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***OWNERSHIP STRUCTURE AND INITIAL
PUBLIC OFFERINGS IN PORTUGAL***

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ABSTRACT

This study aims to answer three different questions. First, whether we could observe short-term abnormal return anomaly or long-term underperformance in IPOs of a small economy. Second, if these anomalies do appear to exist, whether they are distinct when ownership categories (private versus state owned) are compared. Third, if these categories show different patterns, whether private placements show significantly different under/overpricing phenomena compared with placements made by state owned companies. In order to do this, we selected the Portuguese market to test whether cumulative abnormal returns (CARs) or the wealth relative (WR) of a set of portfolios were statistically and significantly different from zero.

We found significant short-term abnormal returns both for IPOs placed by private firms and for IPOs placed by state owned firms. In addition, state owned IPOs have been more profitable for short-term investments than private IPOs.

Secondly we observed weak signs for one-year time period underperformance, but we found new evidence, as reported in the literature, for significant differences for one-year performance according to the ownership structure. Contrary to what the literature on economic and financial performance of privatized firms would lead us to expect, we found that IPOs placed by private companies tend to perform better in a one-year term than IPOs placed by state owned firms. However our results are quite sensitive to the methodology being used.

Key words: IPO, abnormal returns, market efficiency, event studies.

JEL Classification: G14 – Information and Market Efficiency; Event Studies.

1. Introduction

In a few areas of Finance, European financial markets have been the leading field of observation. One such area is the privatization phenomenon. Originating in Germany under the government of Konrad Adenauer in 1957 (see Megginson, Nash and Van Randenborgh (1994) for details) and initially called the “denationalization” program,

privatization became famous under the Thatcher government in the United Kingdom during the 1980's. While not synonymous, privatization became popular when operated through initial public offerings. Therefore, we see why the share price market performance became a standard way of evaluating the performance of newly privatized firms.

Although it does not deal exclusively with privatization, our paper is dependent on the occurrence of this phenomenon in Portugal. Without it, the current Portuguese capital market would be significantly different. In fact, even though it is still small and marginally significant in terms of the Portuguese economy, without the privatization program it would not exist at all.

The aim of this study is to analyze Initial Public Offerings in a small economy, using the case of the Portuguese securities market and paying particular attention to the ownership structure of the companies that place the offer. We consider whether the so-called underpricing phenomena commonly referred to in the literature, and detected in several major markets, it is observable in a small security market, such as the Portuguese one. Moreover, we investigate whether private companies placing public offers in the market show a different pattern of behavior than state owned companies doing the same, particularly when executing a governmental privatization programme.

If the value of the stock is fairly priced by the issuer in the public offer, the investors should not expect any abnormal returns. Otherwise, statistically strong abnormal returns should be observed.

In Portugal during the 1990's, both government and private companies competed for funds. Although the state owned IPO processes were more innovative, private companies followed them immediately.

We suspect that empirical findings of underpricing observed in developed markets is still observable in a small and emerging market. However, in accordance with Megginson, Nash and Van Randenborgh (1994), who found privatization programs associated with an increase in economic and financial performance of privatized companies, we would expect a significant difference between state owned companies and private IPOs. Therefore, we suspect that the underpricing phenomena it is still observable in a small economy, but it is expected to be more pronounced when state owned companies are involved, serving the national interests of the government in stimulating the use of capital markets by the entire economy. Splitting the analysis into

two samples – public offers made by private companies and by state owned firms – we expect to find differences between them.

The study goes over a six-year period, between 1992 and 1998, assuming investors would buy the stocks in the IPO or in the first trading day after it occurred and holding it for a one-year time period.

We start this paper by describing briefly the IPO literature. Next we present the data and the methodology in use. Then we present the empirical results and conclusions.

2. Reasons and findings around initial public offering patterns

Financial theory has been uncovering an IPO pattern where the initial abnormal returns are positive and the long-term abnormal returns are negative. Additionally, the IPO literature has suggested a positive association between IPO activity and the stock market momentum.

Ibbotson (1975), with a small sample and non-normal distribution, concluded that on average, the IPO abnormal return at the end of the first trading month (bid price) was +11.4%. At the end of one year, the average monthly abnormal return was 2.4%. In the long-term, however, he did not find statistically strong support to reject the hypothesis of an efficient market. The author justified this market behavior with the hypothesis of a value transfer between investors and issuers through financial intermediaries. This process would guarantee the subscription of all subsequent IPOs placed by the financial intermediary. He also showed that IPO issuers had a higher systematic risk than the market as a whole.

Later, Ibbotson and Jaffe (1975) and Ibbotson, Sindelar and Ritter (1988) showed the links between market variables such as initial abnormal returns and “hot issue markets”.

In the long term, Ritter (1991) showed evidence that IPO issuers underperform other non-issuers in the same economic sector with equal market value. The author concluded that timing for placing an IPO is not random, as the most adequate moment for the market is chosen. Loughran and Ritter (1995) compared two portfolios of IPO issuers and non-issuers through the process that Ritter (1991) called *wealth relatives*,

defined as the ratio between the buy and hold IPO portfolio returns, and a buy and hold non-issuers portfolio returns for the same time period³. In a study with one year of data after the IPO event, the *wealth relatives* were estimated as 0.95, which means a negative abnormal return. When changing the non-issuers portfolio for the *Standard & Poor's 500* index the conclusions did not change. Even using a five-year period, abnormal returns remained negative with the IPO portfolio having higher systematic risk than a non-issuers portfolio.

