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Initial underpricing and the Euronext Lisbon-listed companies

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Abstract

This study aims to determine the level of initial underpricing in the Euronext Lisbon-listed companies during a period (1990–2010) that includes the effects of the current global financial crisis. We employed two methods of analysis: one for the short-term (*i.e.* the market adjusted abnormal returns (MAAR)), and the other for the long-term (*i.e.* the buy-and-hold abnormal returns (BHAR)). The results suggest the existence of low efficiency in the Portuguese stock market, generating underpricing for Initial Public Offerings (IPOs) in the short-term with positive MAARs. The same situation occurs for the long-term, where companies present positive BHARs.

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1. Introduction

The study of Initial Public Offerings (IPOs) is one of the most important topics in the area of corporate finance, presenting a robust theoretical background in terms of different approaches. This evidence is conveyed by the words of Cheung, Ouyang & Tan (2009) who state, “*there has been a lot of research conducted on IPOs, documenting short-run underpricing and long-run underperformance*” (for further developments, see also Welch, 1996; An & Chan, 2008; Beneda & Zhang, 2009; Chemmanur & He, 2011). Thus, the analysis of IPOs has revealed a wide range

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of variables that help to understand the process of long-term financial decision making. These variables relate not only to operational and financial fundamentals, but also to environmental factors related to the capital market conditions and corporate and individual taxing policies.

For many years, the high abnormal returns revealed by IPOs were one of the greatest challenges to market efficiency. Consequently, many studies have been done in order to explain this phenomenon. Ibbotson & Jaffe (1975), for example, identified a significant correlation between the number of IPOs and the monthly average returns on the first day. To Aggarwal & Rivoli (1990), there are two possible explanations for the abnormal returns found in the new U.S. emissions: underpricing and aftermarket inefficiencies (Zheng & Li, 2008). Ritter (1991) showed that the strategy of investing in IPOs at the end of the first day of public trading, and retaining them for three years, has left investors with only 83 cents for each dollar invested in a group of companies listed on the American Express (AMEX) or the New York Stock Exchange (NYSE). Younger firms and firms that have been inserted on the stock exchange in years of strong volume perform even worse than the average. The evidence presented so far is broadly consistent with the notion that many companies are introduced “in the bag” near the summit of “fads” of specific industries.

Given the above, an investigation focusing on the initial underpricing of Euronext Lisbon-listed companies seems to be of great importance, namely because most previous studies in this field took place before the current global financial crisis, which has impacted the world economies and the functioning of the financial and capital markets.

The remainder of this paper is structured as follows. The next section presents a brief review of the literature, highlighting the basic principles of the Efficient Market Theory (EMT) and evidence from the Portuguese stock market. The third section presents the analysis carried out. Section 4 analyses the results and, finally, section 5 concludes the paper.

Nomenclature

AMEX	American Express
BHAR	Buy-and-Hold Abnormal Returns
EMT	Efficient Market Theory
IPO	Initial Public Offering
MAAR	Market Adjusted Abnormal Returns
NYSE	New York Stock Exchange

2. Background

2.1. Principles of the Efficient Market Theory (EMT)

2.1.1 Traditionalist theory of market efficiency

The traditionalist theory of market efficiency was initially introduced by Fama (1965; 1970), and builds on the classical model of finance, according to which human behavior is rational, utility maximizing and able to optimally process available information. Markets are operated by agents of unlimited rationality. However, this theory is based on several assumptions: (1) perfect competition, in which no single agent can significantly change the prices; (2) homogeneous expectations, since investors have equitable access to information and act rationally; and (3) divisible assets and no transaction cost. From this perspective, Fama (1970) proposed three forms of efficiency:

- *Weak form*: in this case, prices incorporate all the historical data about assets (*i.e.* all past information). The analysis is based on the historical stock prices and fundamental analysis in the financial statements published by the respective companies in order to predict future initiatives. Expected return is a function of the risk involved (Famá, Cioffi, & Coelho, 2008). Thus, all investors have the same information and may not obtain superior profits in comparison to other agents, as the data available for pricing is indifferent to

everyone and all use the same knowledge to make relevant decisions. However, they can obtain extraordinary profits as a result of luck or access to privileged information;

- *Semi-strong form*: this hypothesis describes the situation in which stock prices reflect not only past data, but also other public information (e.g. financial statements, historical pricing data, announcements about dividends, profits, mergers, acquisitions, investments, divestitures and emissions of new shares). Several studies confirm that the market is generally efficient in the semi-strong form;
- *Strong form*: this hypothesis considers all available information for pricing, public and non-public, implying that even inside traders can achieve excess returns using insider information. This is one extreme hypothesis, which is almost impossible to happen (*i.e.* would only be possible in a perfect market).

