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The aftermarket performance of Spanish REITs

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ABSTRACT

Since 2013, when the market for REITs started in Spain, the number of these investment vehicles has grown steadily. At the end of 2019, Spanish REITs ranked third in Europe in terms of market capitalisation, and first in terms of the number of REITs. This research investigates the abnormal performance of REITs in the Spanish market for 6-, 12- and 24-month post-admission windows during the period from November 2013 to January 2020. We obtain evidence that issuers experience economically and statistically significant negative abnormal returns during the two years after going public. These results are robust to the different metrics, estimations and tests used. The differentiating characteristics of the market analysed (mainly the fact that the flotations were not carried out through an Initial Public Offering, unlike most previous studies, but through a direct listing procedure) are particularly relevant to determine the level of aftermarket performance.

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1. Introduction

Several studies have examined the performance of IPO share prices during a long period after going public. Since the seminal study by Ibbotson (1975), evidence of the existence of negative abnormal returns over long periods of time after this event has become so generalised that it is now a well-accepted phenomenon (see section 3 for a review of previous empirical evidence).

However, the unique characteristics of Real Estate Investment Trusts (REITs) have motivated the study of this phenomenon separately from other types of companies. Outcomes in these investment vehicle markets do not necessarily reflect the trends of the industrial sector and, as we discuss in section 3, the evidence on the aftermarket performance of REIT IPOs is mixed, as it depends on the country (Chan et al., 2013), the time period, the cycle in which the IPO takes place and the methodology assumed to estimate the abnormal returns of the REIT (Buttimer et al., 2005; Chan et al., 2001; Joel-Carbonell & Rottke, 2009; Ooi et al., 2018; Wang et al., 1992). It is also affected by other issues such as the management structure, institutional involvement, the underwriter's reputation or the compensation structure of managers (Chan et al., 2013; Ling & Ryngaert, 1997; Ooi, 2009; Ooi et al., 2018).

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This paper analyses the aftermarket performance of 44 REITs during the two years following their listing on the Spanish Alternative Stock Market (*Mercado Alternativo Bursátil* – MAB) over the period from November 2013 to January 2020 and investigates its relationship with the underlying firm, flotation and market characteristics.[1] The detection of abnormal performance after their admission is a critical issue since post-admission stock price underperformance reveals that firms were overpriced at the listing.[2] Unlike previous studies in other markets, one relevant feature of this research is that all the REIT flotations in the MAB were carried out through direct listing rather than by means of an Initial Public Offering (IPO). However, some REITs opted for a private placement of shares prior to market entry (up to 6 months before).

Due to statistical and conceptual problems related to the estimation and testing of long-horizon returns, we have used different approaches to estimate abnormal returns: (i) the composition of monthly returns (buy-and-hold abnormal return, BHAR), and (ii) the addition of monthly returns (cumulative average abnormal return, CAR). In order to estimate abnormal returns, we have used a wide range of references (controls).

This research is of interest for several reasons. The first is the fact that it investigates the way REITs have been incorporated into the market and how the initial price of the quotation is set. As stated above, unlike other markets, Spanish REITs go public not through an Initial Public Offering (IPO) but through direct listing (DL) or introduction (companies are immediately transferred from being a private company to a public one).[3] Thus, the price taken as the initial admission price (reference price) does not come from a book-building route but is determined by the board of directors of the REIT based on the valuation of the company carried out by an independent expert (appraiser) (Bolsas y Mercados Españoles, 2018). Nevertheless, some REITs have chosen to make a private placement of shares prior to market entry (up to 6 months before), in which case the initial listing price is determined by the price of that private placement.

A second key characteristic of the Spanish market of REITs is its reduced liquidity. This lack of liquidity hinders the full and quick incorporation of information into prices.

The third interesting feature is the real estate activity in the Spanish economy, as well as its attractiveness to the international investment community. In 2019 direct investment in this sector in Spain exceeded 12,000 million euros (excluding corporate operations), which is similar to the figure for 2018, reaching a new record for the sixth consecutive year. Around 60% of the total amount was carried out by foreign direct investment. REITs invested 9% of the total, while the rest consisted of national investment (CBRE, 2020). In addition, foreign investors find the Spanish stock market attractive, as evidenced by the fact that they owned 50.2% of the total value of Spanish listed companies at the close of 2019, an increase of more than 10 percentage points over the last decade and more than 20 percentage points since 1995 (Bolsas y Mercados Españoles, 2020).

The last point is the rise of REITs in Spain and the increase in the number of flotations of these companies. It is worth noting that at the end of 2019, Spanish REITs ranked third in Europe in terms of market capitalisation, and first in terms of the number of REITs (see Figure 2) (EPRA, 2020).

We obtain evidence that issuers experience economically and statistically significant negative abnormal returns during the two years after their listing regardless of the methodology we employ to estimate the abnormal returns. It should be noted that the

underperformance increases in the first months after the listing, is slightly reduced around months 11–12, and then increases again and continues until month 24 after the listing. Moreover, our results suggest that the characteristics of the process of going public in this market explain the aftermarket performance to a greater extent than the variables generally used in the abnormal long-run performance literature. Thus, REITs that have carried out a previous private placement and in which the members of the board of directors set a reference price for the start of trading that is above the price determined by the appraiser underperform less severely than their counterparts. This question is of interest both to investors and to regulators.

This is the first piece of research, as far as we know, to analyse the existence of abnormal performance after the listing of REITs on the Spanish market. The recent incorporation of REITs into the Spanish legislation has so far not allowed access to a sufficiently large sample of this type of institution to carry out empirical studies individually. The evidence obtained is consistent, in part, with the results achieved in other markets. In any case, the implications of this phenomenon in relation to the rational valuation of stocks, market efficiency, investors' behaviour and resource allocation warrant future research.

