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IPO patterns in Euronext after the global financial crisis of 2007-2008 *

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Abstract
This paper investigates the pricing patterns of 161 IPOs that occurred in 2009-2017 in the Euronext markets of Amsterdam, Brussels, Lisbon, and Paris. Across all the IPOs, we find a first-day raw return of 1.4% and an industry-adjusted return of 1.2%. After one year, the average raw returns are slightly higher, around 4.5%, and the average adjusted returns are negative, around -2.7%. These first-day returns are lower whilst long-run returns are higher than those reported in other studies, most notably in those that use periods that overlap our sample Healthcare is the industry that presents a higher initial underpricing (2.3% industry-adjusted return), whilst the Technology industry presents the higher year underperformance (-29.5% industry-adjusted return). Mainly, results are in line with the market conditions and investor sentiment hypotheses according to which, when market conditions are bad (crises), uninformed investors are not so active and optimistic in the IPO market, hence initial underpricing and subsequent underperformance tend to be lower.

Keywords: IPO, Euronext, underpricing, market conditions, investor sentiment

JEL classification: G12, G14, G24

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1. Introduction

Research on the IPO market has been mainly centred on the US (see, for instance, Ritter and Welch, 2002), however the literature on other countries has been building up in the last fifteen years. Among others, Jenkinson and Ljungqvist (2001), Ritter (2003), Ljungqvist (2007), and Boutron et al. (2007) survey the IPO literature and discuss the empirical evidence on other countries rather than the US. These studies point out that although the IPO market presents time-varying features that also vary across countries, some patterns seem to be pervasive. Notably, initial offer prices are substantially lower than the subsequent trading prices, which indicates initial underpricing, IPO stocks present long-run underperformance (1 to 5-year low returns) and IPO volume is related to the business and financial cycles.

There are several theories on IPO patterns, which, according to Ljungqvist (2007), may be grouped under four broad headings: asymmetric information, institutional, control, and behavioural. Arguably, all these theories have their explanatory merits; however, at least since the seminal work of Ritter and Welch (2002), the behavioural theories have gathered more consensus. Large variation in the number of IPOs, particularly the drop of issuing volume following bear markets, and the huge amounts of "money left on the table" in hot markets, such as the internet bubble of 1998–2000, suggest that market conditions are the most important factor in the decision to go public, while bounded rationality behaviour is behind the underpricing and long-run underperformance patterns. This is the main perspective undertaken in the present paper.

This study aims at contributing to the empirical literature on IPOs, by looking at the pricing patterns of IPOs that occurred in 2009-2017 in the Euronext markets of Amsterdam, Brussels, Lisbon, and Paris. We choose these markets because they share common listing rules. The period under scrutiny allows the examination of these patterns after the global financial crisis of 2007-2008. The studies on IPOs in this latter period in Europe are still scarce, and, to the best of our knowledge, Dorsman and Gounopoulos (2013) is one of the few papers

to address this issue, finding that the crisis has increased underpricing and deepened the long-term underperformance of IPOs in the NYSE Euronext Amsterdam Stock Exchange. However, this conclusion is at odds with the market conditions and investor sentiment hypotheses.

The remainder of the paper is structured as follows. Section 2 reviews the theoretical and empirical literature, with a focus on the investor sentiment hypothesis. Section 3 presents the data used in this study and shows the distribution of IPOs per year and industry and their returns across industries and markets for different time horizons. Section 4 describes the procedures used to compute the IPO abnormal returns and test their significance and presents the variables used to proxy for the market conditions and investor sentiment, which are then used in regression analyses of the first-day abnormal returns. Section 5 shows the main results and Section 6 concludes the paper.

2. Literature Review

The variability of underpricing and underperformance across time, industries and countries is easily recognized when one compares the results documented in the literature. For instance, Ritter and Welch (2002) report that the average first-day return of 6,249 IPOs based in the US from 1980 to 2001 was 18.8%, but Loughran and Ritter (2004) show that these initial returns were 7% in the 1980s, doubled to almost 15% during 1990-1998, jumped to 65% during the internet bubble years of 1999-2000 and then reverted to 12% during 2001-2003. Schuster (2003) distinguish between New Economy industries (Technology, Media, Telecommunication and Healthcare) and Old Economy Industries and indicate that the initial returns and 3-year buy-and-hold returns for the former group were always higher in Germany, France, Italy, Switzerland, Netherlands, Spain, and Sweden during the period 1988-1998. Hence the observation that there is a positive link between the degree of a country's involvement in New Economy IPO activity and their IPO long-run performance. Ritter (2003) compares the IPO markets in US and Europe and gathers empirical evidence on the first-day

returns for 38 countries mainly during the eighties and nineties, showing that initial underpricing ranges from around 6% (Austria, Canada and Denmark) to as much as 104% (Malaysia) and 257% (China). Boutron et al. (2007) conclude that the European IPO market has been characterized by a higher performance of New Economy IPOs and that long-term performance of European IPOs is generally superior to that measured in the US and is even positive in some countries.

