in 2010.

The time distribution of the IPOs in Figure 1 shows the existence of two waves of IPOs. The first ends with the bursting of the technology bubble in 2001 and the second in 2007 with the start of the international financial crisis. The limited IPO activity in the Spanish market during the period of the economic crisis, with a single IPO between 2008 and 2013, is noteworthy.

Regarding the characteristics of the offers, only 4 (9.1% of the total) consisted of a pure Public Subscription Offer (PSO), while 23 (52.3%) were pure Public Offerings of Sale (POS). The remaining 17 (38.6%) were mixed offers (PSO/POS). In this regard, a POS involves the sale of shares in the hands of the owners of the company, while a PSO requires the issuance of new shares and the consequent access to financial resources. The segmentation of the IPOs according to the type of the offer has been little studied in the literature, except by authors as Huyghebaert & Van Hulle (2006) or Subadar-Agathee, Sannassee, & Brooks (2014).

Therefore, just under half of the IPOs (47%) sought funding, leading to the conclusion that the IPOs were used mostly by the owners to divest part of their participation in the firm, which would support the hypothesis of portfolio diversification as the main determinant of the IPO, although it could also be due to the interest of the original owners in valuing their companies or in increasing the liquidity of their investment portfolios. In this sense, 17 out of 44 companies (38.6%) were acquired within an average term of 5.8 years (median of 5 years), more than doubling the 16% that Gill de Albornoz & Pope (2004) find in the UK IPOs or the 17% of Jain & Kini (1999) in the US market. This evidence might reveal that for a significant number of firms, going public in the Spanish market is a first step towards assessing the value of the shares in the sale process of the firm (Field, 1998; Zingales, 1995).

Regarding the non-IPO group, we apply criteria (i) to (vii) of Section 3.1 to the universe of companies from SABI dataset. Then, we eliminate those cases (firm-year observations) due to errors, lack of information in the proxies considered and firms

with negative book value of equity. As a result, the IPO sample is reduced to 31 firms that went public in the period 1997–2007, both inclusive, while the non-IPO sample comprises 7,089 firm-year observations.

To eliminate outliers in the non-IPO sample, we have carried out both a univariate and multivariate elimination with respect to all variables (except those related to age and size) that we use to approximate the 10 intrinsic characteristics of the firms. In the first case, we eliminate all observations in which the value of any of the variables is outside the range between the mean and plus/minus three times the sample standard deviation (648 firm-year observations). In the second case, we use the Mahalanobis distance and consider as a critical value 66.15 (value of a random variable that follows a chi-square distribution with 29 degrees of freedom and that leaves a probability equal to 0.0001 on its right). As a result, we eliminated 281 cases, with the final non-IPO sample being 6,160 firm-year observations.

3.3. Methodology

To obtain the determining factors for IPOs in the Spanish market, we use Generalized Linear Models (Nelder & Wedderburn, 1972). The response variable is binary, taking the value 1 in the year prior to the IPO and 0 if the firm does not go public the following year. Therefore, we use logit models.[8]

Regarding the explanatory variables, we consider 10 intrinsic characteristics to the firms and 2 characteristics related to the return of the stock market and the Spanish economic situation. For each of these characteristics we include different proxies and, in turn, different specifications (variables). The total number of explanatory variables considered amounts to 37 (32 variables that measure 10 intrinsic characteristics of firms and 5 exogenous variables related to the stock market situation and the economic cycle). Table 1 shows the definitions of all characteristics and its explanatory variables considered.

Table 2 exhibits the main descriptive statistics of the 32 variables related to the intrinsic firm characteristics. We also test the differences in median for every variable. In this sense, we find significant differences in all the variables for some of the characteristics. Thus, Spanish firms that decided to go public (i) were younger; (ii) invested more; (iii) experienced a higher growth; (iv) were more profitable; and (v) were larger than those firms that remained private.

Then we follow two criteria to reduce the number of variables and facilitate the modeling of the problem. On the one hand, we calculate the sample correlations between all the pairs of variables using the Pearson correlation coefficient. On the other hand, we compute the Accuracy Ratio (AR) for each of the independent variables. Following Engelmann, Hayden, and Tasche (2003), the AR is given by expression [1].

$$AR = 2 \cdot AUC - 1 \qquad [1]$$

where AUC (Area Under the Curve) is the area below the ROC (Receiver Operating Characteristic) curve obtained from the logistic regression of the dependent variable on each explanatory variable. Tables 3 and 4 exhibit the correlation coefficients and the Accuracy Ratio, respectively.[9]

Table 1. Characteristics and explanatory variables.

