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Abnormal Returns in Privatization Public Offerings: The Case of Portuguese Firms

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resumo

Neste trabalho analisamos a evidência sobre o comportamento dos retornos das acções das empresas privatizadas em Portugal entre 1989 e 2001. O objectivo do nosso trabalho foi de recolher evidência sobre o desempenho em bolsa de uma amostra abrangente de operações públicas de privatização e avaliar os factores determinantes do desempenho observado. Os resultados obtidos confirmam a existência de retornos anormais positivos no dia e mês após a venda das acções em bolsa, mas os retornos são de reduzida magnitude e com reduzida significância estatística. Além disso, os retornos observados para as acções das empresas privatizadas são inferiores aos observados para empresas privadas que realizaram Ofertas Públicas Iniciais. No longo prazo, o desempenho é negativo mas superior ao observado para as acções de empresas privadas que efectuaram OPIs. Os resultados sugerem assim que há reversão parcial dos retornos iniciais e ainda que os investidores exigem retornos mais elevados para acções de empresas que são privatizadas parcialmente.

résumé / abstract

La présente étude analyse les rendements excédentaires des émissions relevant de privatisations au Portugal dans le période de 1989 à 2001. Nous étudions les performances boursières, initiale et à moyen et long terme, pour un échantillon qui comporte l'ensemble des privatisations portugaises (ouverture initiale et ventes subséquentes), et les facteurs qui expliquent cette performance. Les offres des entreprises publiques observent un rendement initial positif mais modeste, vis-à-vis le rendement de référence et, en moyenne, sont moins rentables que celles achevées par les entreprises au capital privé. Les rendements excédentaires cumulés registrent une performance négative pendant une période de 3 à 5 ans, mais la perte est inférieure à celle générée par les émissions initiales de entreprises au capital privé. Les résultats suggèrent donc que le rendement initial est partiellement reversé et que les actionnaires demandent des rendements supérieurs pour les privatisations partielles.

This paper provides evidence on abnormal returns of Portuguese privatization public offerings for the period from 1989 to 2001. This study explores the abnormal performance of a comprehensive sample of Portuguese privatization transactions and investigates the determinants of the observed price behavior. We find some evidence of the underpricing phenomenon for privatized offerings but initial returns are low and barely significant. The results show further that privatization IPOs underperform private sector IPOs. In the long run, we observe negative abnormal returns. While in early event months, privatization public offerings yield more negative returns than private sector offerings, this effect is reversed in longer horizon periods. Initial underpricing is thus partially reversed and investors seem to require higher returns in partial privatizations.

JEL Classification: G38; G32

1. Introduction



A considerably high number of studies document the phenomenon of underpricing of privatized firms in the short run and positive abnormal performance in the long run. This study measures short- and long-term abnormal returns to investors in Portuguese privatization public offerings and investigates the determinants of the observed price behavior. The empirical analysis is based on a comprehensive sample of privatization transactions that took place on the Portuguese stock exchange for the period from 1989 to 2001.

Documenting and understanding the short- and long-term market performance of privatization public offerings in different countries can shed light on the debate upon the impact of privatization programs on the firm's value and on whether the performance is tied to particular characteristics of a privatization program (aims, strategies and methods). The contribution of this paper is to extend the analysis of the literature on privatization public offerings providing additional evidence regarding a single country program. Previous empirical studies are mainly multi-country studies that analyze transactions across markets or single-country studies that focus on "voucher" privatization programs of economies in transition (countries from Central and Eastern Europe).

Our paper tests several theoretical predictions that have been put forward in the literature. In particular we investigate the role of political strategies and dual listing in the short and long run performance of privatization public offerings.

Our results are not supportive of the underpricing phenomenon except when we exclude the very extreme observations. Our results show further that privatization IPOs underperform private sector IPOs. These results contradict most of the previous evidence¹. The degree of underpricing seems to reflect uncertainty and not a strategic political policy to retain power.

In the long run, we observe negative abnormal returns contradicting the most recent evidence². While in early event months, privatization public offerings yield more negative returns than private sector offerings, this effect is reversed in longer horizon periods³. Initial underpricing is thus partially reversed and investors seem to require higher returns in partial privatizations.

This paper is organized as follows: Section 2 provides a brief overview of the Portuguese privatization program. Section 3 describes the sample. In Sections 4 and 5 we review the relevant literature, describe the tests and variables and present the results for, respectively, the short and long run market performance. Section 6 concludes our study.

2. The Portuguese Privatization Program

The Portuguese privatization program started in 1989, well after the privatization wave in developed European countries initiated by Margaret Thatcher's British government back in the early 1980's. The late launch of the program was due to the political and legal environment created by the 1974 Revolution and the massive process of nationalizations that followed⁴. Only in 1998 as a part of a broad set of economic reforms, was the transfer of state holdings to the

1 See for example Choi and Nam (1998) that look at 185 PIPOs from 30 countries over the period from 1981 to 1997. Yet some studies on Central and Eastern European privatization offerings also find that the difference in initial returns between IPOs and Private IPOs is insignificant.

2 Megginson, Nash, Netter and Schwartz (2000) find positive and statistically positive long-run (1-5 years) returns for a sample of 158 PIPOs from 33 countries from 1981 to 1997.

3 This result is consistent with recent empirical literature that finds Privatization Initial Public Offers (PIPOs) outperforming private IPOs. Moreover, there is worldwide evidence of negative long-term returns for private IPOs (see for example Jenkinson and Ljungqvist, 2001).

4 The nationalization process in Portugal started in 1975 and was extensive to all sectors in the economy: banks, insurance companies, oil, transport, energy, telecommunications, pulp and paper, beverages, etc.



private sector begun. Initially only sales of minority shareholding positions were allowed but that was changed in 1990, when the Law of Privatization was approved. The main stated objectives of the privatization program therein, were similar to those announced in most European countries. Besides the reduction of state ownership in itself, the program aimed at raising cash to reduce public debt and budget deficits; improving economic efficiency through the use of markets to allocate resources; submitting companies to transparent corporate governance rules; developing domestic capital markets; and disseminating share ownership⁵.

The privatization methods used by the Portuguese government changed over time but the preferred method was sales through Public Offerings held in the Portuguese stock exchange. The method of Direct Sales was used, exceptionally, for small companies, and supposedly when national political and economic interests were at stake⁶.

Table 1 shows the annual proceeds of the privatization public offerings over the period from 1989 to 2001. Sales were spread over time but 1992, 1997 and 1998 were important years with sales amounting to respectively, 1.3, 2 and 2.2 billion Euros. Total capital raised amounted to 8.8 billion Euros in 66 transactions. There was a predominance of partial privatizations and over time, there were important differences in the transactions, in particular regarding the industries of the privatized firms⁷. By 2001, privatized firms accounted for more than 50% of total market capitalization.

3. Sample

We have identified the transactions in Dathis, a financial database compiled by the Portuguese stock exchange and that is the most comprehensive data set on Portuguese stocks. We have collected data on offer size, initial offer prices, offer dates and quotes.

Table 2 shows the descriptive statistics for gross proceeds of the transactions that constitute our sample. The sample includes 42 privatization transactions, of which 19 are initial offers (Privatization Initial Public Offers – PIPOs) and 23 are secondary (seasoned) offers (Privatization Seasoned Public Offers – PSPOs). Inevitably PSPOs are more common in later years, and after 1998, the Portuguese government only launched subsequent offers. The proceeds of the 42 privatization transactions in the sample represent 96% of the total proceeds of all privatization public offers in Portugal for the period analyzed. The remaining transactions refer to sales of small firms that were sold on the stock exchange but were not listed on the main regular market⁸.

As documented in other privatization studies (see for example Jelic and Briston, 2003), the effective open market trading of the shares of privatized firms after the official IPO date is often a long process and there is a substantial variance in time to listing across firms. This delay results from the design of the operation, in particular legal constraints on trading⁹. For the PIPOs in the sample, the median time to listing was 43 days.

5 By the end of 1988, the Portuguese stock market was short-lived, illiquid and tiny. Aggregate market capitalization was then below 4 000 million Euros. By the end of 2001, aggregate market capitalization was above 73 thousand million Euros (down from 116 thousand million Euros by the end of 2000).

6 This was the case of GALP, the Portuguese oil refinery and distribution company.

7 The initial transactions involved banks, insurance companies and brewers.

8 In April 1991, the new Capital Markets law (Lei Sapateiro) set up three market segments in the Portuguese stock exchange. Regular firms, i.e. those firms meet all exchange requirements (in terms of capital dispersion, market capitalization and solvency), are listed on Mercado de Cotações Oficiais (Market with Official Quotations). Small and medium firms list on Segundo Mercado (Second Market). The firms that do not meet the exchange requirements are traded on Mercado Sem Cotações (Market Without Quotations). From 2005 on, all stocks listed either on Mercado de Cotações Oficiais or Segundo Mercado became listed on Euronext Lisbon.

9 For example, in Portugal, buying shares of privatized companies allowed tax allowances subject to a minimum required holding period. The same applies for special tranches reserved to employees, immigrants, small investors and even clients, placed at a discount relative to the offer price but again required a minimum holding period.