IPO volume tends to be higher during economic expansions, when economy-wide demand for capital is higher (Lowry, 2003), in periods of excessive optimism (Loughran et al., 1994) and lower macroeconomic uncertainty (Thanh, 2019). Brau and Fawcett (2006) surveyed 336 chief financial officers (CFOs) in the USA in 2003, finding that the primary motivation for going public is to facilitate acquisitions and that CFOs base IPO timing on overall market conditions and take into account market and industry stock returns. Lowery (2003) show that capital demands (proxied by the change in the number of new corporations since the last three quarters prior to the IPO) and investor sentiment (proxied by the market index returns over the four quarters subsequent to the IPO) are important determinants of IPO volume. Thanh (2019) uses the Macro Uncertainty Index of Jurado et al. (2015), which is a simple average of the standard deviations of the 1-step-ahead forecast error of 132 macroeconomic variables, and emphasizes that an increase in macroeconomic uncertainty by one standard deviation lowers the number of monthly IPOs by roughly four in the long-run. Ivanov and Lewis (2015) show that time variation in business conditions, which encompasses the cost of capital (measured by the return on the benchmark stock index over the 180-day period immediately preceding the issue and the first-difference in the monthly term spread), changes in expected profitability (first-difference in the monthly levels of an index of leading indicators), and changes in the consumer sentiment are important determinants of monthly issue activity.

Pastor and Veronesi (2005) develop a model of optimal IPO timing in which IPO volume fluctuates due to time variation in market conditions. The empirical application of their model highlights that IPO volume is positively (negatively) related to the total market return over the previous two quarters (in the subsequent quarter) and negatively related to past and present changes in market volatility. Colak and Günay (2011) construct a game-theoretic model where some high-quality firms may strategically delay their initial public offering until a favourable signal about the economic conditions is generated by other issuing firms. By the time that the signal is spread among waiting private firms, the stock market is already rising, and the private firms' cash flows are at high levels due to the same underlying economic reasons that caused an increase in the IPO activity.

According to the investor sentiment hypothesis of Loughran et al. (1994), Ritter and Welch (2002) and Ljungqvist et al. (2006), over-enthusiasm of individual investors may drive up IPOs first-day returns, then eventually overpriced IPOs revert to fundamental value, which causes long-run underperformance. Loughran et al. (1994) reinforce this claim by arguing that institutional investors maintain stock prices - thereby extracting surplus from sentiment investors - by holding IPO stocks in inventory and restricting the availability of shares. Underpricing emerges as fair compensation to institutional investors for expected inventory losses arising from the possibility that sentiment demand may cease. Ljungqvist et al. (2006) highlight that both the initial price run-up and subsequent underperformance are more dramatic in “hot” periods of high IPO volume, implying that the impact of investor sentiment is particularly acute in hot markets. Over time, investor exuberance fades, resulting in long-run underperformance. In fact the IPO market is perceived as so intimately related to investor sentiment that first-day returns on IPOs have been proposed as a proxy for investor sentiment (Baker and Wurgler, 2006; Santos, 2017).

Several studies support empirically the investor sentiment hypothesis. For instance, this empirical evidence is found in Cornelli et al. (2006), Kaustia and Knüpfer (2008), Dorn

(2009), Da et al. (2011), Aissia (2014), Saade (2015) and Santos (2017). Cornelli et al. (2006) use prices from the grey market (the market that precedes European IPOs) to proxy for small investors' valuations. High grey market prices (indicating over-optimism) are found to be a very good predictor of first-day prices, while low grey market prices (indicating excessive pessimism) are not. They find long-run price reversal only following high grey market prices. This asymmetry occurs because larger institutional investors can choose between keeping the shares they are allocated in the IPO and reselling them when small investors are overoptimistic. Kaustia and Knüpfer (2008) use data on 183,000 retail investors in 57 Finnish IPOs that occurred from 1995 to 2000, and find a strong positive link between past IPO returns and future subscriptions at the investor level, which goes beyond the patterns related to the IPO cycle or wealth effects. This behaviour is consistent with reinforcement learning, where individuals repeat the strategies that have produced good outcomes in the past, overweighting in the process their personal experience. Using German data on IPO trading by 5,000 retail customers of an online broker during 1999 and 2000, Dorn (2009) documents that retail investors consistently overpay for IPOs following periods of high underpricing in recent IPOs. It is also shown that hot IPOs pass from institutional into retail hands, and over time, high initial returns are reversed as net purchases by retail investors subside, eventually resulting in underperformance over the first 6 to 12 months after the IPO. Da et al. (2011) use weekly Google searches to capture the attention of less sophisticated individual investors towards stocks. The authors point out that these investors are net buyers of attention-grabbing stocks and thus an increase in individual investor attention and related retail investor sentiment results in temporary positive price pressure, hence abnormally higher number of internet searches should predict higher stock prices in the short term and price reversals in the long-run. The results show that the group of IPOs that experiences more attention during the week prior to the IPO outperforms the other group by 6% during the first trading day and that the long-run return reversals are more acute in the former group. Aissia (2014) examines