2.1.2 Behaviorist theory

This theory arose as a result of the need to explain certain anomalies that take place in the capital market (e.g. financial “bubbles”, predictability in asset prices, excessive volatility, naive diversification), questioning the existence of market efficiency (see Chang (2011) for further developments).

In the early 1980s, the development of computers made research easier in areas in which computing skills were an asset. This was the case of the financial sector, which benefited greatly from this technological advancement. Consequently, it became possible to observe that there are abnormal returns in financial assets, which, to some extent, questions the fundamental assumptions of market efficiency. The most recognizable precursors of this theory are Mullainathan & Thaler (2000), who analyze the behavior of economic agents based on their limitations and difficulties in making decisions. Subsequently, Barberis, & Thaler (2003) continued this line of analytic thinking, observing and theorizing individual behavior, and questioning agents’ rationality underlined to the traditionalist theory. In their research, the authors start from the premise that people make decisions that are not always based on an unlimited rationality, taking into account psychological and sociological factors that affect the agents’ rationality. The lever behind the development of the Behaviorist Theory relies on obtaining the necessary explanations to fill the gaps in the existing anomalies in the capital markets.

2.2. Evidence from the Portuguese stock market

Nascimento (2007) analyzed the Portuguese market during 1997–2007, obtaining the following conclusion: 42% of the 26 selected stocks, which had a random walk in prices, held a significant part of the efficiency where the market players did not enjoy supernormal profits. Nevertheless, the author hints at the possibility of inefficiency due to the existence of information asymmetries, since 58% of the remaining assets of the sample allowed supernormal profits to be possible. Duque & Madeira (2004) present empirical evidence on the existence of abnormal returns of asset prices in the Portuguese Stock Index (PSI) for the period 1996–2001, reaching the conclusion that the Portuguese stock market has a weak efficiency (*i.e.* the semi-strong form is rejected). However, in the analysis of the subsamples, an improvement was identified in market efficiency, which attenuates the abnormal returns. The authors underline, however, the need to be cautious in this analysis due to the small size of the sample.

Evidence of inefficiency in the Portuguese stock market gives insight into the possibility of over or undervalued assets (*i.e.* overpricing or underpricing), which may be a consequence of the presence of information asymmetry between market participants (Yung & Zender, 2010). Based on the findings obtained in the studies of Ritter & Welch (2002), in all theories of underpricing where the common element is asymmetric information, the estimated underpricing is positively related to the degree of information asymmetry; and, when the uncertainty of asymmetric information approaches zero, undervaluation disappears in these models. Given this, according to Duque & Madeira (2004), the Portuguese stock market is defined as being able to fit into the weak form of efficiency. To understand the impact of the effect of underpricing IPOs in Portugal, we first define the degree of informational efficiency in the stock market, which will allow us to understand the abnormal returns observed, and then consider whether in fact there is a link between informational efficiency and abnormal returns.

3. Empirical Analysis

3.1. Sample characterization

During the period of study (*i.e.* January 1st, 1990 until December 31st, 2010) 28 IPOs were introduced in the Euronext Lisbon. Table 1 shows the evolution of the number of IPOs per year.

Table 1. Sample of IPOs

Year	# IPOs	IPOs Gross Results
1993	1	121.800.611 €
1994	1	97.940.476 €
1995	4	968.041.205 €
1996	1	303.158.139 €
1997	5	2.543.293.279 €
1998	3	133.977.115 €
1999	2	579.518.942 €
2000	3	1.898.712.784 €
2001	1	8.386.000 €
2003	1	45.465.875 €
2004	1	250.000.003 €
2006	2	6.846.574.206 €
2007	2	2.268.500.000 €
2008	1	7.348.951.235 €
Total	28	23.414.319.869 €

(source: Euronext Lisbon)

As can be seen, there are two moments of great activity in the emergence of IPOs: (1) the period between 1995 and 2000, in which 18 new companies have emerged, most of them via privatization of public enterprises; and (2) during the years 2006 and 2007, with the appearance of four companies.