Following these studies the IPO literature has been abundant in providing evidence of these three phenomena.

In a different perspective Dewenter and Malatesta (1997) compare the market price behavior of private companies with state owned companies when both are publicly offered through IPO. They conclude that, while in the United Kingdom state owned companies are significantly underpriced when compared with the degree of underpricing observed for private companies, in other countries, such as Canada and Malaysia the opposite is observed. This helps them to conclude that there is no general tendency to support the hypothesis that state owned companies are more underpriced than private companies when going public. Furthermore, they show evidence of other effects. They find the degree of underpricing dependent upon the degree of development of the capital market and the degree of industrial sector regulation where the IPO takes place. Also, in Poland, although Aussenegg (2000), Jelic and Briston (2003) find evidences of IPO underpricing, they find no differences when comparing state owned versus private IPOs.

Our paper renews the debate started by Dewenter and Malatesta (1997), testing the issue for Portuguese data. We are concerned with IPO behavior in Portugal as a whole, but we also want to bring some extra light to the question of whether state owned companies are significantly underpriced when compared to privately owned companies when both go public.

The literature has been substantial in providing hypotheses for the patterns presented earlier.

In the *winner's curse hypothesis*, Rock (1986) supports the idea that IPO returns are a compensation for trading against agents with superior information, showing the possible existence of information asymmetry between market agents.

³ Please refer to Equation 3 below.

The cost of information acquisition hypothesis supports the theory that initial abnormal returns are the reward for investors who reveal valuable information to the financial firm. This information is vital to price the IPO. In this sense, Benveniste and Spindt (1989) support the investors' discrimination.

Welch (1992) claims that investors take into account previous buying decisions from other investors in the IPO process. If investors' decisions are sequential, latter investors behave according to previous investment decisions. To avoid initial lack of interest in the IPO, which can affect subsequent investment decisions, the issuer undervalues it. This should capture an important "first wave" of investors who will attract others, creating the effect of a *cascade* (*the cascades hypothesis*).

The information asymmetry hypothesis is based on the presumption that financial firms have superior knowledge of the market over the issuer and benefit from it, reducing the risk. However, Beatty and Ritter (1986) showed a negative relation between financial firms' market share and the fixing of a wrong IPO price. Ibbotson, Sindelar and Ritter (1988) defend the idea that financial firms avoid behavior that might be construed as misconduct in order to protect their commercial brand name.

Brennan and Franks (1997), supporting *the ownership dispersion hypothesis*, pointed out that the initial underpricing creates a demand surplus. When it happens, managers can select the investors and sell less stock to each one. On the other hand, shareholders have less power and influence over management.

The signaling hypothesis implies the issuer's management has a high value reference for the company. In order to signal this value over time, they underprice the IPO. Usually, in the long term, the issuer makes a seasoned equity offering to recover the initial underprice. However, Jegadeesh, Weinstein and Welch (1993) found supporting evidence to state that initial underpricing is due to lack of market information by the issuer. Nevertheless, Garfinkel (1993) did not find statistical support for either of these hypotheses.

The stabilization hypothesis is based on the presumption that initial underpricing is the effect of an agreement between the issuer and the financial firm to sustain the price at or above the IPO price. This process would create the ideal conditions for subsequent public offers. Ruud (1993) found empirical support for this proposition.

The market incompleteness hypothesis assumes that investors ask a premium (the initial return) for holding IPO stocks instead of listed stocks.

Tiniç (1988) suggested *the legal hypothesis* explaining that issuers underprice the offer to reduce the probability of future legal actions against them, if something goes wrong with the IPO. However, Drake and Vetsuypens (1993), Ibbotson and Ritter (1995) and others did not find support for this hypothesis.

Market regulation could be another reason for underpricing, if there are any kinds of rules (or limits) applied in pricing the IPO.

The wealth distribution hypothesis has its roots in the privatization programs of the majority of European governments, which underprice the offers in order to attract small investors to the market.

Ibbotson and Ritter (1995) explain the “hot issue markets” with *the favorable information hypothesis* where investors buy stocks if a previous IPO has had notable rallies.

Finally, there is the hypothesis based on *the changing perception of risk*, which considers the concentration of high risk stock IPOs within short time periods.

The explanation for the long-term underperformance observed by Loughran (1993) may be obtained from three different theories found in the literature. The *opportunity windows’ hypothesis* suggested by Ritter (1991) argues that managers are able to determine the best moment to sell the stocks. Usually, they sell overpriced stock, which correct its price in the long term. However, Jung, Kim and Stulz (1996) did not support this hypothesis.

Shiller (1990) presents another suggestion, known as *the impresario hypothesis*. He supports the idea of financial firms creating an initial and apparent demand surplus. In the long-term the market would correct the price. Issuers have no second chance because financial firms, which do not underprice, would be out of business.