Characteristics	*Variables*
Age	*LNAGE* = Natural logarithm of age of the company
Capital expenditure	*CAPEX* = Change in non-current assets/Non-current assets in *t*-1
	CESA = Change in non-current assets/Net sales
	CETA = Change in non-current assets/Total assets
Cost of debt	*COSTDEBT1* = Finance expenses/Total mean liabilities
	COSTDEBT2 = Max{(Average cost of liability – Risk-free interest rate), 0}
	COSTDEBT3 = Finance expenses/Total mean debt
	COSTDEBT4 = Max{(Average cost of debt – Risk-free interest rate), 0}
Coverage	*COV1* = Total liabilities/EBITDA
	COV2 = (EBT + finance expenses)/Finance expenses
Economic cycle	*GDP* = Annual change in GDP at market prices
Growth	*GROWTH1* = Growth rate of sales in nominal terms
	GROWTH2 = Growth rate of sales in real terms
Leverage	*LEV1* = Total liabilities/Total assets
	LEV2 = Max{(Total liabilities – Cash)/(Total assets – Cash), 0}
	LEV3 = Total liabilities/Total equity
	LEV4 = Short-term liabilities/Total liabilities
Market return	*MR1* = Average market to book of the market
	MR2 = Average market to book of the industry
	MR3 = Annual return of the IGBM
	MR4 = Annual return of an equal-weighted portfolio by industry
Operating efficiency	*OPEREFF1* = Deflated net sales/Average number of employees
	OPEREFF2 = EBIT deflated at constant prices/Average number of employees
	OPEREFF3 = Deflated [EBIT–(tax expenses + tax shield)]/Average number of employees
	OPEREFF4 = Net sales/Average total assets
Profitability	*ROA1* = EBIT/Average non-financial assets
	ROA2 = [EBIT – (tax expenses + tax shield)]/Average non-financial assets
	ROA3 = [EBIT+ finance income – (tax expenses + tax shield)]/Average total assets
	ROE = Net income/Average equity
	ROS1 = EBIT/Net sales
	ROS2 = [EBIT – (tax expenses + tax shield)]/Net sales
	ROS3 = [EBIT+ finance income – (tax expenses + tax shield)]/Net sales
R&D activity	*INT1* = Change in intangible assets/Intangible assets in *t*-1
	INT2 = Intangible assets/Total assets
	INT3 = Change in intangible assets/Net sales
Size	*SIZE1* = Natural logarithm of net sales in real terms
	SIZE2 = Natural logarithm of total assets in real terms

IGBM stands for the general index of the Madrid Stock Exchange.
EBITDA stands for earnings before interest, taxes, depreciation and amortization.
EBT stands for earnings before taxes.
EBIT stands for earnings before interest, and taxes.

The application of both criteria allowed us to discard variables that were highly correlated with others and had a lower Accuracy Ratio and/or variables with a very low value in the Accuracy Ratio. After this filtering process, we eliminate 8 variables (*COSTDEBT2, COSTDEBT4, GROWTH1, LEV2, LEV3, OPEREFF1, ROA3, SIZE1*), remaining 24 intrinsic variables and 5 exogenous variables.

In order to obtain the best logit model, we used the *R* statistical computing environment and carried out different search strategies for the model with the lowest *AIC* (Akaike Information Criterion – Akaike, 1974) and with fewer multi-collinearity problems measured by the variance inflation factor (*VIF*). Thus, we have established 35 different models in which we include 22 common variables and various combinations among 7 specifications of the characteristics of profitability and efficiency.

Table 2. Descriptive statistics of the variables and test of differences in medians.

	IPO Sample					Non- IPO Sample					Diff. in medians
Characteristics/variables	Mean	Stdev	Minimum	Median (1)	Maximum	Mean	Stdev	Minimum	Median (2)	Maximum	(1)-(2)
Age											
AGE	20.226	15.987	2	15	60	28.133	18.271	2	25	136	-10.000***
Capital expenditure											
CAPEX	0.422	0.640	-0.475	0.220	2.492	0.120	0.321	-0.946	0.047	3.895	0.174***
CESA	0.205	0.560	-1.393	0.119	1.973	0.041	0.126	-0.820	0.012	1.266	0.107***
CETA	0.091	0.129	-0.303	0.099	0.407	0.026	0.067	-0.232	0.013	0.290	0.086***
Cost of debt											
COSTDEBT1	0.026	0.019	0.002	0.023	0.078	0.025	0.015	0.000	0.024	0.083	-0.001
COSTDEBT2	0.003	0.010	0.000	0.000	0.045	0.003	0.006	0.000	0.000	0.035	0.000
COSTDEBT3	0.068	0.046	0.015	0.060	0.209	0.062	0.047	0.000	0.050	0.352	0.010
COSTDEBT4	0.035	0.042	0.000	0.020	0.176	0.032	0.043	0.000	0.019	0.313	0.001
Coverage											
COV1	6.354	5.259	0.745	4.910	22.709	8.145	8.467	0.392	5.593	105.274	-0.683
COV2	25.898	48.066	1.678	6.585	262.720	25.354	100.371	0.000	5.517	2078.500	1.068**
Growth											
GROWTH1	1.427	4.818	-0.052	0.215	26.392	0.124	0.316	-0.891	0.078	5.849	0.137***
GROWTH2	1.338	4.622	-0.090	0.188	25.288	0.083	0.304	-0.895	0.039	5.585	0.149***
Leverage											
LEV1	0.620	0.209	0.122	0.689	0.932	0.589	0.196	0.039	0.609	0.961	0.080
LEV2	0.599	0.225	0.092	0.672	0.930	0.575	0.206	0.000	0.598	0.961	0.074
LEV3	2.902	3.218	0.139	2.216	13.687	2.363	2.578	0.041	1.559	24.867	0.657
LEV4	0.652	0.259	0.071	0.720	1.000	0.766	0.210	0.105	0.822	1.000	-0.102***
Operating efficiency											
OPEREFF1	0.326	0.330	0.044	0.179	1.238	0.271	0.314	0.010	0.173	3.207	0.005
OPEREFF2	0.145	0.290	0.005	0.024	1.432	0.029	0.057	0.000	0.012	0.727	0.012***
OPEREFF3	0.114	0.269	0.004	0.019	1.430	0.019	0.038	0.000	0.008	0.495	0.011***
OPEREFF4	0.828	0.579	0.068	0.863	2.778	1.106	0.595	0.043	1.030	3.568	-0.167***
Profitability											
ROA1	0.260	0.417	0.050	0.126	1.887	0.096	0.069	0.000	0.078	0.485	0.048***
ROA2	0.195	0.364	0.030	0.084	1.885	0.067	0.048	0.000	0.055	0.344	0.029***
ROA3	0.109	0.082	0.034	0.074	0.381	0.063	0.039	0.001	0.054	0.230	0.019***
ROE	0.285	0.229	0.040	0.229	1.007	0.146	0.113	-0.147	0.118	0.753	0.111***
ROS1	0.269	0.267	0.036	0.186	1.350	0.099	0.087	0.000	0.071	0.705	0.115***
ROS2	0.198	0.249	0.026	0.128	1.348	0.069	0.061	0.000	0.050	0.462	0.078***
ROS3	0.210	0.263	0.031	0.129	1.420	0.075	0.063	0.000	0.056	0.507	0.073***