a sample of 234 French IPOs performed between 2002 and 2012 and concludes that high initial returns are associated with higher idiosyncratic skewness and investor sentiment (measured by turnover and momentum in the first trading month). The two effects are stronger during periods of favourable market conditions. Saade (2015) decompose the individual and institutional investor sentiment into rational and irrational components and examines their effects on the overall market at the time of IPO and on the aftermarket performance. The study, which is based on 1,346 US technology IPOs completed between 1992 and 2009, shows that the irrational component of individual investor sentiment negatively affects the performance of issued shares 6 months up to 36 months after the IPO. On the other hand, the rational component of institutional investor sentiment does not affect short-run performance (within 6 months), yet positively affects their long-run performance (24 and 36 months after the IPO). This finding suggests that in the short-run the market may be dominated by noise trading due to over-optimistic sentiment prevailing at the time of IPO. Using data on 6,858 US IPOs from 1973 to 2009 and considering IPO first-day returns as a proxy for retail demand, Santos (2017) finds that issuers in high-underpricing periods tend to underperform in the long-run, while issuers in low-underpricing periods do not. Most notably, the 5-year value from investing in IPO firms in low-underpricing periods is not different from investing in the control group; however, for firms going public in high-underpricing periods, the 5-year buy-and-hold return is -1.3%, far below the 69.9% return of their peers.

Additional evidence on the investor sentiment hypothesis comes from the analysis of the relevant information market. Arguably, if the investor sentiment is the main driving force behind underpricing, then the way that information is conveyed to less informed traders has an impact on their beliefs and in turn, drives their demand for share and first-day returns. Loughran and McDonald (2013) show that higher levels of uncertain embedded in the compulsory filings (S-1 forms) in the US have a positive impact on first-day returns, absolute offer price revisions, and subsequent volatility. Using US data, Liu et al. (2014) show that pre-

IPO media coverage, proxied by the number of newspaper articles, is positively related to the level of underpricing, long-term stock value, liquidity, analyst coverage, and institutional investor ownership. Using data between 1995 and 2005, Carey et al. (2016) investigate the influence of optimistic news stories on first-day pricing of IPOs in Australia, where, unlike the US, there is no quiet-period regulation limiting the dissemination of information from media before IPO listing dates. They find that optimistic news stories are negatively associated with IPO underpricing, suggesting that optimistic news stories mitigate information asymmetry and adverse selection problems. Conversely, Bajo and Raimond (2017) show that positive tones in the news are positively associated with IPO underpricing, especially if this news is in more reputable newspapers and is reported close to the IPO date.

3. Data and preliminary analysis

Our database includes all IPOs that occurred in the Euronext markets of Amsterdam, Brussels, Lisbon, and Paris, from 2009 to 2017. Data on the IPO dates and prices, as well as the ICB industry classification of the companies that went public, were collected from the Euronext website. We also obtained the post-IPO adjusted stock daily closing prices, the level 1 industry indexes for each country, the all-share country indexes, from 2008 until the end of 2018 from the Thomson Reuters Eikon, and the Business Confidence Index (BCI) from the OECD site.

Table 1 shows the distribution of all the IPOs by industry and year. The IPO activity is slow at the beginning of the sample due to the world financial crisis. Then, it increases steadily until it peaks in the year 2015, with 40 IPOs. Finally, it decreases in 2016 and 2017. The Healthcare industry is responsible for the largest number of IPOs, 58, which represents around 36% of the total number of IPOs in the sample.

Table 1
Number of IPOs by year and industry

Year → Industry ↓	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Basic Materials			1	1						2
Consumer Goods	1		1			1	5	2	2	12
Consumer Services		2	4		2	2	4	3		17
Financials		2			2	5	7	2		18
Healthcare		6	4	7	4	12	15	4	6	58
Industrials			2	1	6	7	3	1	6	26
Oil & Gas		1	1			1	2	2		7
Technology				2	1	3	4	4	2	16
Telecommunications				1		2		1		4
Utilities				1						1
Total	1	11	13	13	15	33	40	19	16	161