The divergence of opinion hypothesis, presented by Miller (1977), is based on the assumption of the existence of two clusters of investors’ opinion: the optimistic and the pessimistic about the IPO’s future performance. The former are notorious prone buyers in the IPO but, as time goes by, opinions tend to converge implying a long-term price underperformance.

As a result of the literature, when observing the result of an IPO wave process in a small economy, where a significant number of firms have changed their ownership structure, passing from being state owned to being private, we have no expectations of a

different behavior. Therefore, we expect to observe the short-term initial abnormal return effect as well as the long-term underperformance.

Moreover, we are expecting to find privatized firms with a better market performance as a result of the significant change in ownership structure, and consequential setting of higher targets and reaching of better economic and financial results. This should be particularly evident if the industry regulatory framework, from which the privatized companies come, is significantly changed.

3. Data and Methodology

We analyze all the initial public offerings followed by listing that occurred in the main market (Mercado de Cotações Oficiais) of the Euronext Lisbon, from 1992 to 1998⁴. In order to be listed, the exchange requires a firm to have at least two years of business activity and three years of published accounts. Additionally, the issuer must have a sound economic and financial situation, an estimated minimum market capitalization of EUR 2.5 million, representing 500,000 shares, or a 25% free float. This enables small companies, in European terms, to be offered and quoted in the Lisbon Stock Exchange.

The issuer establishes the offering price in the prospectus, which is approved by the securities regulator (CMVM – Portuguese Securities Market Commission). If the issuer agrees, this offering price can be revised (lowered) for an amount no less than 5%. Because the issuer cannot increase the offering price, it sells a call option with a strike price equal to the offering price. Welch (1992) observes that this rule is also common to the US market, in order to prevent issuers from making IPOs with raised prices, which would then fail. In 1995, the Portuguese issuers started initial public offerings based on the book-building system and a price interval to establish the offering price. These changes increased the flexibility to fix the IPO price. Benveniste and Wilhelm (1997) define the book-building system as the process of gathering information from institutional investors to fix the offering price, quantity and buyers for the IPO. Under the Portuguese law, the issuer can stop the IPO if there is a proper clause previously set in the prospectus.

Figure 1 shows the BVL All Shares (BVL - Geral) index evolution and the number of IPOs in the main market per year:

Figure 1 – The Number of IPOs and the stock index BVL All Shares

The IPO activity has not been constant along time, showing some signs of being correlated with price movements. Table 1 shows the correlation coefficient between the BVL All Shares index return and changes in the number of IPOs per year. It is noticeable that the IPO activity tended to be more aggressive in bull markets. Both private companies and state owned companies follow this general rule. However, recently, as the number of companies already privatized increased, the state owned IPOs tend to decrease.

Moreover Figure 1 also shows signs of some waving IPO activity, as spotted by Ritter (1991).

Table 1 – Correlation coefficient between the BVL All Shares index return and the variation in the number of IPOs per year.

IPO	Priv+State Own	Priv	State Own
ρ_{vt}	0.41	0.65	0.65

⁴ Although some issues were observed since then, the criteria used for selection were not fulfilled and could not be included in the sample.

$\rho_{v(t-1)}$	0.14	0.24	0.13
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Notes: [1] ρ_{vt} = correlation coefficient between the variation in the number of IPOs in year (t) and the BVL All Shares index return in year (t). $\rho_{v(t-1)}$ = correlation coefficient between the variation in the number of IPOs in year (t) and the BVL All Shares index return in year (t-1); [2] Priv+State Own = sample of private plus state owned IPOs, Priv = sample of private IPO and State Own = sample of State Owned IPOs;

There were 28 IPOs in the main market of the Lisbon stock exchange (16 placed by private companies and 12 placed by state owned companies) between 1992 and 1998, with an approximate total value of EUR 5,129 million. Following the IPO, all these companies were admitted to the listing process. Seventeen of them were made at a fixed price, six as tender offers and five as direct placements. Twelve IPOs used the book-building system. The other markets of the Lisbon Stock Exchange (Second Market and Market without Quotations) had 12 IPOs but most of them were very illiquid in the after-market and therefore were not considered.

In order to avoid other important effects on the companies selected for sampling, we dropped the IPOs that were followed by a seasoned equity offering within a one-year time period after the IPO event⁵. Whenever a tender offering or an exclusion from the market occurred, we kept the IPO in the sample but the price observations were dropped. Hence, we did not collect prices after the day preceding the event announcement (market exclusion or a subsequent tender offer) until the end of the 247-trading-days time window. Although other methods could be used to treat these phenomena we think this is a more realistic assumption for investors holding IPO portfolios, as was suggested by Loughran and Ritter (1995). Kothari and Warner (1997), for instance, filled the remaining return series after the tender offers with the return earned until the exclusion and Barber and Lyon (1997) filled them with the return of a reference portfolio.

All stocks considered in the sample have a known offering price and were listed (with a known first-day closing price) immediately after the IPO. Then, we were able to

⁵ As the average number of trading days per year in the Lisbon Stock Exchange between 1992 and 1998 was 247 we assumed a time window of that range around the IPO as a measure of one-year time.

build three different samples: a total sample with 21 observations representing an approximate value of EUR 5,069 million, a sample with 11 IPOs placed by state owned companies representing 86% of that value, and a sample of 10 IPOs placed by private companies.