Table 1 – Summary Statistics for Portuguese Privatizations Public Offerings

Year of Privatization	Nr. Privatizations	Gross Proceeds (€ thousand)	% of Partial Privatizations
1989	4	353 327	100%
1990	5	692 795	80%
1991	5	553 478	60%
1992	12	1 283 477	42%
1993	7	327 628	29%
1994	4	344 058	75%
1995	7	550 590	71%
1996	6	491 154	83%
1997	6	1 989 737	100%
1998	4	2 192 530	100%
1999	2	2 718	100%
2000	2	5 258	100%
2001	2	610	100%
Total	66	8 787 360	

Source: Dathis.

Notes: This table reports information concerning the 66 privatizations that occurred in Portugal from 1989-2001.

Table 2 – Gross Proceeds of Portuguese Privatization Public Offerings

	Total	Mean	Median	Std. Dev.
All (n=42)	8 475 096	201 788	124 529	276 135
PIPOs (n=19)	3 917 192	206 168	142 634	224 305
PSPOs (n=23)	4 557 887	198 169	66 289	317 660

Notes: This table presents the gross proceeds (in thousand Euros) of Portuguese privatization public offerings, as well as its breakdown in Initial (PIPOs) and Secondary Offers (PSPOs).

Table 3 – Gross Proceeds of Portuguese Private IPOs

	Total	Mean	Median	Std. Dev.
Private IPOs (n=15)	419 535	27 969	16 959	29 216

Notes: This table presents the main descriptive statistics for the Gross Proceeds (thousand Euros).

Table 3 shows the summary statistics for the gross proceeds of Portuguese private sector IPOs. The sample comprises 15 IPOs and represents the universe of private sector transactions in the sample period. PIPOs are on average much larger than private IPOs (10 times larger) and this is similar to what has been reported in previous studies. The median time to listing for these offerings was 3 days.



4. Short Run Market Performance

4.1. Theoretical Predictions and Previous Findings

Previous evidence has shown that companies underprice their shares when they go public. The underpricing has been also documented for PIPOs, in different countries and over different time periods. The evidence from single country studies, in particular referring to Central and Eastern European countries, is sometimes conflicting. Yet more recent studies, that use comprehensive samples of operations across countries, show overwhelming evidence of positive and superior initial returns for PIPOs compared with private IPOs¹⁰. Seasoned offerings are underpriced as well, though much less so than PIPOs.

Different theoretical arguments have been put forward to account for the observed privatization initial returns.

According to asymmetric information theories, and as described by Huang and Levich (2003), it is reasonable to expect that there should be less uncertainty about larger and mature firms, operating in stable industries, as they are likely to be followed by more analysts, produce more information about their activities, and possibly have longer periods of operation, than smaller and younger firms established in new industries. If so, a more significant underpricing should be observed for privatizations of smaller state-owned firms. Given that companies involved in private IPOs are younger and in more dynamic industries, privatization IPOs should be less underpriced and thus yield lower initial returns. Yet limited demand in small capital markets may dictate greater underpricing for larger issues to ensure the success of the operation. Therefore a higher degree of underpricing may be observed in larger privatization offerings. Asymmetric information theories would also predict that underpricing is greater for transactions where the length of time between offer price setting and first trade date is greater, and for initial privatization offerings. As the scope and implications of the privatization program are revealed, uncertainty about offer characteristics is reduced yielding diminishing initial returns over time¹¹.

Political economic theories argue that governments pursue above all political objectives as demonstrated by Perotti (1995) and Biais and Perotti (2002). This view argues, for example, that shares are allocated for purchase at a discount by firm employees to gain employee political support to the process of privatization. This suggests that initial returns in privatizations for which a share tranche is reserved for employees, should exceed initial returns observed when there is no such reserved tranche. Similarly, governments try to build political support during the early stages of a privatization program by underpricing first privatization offers, which satisfies investors and increases their confidence in the next offers. Higher initial returns should also be expected whenever a privatization offer occurs on a year of parliamentary elections, before these elections take place, to avoid shifting voting preferences among the population. Finally, according to Biais and Perotti (2002), strategic privatization, by allocating significant share ownership to a targeted section of the population, is mainly used by right-wing political parties. If so, higher initial returns should be observed when right-wing parties are leading the country.

As for foreign participation, it is plausible to assume that governments that are concerned with building domestic electoral support, bar foreigners from purchasing any part of the offer. If underpricing occurs, a privatization program represents a wealth transfer from the state to investors, and the government will be more subject to criticism the greater the foreign allocation. The prediction is thus that higher initial returns should be observed in offers where there is no share tranche reserved for foreigners and should be lower when foreign allocation increases. Yet

10 The Megginson and Netter (2001) survey article in the *Journal of Economic Literature* presents a number of studies examining initial returns in PIPOs that find positive significant initial performance. Yet some authors show contradictory results. See for example Dewenter and Malatesta (1997).

11 In Baron (1982).



international diversification benefits would dictate that offer prices are higher in offerings with foreign international investors due to extended capital supply and the presence of more sophisticated investors¹². In addition, the cross-listing of the shares of a privatized firm may be seen as a signal of quality and government's commitment to it through the privatization program. This could resolve part of the uncertainty regarding firm value and result in higher initial offer prices and therefore lower underpricing for those offers with a listing in foreign markets.

Agency theory models argue that managerial incentives and market monitoring are ineffective in partial sales because the control shift to the private sector is incomplete, given the likelihood of a government intervention later after the sale, and this impacts expected economic performance. This is also true for sales of firms in regulated industries. The prediction is that partial privatization offerings are riskier and therefore a greater underpricing is required to reassure and convince investors to buy shares. Yet a government that is mainly concerned with revenue maximization will be unwilling to underprice and will prefer total privatization.

Finally, the degree of underpricing depends on how the offer price was chosen. More and more offer prices are set after a process of book building, in order to gather information on the demand prices and orders. In such a setting, investors reveal their opinions and therefore underpricing should be lower due to uncertainty resolution when such processes are used.

Evidence suggests that underpricing is more severe for state-owned firms in regulated industries, consistent with the agency arguments (see for example Dewenter and Malatesta, 1997). Yet there are conflicting results regarding the effect of partial privatization: several studies show returns are positively related to the stake sold (see for example Jones, Megginson, Nash and Letter, 1999, and Choi and Nam, 1998), suggesting governments choose above all to maximize revenues.

In this paper we empirically investigate the arguments outlined above.

4.2 Methodology and Variables

We investigate if Portuguese privatization public offerings have positive initial returns. We use the traditional event-study methodology (see for example Dewenter and Malatesta, 1997) to measure privatization total and market-adjusted returns over one-day, seven-day and thirty-day holding periods following the offer date¹³.

Raw returns are given by:

$$r_{it} = \log(P_{i,t}) - \log(P_{i,0}) \quad (1)$$

where

r_{it} : raw, unadjusted return for stock i on day t ;

$P_{i,t}$: closing price for stock i on day t following initial trade ($t = 1, 7, 30$); and

$P_{i,0}$: initial offer price for stock i (time index 0 refers to the issue date).

Abnormal returns are defined as market-adjusted returns:¹⁴

$$r_{it}^* = r_{it} - r_{mt} \quad (2)$$

¹² Higher offer prices are due to an increase in demand for shares (demand effect).

¹³ For simplification, we use calendar day intervals and not trading days.

¹⁴ Alternative risk adjustment methods are not used because there is no pre-listing period concerning privatized firms.



where

r_{it}^* : market-adjusted return for company i on day t ;

r_{mt} : market return on day t , defined as $\log(I_t) - \log(I_0)$;

I_t : stock market index level on day t ; and

I_0 : stock market index level on the date the offer price was set.

To ensure that results are robust, market-adjusted returns were computed with reference to two different indices.¹⁵ The indices used were PSI Geral (the reference index of Portuguese stocks) and S&P 500. Stock market indices data is from Datastream International.

The use of offer prices for the calculation of initial returns creates some problems. In particular, the time difference observed in the process of introducing shares into trading is, in some cases, very long and as such, abnormal returns should be interpreted with caution.

Significance is assessed on the basis of Student's t -test¹⁶. To check robustness, we performed a Sign Test¹⁷.

We also investigate whether Portuguese PIPOs are more underpriced than Portuguese private sector IPOs. We perform a difference t -test and Wilcoxon Mann-Whitney-U test to evaluate the differences between initial returns of state-owned IPOs and private IPOs¹⁸.

¹⁵ Results using FTSE 100 are also available upon request.

¹⁶ The test statistic assumes that abnormal returns are independently, identically and normally distributed and is distributed as t -Student with degrees of freedom equal to the sample size minus one. The t -statistic is given by

$$t = \frac{\sum r_i^*}{\sqrt{N} \cdot \hat{\sigma}^*}$$

where N is the number of companies in the sample. Given that there is no available data prior to the event, the standard deviation of abnormal returns (s^*) is estimated from the cross-section of event date abnormal returns. See Serra (2004) for more details.

¹⁷ The Sign test is a non-parametric test used as an alternative to the t -test. The Sign test is a simple binomial test of whether the fraction of positive abnormal residuals (p) equals 50%. The statistic

$$GS = \frac{|p_0 - p|}{\sqrt{p(1-p)/N}}$$

has an approximate unit normal distribution. p_0 is the observed fraction of positive returns across firms in one particular event period. If abnormal returns are independent, under the null hypothesis the number of non-negative values of abnormal returns has a binomial distribution with parameter p . The alternative hypothesis, for any level of abnormal performance, is that the proportion is different than that prior to it.