3.2. Methodology

Based on a study by Toniato (2007), which evaluated the performance of IPOs in the UK market during the period between 1998 and 2003, in this study we used two different methodologies (*i.e.* one for the short-term and the other for the long-term). For the measurement of the short-term performance, the initial abnormal returns were evaluated in accordance with the formulation (1) and (2) (Aggarwal, Leal, & Hernandez, 1993).

$$Rs_t = \frac{Ps_t}{Ps_0} - 1 \quad (1)$$

$$Rb_t = \frac{Pb_t}{Pb_0} - 1 \quad (2)$$

Rs_t is the total return on the shares of each company studied, taking as variables the share price at the close of the market on the t -th trading day (Ps_t) and the share price at the close of the market on the first trading day (Ps_0). In turn, Rb_t is the total return of the PSI Geral index, having as variables the closing price of the PSI Geral index on the t -th trading day (Pb_t) and the closing price of the PSI Geral index on the first trading day of the IPO to evaluate

(Pb_0). After obtaining these returns, we will calculate the market adjusted abnormal return from the first trading day until the t -th trading day, according to the formula (3).

$$MAAR_i = 100x \left\{ \left[\frac{(1 + Rs_t)}{(1 + Rb_t)} \right] - 1 \right\} \quad (3)$$

For the measurement of long-term performance, we will use the model of Barber and Lyon (1997). This method allows the range of total returns of the company and the abnormal returns to be added, using the strategy buy-and-hold, where $BHAR_i$ is the buy-and-hold abnormal return for the shares of the selected firm in period i , as shown in formulation (4).

$$BHAR_i = \prod_{t=1}^i (1 + Rs_t) - \prod_{t=1}^i (1 + Rb_t) \quad (4)$$

3.3. Hypotheses

The objective of this analysis is to evaluate the performance of each company studied, proving the existence of underpricing by comparing the abnormal returns against the market returns (i.e. PSI Geral index), during the first day, a week and one month after its introduction in the Euronext Lisbon. Thus, the first null hypothesis is the absence of excess returns compared to the returns registered in the PSI Geral index during the 1st, 5th and 21th trading days. I.e.:

$H1_0$: $MAAR_i \leq 0$; for each company and each period $i = 1, 5, 21$ days

$H1_1$: $MAAR_i > 0$; for each company and each period $i = 1, 5, 21$ days

The second hypothesis consists in evaluating the returns of the companies that perform better than market returns (i.e. PSI Geral index). To test this hypothesis, we constructed the BHARs of each company for periods of 1, 2 and 3 years after the first day of trading. Our null hypothesis 2 will build on the idea that the BHARs of each company will have underperformed the PSI Geral index during the periods 1, 2 and 3 years from the first day of trading of the company in the Euronext Lisbon. I.e.:

$H2_0$: $BHAR_i \geq 0$; for each company and each period $i = 12, 24, 36$ months

$H2_1$: $BHAR_i < 0$; for each company and each period $i = 12, 24, 36$ months

4. Results

4.1. Short-term results

The short-term results for the 28 IPOs listed on the Euronext Lisbon indicate that, on the first day of trading, there is an abnormal return of 32.428% over the return of the PSI Geral index, with a significance level of 0.1%. When analyzing the IPOs on the fifth trading day, they have, on average, an abnormal return declining to 0.6% over the return of the *PSI Geral* index, with a significance level of 5%. Finally, on the twenty-first day of trading, there is an abnormal return of -0.1% compared to the return of the PSI Geral index, with a significance level of 10%. Table 2 summarizes the results obtained.

Table 2. Short-term results (MAARs)

Day	Sample (A)		PSI Geral Index (B)		Difference (A-B)			
	Mean	Median	Mean	Median	Mean	P-value	Median	P-value
1	1.32573	1.099127	1.00145	1.000595	0.32428	0.014**	0.098532	0.000***
5	1.00809	1	1.00206	0.999968	0.00603	0.016**	0.0000322	0.385
21	0.99908	1	1.00017	1.000477	-0.00109	0.070*	-0.00048	0.844

*** Significance level of 0.1%.

** Significance level of 5%.

* Significance level of 10%.

In the analysis developed by Ritter (2011) for the U.S. market, during the period 1980–2008, for a sample of 7314 IPOs, there were average abnormal returns of 18.1% for the first day of trading, values that correspond to the ones evidenced in the Portuguese market. In the study by Almeida & Duque (2000) for the Portuguese market, during the period 1992–1998 and for a sample of 21 IPOs, results show the existence of abnormal returns on the first trading day, although the authors present a methodology different from that one used in the present study (i.e. Cumulative Abnormal Returns (CARs)), with values of 10.55%.