Stock prices were retrieved from the Lisbon Stock Exchange data system and represent daily closing prices. Each price series was corrected of the most relevant events (stock splits, equity issues and dividends). In the case of dividends the drop observed in stock prices was assumed to equal the gross dividend paid. Daily instantaneous stock returns were then computed according to $r_{it} = \ln(P_{i,t}/P_{i,t-1})$, where $P_{i,t}$ represents the closing adjusted price of stock i on day t . For the first trading day, ordinary investors would get an instantaneous rate of return of $r_{i1} = \ln(P_{i,1}/P_{i,0})$ where $P_{i,t}$ represents the offering price of the IPO.

We computed the cumulative abnormal returns (CAR) in comparison to the market.

$$CAR_{p,u} = \sum_{t=p}^u \left[\sum_{i=1}^n x_i * (r_{it} - r_{mt}) \right] \quad \text{Eq. 1}$$

With, $CAR_{p,u}$ = the portfolio cumulative abnormal return between day p and day u , with $u > p$, r_{mt} = market (m) return on day t measured by log relative BVL All Shares index and x_i the stock i weighting factor. In order to account for a possible size effect in IPO long run underperformance, detected by both Brav and Gompers (1997) and Fama (1998), we used two different methodologies to calculate the portfolio CARs: the equally-weighted methodology where $x_1 = x_2 = \dots = x_i = 1/n$ and value-weighted methodology. The value-weight for a specific stock is

$$x_i = \frac{N_i P_{i,1}}{\sum_{j=1}^n N_j P_{j,1}} \quad \text{Eq. 2}$$

Where N_i represents the number of stocks listed and $P_{i,1}$ the first closing price of stock i after the IPO.

Choosing the BVL All Shares index to compute the abnormal return we face three problems. First, the index is a value-weighted index, which creates a mismatch when computing the equally-weighted CAR (CAR_{eqw}). Second, following the IPO, the new listed stock is one of the index components. And third, we assume $\beta_i = 1$ when Ibbotson (1975) and Ritter (1991) showed that IPO issuers have a systematic risk higher than 1. This means that the sample tends to overvalue abnormal returns.

Although Barber and Lyon (1997) conclude that abnormal returns measured against other non-offering issuers with similar market value and book-to-market ratio show good results, we could not adopt this method because of scarcity of issuers. In Lisbon Stock Exchange, on average, 28% of the issuers make some sort of public offer each year. Using that method, and a protective time window for keeping data isolated from other effects, would dry up the total sample. Nor could sector indices be used, as Brav and Gompers (1997) proposed, since in some cases the sectors are the result of the new public offers under consideration⁶.

We also used one other method to estimate abnormal returns called *wealth relative* (WR) as suggested by Ritter (1991):

$$WR_{p,u} = \frac{1 + R_{i,u}}{1 + R_{m,u}} = \frac{1 + \sum_{i=1}^n x_i * \left[\prod_{t=p}^u (1 + r_{i,t}) - 1 \right]}{1 + \sum_{i=1}^n x_i * \left[\prod_{t=p}^u (1 + r_{m,t}) - 1 \right]} \quad \text{Eq. 3}$$

If $WR > 1$, then the return from investing in an IPO portfolio is higher than investing in the market portfolio. If $WR < 1$, it means the opposite, and if $WR = 1$, there would be no important difference in returns between the portfolios.

The aim of the study is to answer three different questions. First, whether we could observe short-term abnormal return anomaly and long-term underperformance. Second, if these anomalies do seem to exist in the Portuguese market in general, whether they are distinct when ownership categories (private versus state owned) are compared. And third, if these categories do show different patterns, whether private placements show significantly different under/overpricing phenomena compared with placements made by state owned companies. In order to achieve this, we tested the null

⁶ This is the case for the telecommunications, energy and cement sectors.

hypothesis (H_0) of the cumulative abnormal returns (CAR) of Portuguese IPOs as well as wealth relative (WR) being rejected for the total sample, the state owned companies sample, and the private companies sample. This is:

$$H_0: \mu = 0$$

$$H_a: \mu \neq 0$$

A t-test was used to accept/reject the null hypothesis, assuming independent and normally distributed abnormal returns.

IV – Empirical Results

We started by computing the market value of the issue for each sample. In order to do so we used the closing prices after the stock being listed. The average value of the state owned IPOs is bigger than the average value of the private IPOs and the total value is almost the double. However, the difference between private and public IPOs is not straight when we compare the median and minimum amounts for each one in Table 2. This is a result of a few, very large, public IPOs (usually utilities).

Table 2 – Market value of the issues in each sample computed with close price of the first trading day after the IPO.

Market value (EUR million)	Private plus state owned IPOs (21 issues)	Private IPOs (10 issues)	State owned IPOs (11 issues)
Median	184	169	184
Mean	393	310	467
Maximum	2,745	1,019	2,745
Minimum	18	54	18
Total	8,244	3,103	5,141

Note: Private plus state owned market values on the first trading day after the IPO are from Almeida (1999).