¹⁸ The Wilcoxon-Mann-Whitney test is a non-parametric test for comparing two population means (or medians) based on independent samples. The statistic for the test is given by:

$$T = \sum K_i$$

where K_i is the rank of the absolute value of abnormal returns of the first sample (PIPOs). It is assumed that none of the absolute values are equal and that each is different from zero. *Asymptotically*, for $N > M > 10$, the distribution of T , under the null hypothesis of equally likely superior or inferior abnormal returns, will be normal with

$$E(T) = N(N + M + 1) / 2$$

$$\sigma^2(T) = N(N + M + 1)M / 12$$

N and M are, respectively, the number of firms of state-owned IPOs (19 observations) and private IPOs (15



Finally, in order to evaluate the importance of the several theoretical arguments reviewed above, we perform a multivariate analysis. We use the following specification:

$$r_i^* = \alpha + \beta_1 \text{DAYS}_i + \beta_2 \text{SIZE}_i + \beta_3 \text{EMP}_i + \beta_4 \text{FOR}_i + \beta_5 \text{ORDER}_i + \beta_6 \text{PARTIAL}_i + \beta_7 \text{GOV}_i + \beta_8 \text{ELECTION}_i + \beta_9 \text{ADR}_i + \varepsilon_i \quad (3)$$

where

r_i^* : market-adjusted one, seven or thirty-day initial return for privatization offering i ;

DAYS: number of days between the date of price setting and the first trade date;

SIZE: (log) total value of the privatization offer;

EMP: dummy variable that equals one for employee participation and zero otherwise;

FOR: dummy variable that equals one for foreign participation and zero otherwise;

ORDER: order of the privatization offering i within the country's privatization program, that equals one for the first share privatization offer sale, two for the second offer, and so forth;

PARTIAL: dummy variable that equals one if the privatization offering i is partial (fraction of equity sold by the government inferior to 100%) and zero if 100% of the company is sold;

GOV: dummy variable that equals one if the privatization offering i occurred while a right-wing party was governing the country and zero otherwise;

ELECTION: dummy variable that equals one if the privatization offering i occurred on a year of parliamentary elections before elections took place, and zero otherwise; and

ADR: dummy variable that equals one if the stocks were listed in the form of ADRs in an international capital market and zero otherwise.

According to asymmetric information theories it is reasonable to expect a lower degree of underpricing for larger and more mature firms, operating in stable industries, as they are likely to be followed closely by more analysts, produce more information about their activities, and possibly have longer periods of operation, than smaller and younger firms established in new industries. This effect is captured by the variable SIZE. Yet many privatizations occur in small capital markets and a higher degree of underpricing may be required to warrant the placement of the entire offer. Information asymmetry would also predict that the greater the length of time between offer price setting and first trade date (DAYS), the higher the degree of underpricing. The order of the offer (ORDER) may also affect initial returns: the degree of uncertainty about the first privatization issue is much higher than other subsequent privatizations (in a sector or in industry, in case of banks, beverages, insurance, pulp). Asymmetric information theories would predict that – for subsequent offers – as the scope and the implications of the privatization program are revealed, underpricing should be less severe. Finally, governments may list the privatized shares in international exchanges (through ADRs), to signal quality and government's commitment to it through the privatization program. Therefore, initial returns should be higher for those offers that were listed in foreign markets¹⁹.

To investigate political economic arguments we use several different variables. If governments are concerned with building political support, initial returns in privatizations where a share

observations). If the underlying distribution is normal, the relative efficiency of this test against the t-test is 0.955 and is thus less powerful for smaller samples. This is no longer true if the abnormal returns are not normally distributed.

¹⁹ Yet this effect may be mitigated by the way the offer price was determined. More and more offer prices are set after a process of book building involving large international institutional investors, reducing the degree of underpricing.



tranche is reserved to employees (EMP) should exceed initial returns where there is no such reserved tranche. The variables GOV and ELECTION are also included to assess if privatization is used by governments to retain political power: higher initial returns should be observed when right-wing parties are leading the country, and when privatization occurs just before parliamentary elections. Again if governments' main concern is to assure political support, one should observe that when foreign participation (FOR) is allowed, one should observe lower initial returns as a result of higher offer prices to bar wealth transfers to foreigners. Yet one could observe this same effect driven by greater demand for shares, improved risk sharing and lower risk aversion that would enhance offer prices. Governments may also try to build political support during the early stages of a privatization program by underpricing first offers (ORDER), which satisfies investors and increases their confidence for subsequent offers. If the privatization offer is partial (PARTIAL) a higher degree of underpricing may also be used as a means to assure and convince investors to buy in subsequent offers. Partial sales may also require higher underpricing to compensate for the fact that the control shift to the private sector is not effective and therefore the impact on the firm's expected economic performance is lower.

Data regarding governments in power in Portugal for the sample period, as well as information concerning the parliamentary electoral dates, were obtained from the Portuguese Elections National Commission²⁰. Table 4 presents this information.

Information concerning Portuguese privatized companies Depository Receipts listed in the US was obtained in DR Directory of the Bank of New York. Table 5 summarizes this information.

Table 4 – Portuguese Parliamentary Elections for the Period 1989-2002

Date of the Election	Winner party	Right/Left wing
19-07-1987	PSD	Right-wing
06-10-1991	PSD	Right-wing
01-10-1995	PS	Left-wing
10-10-1999	PS	Left-wing
17-03-2002	PSD	Right-wing

Source: Comissão Nacional de Eleições.

Notes: This table reports summary information concerning the dates and the winners of parliamentary elections occurred in Portugal during 1989-2002. PSD: Partido Social Democrata; PS: Partido Socialista.

Table 5 – Depository Receipts of Portuguese Privatized Firms Shares

DR Issue	Exchange	Ratio ADR:ORD	Industry	Deposit	Date
PTelecom	NYSE	1:1	Fixed Line Comm.	BNY	01-06-1995
Portucel	PORTAL	1:1	Forest Products & Paper	CIT	28-06-1995
Cimpor	PORTAL	1:2	Building Materials	CIT	18-10-1996
EDP	NYSE	1:10	Electric Utilities	CIT	19-06-1997

Source: Bank of New York DR Directory.

Notes: This table reports summary information concerning Portuguese privatized companies depository receipts listed in the US.

4.3. Results

Table 6 shows the summary statistics of the raw and market-adjusted returns for the 42 Privatization Public Offerings in our sample. Average and median unadjusted and market-adjusted returns over one- and seven-day periods are positive but statistically insignificant.

²⁰ "Comissão Nacional de Eleições".



Considering a holding period of 30 days, average market-adjusted returns become lower and are even negative when we use the S&P 500 as the market benchmark. The parametric t-tests for all periods in the analysis show that there is no significance at the 5% level. As such we cannot reject the null hypothesis that initial returns of Portuguese Privatization Public Offerings are equal to zero. These results do not confirm the findings reported in the literature for other countries.

Table 6 – Initial Returns for Portuguese Privatization Public Offerings

n = 42	Unadjusted Returns (%)			Market-Adjusted PSI GERAL Returns (%)			Market-Adjusted Returns (%) S&P 500		
	1 day AR	7 days CAR	30 days CAR	1 day AR	7 days CAR	30 days CAR	1 day AR	7 days CAR	30 days CAR
Average	1.10	1.24	0.47	1.49	1.39	0.69	0.50	0.60	-0.45
Median	2.60	2.68	1.87	2.81	2.64	2.34	1.87	2.24	1.95
t-statistic	(0.812)	(0.874)	(0.312)	(1.024)	(0.921)	(0.454)	(0.342)	(0.399)	(-0.275)
% Positive	76.19%	73.81%	64.29%	80.95%	76.19%	59.52%	73.81%	73.81%	61.90%
Sign Test	3.395 ^a	3.086 ^a	1.852	4.012 ^a	3.396 ^a	1.234	3.086 ^a	3.086 ^a	1.543

Notes: This table presents the average and median unadjusted and market adjusted initial returns for 42 Portuguese Privatization Public Offerings. Abnormal Returns (AR) and Cumulative Abnormal Returns (CAR) are measured over intervals of 1, 7 and 30 calendar days following initial trading of the shares. Market index data refers to PSI GERAL and S&P 500. t-tests refer to two-tailed tests. ^a denotes significance at the 5% level.

Yet, using a non-parametric test, the test statistical values obtained for the Sign Test allow us to reject the null hypothesis of no abnormal returns at a 5% significance level for one and seven days periods. For thirty-day periods results are consistent with the ones obtained from parametric tests.

As described above, some of these initial returns refer sometimes to very long periods because for some stocks, trading is initialized months after the offer date. The variable Time to listing ranges from a minimum of 1 day to a maximum of 476 days. To check if the most extreme observations were affecting the returns we re-calculate the average abnormal return over one-, seven- and thirty-day periods, excluding from the sample those companies that had a Time to listing outside the third quartile of the distribution. We excluded 11 observations. The results obtained for the remaining 31 Privatization Public Offerings are presented in Table 7. Average unadjusted and market-adjusted returns over one-, seven- and thirty-day periods are now higher than the ones obtained for the full sample of 42 Privatization Public Offerings, and the t-tests and sign test are significant at the 5% level. Therefore, after deleting extreme observations, we reject the null hypothesis that initial returns of these 31 Portuguese Privatization Public Offerings are equal to zero, and confirm the phenomenon of underpricing in the short run.