Table 2 exhibits the buy-and-hold average returns and their standard deviations for the full IPO sample, and the ten industries. The average first-day return across all the IPOs is 1.41%, which is considerably lower than the ones reported in prior studies. Giudici and Roosenboom (2006) analyse 532 IPOs listed in the European "new markets", since their creation until December 2002, and find that the average first-day return is 35.7%. Schuster (2001) reports average 1-day returns in Dutch IPOs of 6.4%, 1.2% and 18.9% for the periods 1988-1990, 1991-1994 and 1995-1998, respectively. Dorsman and Gounopoulos (2013) show that average market-adjusted initial returns of Dutch IPO amounted to 5.13%, from 1990 to 2008, and 18.7% afterward until 2012. Boelen and Hübner (2006) find an average first-day return of 10.4% for 49 IPOs on the First Market of the Euronext Brussels Stock Exchange from January 1989 to March 2004. Aissia (2014) considers a sample of 234 French IPOs from 2002 to 2012 traded on Euronext and Alternext markets and finds an average first-day return of 34.8%. Using data on 43 IPOs from 1987 to 2004, of which 19 are privatizations (there were no IPOs on the Lisbon Stock Exchange after 2001 until 2004), Borges (2007) finds an average first-day market-adjusted return of 11.1%.

For the other time-horizons, the average return is slightly higher: it attains 4.48% after one week, increases to 5.3% at the end of the first month, and then decreases to 4.49% at the

end of the first year. The standard deviation is increasing, as expected, which shows that the cross-section return variability is higher for longer time-horizons.

At the industry level, the first-day return is similar across industries (between 0% for Basic Materials and Utilities and 2.35% for Healthcare). The dispersion of average returns is higher at the end of the first year. The Oil & Gas (-22.16%) and Technology (-17.34%) industries significantly underperform the remaining ones, while Telecommunications (65.48%) presents the highest average return.

Table 2
Descriptive Statistics - Industries
Cross-section means (top) and standard deviations (bottom) of the buy-and-hold returns on the first day, week (5 days), month (22 days) and year (260 days) after the IPO date. The 1%, 5%, and 10% significance of a difference-in-means test between each industry average return and the average return of the remaining industries is denoted by "***", "**" and "*", respectively.

	Day	Week	Month	Year
All	1.41% 9.66%	4.48% 18.48%	5.30% 45.24%	4.49% 79.11%
Basic Materials	0.00%* 0.00%	-3.01%** 4.25%	-9.40%*** 2.42%	-14.33% 19.69%
Consumer Goods	1.12% 6.44%	3.50% 10.11%	-2.11% 14.97%	-16.35% 52.26%
Consumer Services	1.00% 5.91%	1.78% 7.96%	-2.97% 17.03%	9.18% 46.63%
Financials	0.43% 4.67%	3.18% 9.87%	27.27% 113.2%	8.54% 30.07%
Healthcare	2.35% 13.7%	8.17% 27.97%	8.22% 36.77*	3.02% 115.4%
Industrials	1.23% 4.39%	1.16%* 8.33%	1.52% 16.09%	3.45% 52.65%
Oil & Gas	1.32% 11.53%	0.65% 12.65%	-7.9%* 18.44%	-22.16%** 22.93%
Technology	0.40% 9.92%	4.89% 11.57%	-0.41% 13.78%	-17.34%* 43.70%
Telecommunications	1.34% 1.36%	3.07% 3.20%	2.14% 9.00%	65.48% 100.5%
Utilities	0.00% --	-1.11%% --	-5.56% --	-10.00% --

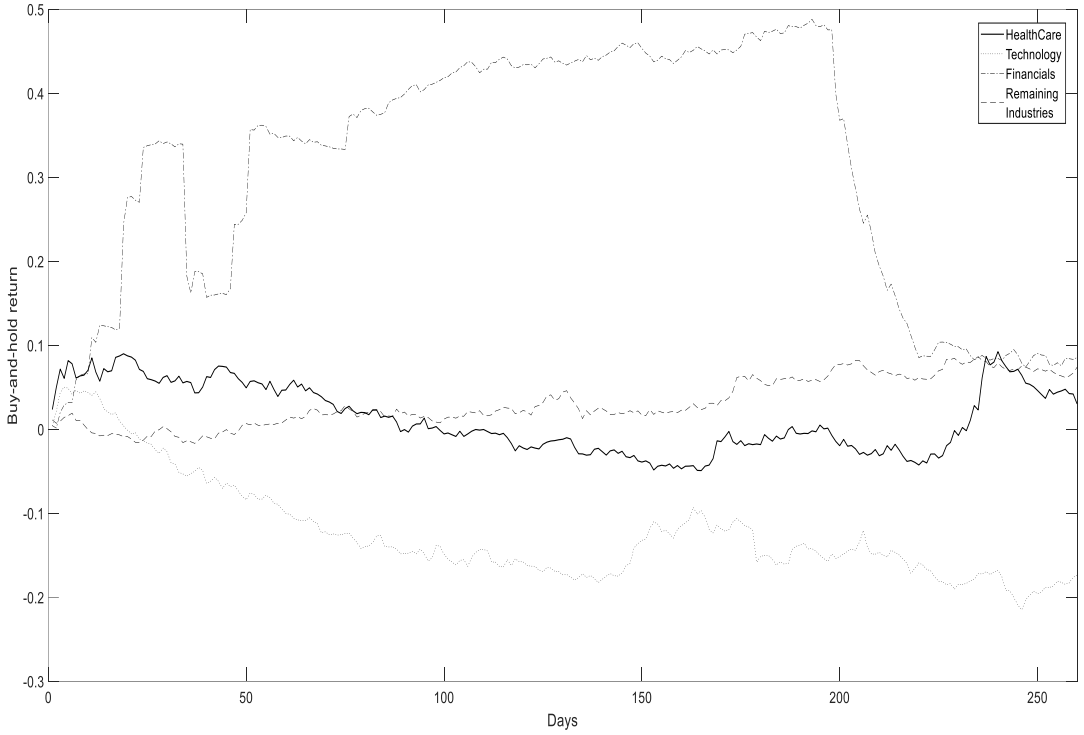
Table 3 shows that the first-day average return in Lisbon (-0.24%) is significantly lower than the ones in the other markets. At the 1-year horizon, Amsterdam outperforms the rest of the markets, while Paris exhibits a negative return. The cross-section variability of IPO returns is the highest in Paris, particularly at long time-horizons.