Usually, neither daily returns nor abnormal daily returns after the IPOs follow normal distributions. They show high values for skewness and kurtosis. Table 3 documents the characteristics of the daily returns and the daily abnormal returns

determined for equally- (eqw) and value-weighted (vw) portfolios for each sample. Brown and Warner (1985) overcame this difficulty in their study by using 250 samples, each one with 50 stocks, but our small sample does not allow such a procedure in this study.

Table 3 – Descriptive statistics of (a) daily returns of each sample and (b) daily abnormal returns of each sample.

IPO	Period: 247 trading days				
	Mean	Md.	Sd.	Skew.	Kurt.
(a) Daily returns of each sample					
Priv+State Own (eqw)	0.08%	0.09%	1.08%	2.48	48.16
Priv (eqw)	0.16%	0.09%	1.46%	6.19	70.72
Sate Own (eqw)	0.01%	0.06%	1.37%	-2.57	65.14
Priv+State Own (vw)	0.19%	0.07%	1.32%	7.99	98.57
Priv (vw)	0.19%	0.09%	1.59%	2.73	20.12
Sate Own (vw)	0.19%	0.01%	1.53%	7.30	85.96
(b) Daily abnormal returns of each sample					
Priv+State Own (eqw)	-0.01%	-0.05%	1.08%	3.18	56.91
Priv (eqw)	0.08%	0.00%	1.31%	7.18	85.80
Sate Own (eqw)	-0.08%	-0.06%	1.40%	-2.17	62.60
Priv+State Own (vw)	0.04%	-0.02%	1.16%	10.20	137.44
Priv (vw)	0.07%	-0.01%	1.33%	2.35	17.75
Sate Own (vw)	0.03%	-0.12%	1.39%	10.03	133.25

Notes: [1] Priv+State Own = sample of private plus state owned IPOs, Priv = sample of private IPOs and Sate Own = sample of public IPO; [2] Private plus state owned IPOs (Priv+State Own) figures are from Almeida (1999); [3] eqw = equally-weighted, vw = value-weighted; [4] Md. = median, Sd. = standard deviation, Skew. = Skewness and Kurt. = Kurtosis; [5] Normal distribution has a skewness = 0 and a kurtosis = 3.

While daily returns show a positive mean and median, we did not find similar results for daily abnormal returns. However, we found state owned IPOs show a poorer daily performance than private IPOs, in terms of both average returns and average abnormal returns. Furthermore, although state owned IPOs show a lower daily performance they also present a higher abnormal returns' standard deviation. In

addition, both returns are far from being normally distributed. In spite of this, care must be taken when interpreting statistical results.

The initial returns (observed between the subscription price and the first closing price after the listing) are positive whichever the weighting method (Table 4), but the weighting method makes a difference. Large state owned IPOs show a higher return than small state owned IPOs. In the private IPOs we have the opposite situation.

Table 4 – Initial returns.

IPO _{0,1}	Initial returns	
	eqw	vw
Priv+Sate Own	10.55%	16.68%
Priv	16.95%	13.33%
State Own	4.74%	18.70%

Notes: [1] Priv+Sate Own = sample of private plus state owned IPOs, Priv = sample of private IPOs and State Own = sample of state owned IPOs; [2] Private plus state owned IPOs (Priv+Sate Own) figures are from Almeida (1999); [3] eqw = equally-weighted, vw = value-weighted.

Our sample with equally-weighted private plus state owned IPOs show smaller initial returns than those reported by Alpalhão (1988) for the Portuguese market. It is the 7th smallest initial return out of 25 countries reported by Loughran, Ritter and Rydqvist (1994), when ranked among their sample.

After studying the initial abnormal return anomaly, we looked to cumulative abnormal returns (CAR) and the wealth relatives (WR) on the 247th trading day. As described earlier in the paper, we used CARs and WR with two methodologies. We started by assuming portfolios were composed of stocks bought at the IPO subscription price (with time period represented by [0; 247]). Then, in a second version, we assumed that portfolios were composed of stocks bought at the first trading day closing price after the IPO (time period represented by [1; 247]).

The cumulative returns on the 247th trading day, when the stock is bought in the IPO, are shown in Table 5. We found the same pattern as in the initial returns, but the value-weighted method in the private IPOs reaches a higher return than the equally-

weighted method. Once again, the value-weight methodology makes a positive difference after 247 trading days.

Table 5 – Cumulative returns on the 247th trading day.

IPO _{0,247}	Cumulative returns	
	eqw	vw
Priv+Sate Own	20.48%	47.11%
Priv	40.30%	45.78%
State Own	3.28%	46.29%

Notes: [1] Priv+Sate Own = sample of private plus state owned IPOs, Priv = sample of private IPOs and State Own = sample of state owned IPOs; [2] Private plus state owned IPOs (Priv+Sate Own) figures are from Almeida (1999); [3] eqw = equally-weighted, vw = value-weighted.

Figures 2 and 3 document the evolution of the cumulative returns per sample and weighting methodology until the 247th trading day after the IPO.

Figure 2 – IPO value-weighted cumulative returns

Figure 3 - IPO equally-weighted cumulative returns

Notes: [1] Priv+Sate Own = sample of private plus state owned IPOs, Priv = sample of private IPOs and State Own = sample of state owned IPOs; [2] Private plus state owned IPOs (Priv+Sate Own) figures are from Almeida (1999); [3] eqw = equally-weighted, vw = value-weighted.