As initial and subsequent offerings have different nature, we removed the 23 subsequent offerings from the sample to check if these transactions had influence on the results. Table 8 shows summary statistics of the initial returns for the 19 Portuguese PIPOs included in the sample. Average and median unadjusted and market-adjusted returns are now higher than the ones obtained with the initial sample of 42 transactions. In any case, initial returns are low and barely significant, except for market-adjusted one-day returns using the PSI GERAL as the market benchmark and the sign test over one- and seven-day periods. In addition to that, sample size is very small affecting statistic inference.

We performed a comparative analysis by considering two sub-samples: PIPOs and private IPOs. We compute initial returns to investors for the sub-sample of 19 PIPOs and compare these returns with the ones observed for the control sample of private IPOs. Table 8 shows the raw and market-adjusted returns for PIPOs and private IPOs.


Table 7 – Initial Returns for 31 Portuguese Privatization Public Offerings Excluding Outliers

n = 31	Unadjusted Returns (%)			Market-Adjusted Returns (%) PSI GERAL			Market-Adjusted Returns (%) S&P 500		
	1 day AR	7 days CAR	30 days CAR	1 day AR	7 days CAR	30 days CAR	1 day AR	7 days CAR	30 days CAR
Average	3.81	3.98	3.59	3.49	3.42	3.06	3.42	3.69	3.36
Median	3.63	3.25	3.16	2.95	2.71	2.83	3.43	3.19	3.36
t-statistic	(3.816) ^a	(3.875) ^a	(3.127) ^a	(3.697) ^a	(3.255) ^a	(2.797) ^a	(3.472) ^a	(3.634) ^a	(3.051) ^a
% Positive	90.32%	90.32%	80.65%	90.32%	87.10%	70.97%	83.87%	83.87%	77.42%
Sign Test	4.490 ^a	4.490 ^a	3.413 ^a	4.490 ^a	4.131 ^a	2.335 ^a	3.772 ^a	3.772 ^a	3.053 ^a

Notes: This table presents the average and median unadjusted and market adjusted initial returns for 31 Portuguese Privatization Public Offerings. Returns (AR and CAR) are measured over intervals of 1, 7 and 30 calendar days following initial trading of the shares. Market index data refers to PSI GERAL and S&P 500. t-tests refer to two-tailed tests. ^a denotes significance at the 5% level.

Table 8 – Initial Returns for Portuguese PIPOs and Private IPOs

PIPOs n = 19	Unadjusted Returns (%)			Market-Adjusted Returns (%) PSI GERAL			Market-Adjusted Returns (%) S&P 500		
	1 day AR	7 days CAR	30 days CAR	1 day AR	7 days CAR	30 days CAR	1 day AR	7 days CAR	30 days CAR
Average	3.31	3.04	1.64	3.38	3.11	1.41	2.69	2.43	-0.02
Median	3.00	2.83	1.35	2.95	2.71	1.85	2.76	2.61	1.45
t-statistic	(1.814)	(1.628)	(0.787)	(2.137) ^a	(1.769)	(0.766)	(1.442)	(1.188)	(-0.010)
% Positive	73.68%	68.42%	57.89%	73.68%	73.68%	52.63%	68.42%	68.42%	57.89%
Sign Test	2.065 ^a	1.606	0.688	2.065 ^a	2.065 ^a	0.229	1.606	1.606	0.688

Private IPOs n=15	Unadjusted Returns (%)			Market-Adjusted Returns (%) PSI GERAL			Market-Adjusted Returns (%) S&P 500		
	1 day AR	7 days CAR	30 days CAR	1 day AR	7 days CAR	30 days CAR	1 day AR	7 days CAR	30 days CAR
Average	8.55	9.38	9.93	7.83	8.62	8.21	8.24	9.35	9.51
Median	7.74	7.37	6.12	6.69	5.25	6.03	6.27	6.72	7.27
t-statistic	(4.195) ^a	(3.499) ^a	(3.467) ^a	(3.841) ^a	(3.685) ^a	(3.769) ^a	(4.077) ^a	(3.614) ^a	(3.423) ^a
% Positive	93.33%	93.33%	93.33%	93.33%	100.00%	86.67%	93.33%	93.33%	80.00%
Sign Test	3.357 ^a	3.357 ^a	3.357 ^a	3.357 ^a	3.873 ^a	2.840 ^a	3.357 ^a	3.357 ^a	2.324 ^a

Notes: This table presents the average and median unadjusted and market adjusted initial returns for PIPOs and private IPOs. Returns (AR and CAR) are measured over intervals of 1, 7 and 30 calendar days following initial trading of the shares. Market index data refers to PSI GERAL and S&P 500. t-tests refer to two-tailed tests. ^a denotes significance at the 5% level.



The sub-sample of PIPOs shows higher average and median unadjusted and market-adjusted returns than those observed for the entire sample of Privatization offerings (initial and subsequent) separately from subsequent offers. As for the 15 private IPOs, and for every holding period considered in the analysis, the returns are positive and statistically significant.

As above, we re-calculated returns for PIPOs excluding from the sample those firms that had a Time to listing outside the third quartile of the range (dropping 5 observations). The results, shown in Table 9, are very similar to those above: abnormal returns are low and barely significant.

Table 9 – Initial Returns for the Sub-Sample of PIPOs Excluding Outliers

PIPOs n = 14	Unadjusted Returns (%)			Market-Adjusted Returns (%) PSI GERAL			Market-Adjusted Returns (%) S&P 500		
	1 day AR	7 days CAR	30 days CAR	1 day AR	7 days CAR	30 days CAR	1 day AR	7 days CAR	30 days CAR
Average	3.06	3.13	2.89	3.20	3.13	2.41	2.47	2.79	1.74
Median	3.12	2.88	2.26	2.89	2.74	2.64	3.07	2.70	2.36
t-statistic	(1.766)	(1.613)	(1.333)	(1.724)	(1.516)	(1.098)	(1.556)	(1.620)	(0.883)
% Positive	78.57%	78.57%	64.29%	78.57%	78.57%	57.14%	71.43%	71.43%	64.29%
Sign Test	2.138 ^a	2.138 ^a	1.069	2.138 ^a	2.138 ^a	0.535	1.604	1.604	1.069

Notes: This table presents the average and median unadjusted and market adjusted initial returns for 14 PIPOs. Returns (AR and CAR) are measured over intervals of 1, 7 and 30 calendar days following initial trading of the shares. Market index data refers to PSI GERAL and S&P 500. t-test refers to two-tailed tests. ^a denotes significance at the 5% level.

Table 10 shows the test statistics for the difference t- and Mann Whitney U-tests. The results indicate that we reject the null hypothesis that the average initial returns for PIPOs are equal to the average initial return in private IPOs for a 30-day holding period. Student t and Mann-Whitney U tests are consistent and significant at a 5% level. As for the one- and the seven-day analyses, the statistics for the difference t-tests are insignificant. Yet the non-parametric test allows us to reject the null hypothesis that the price impact of PIPOs and private IPOs is the same.

Overall, results suggest that privatizations yield, on average, lower initial returns than private new offerings, which contradicts previous research reporting that PIPOs tend to be more underpriced than other IPOs. In Almeida and Duque (2005), the average initial return for the 24 IPOs analyzed (that include PIPOs) is positive (7.27%) and statistically significant. We find a lower underpricing effect. This may stem from the fact that we use a more extensive sample period that includes more recent offerings for which underpricing was lower. Our result could either reflect uncertainty resolution as the privatization process evolved or lower demand for later offerings or both.

To identify the factors that may affect the short-term price behavior in privatization offerings, we run univariate tests to check for differences in market-adjusted one-day returns for several sub-samples formed on the basis of the dummy variables. These are employee participation (EMP), foreign participation (FOR), partial or total privatization (PARTIAL), political party of the government that leads the country (GOV), date of the parliamentary elections (ELECTION) and ADR listing (ADR). Results are presented in Table 11.

The results are very weak except for the dummy variable GOV. The results suggest that whenever the privatization offering occurs with a left-wing party governing the country, (one-day market adjusted returns using the S&P 500 as the market benchmark) initial returns are higher, which contradicts the hypothesis that right-wing parties are more populist and make more use of privatization offers to attract voters political support as a strategic policy to retain power.



Table 10 – Tests of Differences Between PIPOs and Private IPOs Average Initial Returns

Period	PIPOs			Private IPOs			Difference in Returns		
	Raw Return (1)	Market Adjusted Return PSI GERAL (2)	Market Adjusted Return S&P 500 (3)	Raw Return (1)	Market Adjusted Return PSI GERAL (2)	Market Adjusted Return S&P 500 (3)	Raw (1)	PSI GERAL (2)	S&P 500 (3)
One-day	3.31	3.38	2.69	8,55	7,83	8,24	-5,24	-4,45	-5,55
							t-stat (-1.914)	(-1.728)	(-2.017)
							t-stat (-2.098) ^a	(-2.029) ^a	(-2.064) ^a
Seven-day	3.04	3.11	2.43	9,38	8,62	9,35	-6,34	-5,51	-6,92
							t-stat (-1.939)	(-1.881)	(-2.100) ^a
							t-stat (-1.856)	(-1.994) ^a	(-2.168) ^a
Thirty-day	1.64	1.41	-0.02	9,93	8,21	9,51	-8,29	-6,80	-9,53
							t-stat (-2.342) ^a	(-2.378) ^a	(-2.634) ^a
							t-stat (-2.168) ^a	(-2.029) ^a	(-2.341) ^a

Notes: This table reports the average difference in initial returns of state-owned (19 observations) and privately-owned offerings (15 observations). Returns are in %. t- and z-tests refer to two-tailed (t-Student and Wilcoxon Mann-Whitney U) tests. ^a denotes significance at the 5% level.