(*Continued*)

Table 2. (Continued).

Characteristics/variables	IPO Sample					Non- IPO Sample					Diff. in medians (1)-(2)
	Mean	Stdev	Minimum	Median (1)	Maximum	Mean	Stdev	Minimum	Median (2)	Maximum	
R&D activity											
INT1	0.842	2.663	-0.994	0.045	10.248	0.878	5.727	-0.999	-0.032	146.250	0.077
INT2	0.099	0.147	0.000	0.027	0.646	0.033	0.053	0.000	0.011	0.304	0.016**
INT3	-0.016	0.130	-0.678	0.000	0.135	0.003	0.025	-0.199	0.000	0.255	0.000
Size											
SIZE1	18.916	1.516	15.504	19.518	21.543	17.403	1.110	14.012	17.303	23.173	2.215***
SIZE2	19.492	1.504	16.815	19.562	22.260	17.504	1.034	15.948	17.288	23.526	2.273***

Variable *AGE* is measured in years.
OPEREFF1, *OPEREFF2* and *OPEREFF3* are in millions of euros.
See Table 1 for the definition of the variables.
***Significant at 1%, **significant at 5 %, *significant at 10 %.

Table 3. Correlation matrix.

VARIABLE	CAPEX	CESA	COSTDEBT1	COSTDEBT3	GROWTH1	LEV1	LEV2	OPEREFF1	OPEREFF2	OPEREFF3	ROA1	ROA2	ROA3	ROS1	ROS2	SIZE1
CETA	0.657[a]	0.784[a]														
COSTDEBT2			0.604[a]													
COSTDEBT4				0.964[a]												
GROWTH2					0.999[a]											
LEV2						0.993[a]										
LEV3						0.752[a]	0.742[a]									
OPEREFF2								0.631[a]								
OPEREFF3									0.986[a]							
ROA2											0.966[a]					
ROA3											0.877[a]	0.867[a]				
ROE													0.673[a]			
ROS1									0.603[a]	0.602[a]						
ROS2										0.605[a]				0.973[a]		
ROS3														0.965[a]	0.984[a]	
SIZE2																0.844[a]

This table shows the correlation coefficients and its significance among the intrinsic variables. The correlation coefficient is only shown below of the diagonal if it is greater to 0.6. The rest of the correlation coefficients are greater than −0.6 and lower than 0.6.

See Table 1 for the definition of the variables.

[a]Significant at 1%.

Table 4. Accuracy ratio of the independent variables.

VARIABLE	AR	VARIABLE	AR
LNAGE	0.301	OPEREFF1	0.070
CAPEX	0.376	OPEREFF2	0.419
CESA	0.453	OPEREFF3	0.420
CETA	0.444	OPEREFF4	0.293
COSTDEBT1	0.030	ROA1	0.424
COSTDEBT2	−0.138	ROA2	0.416
COSTDEBT3	0.081	ROA3	0.401
COSTDEBT4	0.013	ROE	0.471
COV1	0.121	ROS1	0.580
COV2	0.242	ROS2	0.573
GDP	0.259	ROS3	0.571
GROWTH1	0.555	INT1	0.051
GROWTH2	0.565	INT2	0.231
LEV1	0.100	INT3	0.015
LEV2	0.084	SIZE1	0.578
LEV3	0.100	SIZE2	0.725
LEV4	0.278		
MR1	0.122		
MR2	0.362		
MR3	0.456		
MR4	0.287		

This table shows the accuracy ratio obtained when performing the logistic regression of the binary variable IPO with respect to each one of the 37 explicative variables. See Table 1 for the definition of the variables.