As observed in Figures 2 and 3, the weighting method seems to interfere with the results. When using the equally-weighted methodology, the cumulative returns of the state owned IPOs are lower than the private IPOs, whatever the time period under observation. When using the value-weighted method the private IPOs' dominance is less obvious and depends on the time period under consideration. In this particular case, we cannot reject the null hypothesis that mean difference equals zero.

When studying the IPO abnormal returns at the end of 247 trading days, results are dependent on the sample and method under consideration. When observing the entire sample, investors buying stocks in the IPO would obtain positive abnormal returns if compiling a value-weighted portfolio, but negative abnormal returns if choosing an equally-weighted portfolio. However, when buying stocks on the first day the results would have been negative whatever the method under consideration.

When comparing the results of private and state owned IPOs, we found that whatever the method, it has been more profitable, on average, to invest in portfolios composed of private company IPOs rather than by state owned company IPOs. This seems to contradict our forecasts since we were expecting state owned IPOs to perform better than companies placed in IPOs by private firms. However, as standard deviations

observed in all samples are high, and sample sizes are small, the cumulated abnormal returns (CAR) and the *wealth relatives* (WR) are not statistically strong enough to reject the null hypothesis of the mean equal to zero.

Table 6 – Cumulative abnormal returns (CAR) and weighted relatives (WR) when the investors buy the stocks: in (a) the IPO ([0;247]) or (b) on the first trading day after the IPO ([1;247]) and keep it in the portfolio until the 247th trading day.

IPO	CAR vw	CAR eqw	WR vw	WR eqw
(a) investors buy the stock in the IPO [0;247]				
Priv+Sate Own	10.87% (1.34)	-2.80% (-0.18)	110.78% (1.80)	97.04% (-0.19)
Priv	17.42% (1.41)	19.46% (1.17)	116.36% (1.49)	126.68% (1.21)
State Own	7.98% (0.80)	-20.50% (-0.83)	107.80% (1.14)	71.07% (-1.56)
(b) investors buy the stocks on the first trading day after the IPO [1;247]				
Priv+Sate Own	-4.83% (-0.70)	-13.75% (-0.91)	94.16% (-1.17)	83.73% (-1.24)
Priv	6.67% (0.62)	3.56% (0.26)	103.36% (0.45)	106.21% (0.41)
State Own	-10.71% (-1.33)	-26.96% (-1.11)	89.36% (-1.69)	64.62% (-1.84)

Notes: [1] Priv+State Own = sample of private plus state owned IPO, Priv = sample of private IPO and State Own = sample of state owned IPO; [2] Private plus state owned IPO (Priv+State Own) figures are from Almeida (1999); [3] eqw = equally-weighted, vw = value-weighted; [4] *t*-statistic in parentheses (-). In the *wealth relatives* (WR) method the *t*-statistic is computed by the difference between the return of the stock (*i*) and its expected return (see above [eq.4]).

Brav and Gompers (1997) and Fama (1998) support the theory that long-term underperformance of IPOs is a size effect observed for small market value issues. Our results for the private plus state owned IPOs and the state owned IPOs samples seem to support those authors. The equally-weighted samples show worse results than the value-weighted samples (except for the private IPO samples). For a 5% level of confidence we reject the null hypothesis that the mean of value-weighted samples is lower than the mean of equally-weighted samples (except for the private IPO samples). We also reject the hypothesis of the private IPO mean being lower than the public IPO mean whichever the purchase day (IPO [0;247] or IPO [1;247]).

Aggarwal, Leal and Hernandez (1993) showed that in Chile the state owned IPOs underperformed the market over one year, no matter which methodology is used (CAR or WR and whether stocks are bought in the IPO or on the first trading day). This

state owned IPO sample presented poorer results than the mixed sample of private plus public IPOs. This behavior is consistent with what we found for the Portuguese market.

From Table 6, we see that the way investors weight the investment and the day on which they buy the stocks makes a difference. Buying the stocks on the first trading day after the IPO leads to worse performance than buying the stocks in the IPO.

Table 7 shows that the first trading day has positive abnormal returns significant at the 5% level, assuming normality and independence.

Table 7 – Abnormal returns ($CAR_{1,1}$) and wealth relatives ($WR_{1,1}$) on the first trading day after the IPO ([0;1]).

IPO	$CAR_{0,1}$ vw	$CAR_{0,1}$ eqw	$WR_{0,1}$ vw	$WR_{0,1}$ eqw
Priv+State Own	15.70%* (36.78)	10.95%* (12.86)	115.55%* (4.70)	111.00%* (2.79)
Priv	10.75%* (17.52)	15.90%* (19.50)	110.48%* (2.28)	115.73% (2.21)
State Own	18.69%* (34.54)	6.46%* (4.55)	118.68%* (4.20)	106.57% (1.83)

Notes: [1] Priv+State Own = sample of private plus state owned IPO, Priv = sample of private IPO and State Own = sample of state owned IPO; [2] Private plus state owned IPO (Priv+State Own) figures are from Almeida (1999); [3] eqw = equally-weighted, vw = value-weighted; [4] t -statistic in parentheses ($\cdot$). In the *wealth relatives* (WR) method the t -statistic is computed by the difference between the return of the stock (i) and its expected return (see above [eq.4]); [5] * significant at the 5% level, assuming normality and independence.