Table 3
Descriptive Statistics - Markets
Cross-section means (top) and standard deviations (bottom) of the buy-and-hold returns on the first day, week (5 days), month (22 days) and year (260 days) after the IPO date. The 1%, 5%, and 10% significance of a difference-in-means test between each market average return and the average return of the remaining markets is denoted by "***", "**" and "*", respectively.

	Day	Week	Month	Year
All	1.41%	4.48%	5.30%	4.49%
	9.66%	18.48%	45.24%	79.11%
Amsterdam	2.10%	4.60%	2.27%	28.52%**
	8.14%	14.71%	9.83%	48.09%
Brussels	2.16%	5.73%	4.02%	9.62%
	5.94%	14.62%	12.08%	38.03%
Paris	1.24%	4.39%	6.02%	-1.94%**
	10.40%	19.75%	51.67%	86.99%
Lisbon	-0.24%**	0.98%	3.69%	18.37%
	0.21%	4.43%	6.82%	25.12%

Figure 1 displays the evolution of the buy-and-hold average returns for Healthcare, Financials, Technology, and the remaining industries. The average performance of Finance firms after their IPOs is quite atypical: stock prices surge during the first month after the IPO, but, in the last quarter of the first year, they strongly underperform the rest of the industries and revert towards the overall average performance. Healthcare, the industry with the largest number of IPO, shows a better than average performance during the first week, then underperforms from months two to ten, and finally recovers at the end of the year. Technology stock prices increase during the first week, but, after that, they decrease substantially, leading to one of the worst average one-year returns amongst all industries.

Figure 1
Average buy-and-hold return in the first year after the IPO



4. Methodology

This section describes the procedure used to compute the IPO abnormal returns and the three tests designed to evaluate their significance. It also presents the variables used to proxy for the previous and expected market conditions and investor sentiment, which are then used in univariate and multivariate regression analyses of the first-day abnormal returns.

4.1 Abnormal return tests

Let BHR_t^j denote the discrete buy-and-hold return for firm j in the first t days following its IPO, such that

$$BHR_t^j = \frac{P_t^j}{P_o^j} - 1, \quad (1)$$

where P_0^j represents the IPO price of firm *j*, and P_t^j represents its adjusted stock price at the end of day t. The buy-and-hold abnormal return of firm *j*, $BHAR_t^j$, is computed as the excess return relative to its corresponding industry-country index return

$$BHAR_t^j = BHR_t^j - \left(\frac{I_t^j}{I_0^j} - 1\right), \quad (2)$$

where I_t^j and I_0^j represent the index values at the end of days *t* and 0, respectively. The average buy-and-hold abnormal return for firms belonging to the industry *i* is

$$ABHAR_t^i = \frac{\sum_{j\epsilon i} BHAR_t^j}{N^i}, \quad (3)$$

where N^i is the number of firms belonging to the industry *i* in the IPO sample.

In order to evaluate if the average buy-and-hold abnormal return is different from zero, we use the skewness-adjusted t-test proposed by Hall (1992), which corrects the cross-sectional standard t-test for skewed abnormal returns distribution. This test has a standard normal asymptotic distribution. The estimates of the significance test for the buy-and-hold abnormal returns within t-days for industry *i,* $t_{Skew,t}^i$, are computed as

$$t_{Skew,t}^i = \sqrt{N^i}\left(S_t^i + \frac{1}{3}\gamma_t^i {S_t^i}^2 + \frac{1}{27}\gamma_t^{i^2} {S_t^i}^3 + \frac{1}{6N^i}\gamma_t^i\right), \quad (4)$$

where S_t^i is the ratio between the average abnormal return for industry *i* and its cross-section standard deviation:

$$S_t^i = \frac{ABHAR_t^i}{\sigma_t^i}, \quad (5)$$

$$\sigma_t^{i^2} = \frac{1}{N^i - 1}\sum_{j\epsilon i}\left(BHAR_t^j - ABHAR_t^i\right)^2, \quad (6)$$

and γ_t^i is the corresponding skewness estimate, given by

$$\gamma_t^i = \frac{N^i}{(N^i - 1)(N^i - 2)}\frac{\sum_{j\epsilon i}\left(BHAR_t^j - ABHAR_t^i\right)^3}{\sigma_t^{i^3}}. \quad (7)$$