Given that the models still had a *VIF* that were high for their variables, and in order to obtain a model as parsimonious as possible, for each of them we have performed a backward search process. In the resulting models, three issues are notable. The market-to-book variables of the market and the industry have never been selected in the search process. This result contrasts with the existing literature, since in several empirical studies the variable related to the market-to-book of the industry is usually a determinant in the IPO. Second, the stability in the signs of the estimated parameters, since in all cases in which a coefficient has been significant, at least at 10% level, its sign remains unchanged in the corresponding models. In addition, the sign is positive in most cases, except for some variables related to R&D activity, leverage and efficiency. Finally, the variables related to the cost of debt have not been selected in any of the resulting models, which seems to indicate that this characteristic is not determinant in Spanish IPOs.

Eventually, we obtain a final model with an *AIC* of 219.33, which incorporates 10 variables representing 8 intrinsic characteristics (Capital expenditure, Growth, Leverage, Coverage, Size, R&D activity, Profitability, Operating efficiency) and 2 other variables related to the capital market and the economic cycle.

To test the consistency of the model obtained, we have performed a process of backward search, starting with the 24 initial variables.[10] Additionally, we have generated and adjusted all the resulting models from the different combinations among the 12 explanatory variables of the model.

As a result of the above analyses, we conclude that the final model is the best model found for our samples. Thus, the model in expression [2] is used.

$$\ln\left(\frac{\pi(x_i)}{1-\pi(x_i)}\right) = \beta_0 + \beta_1 CETA_i + \beta_2 GROWTH2_i + \beta_3 LEV4_i + \beta_4 COV2_i + \beta_5 SIZE2_i + \beta_6 INT2_i + \beta_7 INT3_i + \beta_8 ROA2_i + \beta_9 ROS1_i + \beta_{10} OPEREFF2_i + \beta_{11} MR3_i + \beta_{12} GDP_i \quad [2]$$

where $\pi(x_i)$ is the probability that firm i goes public during the next year and $\frac{\pi(x_i)}{1-\pi(x_i)}$ is the odds ratio. The independent variables are: *CETA* is capital expenditure measured as the change in non-current assets/total assets; *GROWTH2* is the growth rate of sales in real terms; *LEV4* is the leverage ratio proxied by short-term liabilities/total liabilities; *COV2* is the interest coverage measured as (EBT+finance expenses)/finance expenses; *SIZE2* is measured as the natural logarithm of total assets in real terms; *INT2* is intangible assets/total assets; *INT3* is the change in intangible assets/net sales; *ROA2* is the economic profitability ratio calculated as [EBIT–(tax expenses+tax shield)]/average non-financial assets; *ROS1* is return on sales measured as EBIT/net sales; *OPEREFF2* is the operating efficiency measured as EBIT deflated at constant prices/average number of employees; *MR3* is the market return measured as the annual return of the IGBM; *GDP* is the annual change in GDP at market prices.

In relation to the goodness of fit of model [2] we applied the Hosmer-Lemeshow test and the *ROC* curve analysis. In the application of the first test, we consider 11 different groups by the probabilities estimated by the model and obtain a value of 6.58 for a chi squared with 9 degrees of freedom with an associated *p*-value equal to 0.68, so we conclude that there is no significant evidence against the fit obtained of model [2]. On the other hand, our model displays an area below the *ROC* curve of 0.96 and the shape of this *ROC* curve does not allow us to reject the null hypothesis related to the goodness of fit of the model.

4. Results

Table 5 shows the results of model [2]. When comparing the results obtained with the hypotheses stated in Section 2, we can highlight several issues. The investment of the firm (*CETA*) seems to increase the likelihood of going public. This variable is positive and significant at 5%, which would reflect the need for firms to obtain funds to finance their investments. This is reinforced by the fact that the variable we use to measure growth (*GROWTH2*) is positive and significant at 1%. In conclusion, our results support the hypothesis H1, and the sign of *CETA* and *GROWTH2* are the expected ones.

The prior empirical evidence is contradictory on the role of leverage, cost of debt and coverage in the decision to go public. Thus, Pagano et al. (1998) do not obtain a statistically significant impact of leverage and cost of debt. Mayur & Kumar (2013) also evidence the lack of significance of leverage. On the other hand, Fischer (2000) and Gill de Albornoz & Pope (2004) find a negative effect in the German and UK markets, respectively, while other authors, such as Pannemans (2002), report a positive and significant impact of leverage on the probability of going public.

Table 5. Results of model [2].

Variables	Coefficient	p-value
Constant	−33.280	0.000
CETA	6.065	0.014
GROWTH2	1.271	0.000
LEV4	2.820	0.031
COV2	−0.010	0.269
SIZE2	0.986	0.000
INT2	12.020	0.000
INT3	−11.150	0.033
ROA2	5.625	0.009
ROS1	9.571	0.000
OPEREFF2	−0.000	0.093
MR3	6.784	0.001
GDP	0.787	0.126

Null deviance: 390.25 with 6,190 df.
Residual deviance: 199.33 with 6,178 df.
AIC: 219.33; McFadden's R2: 0.505.
Minimum VIF: 1.051; Maximum VIF: 3.169.
The independent variables are: *CETA* is capital expenditure measured as the change in non-current assets/total assets; *GROWTH2* is the growth rate of sales in real terms; *LEV4* is the leverage ratio proxied by short-term liabilities/total liabilities; *COV2* is the interest coverage measured as (EBT+finance expenses)/finance expenses; *SIZE2* is measured as the natural logarithm of total assets in real terms; *INT2* is intangible assets/total assets; *INT3* is the change in intangible assets/net sales; *ROA2* is the economic profitability ratio calculated as [EBIT−(tax expenses+tax shield)]/average non-financial assets; *ROS1* is return on sales measured as EBIT/net sales; *OPEREFF2* is the operating efficiency measured as EBIT deflated at constant prices/average number of employees; *MR3* is the market return measured as the annual return of the IGBM; *GDP* is the annual change in GDP at market prices.