Contrary to the previous analysis, the state owned IPO presents a first day return above the private IPO. This seems to provide us information about the way government and private managers fix the offering price. The state owned offerings present higher initial abnormal returns and lower one year abnormal returns than the private offerings. Also, the initial abnormal returns are a key element to the performance of investing in IPOs (mainly state owned offerings). The value-weighted methodology outperforms the equally-weighted methodology, except in the case of private IPOs. The initial returns behavior is equivalent to that observed by Ibbotson (1975) and many other authors. It seems that investors could take advantage of this market inefficiency by flipping the stocks on the first trading day. Interestingly, the state owned IPOs initial results with the equally-weighted methodology are similar to the ones presented by Aggarwal, Leal and Hernandez (1993) ($CAR = 7.6\%$ and $WR = 108\%$).

The analysis of the CAR and WR series between the IPO and the 247th trading day shows that the value-weighted methodology is always positive during this time period. This does not happen with the equally-weighted methodology due to small state owned IPOs underperformance. Whatever the market value of state owned IPOs, the initial performance dilutes with time. The rejection rate of the null hypothesis is located in the first half of the series and the statistical results of the private IPO sample are stronger than the state owned offerings.

Table 8 – Descriptive statistics of the cumulative abnormal returns (CAR) and wealth relatives (WR) of the IPO between the offering and the 247th trading day ($t = 0;...;247$) – maximum, minimum, relevant trading day, frequency of rejection of the null hypothesis and number of trading days higher than zero.

IPO		CAR _{0,247} vw	CAR _{0,247} eqw	WR _{0,247} vw	WR _{0,247} eqw
Priv + State Own	Maximum [trading day]	18.96% [3]	12.22% [3]	119.94% [3]	113.24% [3]
	Minimum [trading day]	4.35% [184]	-6.37% [185]	104.92% [187]	94.52% [226]
	Rejects H_0 [CAR or WR >0]	130 [247]	20 [151]	86 [247]	6 [151]
Priv	Maximum [trading day]	19.93% [245]	27.38% [133]	121.61% [55]	138.53% [116]
	Minimum [trading day]	1.54% [179]	14.10% [17]	104.80% [179]	115.73% [1]
	Rejects H_0 [CAR or WR >0]	90 [247]	110 [247]	1 [247]	0 [247]
State Own	Maximum [trading day]	23.74% [3]	7.27% [3]	125.35% [3]	107.59% [3]
	Minimum [trading day]	4.36% [184]	-23.99% [185]	104.38% [176]	69.17% [233]
	Rejects H_0 [CAR or WR >0]	77 [247]	4 [23]	33 [247]	0 [22]

Notes: [1] Priv+State Own = sample of private plus state owned IPO, Priv = sample of private IPO and State Own = sample of public IPO; [2] Private plus public IPO (Priv+State Own) figures are from Almeida (1999); [3] eqw = equally-weighted, vw = value-weighted; [4] the indices in each method represents the period of analysis; [5] the t -statistic is in parentheses (-). In the *wealth relatives* (WR) method the t -statistic is computed by the difference between the return of the stock

(i) and its expected return; [6] rejects H_0 = number of trading days in which the null hypothesis is rejected from being equal to zero. The statistical test is continuously repeated all over the trading days $t=0,2,3,\dots,247$; [7] $[CAR \text{ or } WR > 0]$ = number of trading days in which each method is positive or higher than 100%, correspondingly; [8] [trading day] = sequential number of the first trading day in which the value was registered.

There is another difference between the private and state owned IPOs. While the private IPOs show a higher result in the second half of the period under consideration, the state owned IPOs present higher results in the beginning (also associated with the previously reported first day abnormal return). Figure 4 depicts the cumulative abnormal returns (CAR) evolution during 247 trading days.

Figure 4 – Cumulative Abnormal Returns – Private and State Owned IPOs, equally vs. value-weighted

Notes: [1] State Own+Priv = sample of private plus state owned IPO, Priv = sample of private IPO and State Own = sample of state owned IPO; [2] eqw = equally-weighted, vw = value-weighted.

Figure 5 shows a similar evolution for the *wealth relative* (WR).

Figure 5 – Wealth Relative – Private and State Owned IPOs, equally vs. value-weighted

Notes: [1] Priv+State Own = sample of private plus state owned IPO, Priv = sample of private IPO and State Own = sample of state owned IPO; [2] eqw = equally-weighted, vw = value-weighted.

If investors bought the stock on the first trading day after the IPO, we observe a similar data pattern to that which was previously seen. However, in this case, every sample registers a larger number of negative results with less positive results. The rejection rate is non-relevant.

Table 9 – Descriptive statistics of the cumulative abnormal returns (CAR) and *wealth relatives* (WR) of the IPO between the first trading day after the offering and the 247th trading day (t = 1;...;247) – maximum, minimum, relevant trading day, frequency of rejection of the null hypothesis and number of trading days higher than zero.