Table 11 – Tests of Differences in Market-Adjusted One-day Returns for Sub-Samples of Portuguese Privatization Offerings

Variable	Difference in Returns (PSI GERAL) (%)	Difference in Returns (S&P 500) (%)
EMP	-2.201	1.857
t-stat	(-0.227)	(0.192)
FOR	3.153	0.326
t-stat	(0.335)	(0.036)
PARTIAL	0.102	1.535
t-stat	(0.043)	(0.517)
GOV	-3.514	-5.165
t-stat	(-1.440)	(-2.166) ^a
ELECTION	-3.558	-4.249
t-stat	(-0.820)	(-0.867)
ADR	5.541	6.698
t-stat	(1.616)	(1.997)

Notes: This table reports the average difference in market-adjusted one-day returns for sub-samples of the 42 Portuguese privatization public offerings formed on the basis of six dummy variables: employee participation (EMP), foreign participation (FOR), partial or total privatization (PARTIAL), party of the government that leads the country (GOV), date of the parliamentary elections (ELECTION) and ADR listing (ADR). Returns are in %. t-tests refer to two-tailed tests. ^a denotes significance at the 5% level.

We also performed this univariate analysis considering just the sample of 19 PIPOs. Results are shown in Table 12.

The results obtained from the tests continue to be very weak and lack statistical significance. In fact, when considering only the 19 PIPOs in the sample the dummy variable GOV is no longer statistically significant, despite its negative sign.

In order to test the impact of the firm belonging or not to the financial sector (banks and insurance companies), we divided the sample of 42 observations into transactions of financial firms (23 observations) and non-financial firms (19 observations). The results are presented in Table 13. The results suggest the underpricing of financial firms is greater but the results are not statistically significant.

Results of the multivariate analysis are presented in Table 14. The fit of the model is extremely poor and the individual parameter estimates are not significant²¹. The signs of the coefficients of



Table 12 – Tests of Differences in Market-Adjusted One-day Returns for Sub-Samples of Portuguese Privatization Initial Public Offerings (PIPOs)

Variable	Difference in Returns (PSI GERAL) (%)	Difference in Returns (S&P 500) (%)
EMP	-N/A	N/A
t-stat	*	*
FOR	-4.930	-6.413
t-stat	(-1.148)	(-1.275)
PARTIAL	2.679	4.814
t-stat	(0.737)	(1.146)
GOV	-7.717	-8.261
t-stat	(-1.557)	(-1.394)
ELECTION	-1.065	-2.517
t-stat	(-0.289)	(-0.583)
ADR	4.443	5.334
t-stat	(1.027)	(1.045)

Notes: This table reports the average difference in market-adjusted one-day returns for sub-samples of the 19 Portuguese privatization initial public offerings formed on the basis of six dummy variables: employee participation (EMP), foreign participation (FOR), partial or total privatization (PARTIAL), party of the government that leads the country (GOV), date of the parliamentary elections (ELECTION) and ADR listing (ADR). Returns are in %. t-tests refer to two-tailed tests. * denotes significance at the 5% level.

Table 13 – Tests of Differences in Market-Adjusted One-day Returns for Sub-Samples of Portuguese Privatization Initial Public Offerings (PIPOs)

Variable	Difference in Returns (PSI GERAL) (%)	Difference in Returns (S&P 500) (%)
FIN	4.048	4.048
t-stat	(1.402)	(1.402)

Notes: This table reports the average difference in market-adjusted one-day returns for sub-samples of the 42 Portuguese privatization public offerings formed on the basis of the dummy variable FIN that equals 1 if the firm is a bank or an insurance company (23 observations) and 0 otherwise (19 observations). Returns are in %. t-tests refer to two-tailed tests. * denotes significance at the 5% level. Results obtained for one and seven-day market-adjusted returns are available upon request.

21 The t-statistics after performing the White correction are very similar and are available upon request.



the explanatory variables SIZE, ORDER, PARTIAL and ADR are as predicted by the literature: the degree of underpricing is greater for initial offerings, when the privatization is partial and when shares are cross-listed. As for the variables DAYS, EMP, GOV and ELECTION the signs of the coefficients contradict the theoretical arguments. The underpricing is lower for large issues, with right-wing parties, and in the years elections took place. Results for the dummy variable FOR are also not significant, suggesting that the influence of foreign investors on the privatization initial returns is trivial²².

In sum, PIPOs seem to start trading below their market value as observed with IPOs. The results of univariate and the multivariate analyses performed to inform about the determinants of the observed underpricing are not conclusive. Yet even if, for several of the variables analyzed to account for the different arguments, the economic relationships are as predicted, the estimates lack statistical significance and this may stem in part from the small sample in our study. Overall results seem to be consistent with asymmetric information and agency arguments and do not support the claim that governments deliberately underprice privatization offerings for political factors as predicted by Biais and Perotti (2002).

Table 14 – Determinants for Privatization Market-Adjusted Initial Returns

30 days Market-Adjusted Returns (Market index: PSI GERAL)			(Market index: S&P 500)		
	Coefficients	t-statistic		Coefficients	t-statistic
Constant	14.6404	(0.6856)	Constant	12.246	(0.5743)
DAYS	-0.01568	(-0.9088)	DAYS	-0.0285	(-1.6571)
SIZE	-1.2420	(-0.5405)	SIZE	-0.5183	(-0.2259)
EMP	-5.8615	(-0.5570)	EMP	-4.0329	(-0.3838)
FOR	3.1145	(0.5759)	FOR	-1.8506	(-0.3427)
ORDER	-3.3315	(-1.2774)	ORDER	-2.1245	(-0.8158)
PARTIAL	8.2210	(1.7938)	PARTIAL	7.7793	(1.7000)
GOV	-6.3272	(-1.1609)	GOV	-7.2024	(-1.3234)
ELECTION	-2.7529	(-0.6476)	ELECTION	-3.2026	(-0.7545)
ADR	2.0351	(0.3514)	ADR	2.4072	(0.4163)
F-statistic		1.3401	F-statistic		2.1048
Adj.R ²		0.0695	Adj.R ²		0.1952

Notes: This table shows the estimates of the regression of market-adjusted initial returns for 42 Portuguese Privatization Public Offerings against the number of days between price setting and first trade date (DAYS); the log of total value of the privatization offer (SIZE); Dummy variables for employee participation (EMP), foreign participation (FOR), partial or total privatization (PARTIAL), party of the government that leads the country (GOV), date of the parliamentary elections (ELECTION) and ADR listing (ADR); and a discrete variable that equals one for the first share sale privatization offer, two for the second offer, and so forth (ORDER). Parameters are estimated by ordinary least squares regression. t-tests refer to two-tailed tests. a denotes significance at the 5% level.

²² We run the regression for the sub-sample excluding the “outliers” as described above. The results are very similar except for the specification explaining one-day initial returns where the negative coefficient of the variable ORDER is now statistically significant at a 5% level.

5. Long Run Market Performance



5.1. Theoretical Predictions and Previous Findings

Several studies examine the long run returns from privatization offerings. While in private IPOs there seems to be strong evidence of negative long-term returns, in privatization offerings the international evidence, in particular studies based on large international samples, suggest that the long-term performance of privatization offerings is positive and that PIPOs outperform IPOs or firms from matching samples²³. The most recent studies cover a large number of countries (and offerings) and use several methods to control for several problems with estimates and test statistics of long run returns, and the positive performance is robust to these tests²⁴. Further the results suggest that PIPOs outperform IPOs²⁵. Yet some studies indicate that privatization offerings underperform in the long run. This underperformance is mainly observed for emerging markets and privatization-related ADRs²⁶. Altogether, there seems to be no manifest conflicting performance results regarding the long-term performance of privatization issues, given that the studies that found underperformance refer to the particular case of emerging markets offerings in foreign exchanges.

Most studies analyze the returns earned by investors who buy privatized shares at the first closing market prices and hold stocks up to 1, 3 and 5 years. In addition, a few studies investigate the determinants of the observed returns. Several explanations have been put forward to account for the long run performance of privatized shares. While some arguments are valid for any IPOs, privatization offerings have different characteristics that have to be accounted for.

Ibbotson, Sindelar and Ritter (1994) present three possible explanations for the long run performance of IPOs: divergence of opinion, the empresario hypothesis and windows of opportunities. Ritter (1991) tries to capture these effects with variables such as size, age, industry and initial underpricing²⁷. For the particular case of privatization offerings, additional variables that may affect long run performance are associated with management shifts resulting from the transfer of state to private ownership, and the resulting improvements in economic efficiency. Political risk is an obvious distinctive feature of privatization offerings that may play an important role in understanding the behavior of returns over time.