Though leverage (*LEV4*) is significant at 5% level, neither coverage (*COV2*) nor the cost of debt are determinants in the going public decision, as *COV2* is not statistically significant and none of the proxies for the cost of debt appear in model [2]. Therefore, the evidence found does not provide support to hypothesis H2. The explanation could lie in the divergence in the sampling periods. In our case, the time horizon is characterized by the existence of low and stable interest rates that enabled firms to bear financial costs lower than those of other studies. Moreover, the firms that went public in the Spanish market were large companies, whose bank lenders bore lower costs derived from the information asymmetry, facilitating financing under favourable conditions (i.e. lower interest rates).

The firm size is relevant in the IPO and its positive sign coincides with the expected. This is a general result in the literature and corresponds with that obtained by Pagano et al. (1998), Gill de Albornoz & Pope (2004) or Pannemans (2002), although we also find exceptions such as Cals de Oliveira & Martelanc (2014), who do not find such evidence in the Brazilian market. There are different explanations for this positive

relationship: (i) the reduction of costs of the information asymmetry for new investors, (ii) the lower relative weight of the fixed costs of going public and maintenance in the market, and (iii) the reduction in the risk borne by the former owners.

Regarding the age of the firm, this is not a determining characteristic of IPOs in the Spanish market, since it has not been selected in the final model. This result contrasts with the hypothesis formulated by Pagano et al. (1998), which argues for a greater predisposition of older firms to go public in Continental Europe. Consequently, our findings provide partial support for hypothesis H3.

Regarding R&D activities, the results partially support hypothesis H4. *INT2*, which measures the weight of intangible assets in the firm's assets, turns out to be significant and its sign is positive. Gill de Albornoz & Pope (2004) reached the same result for the UK market, as did Fischer (2000) for Germany. The explanation for this relationship would lie in the risk diversification of the owners, since they would be more prone to take the riskiest firms public in order to transfer part of their risk to new shareholders and to capture resources in order to diversify their investment portfolio.

It is noteworthy that *INT3* is significant, but with negative sign, so that the probability of going public is reduced in the case of those firms that allocate a greater percentage of their sales to increasing intangible assets. Although Zhou, Xiao, Chan, & Fung (2018) suggest that firms that going public cut R&D investments to boost earnings to receive IPO approval, another explanation could be related to the loss of confidentiality, as suggested by Pagano et al. (1998). While it may seem that the results derived from the coefficients of *INT2* and *INT3* are contradictory, they might be compatible when taking into account a time perspective. We consider that firms that are in the research phase or that are investing in new technologies do not want to go public so as not to disclose private information that their closest competitors could use to undermine their competitive advantage, but once they have completed their investment process or have taken advantage of the investment, they want to go public in order to diversify the risk of their owners and the firm itself.[11]

Table 5 also shows that the *ROA2* and *ROS1* have a significant effect and with the expected sign on the probability of going public. These results coincide with those obtained by Pagano et al. (1998), Fischer (2000) and Boehmer & Ljungqvist (2004). However, they contrast with the result of Gill de Albornoz & Pope (2004), who find a negative and significant effect in the UK.

The positive sign of firm profitability has several possible explanations. On the one hand, it may be the case that owners take advantage of high returns to signal the quality of their firms and incur a lower underpricing. On the other hand, it might reflect the fact that the IPO is synchronized with the periods of economic expansion in its business activity, which would justify to go public to obtain resources with which to finance future growth; or it may be that owners schedule the IPO of their firms when they consider that they have reached their maximum return and wish to take advantage of the valuation of the market for its final sale.

Concerning the effect of stock market conditions on the probability of going public, there is empirical evidence in favour of the positive relationship between the market-to-book of the industry and the probability of going public (Gill de Albornoz & Pope, 2004; Pagano et al., 1998). In our model, the market-to-book of the industry has not been selected as an explanatory variable, but market return

(*MR3*) has been included as a determinant in the model, and its positive sign indicates that market conditions are an important factor in the decision to undertake an IPO.

In this line, Mayur & Kumar (2013) do not find a significant effect of the industry's market-to-book on IPOs in India either. The positive effect of market return on IPOs has been previously found by Rydqvist & Högholm (1995), Breinlinger & Glogova (2002) and Pastor & Veronesi (2005). Furthermore, Beaulieu & Bouden (2015) find an inverse relationship between market volatility and the number of IPOs.