It is well known that the previous skewness-adjusted t-test rests on specific assumptions about the return distributions. Thus, we evaluate the robustness of our results using two alternative non-parametric tests, namely, the sign test and the Wilcoxon signed-rank test.

The sign test rests on the assumption that abnormal returns are independent across IPOs, and that positive and negative abnormal returns are equally likely. Let $N_t^{i,+}$ represent the number of firms from the industry *i* with positive t-days abnormal returns. Then, the sign test, which follows an asymptotic standard normal distribution, is given by

$$Sign_t^i = \left[\frac{N_t^{i,+}}{N^i} - 0.5\right]\frac{N^{i^{0.5}}}{0.5}. \quad (8)$$

The Wilcoxon signed-rank test considers not only the signs of the abnormal returns but also their size. In this test, the absolute values of abnormal returns are ordered from the lowest to the highest, and a ranking number is attributed to each observation according to its position. Then, a sign is given to each rank, equal to the sign of the corresponding abnormal return. The test is computed as the sum of the signed-ranks divided by their standard deviation.

$$Wilcox_t^i = \frac{W_t^i \pm 0.5}{\sigma_{W,t}^i}. \quad (9)$$

In the previous formula, W_t^i is the sum of the signed-ranks corresponding to the *t*-day returns from the industry *i*, "± 0.5" is a correction for continuity which is negative (positive) if W_t^i is positive (negative), and the standard deviation equals

$$\sigma_{W,t}^i = \left[\frac{N^i(N^i+1)(2N^i+1)}{6}\right]^{0.5}. \quad (10)$$

4.2 First-day abnormal returns, market conditions and investor sentiment

Butler et al. (2014) select, from an initial set of 48 variables, a parsimonious list of 14 variables that are robustly related to the initial IPO returns. This list includes, besides firm- and IPO-specific variables, prior 30-days market and industry returns and volatility.

Lowry et al. (2010) document the monthly dispersion of IPO initial returns and demonstrate that the volatility of initial returns is large on average and varies considerably over time. The dispersion of initial IPO returns each month has a strong positive correlation with average

initial returns each month. The 1-month post-IPO returns and their volatility are highly positively correlated with the previous 1-month market returns.

Ellul and Pagano (2006) argue that, besides risk, IPO investors also worry about the after-market illiquidity that may result from asymmetric information after the IPO. The less liquid the aftermarket is expected to be, and the less predictable its liquidity, the larger will be the initial IPO underpricing.

Following the authors mentioned above, we test whether market conditions and investor sentiment influence the first-day IPO return, using:

(i) The average return of the all-share country index in the 15 days before the IPO;

(ii) The standard deviation of the all-share country index in the 15 days before the IPO;

(iii) The average return of the industry index in the 15 days before the IPO;

(iv) The standard deviation of the industry index in the 15 days before the IPO;

(v) The number of IPOs in the past six months;

(vi) The last available value of the Business Confidence Indicator at the IPO date[1]

(vii) The Amihud (2002) illiquidity measure, computed using the first 15 days after the IPO date.

5. Empirical Results

In the first part of this section, we report the values of the abnormal returns for the full sample and ten industries, as well as their statistical significance. The second part presents the estimation results of the first-day returns on the possible explaining variables.

[1] According to OECD, the BCI "provides information on future developments, based upon opinion surveys on developments in production, orders, and stocks of finished goods in the industry sector. It can be used to monitor output growth and to anticipate turning points in economic activity. Numbers above 100 suggest increased confidence in near future business performance, and numbers below 100 indicate pessimism towards future performance." We use, as an explanatory variable, (BCI-100)/100.

Table 4

Buy-and-hold abnormal returns and significance tests

The top number in each cell represents the buy-and-hold average abnormal return in the first day, week (5 days), month (22 days) and year (260 days) after the IPO date, for the full sample (All) and ten industries. The bottom numbers (in parentheses) represents the skewness-adjusted t-test value, Sign test, and Wilcoxon signed-rank test, respectively. Significance at the 1%, 5% and 10% levels is denoted by "***", "**" and "*", respectively.