4.2. Long-term results

For a sample of 28 IPOs, we found average abnormal returns of 44.18% over the PSI Geral index, for the first twelve months of trading, with a significance level of 5%. For the first twenty-four months of negotiation, we obtained an average abnormal return of 26% over the PSI Geral index with a significance level of 0.1%. When analyzing the first thirty-six months of trading, IPOs had average abnormal returns of -12.54% over the PSI Geral index, with a significance level of 10%. Table 3 summarizes the results obtained.

Table 3. Long-term results (BHARs)

Month	Sample (A)		PSI Geral Index (B)		Difference (A-B)			
	Mean	Median	Mean	Median	Mean	P-value	Median	P-value
12	1.54755	1.123872	1.10571	1.109886	0.44184	0.028**	0.013987	0.367
24	1.46016	1.081775	1.20015	1.297821	0.26001	0.001***	-0.21605	0.635
36	1.29927	0.689881	1.42469	1.095295	-0.12542	0.085*	-0.40541	0.194

*** Significance level of 0.1%.

** Significance level of 5%.

* Significance level of 10%.

These results are significantly different from the ones obtained by Ritter (2011) when he analyzed 7314 IPOs in the U.S. market for the period 1980 to 2008, which exhibited an average abnormal return of 20.8% for the first thirty six months of trading. However, these results corroborate the ones obtained by Almeida & Duque (2000), for the Portuguese market, which showed accumulation of abnormal returns of 20.48% for the selected sample of 21 IPOs during the period 1992–1998. Furthermore, in a study by Jaskiewicz, González, Menéndez & Schiereck, (2005), for the German and Spanish markets, during the 1990–2000 period, there are negative abnormal returns (i.e. -32.5% for German and -38% in the Spanish case), when compared with the respective market during the first thirty-six months of trading.

5. Conclusion

As stated at the beginning of this study, the IPO market is assuming growing importance in terms of economic development. Su & Brookfield (2013) have recently reinforced this premise, noting that “*an effective and active IPO market is a pre-condition for the development of the nascent stock market*”. From this standpoint, the main contribution of this study is to demonstrate the existence of IPO underpricing in the *Euronext Lisbon*, during the period of 1990–2010, reinforcing the results presented by other authors who have studied the Portuguese market (Almeida & Duque, 2000) and other markets, both developed (UK, US, Germany and Spain) and developing (Brazil). According to Chang (2011), “*on average, the offer price of IPO shares is substantially lower than the closing price on the first day of trading. The first-day abnormal returns of IPO shares, on average, are economically and statistically significant*”. Through further analyses, one for the short-term (MAARs) and the other for the long-term (BHARs), we can conclude that an investor who buys shares in the subscription period and sells them on the 1st day of trading in the *Euronext Lisbon* tends to get a return of 32%. This return decreases after the 5th day (i.e. the investor would get a return of 6%) and 21st day of trading (i.e. the investor would get a return similar to the market). Thus, we can assume that the efficiency in the Portuguese market increases over time. When compared with the results presented by Aggarwal, Leal, & Hernandez, (1993), the Brazilian market had a similar performance during the first day of trading (36%). In the case of Khurshed & Mudambi (2002) for the UK, returns were lower than the values registered in the Portuguese case (6.56%), as well as in the study by Ritter (2011) for the U.S. market (18.1%). All these values are different from the results achieved by Chi & Padgett (2002), with 129% (i.e. well above those achieved in the *Euronext Lisbon* (see also Deb & Marisetty, 2010)). In the long-term analysis, we can argue that, during the first year of trading, the investor who bought through the initial subscription and sold after 12 months would get a return of 44%. If the share is kept for 24 months, the investor would get a return of 26%, but if kept for 36 months, the return would be –12%. In this sense, one can conclude that, over time, the market efficiency in the *Euronext Lisbon* increases, reducing the information imperfections that may have caused the initial underpricing in the IPOs. When compared with the results obtained by Ritter (2011) for the North American market, which presented returns of 20.8% for the first three years of negotiation, the results achieved are considerably different. However, in the case of the Spanish and German markets, where the performance over three years was negative (i.e. –32.5% and –38% in Germany and Spain, respectively), the trend is close to the one revealed by the Portuguese stock market (i.e. 12%).

In looking ahead to future research, we recommend an increase in both sample and time period. In addition, it is convenient to study the abnormal returns by sector of activity and/or groups of companies (e.g. private vs. companies subject to privatization). This would allow conclusions on market efficiency to be enhanced. As already point out by Ruud (1993), “*evidence of underpricing of initial public offerings (IPOs) has spawned considerable [...] literature attempting to explain the apparent contradiction to market efficiency*”.

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