The existing evidence offers contradictory results regarding the role played by the economic cycle. As in other studies where the variation of *GDP* is not an explanatory variable (Breinlinger & Glogova, 2002; Loughran, Ritter, & Rydqvist, 1994; Rydqvist & Högholm, 1995), in our model this variable is not significant. However, more recent works related to emerging markets do find evidence of the positive impact of the economic situation on the IPO (Ameer, 2012; Meluzín, Zinecker, & Lapinska, 2014). In addition, La Porta, Lopez-de-Silanes, Shleifer, & Vishny (1997) also find a positive influence of macroeconomic variables on the number of IPOs in emerging markets. We believe that this discrepancy in results could be explained by the greater or lesser development of the capital market analysed. In any case, results seem to partially support hypothesis H5.

Finally, we discard efficiency to be a key factor in the going public decision, as *OPEREFF2* shows a coefficient near to zero and a *p*-value of 0.093.[12]

5. Additional analyses

5.1. Robustness of model [2] employing the initial non-IPO control sample

First, given that in model [2] there are no variables that have led to the elimination of some IPOs due to a lack of information, we have carried out a sensitivity analysis including 5 of the 13 missing observations in the IPO sample, so the sample size rises to 36 IPOs, while we use the same non-IPO sample (6,160 firm-year observations).

Table 6 exhibits the information about the robustness of model [2]. The second column of the table includes the estimated coefficients of model [2] with the expanded IPO sample. As can be seen, the results of model [2] with this expanded IPO sample are very similar, despite having increased the IPO sample by 16% compared to the initial size. The only change we find is in *OPEREFF2*, which becomes non-significant. Therefore, the results are consistent with those in Table 5.

Second, we analyse the robustness of our results for different sizes of the non-IPO sample, given the inverse relationship between the goodness of fit (measured through the McFadden's R^2) and the ratio between the sample size of the IPO sample and the control sample. Specifically, we have run model [2] by combining the 36 firms in the expanded IPO sample and 1,000 random extractions with replacement in the non-IPO sample with different sizes (500, 1,000, 2,000, 3,000, 4,000 and 5,000) for a total number of 6,000 estimations.

Columns three to fourteen in Table 6 include the percentages of cases in which the sign of each of the variables is positive or negative in the different estimates made for

Table 6. Sensitivity analysis of model [2].

		Sample sizes for non-IPO firms											
		500		1,000		2,000		3,000		4,000		5,000	
	Expanded IPO sample	+	-	+	-	+	-	+	-	+	-	+	-
Constant	−30.010[a]	0	100	0	100	0	100	0	100	0	100	0	100
CETA	5.989[a]	30	0	61	0	92	0	100	0	100	0	100	0
GROWTH2	1.003[a]	64	0	94	0	100	0	100	0	100	0	100	0
LEV4	2.114[c]	17	0	28	0	44	0	59	0	77	0	92	0
COV2	−0.005	0	0	0	0	0	0	0	0	0	0	0	0
SIZE2	0.906[a]	100	0	100	0	100	0	100	0	100	0	100	0
INT2	11.270[a]	99	0	100	0	100	0	100	0	100	0	100	0
INT3	−7.809[b]	0	3	0	44	0	100	0	100	0	100	0	100
ROA2	5.187[b]	12	0	60	0	100	0	100	0	100	0	100	0
ROS1	6.886[a]	61	0	90	0	100	0	100	0	100	0	100	0
OPEREFF2	−0.000	0	1	0	1	0	1	0	0	0	0	0	0
MR3	6.474[a]	100	0	100	0	100	0	100	0	100	0	100	0
GDP	0.647	12	0	18	0	22	0	19	0	15	0	5	0

The second column of the table includes the estimated coefficients of model [2] with the expanded IPO sample, while columns three to fourteen reflect the percentages of cases in which the sign of each of the variables is positive or negative in the different estimates made for a significance of at least 10%.

The independent variables are: *CETA* is capital expenditure measured as the change in non-current assets/total assets; *GROWTH2* is the growth rate of sales in real terms; *LEV4* is the liability maturity ratio proxied by short-term liabilities/total liabilities; *COV2* is the interest coverage measured as (EBT+finance expenses)/finance expenses; *SIZE2* is measured as the logarithm of total assets; *INT2* is intangible assets/total assets; *INT3* is the change in intangible assets/net sales; *ROA2* is the economic profitability ratio calculated as [EBIT–(tax expenses+tax shield)]/average non-financial assets; *ROS1* is return on sales measured as EBIT/net sales; *OPEREFF2* is the operating efficiency measured as EBIT deflated at constant prices/average number of employees; *MR3* is the annual return of the IGBM; *GDP* is the annual change in GDP at market prices.

[a] [b], [c]Significant at 1%, 5% and 10%, respectively.

a significance of at least 10%. Results show the stability in the sign of the estimates for different relative sample sizes. We did not observe any variable in which a significant sign change occurred at 10% in the 6,000 estimates.

From Table 6 we find that *SIZE2* and *MR3* have a positive and significant coefficient in all cases, at least at 10%; while for certain variables the percentage of cases in which they turn out to be significant increases as the sample size of the non-IPO sample does. This is what happens, for example, with *LEV4* or *ROS1*.

There are variables for which relatively stable behaviour is observed, since starting from certain sizes of the control sample their significance is maintained in all cases (e.g. *INT2* with a non-IPO sample size of 1,000 observations; *GROWTH2, ROA2* and *ROS1* with 2,000 observations; and *CETA* with 3,000 observations).