IPOs		CAR _{1,247} vw	CAR _{1,247} eqw	WR _{1,247} vw	WR _{1,247} eqw
Priv + State Own	Maximum [trading day]	3.27% [3]	1.26% [3]	103.31% [3]	101.26% [3]
	Minimum [trading day]	-11.35% [184]	-17.32% [185]	89.45% [179]	81.59% [226]
	Rejects H_0 [CAR or WR > 0]	4 [10]	4 [5]	33 [14]	0 [9]
Priv	Maximum [trading day]	9.18% [245]	11.48% [133]	108.54% [55]	115.39% [116]
	Minimum [trading day]	-9.21% [179]	-1.80% [17]	93.37% [164]	98.86% [17]

	Rejects H_0 [CAR or WR >0]	0 [154]	0 [221]	0 [148]	0 [234]
State Own	Maximum [trading day]	5.05% [3]	0.82% [3]	105.12% [3]	100.74% [2]
	Minimum [trading day]	-14.33% [184]	-30.45% [185]	86.40% [212]	62.59% [233]
	Rejects H_0 [CAR or WR >0]	12 [15]	9 [7]	44 [16]	0 [6]

Notes: [1] Priv+State Own = sample of private plus state owned IPO, Priv = sample of private IPO and State Own = sample of state owned IPO; [2] Private plus State Owned IPO (Priv+State Own) figures are from Almeida (1999); [3] eqw = equally-weighted, vw = value-weighted; [4] the indices in each method represents the period of analysis; [5] the t -statistic is in parentheses ($\cdot$). In the *wealth relatives* (WR) method the t -statistic is computed by the difference between the return of the stock (i) and its expected return; [6] rejects H_0 = number of trading days in which the null hypothesis is rejected from being equal to zero. The statistic test is continuously repeated over all the trading days $t=1,3,\dots,247$; [7] [CAR or WR >0] = number of trading days in which each method is positive or higher than 100%; [8] [trading day] = sequential number of the first trading day in which the value was registered.

Alpalhão (1988), for a sample taken between 1986 and 1987, rejects the null hypothesis that the Portuguese IPO market is efficient. His initial abnormal return was 54.4% when taking the BTA Index as the benchmark. Imposing the additional criteria of at least 20 quotes out of 30 initial trading days after the IPO, the author found an initial abnormal return of 72.6% and a cumulated abnormal return of 36.2% at the end of 20 quotes. Mello (1994), for a sample taken between 1989 and 1993, found that the Portuguese IPO average annual return was +8.3% against a market average return of -8.0%.

Our results go a step further than those reported by both authors. We show that the initial abnormal returns are positive and statistically strong but over one year the abnormal returns depend on the weighting methodology. After one year, we do not prove the market is inefficient.

V – Conclusion

This study aims to answer to three different questions. First, whether we could observe the short-term abnormal return anomaly or long-term underperformance in IPOs of a small economy. Second, if these anomalies do seem to exist, whether they are distinct when ownership categories (private versus state owned) are compared. Finally, if these categories do show different patterns, whether private placements show a significantly different under/overpricing phenomena compared with placements made by state owned companies. In order to do this, we selected the Portuguese market to test whether cumulative abnormal returns (CARs) or the wealth relative (WR) of a set of portfolios were statistically and significantly different from zero.

We started by concluding that there have been significant abnormal returns in the short-term for IPOs in the Portuguese market and they seem to be more pronounced if value-weighted portfolios were compiled. These findings seem to support the majority of previous studies in the field, such as Ibbotson (1975). In addition, state owned IPOs have been more profitable for short-term investments than private IPOs, confirming, for Portugal, what Dewenter and Malatesta (1997) found for the UK market.

In a second study for a one-year time period, we found that abnormal returns obtained from Portuguese IPOs were not statistically different from zero, either for private or for state owned IPOs. However, we found that there are significant signs that private IPOs perform better in a one-year term than state owned IPOs. This seems to confirm the empirical results observed by Aggarwal, Leal and Hernandez (1993) for the Chilean market, but seems to reject our pre-expectations about their relative performance based on a research of Megginson, Nash, and Van Randenborgh (1994). According to these authors privatized companies significantly improve their economic and financial performance. Therefore we would expect privatized firms to perform better than private firms after being listed. In addition, these results are also contradictory to the findings of Dewenter and Malatesta (1997). We believe that in small economies (like the Portuguese or the Chilean) where privatized firms were basically monopoly utilities, the change in the ownership structure did not affect deeply the firms' environment or its management. For the Portuguese case this is particularly true, since privatized companies were only partly placed in the market, leaving the remaining slides of the share capital to seasoned equity offerings. And on top of that, the State has always guaranteed a Golden Share, particularly significant for large firms and those offering essential products/services, which had a major effect on our value based

methodology. As Huibers and Perotti (1998) maintain, this is a source of political risk with negative impact on price. Additionally, taking into consideration that these privatized monopolies tended to become regulated by recently created regulatory structures, they suffered additional operational restrictions and strong price limits. Therefore, although changing, the new ownership structure did not affect their operational structure, at least not as quickly as the market and regulators would desire. As a consequence, markets seem to have penalized them.

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