Boardman and Laurin (2000) use a variable to measure the timing of a particular offering within the process of privatization in a country. They also account for the portion of retained government ownership (and golden shares) and for different regulating and competitive environments. Perotti and Van Oijen (2001) also use a proxy for political risk and suggest that the progressive resolution of political risk as the privatization program evolves, leads to more positive returns. Yet, in the long run, after the initial correction, one should observe lower returns reflecting lower risk. Finally, and similarly to what happens with private IPOs, the decision to cross-list may impact on the returns of the privatized firm's shares in the long run²⁸.

In this paper we ask whether the arguments above can account for the long-term performance of Portuguese PIPOs. Very little is known about the determinants of the long run returns in privatizations. Further the explanatory variables that have been looked to in previous studies can account for several different theoretical arguments. For example, Boardman and Laurin (2000) find that privatizations, occurring later in the process, show greater excess positive returns but

23 For evidence regarding the long-term performance of IPOs and PIPOs respectively, please refer to table B2.2 in Jenkinson and Ljungkvist (2001) and table 9 in Megginson and Netter (2001).

24 See for example Barber and Lyon (1997) or Kothari and Warner (1997).

25 See for example Boardman and Laurin (2000), Dewenter and Malatesta (2001) and Jelic and Briston (2003).

26 See for example Foerster and Karolyi (2000), Aybar (2002) and, more recently, Jia, Sun and Tong (2005).

27 Boardman and Laurin (2000) report that privatization offerings are larger and older and operate in more mature industries and have therefore lower growth prospects than the typical IPO firm.

28 See Foerster and Karolyi (2000).



this effect could equally support agency, asymmetry or political risk arguments. Similarly, Aybar (2002) shows that emerging market PIPOs underperform developed markets issues. Yet this difference could validate political as well as agency risk arguments.

5.2. Methodology

To investigate long run performance we use the methodology proposed by Ritter (1991) as in several other single-country studies. We investigate the sign and magnitude of long run abnormal returns to investors in Portuguese privatization offerings. Further we analyse if there are statistically significant differences between PIPOs' and private IPOs' long run performance.

Abnormal returns are defined as in (2). The average market-adjusted return on a sample of N companies in event period t is the equally weighted arithmetic average of the benchmark-adjusted returns:

$$AR_t = \frac{1}{N} \sum_{i=1}^N r_{it}^* \quad (4)$$

The cumulative market-adjusted aftermarket performance from q to s is the summation of the average market-adjusted returns:

$$CAR_{q,s} = \sum_{t=q}^s AR_t \quad (5)$$

The parametric tests proposed in the literature rely on the important assumption that abnormal returns are normally distributed. We use the standard t-statistic to test the significance of abnormal returns²⁹.

To check the robustness of the results, we performed a procedure based on calendar-time portfolio returns. The use of this method is an attempt to eliminate the problem of cross-sectional dependence among sample firms once the returns of sample firms are aggregated into a single portfolio.

Considering the period from 1989 to 2001, we calculate, for each offering i , the six months abnormal return (AR_i) over the sample period. For each holding six-month period, we create an equally-weighted portfolio of the existing offerings for that particular period. The mean abnormal return – MAR_t – across firms in the portfolio is given by:

$$MAR_t = \frac{1}{n_t} \sum_{i=1}^{n_t} AR_{i,t} \quad (6)$$

where

n_t is the number of active firms in that six-month period (t).

Subsequently, we calculate the grand mean for the T six-month periods abnormal returns (MMAR), given by:

$$MMAR = \frac{1}{T} \sum_{t=1}^T MAR_t \quad (7)$$

²⁹ Please refer to footnote 16.

where

T is the number of six month periods over the total sample period.

To test the null hypothesis of zero mean six-month period abnormal returns, a t-statistic is estimated using the time-series standard deviation of the observed six-month abnormal returns:

$$t(MMAR) = \frac{MMAR}{\frac{\sigma(MAR_t)}{\sqrt{T}}} \quad (8)$$

To conduct the multivariate analysis we follow the model proposed by Boardman and Laurin (2000). They regress three-year CARs against (i) the relative size of the firm, measured by the market capitalization of the privatized firm divided by the total capitalization of the market; (ii) the percentage of ownership retained by the government; (iii) a dummy variable that equals one if the government retains a special share (Golden Share) and zero otherwise; (iv) the initial underpricing measured by the returns earned in the first days after listing; and (v) a dummy variable that equals one if the privatization occurred relatively late in the country's privatization program and zero otherwise. Hence our specification is:

$$CAR_{1,36i} = \beta_1 MR_i + \beta_2 SIZE_i + \beta_3 ORDER_i + \beta_4 PARTIAL_i + \beta_5 ADR_i + \beta_6 LATE_i + \varepsilon_i \quad (9)$$

where

$CAR_{1,36i}$: three-year cumulative abnormal returns for privatization offering i;

MR: market-adjusted (one-, seven- or thirty-day) initial return;

LATE: dummy variable that equals one if the privatization offering occurred relatively late in the country's privatization program and zero otherwise.

SIZE, ORDER, PARTIAL and ADR are defined as in section 4.2 above.

The variable MR that refers to the initial underpricing may be seen as a proxy for over optimism. Perotti (1995) shows that when the policy uncertainty is high, underpricing is seen as a sign for a government's commitment to the privatization program. Therefore, a higher degree of underpricing should have a positive effect on long run privatization returns. On the other hand, that kind of commitment may reduce the premium required by investors and yield lower required returns in the long run.

The effect of SIZE on long run stock price performance stems from asymmetric information theories. It is reasonable to expect that there should be less uncertainty about larger and mature firms, operating in stable industries, than in smaller and younger firms established in new industries. In fact, the existence of lower uncertainty implies lower risk and, subsequently, lower required returns for larger offerings. In that case, small size offerings would show higher long-term returns due to higher uncertainty. Yet several authors suggest that smaller firms should outperform larger firms due to greater improvement in economic efficiency.

The ORDER of the offer may also affect long run returns. If it is a first privatization offer, the government will retain some percentage of ownership to sell eventually in subsequent offerings. This might be interpreted as a signal that the government is still interested in the company, which would lead to a negative relationship between the order of the offer and long run performance. This effect may be better captured by the variable PARTIAL due to the fact that if governments decide not to sell immediately 100% of the shares of the companies, but prefer to do it slowly, investors may interpret this as a positive sign of commitment to the privatization program, having





a negative effect on long run performance due to the lower risk. Yet, partial privatizations may also reflect the interference of the government in the offerings and, therefore, higher risk leading to higher returns.

As for the explanatory variable ADR, listing the privatization offering on an international market may be seen as a sign of quality and the government's commitment to the privatization program, reflecting lower risk and lower required returns. In addition, one could expect that returns would be lower reflecting lower required returns due to the presence of sophisticated foreign investors.

Finally the variable LATE, motivated by Boardman and Laurin (2000), measures the effect of when a specific offer occurred in a particular country. This variable equals one if the privatization occurred relatively late in the country's privatization program and zero otherwise. In fact, early privatization offerings that had no previous track record, might have been considered riskier.

5.3. Results

Table 15 shows the six-month ARs and CARs for 6, 12, 18, 24, 30 and 36 months after the offering. ARs and CARs are negative for the first 6 and 12 months and for horizon periods over 30 months. Results are only statistically significant for the S&P 500 benchmark.

Table 15 – Long-Term Average Abnormal Returns (AR) and Average Cumulative Abnormal Returns (CAR) for Privatization Offerings

PSI GERAL Months	Nr. firms	AR _t (%)	t-stat. (AR _t)	CAR _t (%)	t-stat. (CAR _t)
1-6	41	-2.213	(-1.303)	-2.213	(-1.303)
7-12	40	0.479	(0.349)	-1.794	(-0.804)
13-18	37	1.419	(1.204)	-0.375	(-0.192)
19-24	37	1.650	(1.247)	1.275	(0.378)
25-30	34	-1.081	(-0.541)	0.194	(0.040)
31-36	33	-2.059	(-1.269)	-1.865	(-0.446)

S&P 500 Months	Nr. firms	AR _t (%)	t-stat. (AR _t)	CAR _t (%)	t-stat. (CAR _t)
1-6	41	-4.242	(-2.347) ^a	-4.242	(-2.347) ^a
7-12	40	-0.898	(-0.574)	-5.140	(-2.150) ^a
13-18	37	1.123	(0.813)	-4.017	(-1.511)
19-24	37	-1.531	(-1.036)	-5.548	(-1.818)
25-30	34	-2.218	(-1.079)	-7.766	(-2.120) ^a
31-36	33	-3.238	(-1.788)	-11.004	(-2.650) ^a

Notes: This table shows the ARs and CARs for the 42 Portuguese privatization offerings. The number of firms varies over time due to de-listing and new firms. t-tests refer to two-tailed tests. a denotes significance at the 5% level.

Results of ARs using the calendar-time approach are presented in Table 16. As above, returns are not statistically significant and vary according to the market benchmark used in each case. The occurrence of both positive and negative signs in periodic returns over time could reflect the fact that we compute returns for the aggregate sample (initial and secondary offerings).