Finally, we should highlight that *OPEREFF2* and *GDP* have very low levels of significance at 10%, and *COV2* is never significant. These results confirm the limited role played by these variables in explaining Spanish IPOs.

5.2. Robustness of model [2] extending the non-IPO control sample

As we explained in Section 3.1, some Spanish private firms that did not met the requirements established in the regulations went public eventually. Thus, we perform a sensitivity analysis by relaxing the requirements of the non-IPO sample, so that we build an expanded non-IPO sample. Specifically, we replace criteria (vi) and (vii) of

Section 3.1 with the following criterion: (viii) the size (total assets) in the year prior to the possible IPO, is greater than or equal to the smallest size of the IPO sample. As a result, the non-IPO sample is made up of 13,571 firm-year observations. After performing a backward search process, expression [3] shows the final model found.

$$\ln\left(\frac{\pi(x_i)}{1-\pi(x_i)}\right) = \beta_0 + \beta_1 CETA_i + \beta_2 GROWTH2_i + \beta_3 LEV4_i + \beta_4 SIZE2_i + \beta_5 INT2_i + \beta_6 INT3_i + \beta_7 ROA2_i + \beta_8 ROS1_i + \beta_9 OPEREFF2_i + \beta_{10} MR3_i + \beta_{11} GDP_i \quad [3]$$

As shown in Table 7, the results are very similar to those of model [2]. The main difference is that *COV2* is not in the final model. Therefore, in model [3] there are 11 explanatory variables instead of 12. This is not an important difference since *COV2* was not significant in model [2] either in the robustness analysis. Besides, *OPEREFF2* that was significant at 10% in model [2] it is not significant in model [3].

In addition, we have performed two robustness tests for model [3]. We first replicated the analysis with the expanded IPO sample and second, we have run model [3] with different sample sizes of the non-IPO sample. The second column of Table 8 shows the results of the first analysis (with 37 firms in the IPO sample) and columns 3

Table 7. Results of model [3] with the expanded non-IPO sample.

Variables	Coefficient	p-value
Constant	−35.950	0.000
CETA	6.081	0.016
GROWTH2	0.883	0.000
LEV4	2.654	0.028
SIZE2	1.108	0.000
INT2	11.860	0.000
INT3	−9.710	0.007
ROA2	5.543	0.007
ROS1	9.188	0.000
OPEREFF2	−0.000	0.150
MR3	6.911	0.000
GDP	0.787	0.119

Null deviance: 439.14 with 13,601 df.
Residual deviance: 212.01 with 13,590 df.
AIC: 236,01; McFadden's R2: 0.517.
Minimum VIF: 1.064; Maximum VIF:2.658.
The independent variables are: *CETA* is capital expenditure measured as the change in non-current assets/total assets; *GROWTH2* is the growth rate of sales in real terms; *LEV4* is the leverage ratio proxied by short-term liabilities/total liabilities; *SIZE2* is measured as the natural logarithm of total assets in real terms; *INT2* is intangible assets/total assets; *INT3* is the change in intangible assets/net sales; *ROA2* is the economic profitability ratio calculated as [EBIT–(tax expenses+tax shield)]/average non-financial assets; *ROS1* is return on sales measured as EBIT/net sales; *OPEREFF2* is the operating efficiency measured as EBIT deflated at constant prices/average number of employees; *MR3* is the market return measured as the annual return of the IGBM; *GDP* is the annual change in GDP at market prices.

Table 8. Sensitivity analysis of model [3] with the expanded non-IPO sample.

		Sample sizes for non-IPO firms											
		400		800		1,500		3,000		6,000		12,000	
	Expanded IPO sample	+	-	+	-	+	-	+	-	+	-	+	-
Constant	−31.910[a]	0	100	0	100	0	100	0	100	0	100	0	100
CETA	7.210[a]	72	0	86	0	95	0	100	0	100	0	100	0
GROWTH2	0.749[a]	56	0	89	0	98	0	100	0	100	0	100	0
LEV4	2.058[c]	12	0	16	0	23	0	34	0	70	0	100	0
SIZE2	1.001[a]	100	0	100	0	100	0	100	0	100	0	100	0
INT2	9.893[a]	66	0	96	0	100	0	100	0	100	0	100	0
INT3	−0.292	0	0	0	0	0	0	0	0	0	0	0	0
ROA2	4.848[b]	1	0	4	0	25	0	89	0	100	0	100	0
ROS1	6.990[a]	51	0	68	0	91	0	99	0	100	0	100	0
OPEREFF2	−0.000	0	3	0	1	0	1	0	1	0	0	0	0
MR3	6.526[a]	100	0	100	0	100	0	100	0	100	0	100	0
GDP	0.573	5	0	9	0	15	0	21	0	14	0	0	0

The second column of the table includes the estimated coefficients of model [2] with the expanded IPO sample, while columns three to fourteen reflect the percentages of cases in which the sign of each of the variables is positive or negative in the different estimates made for a significance of at least 10%.