	Day	Week	Month	Year
All	1.22%	4.15%	5.17%	-2.74%
	(1.9)*	(3.67)***	(2.06)**	(-0.31)
	(0.71)	(0.71)	(-1.34)	(-3.55)***
	(0.66)	(1.58)	(-0.81)	(-3.29)***
Basic Materials	0.26%	-7.38%	-12.94%	-19.86%
	(0.24)	(-3.58)***	(-1.55)	(-36.29)***
	(0.00)	(-1.41)	(-1.41)	(-1.41)
	(0.22)	(-1.12)	(-1.12)	(-1.12)
Consumer Goods	0.93%	2.82%	-3.54%	2.79%
	(0.55)	(0.93)	(-1.06)	(0.25)
	(0.58)	(0.58)	(-0.58)	(0.00)
	(0.06)	(1.00)	(-0.84)	(0.22)
Consumer Services	-0.14%	1.82%	-2.46%	8.55%
	(-0.10)	(0.89)	(-0.64)	(0.78)
	(0.73)	(1.21)	(-1.21)	(0.24)
	(0.49)	(1.05)	(-0.77)	(0.53)
Financials	0.17%	2.06%	27.45%	9.19%
	(0.14)	(1.03)	(1.60)	(1.29)
	(0.00)	(0.00)	(1.41)	(0.94)
	(0.40)	(0.53)	(1.06)	(1.27)
Healthcare	2.34%	8.06%	7.98%	-5.59%
	(1.68)*	(2.80)***	(2.11)**	(-0.19)
	(-0.79)	(-0.53)	(-1.31)	(-3.94)***
	(-0.60)	(0.11)	(-0.18)	(-3.79)***
Industrials	1.17%	1.64%	2.09%	-0.33%
	(1.36)	(1.05)	(0.82)	(0.05)
	(0.78)	(0.78)	(0.39)	(-1.18)
	(1.30)	(1.23)	(0.44)	(-0.97)
Oil & Gas	0.68%	-0.98%	-8.87%	-19.14%
	(0.27)	(-0.17)	(-1.28)	(-3.58)***
	(-0.38)	(-0.38)	(-1.89)*	(-1.13)
	(-0.46)	(0.04)	(-1.48)	(-1.82)*
Technology	0.32%	4.44%	-1.07%	-29.46%
	(0.16)	(1.68)*	(-0.31)	(-2.06)**
	(1.50)	(1.00)	(-0.50)	(-2.50)**
	(0.66)	(1.33)	(-0.50)	(-2.31)**
Telecommunications	2.16%	1.29%	5.22%	51.52%
	(0.79)	(0.53)	(0.44)	(0.62)
	(1.00)	(0.00)	(1.00)	(1.00)
	(1.37)	(0.27)	(0.64)	(1.00)
Utilities	-0.05%	0.91%	-10.71%	-13.69%
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Table 4 shows that there is a modest first-day underpricing in the full sample which, although statistically significant according to the skewness-adjusted t-test, is substantially lower than the underpricing found in previous studies, such as Dorsman and Gounopoulos (2013), or Giudici and Roosenboom (2006). During the remainder of the first week and first month, the IPO firms continue to exhibit higher returns than the benchmark industry indexes,

but afterward, their performance reverts. At the end of the year, their adjusted return becomes negative (-2.74%).

Amongst the ten industries, the only one that shows a positive first-day underpricing is Healthcare (2.34%). It is noticeable that the performance of this industry is very similar to the overall sample performance (positive adjusted returns during the first day, week, and month and negative 1-year adjusted returns), which is not surprising, given that approximately 36% of all the IPOs come from the Healthcare industry. At the end of the first week, Healthcare (8.06%) and Technology (4.44%) IPO stock returns are significantly higher than the ones from their respective indexes, while Basic Materials (-7.38%) underperforms. One month after the IPO date, Healthcare (7.98%) stocks continue performing better than their industry index, and the average adjusted return of Oil & Gas companies becomes significantly negative (-8.87%), according to the sign test. Several industries present negative adjusted returns by the end of the first year, which are significant according to, at least, one of the tests. The worst-performing stocks at this time-horizon are from Technology (-29.46%), followed by Basic Material (-19.86%), Oil & Gas (-19.14%), and Healthcare (-5.59%).

Table 5
First-day return predictive regressions
Univariate and multivariate regressions of the first-day returns on the average industry return (μ-Ind(15)), standard deviation of the industry return (σ-Ind(15)), average country return (μ-Mkt(15)), standard deviation of the country return (σ-Mkt(15)), Business Confidence Indicator (BCI), number of IPOs (Num-IPOs), and Amihud illiquidity ratio (Amihud). The top number in each cell represents the coefficient and the bottom one its robust standard deviation. Significance at the 5% and 10% levels is denoted by "**" and "*", respectively.