Table 16 – Long-Term Average Abnormal Returns Using Calendar-Time Portfolio Method for Privatization Offerings

PSI GERAL Period	Nr. firms	MAR _t (%)	Period	Nr. firms	MAR _t (%)
1989 0-6 months	1	14.892	1989 7-12 months	2	-5.181
1990 0-6 months	4	3.112	1990 7-12 months	5	7.495
1991 0-6 months	9	4.949	1991 7-12 months	12	2.093
1992 0-6 months	12	-2.588	1992 7-12 months	17	-0.086
1993 0-6 months	18	-5.152	1993 7-12 months	20	-2.563
1994 0-6 months	20	-2.935	1994 7-12 months	21	-1.808
1995 0-6 months	25	0.459	1995 7-12 months	23	1.327
1996 0-6 months	21	1.341	1996 7-12 months	22	-2.329
1997 0-6 months	22	-7.148	1997 7-12 months	24	-1.501
1998 0-6 months	26	0.449	1998 7-12 months	27	-1.126
1999 0-6 months	28	0.845	1999 7-12 months	29	-1.316
2000 0-6 months	26	4.050	2000 7-12 months	20	5.559
2001 0-6 months	20	4.556	2001 7-12 months	22	-1.998
MMAR (%)		0.592	t-stat. (MMAR)	(0.659)	

S&P 500 Period	Nr. firms	MAR _t (%)	Period	Nr. firms	MAR _t (%)
1989 0-6 months	1	8.990	1989 7-12 months	2	5.948
1990 0-6 months	4	-0.733	1990 7-12 months	5	1.491
1991 0-6 months	9	-7.190	1991 7-12 months	12	-1.876
1992 0-6 months	12	-0.234	1992 7-12 months	17	-12.802
1993 0-6 months	18	-3.862	1993 7-12 months	20	2.443
1994 0-6 months	20	1.473	1994 7-12 months	21	1.305

(continua)



S&P 500 Period	Nr. firms	MAR _t (%)	Period	Nr. firms	MAR _t (%)
1995 0-6 months	25	-4.499	1995 7-12 months	23	-6.470
1996 0-6 months	21	3.376	1996 7-12 months	22	-2.661
1997 0-6 months	22	-5.754	1997 7-12 months	24	-1.029
1998 0-6 months	26	7.961	1998 7-12 months	27	-6.883
1999 0-6 months	28	-12.893	1999 7-12 months	29	2.828
2000 0-6 months	26	3.806	2000 7-12 months	20	4.017
2001 0-6 months	20	-5.319	2001 7-12 months	22	1.712
MMAR (%)		-1.033	t-stat. (MMAR)	(-0.933)	

Notes: This table shows the six-month mean average returns (MAR) for the 42 Portuguese privatization offerings using the calendar-time portfolio method. The number of firms varies over time. t-tests refer to two-tailed tests. MMAR denotes the grand mean of six-month abnormal returns over the entire sample period.

Table 17 – Long-Term Average Abnormal Returns (AR) and Average Cumulative Abnormal Returns (CAR) for PIPOs

PSI GERAL Months	Nr. firms	AR _t (%)	t-stat. (AR _t)	CAR _t (%)	t-stat. (CAR _t)
6	19	-2.999	(-1.086)	-2.999	(-1.086)
12	18	-1.140	(-0.481)	-4.139	(-1.158)
18	18	3.048	(1.594)	-1.091	(-0.295)
24	18	0.662	(0.416)	-0.429	(-0.131)
30	17	-2.543	(-1.049)	-2.972	(-0.590)
36	17	-3.907	(-1.583)	-6.879	(-1.193)

S&P 500 Months	Nr. firms	AR _t (%)	t-stat. (AR _t)	CAR _t (%)	t-stat. (CAR _t)
1-6	19	-5.375	(-1.781)	-5.375	(-1.781)
7-12	18	-1.955	(-0.947)	-7.330	(-2.013)
13-18	18	0.367	(0.172)	-6.963	(-1.655)
19-24	18	-1.905	(-0.477)	-8.868	(-1.919)
25-30	17	-3.023	(-1.241)	-11.891	(-2.279)a
31-36	17	-5.308	(-1.990)	-17.199	(-2.914)a

Notes: This table shows the ARs and CARs for the 19 Portuguese PIPOs. The number of firms varies over time due to de-listing. t-tests refer to two-tailed tests. a denotes significance at the 5% level.



Table 17 presents the excess returns for the sub-sample of PIPOs. Abnormal returns are, as above, very negative for the first and last periods. CARs are consistently negative over the period. Yet the results are only statistically significant when considering S&P 500 as the benchmark and for longer holding periods of 30 and 36 months. When we compare these results with the evidence in table 15, we observe that in the long run, PIPOs seem to severely underperform later offerings. This could merely reflect a correction in prices that takes place after the initial price run-up that is observed in PIPOs.

We checked the robustness of the results, computing calendar-returns for the 19 PIPOs sub-sample. Results are shown in Table 18. For the sub-sample of PIPOs the grand mean is positive regardless of the chosen benchmark but long-term calendar returns are statistically insignificant.

Table 18 – Long-Term Average Abnormal Returns using Calendar-Time Portfolio Method for PIPOs

PSI GERAL Period	Nr. firms	MAR _t (%)	Period	Nr. firms	MAR _t (%)
1989 0-6 months	1	14.892	1989 7-12 months	2	-5.181
1990 0-6 months	4	3.112	1990 7-12 months	5	7.495
1991 0-6 months	6	4.482	1991 7-12 months	8	3.432
1992 0-6 months	8	-2.002	1992 7-12 months	11	0.693
1993 0-6 months	12	-8.142	1993 7-12 months	12	0.004
1994 0-6 months	12	-3.653	1994 7-12 months	13	-2.230
1995 0-6 months	16	-0.250	1995 7-12 months	15	0.158
1996 0-6 months	14	1.488	1996 7-12 months	13	-2.557
1997 0-6 months	13	-4.979	1997 7-12 months	14	-2.117
1998 0-6 months	14	-0.208	1998 7-12 months	14	-0.372
1999 0-6 months	14	2.878	1999 7-12 months	14	1.919
2000 0-6 months	12	2.688	2000 7-12 months	7	6.314
2001 0-6 months	7	3.542	2001 7-12 months	7	-0.301
	MMAR (%)	2.331	t-stat. (MMAR)	(0.991)	

(continua)



S&P 500 Period	Nr. firms	MAR _t (%)	Period	Nr. firms	MAR _t (%)
1989 0-6 months	1	8.990	1989 7-12 months	2	5.948
1990 0-6 months	4	-0.733	1990 7-12 months	5	1.491
1991 0-6 months	6	-5.544	1991 7-12 months	8	-0.424
1992 0-6 months	8	0.390	1992 7-12 months	11	-11.733
1993 0-6 months	12	-6.819	1993 7-12 months	12	5.098
1994 0-6 months	12	0.754	1994 7-12 months	13	0.915
1995 0-6 months	16	-4.901	1995 7-12 months	15	-7.639
1996 0-6 months	14	3.508	1996 7-12 months	13	-2.983
1997 0-6 months	13	-3.627	1997 7-12 months	14	-1.609
1998 0-6 months	14	8.062	1998 7-12 months	14	-6.221
1999 0-6 months	14	-11.229	1999 7-12 months	14	6.002
2000 0-6 months	12	2.445	2000 7-12 months	7	4.133
2001 0-6 months	7	-6.333	2001 7-12 months	7	3.598
	MMAR (%)	1.275	t-stat. (MMAR)	(0.533)	

Table 19 shows the long-term performance of private IPOs. ARs and CARs start being positive in the first 6 months, decreasing afterwards to negative values for up to three years. Yet, again, results are not statistically significant, except for ARs in the first half of the second year following the offering and when the S&P 500 is used as the market benchmark for CARs over longer horizon periods (24 months or more).

To evaluate if the Portuguese private IPOs and PIPOs show different long-term performance we use a difference t-test and a Mann-Whitney U test. Table 20 reports the results.

The null hypothesis that the average CAR for PIPOs is equal to the average CAR for private IPOs is not rejected for all event periods considered in the analysis. Privatizations seem to yield, on average, lower CARs than private offerings up to 1 year. Over longer horizon periods, private IPOs tend to underperform PIPOs³⁰. Please notice that the significance statistics are very alike for the two tests (parametric and non parametric).

We then analyze if the variables used as proxies for the different theoretical arguments discussed above could account for the long-term return behavior in Portuguese privatization offerings. First, we performed univariate analyses to check for differences in the three-year CARs

³⁰ Almeida and Duque (2005) report that, on average, Portuguese offerings underperform after one year. Yet the value-weighted average excess return is positive.

Table 19 – Long-Term Average Abnormal Returns (AR) and Average Cumulative Abnormal Returns (CAR) for Private IPOs

PSI GERAL Months	Nr. firms	AR _t (%)	t-stat. (AR _t)	CAR _t (%)	t-stat. (CAR _t)
6	15	2.848	(0.713)	2.848	(0.713)
12	15	-5.171	(-0.945)	-2.323	(-0.341)
18	15	-8.675	(-2.288) ^a	-10.998	(-1.393)
24	15	-2.918	(-0.668)	-13.916	(-1.555)
30	14	-1.001	(-0.572)	-14.917	(-1.633)
36	12	-3.279	(-0.859)	-18.196	(-1.830)

S&P 500 Months	Nr. firms	AR _t (%)	t-stat. (AR _t)	CAR _t (%)	t-stat. (CAR _t)
6	15	3.513	(0.774)	3.513	(0.774)
12	15	-11.103	(-1.905)	-7.590	(-0.980)
18	15	-9.924	(-2.371) ^a	-17.514	(-1.986)
24	15	-3.322	(-0.620)	-20.836	(-2.034) ^a
30	14	-1.843	(-0.858)	-22.679	(-2.161) ^a
36	12	-5.044	(-1.506)	-27.723	(-2.475) ^a

Notes: This table shows the ARs and CARs for the 15 Portuguese private IPOs. The number of firms varies over time due to delisting and new firms. t-tests refer to two-tailed tests. a denotes significance at the 5% level.