The independent variables are: *CETA* is capital expenditure measured as the change in non-current assets/total assets; *GROWTH2* is the growth rate of sales in real terms; *LEV4* is the liability maturity ratio proxied by short-term liabilities/total liabilities; *SIZE2* is measured as the logarithm of total assets; *INT2* is intangible assets/total assets; *INT3* is the change in intangible assets/net sales; *ROA2* is the economic profitability ratio calculated as [EBIT–(tax expenses+tax shield)]/average non-financial assets; *ROS1* is return on sales measured as EBIT/net sales; *OPEREFF2* is the operating efficiency measured as EBIT deflated at constant prices/average number of employees; *MR3* is the annual return of the IGBM; *GDP* is the annual change in GDP at market prices.

[a] [b], [c]Significant at 1%, 5% and 10%, respectively.

to 14 present the results of the estimates of the 6,000 different samples by combining the 37 firms in the expanded IPO sample and 1,000 random extractions with replacement in the expanded non-IPO sample with different sizes (400, 800, 1,500, 3,000, 6,000 and 12,000). The results of both robustness tests are consistent with those reported in Table 6.

From the above, we can conclude the importance of the issue of relative sample size and how robustness of the results and conclusions can be affected by the decision of the researcher. Despite the importance it seems to have, it is an aspect that has not been addressed by the literature related to the determining factors in the IPO, so we highlight the contribution of this work in this regard.

6. Conclusions

In this research we study the determinants of the going public decision of a sample of Spanish firms in the period 1997–2013. To this end, we formulate a series of hypotheses related to the effect of certain firm characteristics, the state of the market and the economic environment, on the likelihood that firms go public. We study a sample of IPOs in the Spanish market carried out by firms that were not privatised and did not belong to the financial or insurance industry. In addition, we consider a control sample of firms that could potentially have gone public in the same horizon, but remained private.

As far as we know, this is the first study in the Spanish market that explicitly analyses the determining factors of the IPO. We did not find evidence of the

influence of age, coverage, cost of debt or operating efficiency of firms on the probability of going public. However, we do find a significant effect for capital expenditure, growth, leverage, size, investment in intangibles, and firm profitability in the previous year to go public. Furthermore, the state of the capital market also has a positive and significant effect on the likelihood of an IPO. Moreover, our results are robust for different sample sizes.

In brief, the firms that have gone public in the Spanish capital market are relatively younger (in median), have a larger size and are riskier than those firms that could potentially have gone public. They also go public after a period of investment and growth in their sales, although they do not seem to go public to rebalance their financial structure or to reduce their financial costs. The results show that firms are listed at times when the state of the capital market is bullish, thus they seem to take advantage of a window of opportunity (high economic returns and operating margins).

Finally, although our results suggest that the Spanish IPO firms do not fit the European Continental model for going public, further research is assured given the limitations of this study. The most obvious restriction comes from sample size, which is, in turn, an intrinsic characteristic of a thin market as the Spanish one. We have dealt with this limitation performing several sensitivity analyses. Future research may include a variety of firm and/or event characteristics that are likely to affect investors and managers' decisions, such as the amount of new financing raised or the likelihood of being acquired after going public.

Notes

1. Here, the term 'public' is not a synonym of 'listed'.
2. This European regulation is basically collected in four directives: Directive 2001/34/EC, Directive 2003/71/EEC, Directive 2004/39/EC (known as MiFID), and Directive 2004/109/EC.
3. Actually, the amendment of the Regulations of the Spanish Stock Exchanges did not take place until 25 April 2016.
4. Two examples are Vueling and Iberpapel. On the one hand, Vueling set up on 10 February 2004 and went public on 1 December 2006, presenting losses either in 2004 or in 2005. On the other hand, Iberpapel set up on 21 July 1997 and went public on 28 November 1997.
5. Therefore, we discarded those firms in which governments and public authorities jointly had an interest greater than or equal to 50%.
6. However, in a sensitivity analysis we consider an extended non-IPO sample as well (see Section 5).
7. We have excluded the IPOs that involved the sale to the market of a stake of any Spanish state-owned enterprise because the underlying motivations of the offer differ of those carried out by private companies [see Megginson and Netter (2001) for a general discussion and Farinós, García, and Ibáñez (2007b) for the Spanish market].
8. We use logit models instead of probit models since though both models are very similar, the interpretation of the estimated coefficients in probit models is more difficult.
9. In order to preserve space, Table 3 only shows correlations higher than 0.60.
10. We also performed a forward search and a combined search but the models found had an *AIC* of 222.37 and 221.05, respectively.
11. Anyway, this result about *INT3* should be taken carefully because this variable becomes not significant in the sensitivity analyses (see Table 8).
12. The unformatted value of *OPEREFF2* is −5.150E-6.

Acknowledgments

The authors appreciate the useful comments and suggestions from participants in the XXXII Annual Conference of the European Academy of Management and Business Economics (Gandía, 2018) where an earlier draft of this research was presented. This work was supported by Instituto Valenciano de Investigaciones Económicas (IVIE), and the University of Valencia under Grant UV-INV-PRECOMP12-80505. We acknowledge the valuable comments and suggestions from an anonymous referee of the review. All remaining mistakes are our own.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the Valencian Institute of Economic Research (IVIE) and the Universitat de València [UV-INV-PRECOMP12-80505].

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