	R1	**R2**	**R3**	**R4**	**R5**	**R6**	**R7**	**R8**
Constant	0.010 (0.007)	0.002 (0.02)	0.013* (0.007)	0.008 (0.017)	0.014* (0.008)	0.013 (0.015)	0.016 (0.008)	-0.008 (0.032)
μ-Ind(15)	5.31* (2.75)							5.36* (3.09)
σ-Ind(15)		1.07 (1.7)						1.09 (2.71)
μ-Mkt(15)			2.91 (2.56)					0.43 (2.32)
σ-Mkt(15)				0.68 (1.43)				0.62 (2.41)
BCI					-0.22 (0.68)			-0.05 (0.89)
Num-IPOs						0.00 (0.001)		0.00 (0.001)
Amihud							-0.03** (0.015)	-0.041* (0.023)
R-squared	2.07%	0.30%	0.57%	0.10%	0.01%	0.00%	0.57%	3.37%

Table 5 exhibits the results of the univariate and multivariate regressions of the first-day returns on the explanatory variables described before in Subsection 4.2. The first column shows that past industry returns exert a positive influence on the first-day underpricing, which is consistent with Butler et al. (2014) and Edelen and Kadlec (2005). This variable can explain 2.07% of the cross-section first-day return variability. Unlike, Butler et al. (2014), we find that the average country index returns and the standard deviations of the industry and country indexes returns cannot predict the first-day returns. There is also no evidence of any relation between the underpricing and either the Business Confidence Indicator or the number of IPOs. Column 7 shows that illiquidity harms first-day returns. This result runs contrary to Ellul and Pagano (2006), who report a positive relationship between illiquidity and underpricing. In the multivariate regression (last column), the average industry returns and the Amihud illiquidity measure are the sole significant variables. The inclusion of all the predictors simultaneously leads to an increase in the R-squared to 3.37%

6. Conclusion

This paper analyses the IPOs that occurred in the Euronext markets of Amsterdam, Brussels, Lisbon, and Paris, from 2009 to 2017. This sample period allows the examination of IPOs' patterns after the global financial crisis of 2007-2008. During that period there were 161 IPOs, with the Healthcare industry being responsible for the largest number of IPOs (36%). The IPO activity began slowly at the beginning of the sample, then increased until it peaked in 2015, with 40 IPOs.

The average first-day raw return and industry-adjusted return across all the IPOs are 1.4% and 1.2%, respectively. For longer time-horizons, the average raw returns are slightly higher, achieving values of around 4.5% one week and one year after the IPO. During the first week and first month of trading, the IPO firms continue to exhibit higher returns than the benchmark industry indexes, but afterward, their performance reverts, and, at the end of the

year, their average adjusted returns become negative (-2.7%). Hence, for the overall IPO sample, the raw and adjusted returns increase when longer time-horizons are considered, from one day to one week and from one week to one month, and then decrease from one month to one year. The only negative value is the yearly average adjusted return. This overall pattern is dominated by the Healthcare industry, which is not surprising given that approximately 36% of all the IPOs occurred in this industry.

First-day raw and adjusted returns are considerably lower, whilst those returns at an year horizon are higher than those reported in the literature, most notably in those studies that use sample periods that overlap with the one under analysis (see, for instance, Giudici and Roosenboom, 2006; Dorsman and Gounopoulos, 2013; Aissia, 2014). Notably, our results do not corroborate the conclusion of Dorsman and Gounopoulos (2013) that the crisis has increased underpricing and deepened the long-term underperformance of IPOs.

The dispersion of average raw returns across industries is higher at the end of the first year. At this time-horizon, the Oil & Gas (-22.2%) and Technology (-17.3%) industries significantly underperform the remaining industries while Telecommunications presents the highest average return (65.5%). Amongst the ten industries, the only one that shows a significant positive first-day underpricing is Healthcare (with an industry-adjusted return of 2.3%). By the end of one trading year after the IPO, several industries present significant negative adjusted returns according to, at least, one of the tests: Healthcare (-5.6%), Oil & Gas (-19.1%), Basic Material (-19.9%), and Technology (-29.5%). So, the results for the Technology industry are consistent with Saade (2015), who shows that Technology stocks underperform the respective index by 16.5% twelve months after the IPO date, but, unlike Aissia (2014) and Lowry et al. (2010), we find no evidence of short-term overperformance. On the other hand, for the Healthcare industry, in which most companies that went public are biotechnological, our findings agree with those from previous studies

The regression analysis highlights that only post-IPO illiquidity and most especially past industry returns exert a significant effect on the first-day underpricing. It worth noticing that the variable that we use to proxy for investor sentiment (Business Confidence Indicator) is not significant. The illiquidity variable impacts negatively on the first-day adjusted returns, which runs contrary to Ellul and Pagano (2006), who report a positive relationship between illiquidity and underpricing. This difference in the results may be due to the different metrics used to proxy for illiquidity.

In sum, one may conclude that our results on the Euronext IPO market after the financial crisis of 2007-2008 are in line with the market conditions and investor sentiment hypotheses according to which, when market conditions are bad (crises), uninformed investors are not so active and optimistic in the IPO market, hence initial underpricing and subsequent underperformance tend to be lower.

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