Table 20 – Tests of Differences in Long-Term Returns between PIPOs and Private IPOs CARs

Months		Difference in CARs (%) (PSI GERAL)	Difference in CARs (%) (S&P500)
6		-5.847	-8.888
	t-stat	(-1.204)	(-1.631)
	z-stat	(-1.093)	(-1.543)
12		-1.756	0.362
	t-stat	(-0.220)	(0.040)
	z-stat	(-0.087)	(-0.052)
24		13.352	12.151
	t-stat	(1.380)	(1.326)
	z-stat	(-1.162)	(-1.405)
36		11.138	10.452
	t-stat	(0.989)	(1.023)
	z-stat	(-0.954)	(-1.231)

Notes: This table reports the average difference in CARs of PIPOs (19 observations) and privately-owned companies IPOs (15 observations). Returns are in %. t- and z-tests refer to two-tailed (t-Student and Mann-Whitney U) tests. a denotes significance at the 5% level.



for sub-samples formed on the basis of the dummy variables PARTIAL, ADR and LATE. The first two variables have been defined. This last variable measures if the privatization offering occurred relatively late in the country. We considered that an offer occurred late if it was launched three years after the first issue. Results are presented in Table 21. The differences in returns are consistent with the predictions explained above. Yet the tests are not statistically significant, except for the dummy variable PARTIAL (using as market benchmark the PSI GERAL).

Table 21 – Tests of Average Differences in Long-Term Returns for Sub-Samples

Variable	Difference in Returns (PSI GERAL)	Difference in Returns (S&P500)
PARTIAL	24.362	19.563
t-stat	(2.790)a	(2.365)
z-stat	(-2.117)a	(-2.039)a
ADR	-11.755	-1.318
t-stat	(-1.104)	(-0.110)
z-stat	(-1.050)	(-0.122)
LATE	-4.813	5.670
t-stat	(-0.554)	(0.598)
z-stat	(-0.775)	(-0.286)

Notes: This table reports the average difference in three-year CARs for sub-samples of the 42 privatization offerings formed on the basis of the three dummy variables. t- and z-tests refer to two-tailed (t-Student and Mann-Whitney U) tests. a denotes significance at the 5% level.

We conducted the same univariate analysis for the sub-sample of 19 PIPOs. Table 22 shows the results. Overall results suggest that these variables cannot explain the observed performance.

Table 22 – Tests of Average Differences in Long-Term Returns for Sub-Samples: PIPOs

Variable	Difference in Returns (PSI GERAL)	Difference in Returns (S&P500)
PARTIAL	22.556	19.885
t-stat	(2.073)	(1.735)
z-stat	(-1.944)	(-1.759)
ADR	-7.213	5.838
t-stat	(-0.585)	(0.804)
z-stat	(-0.447)	(-0.671)
LATE	-17.545	-2.572
t-stat	(-1.441)	(-0.292)
z-stat	(-1.715)	(-0.163)

Notes: This table reports the average difference in three-year CARs for sub-samples of the 19 privatization initial offerings formed on the basis of the three dummy variables. t- and z-tests refer to two-tailed (t-Student and Mann-Whitney U) tests. a denotes significance at the 5% level.

To assess the impact of the firm being or not being part of the financial sector on long run returns, we split the initial sample of 42 observations into financial firms and non-financial firms. The results in Table 23 are inconclusive.

Table 23 – Tests of Average Differences in Long-Term Returns for Sub-Samples: Financial and Non-Financial Firms

Variable	Difference in Returns (PSI GERAL) (%)	Difference in Returns (S&P500) (%)
FIN	-6.246	-8.832
t-stat	(-0.940)	(-1.277)
z-stat	(-1.023)	(-1.200)

Notes: This table reports the average difference in three-year CARs for sub-samples of the 42 privatization offerings formed on the basis of the dummy variable FIN that equals 1 if the firm is a bank or an insurance company (23 observations) and 0 otherwise (19 observations). Returns are in %. t- and z-tests refer to two-tailed (t-Student and Mann-Whitney U) tests. a denotes significance at the 5% level.

To further investigate the determinants of the observed performance, we obtained estimates of the OLS multivariate regression. Results are shown in Table 24. Most of the estimates lack statistical significance, except for the variable PARTIAL³¹. The positive and statistically significant coefficient obtained for the explanatory variable PARTIAL could suggest that, when a government privatizes partially, investors require higher returns anticipating government interference in the privatized firms and, therefore, higher political risk. The observed effect would thus contradict the argument that partial privatization signals government commitment and reduces uncertainty, and is inconsistent with arguments that predict higher returns for total privatizations for larger expected economic efficiency gains. The downward shift in returns, reflected in the intercept estimate, is thus offset (more than offset when we look at S&P 500 market adjusted returns) by the effect of partial privatization.

Table 24 – Determinants for Privatization Market-Adjusted Initial Returns

Three-Year CARs (Market index: PSI GERAL)			Three-Year CARs (Market index: S&P 500)		
	Coefficients	t-statistic		Coefficients	t-statistic
Constant	-42.6060	(-1.643)	Constant	-28.7055	(-0.975)
MR(30-day)	0.54987	(1.785)	MR(30-day)	0.26982	(0.772)
SIZE	4.60759	(1.064)	SIZE	-0.46232	(-0.094)
ORDER	5.36734	(1.215)	ORDER	6.20706	(1.237)
PARTIAL(*)	18.7762	(1.932)	PARTIAL(*)	12.1488	(1.101)
ADR	-2.02111	(-0.148)	ADR	6.65716	(0.430)
LATE	-10.9688	(-1.385)	LATE	-2.8096	(-0.313)
F-statistic	2.47870 ^a		F-statistic	1.36570	
Adj. R ²	0.17789		Adj. R ²	0.05079	

Notes: This table shows the parameters estimated for the regression of three-year CARs for 42 Portuguese privatization offerings against initial underpricing (market-adjusted thirty-day initial returns) (MR); the log of total value of the privatization offer (SIZE); dummy variables distinguishing partial or total privatization (PARTIAL), ADR listing (ADR) and the timing of privatization (LATE); ORDER that equals one for the first share sale privatization offer, two for the second offer, and so forth. Parameters are estimated by ordinary least squares regression. t-tests refer to two-tailed tests. a denotes significance at the 5% level. Results obtained for one and seven-day market-adjusted returns are available upon request.

(*) Statistically significant sign using t-statistics with White heteroskedasticity consistent standard errors.

³¹ The t-statistics with White heteroskedasticity consistent standard errors are very similar.



The coefficient associated with the variable MR is positive, suggesting as expected that when the underpricing is large, and after controlling for other effects, this is perceived by investors as a sign of government commitment to that privatization offering. Yet the large part of the initial positive return is nevertheless reversed (if we sum this effect with the intercept estimate). This negative aftermarket effect is consistent with overreaction and fads in PIPOs.

As for the other explanatory variables, the results are mixed and the signs reverse with the choice of the market benchmark.

In sum, we find that long-term excess returns are negative (but seldom significant), even if Portuguese PIPOs outperform private IPOs³². The statistics for the difference in means tests are also inconclusive and most of the estimates of the OLS regression lack statistical significance. Again, like the analysis in section 4, this lack of significance may result from small sample size. Overall results suggest that the initial price overreaction seems to be corrected in the aftermarket and that investors require a premium when they anticipate further offerings.

6. Conclusions

This paper evaluates the short- and long-term performance of Portuguese privatization offerings and investigates the determinants of the observed performance. Our main findings are:

1. Portuguese privatization offerings show initial positive returns but lack statistical significance.
2. Portuguese privatization IPOs underperform private sector IPOs contradicting most of the previous evidence.
3. Results suggest that the degree of underpricing is greater for initial offerings, when the privatization is partial and when shares are cross-listed. The underpricing is lower for large issues, with right-wing political parties in government and in the years before elections. Overall these results are consistent with information asymmetry and agency predictions.
4. In the long run, privatization offerings have negative abnormal returns, contradicting the most recent evidence. Yet these results lack statistical significance. While in early event months, privatization public offerings yield more negative returns than private sector offerings, this effect is reversed in longer horizon periods.
5. Our results suggest that initial overreaction seems to be partially reversed in the years following the offer and that investors require higher returns in partial privatizations.
6. The small sample size may explain partially why we fail to find statistically significant average excess returns and non-trivial influences for the variables we investigate.

³² Previous studies (for example Kothari and Warner, 1997) show that survivorship bias impacts seriously on long-term performance. In fact, in our study, only 7 of the 19 PIPOs (22 of the 42 privatization offerings) are listed in 2001. If de-listings were related with bad/good performance, correcting the bias would show more/less negative performance. The results for the calendar portfolio-approach are inconclusive and do not illuminate the direction of the bias. We could have repeated the CAR analysis for the survivors but results would be meaningless given the small sample size.

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