The remainder of the paper is organised as follows. Section 2 describes the arrival of REITs in Spain and the characteristics of the market analysed. Section 3 examines the empirical evidence of aftermarket performance in REITs. The theoretical framework and hypotheses are described in section 4. Sections 5 and 6, respectively, describe the sample and the methodology used. The results obtained are shown in section 7 and section 8 concludes.

2. The REIT market in Spain

The origin of Real Estate Investment Trusts (REITs) goes back to the 1960s in the United States. It was not until the beginning of the 21st century that they arrived in Europe and they have become progressively more firmly established in the Old Continent ever since. The adaptation of the real estate investment industry regulations in different countries in recent decades has promoted the growth of these trusts, increasing both their number and size. Figure 1 shows the composition of the REIT market in the world at the end of 2019 (EPRA, 2020).

Despite the fact that the arrival of the first REIT did not take place until the end of 2013, with the passing of Law 16/2012 (Reino de España, 2012),[4] Spain has a significant weight in Europe, as shown in Figure 2. In fact, in recent years (2017–2019) the number and size of these companies has increased significantly (see Figure 3), representing more than 75% of the listings on the Spanish stock market during that period.

With regard to the REIT market in Spain, it should be noted that most of the companies are admitted in a specific segment dedicated to REITs in the Spanish Alternative Stock Market (MAB), created in 2013. In this respect, at the end of 2019 only 4 of the 82 REITs admitted to the Spanish market were in the Spanish regulated market, more widely known as *Mercado Continuo* or SIBE. The MAB is a Multilateral Trading Facility (MTF) that has a far more flexible regulation than the *Mercado Continuo* in terms of admission and trading requirements, without foregoing an adequate level of transparency. Trading is mainly carried out multilaterally and electronically in the SIBE-

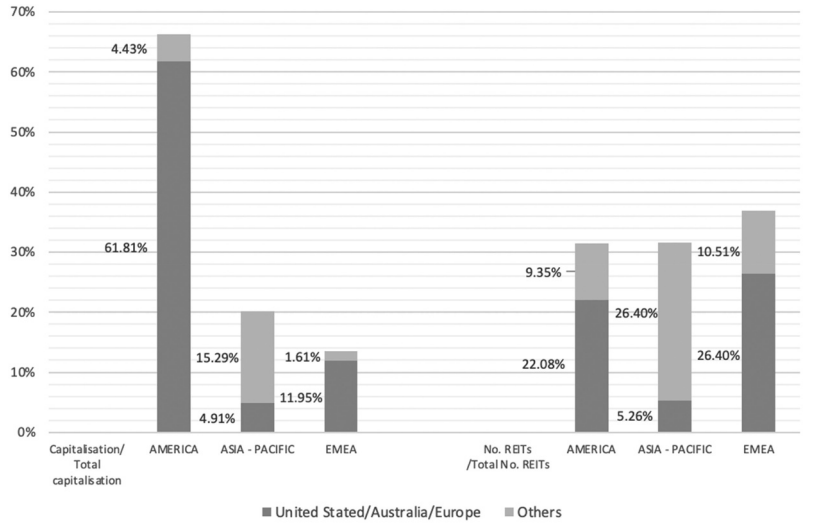

Figure 1. REIT markets around the world at the end of 2019. *Europe* includes European Union and Russian Federation. *EMEA* includes Europe, Israel, South Africa, Turkey, United Arab Emirates and Saudi Arabia. Own elaboration based on EPRA (2020).

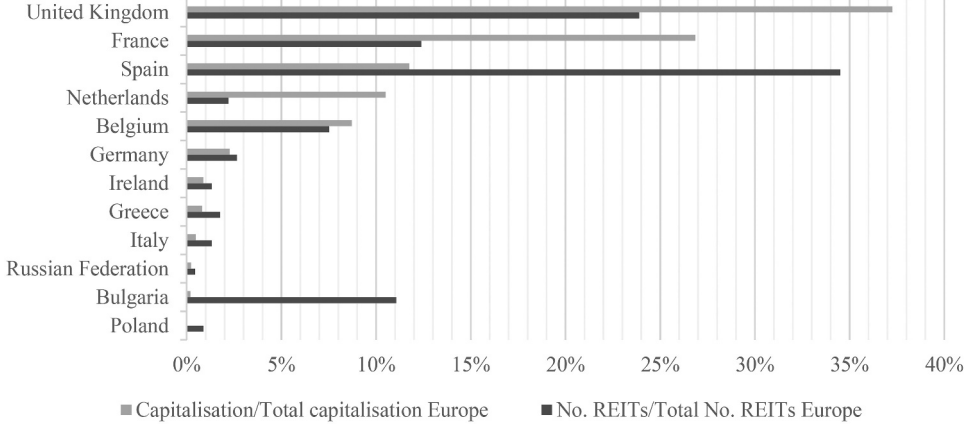

Figure 2. REIT markets in Europe at the end of 2019. Own elaboration based on EPRA (2020).

SMART (the same electronic system as the one used in the *Mercado Continuo*) through a trading system called fixing, in which shares are auctioned throughout the session (from 8.30 am to 4.00 pm) with two price fixing and stock allotment times, at 12 noon and 4 pm (Bolsas y Mercados Españoles, 2017). Finally, in order to enter the market, there is no obligation to make an Initial Public Offering of shares (IPO) if, prior to entry, the minimum free floating capital requirement set out in Circular 2/2018 of the MAB is met (Bolsas y Mercados Españoles, 2018).[5, 6] In this respect, one of the distinguishing features of this market compared to others is that, until now, all the REITs in this market have been incorporated by direct listing (DL). In these cases, the price taken as the initial price for admission (reference price) does not come from a placement, but is determined

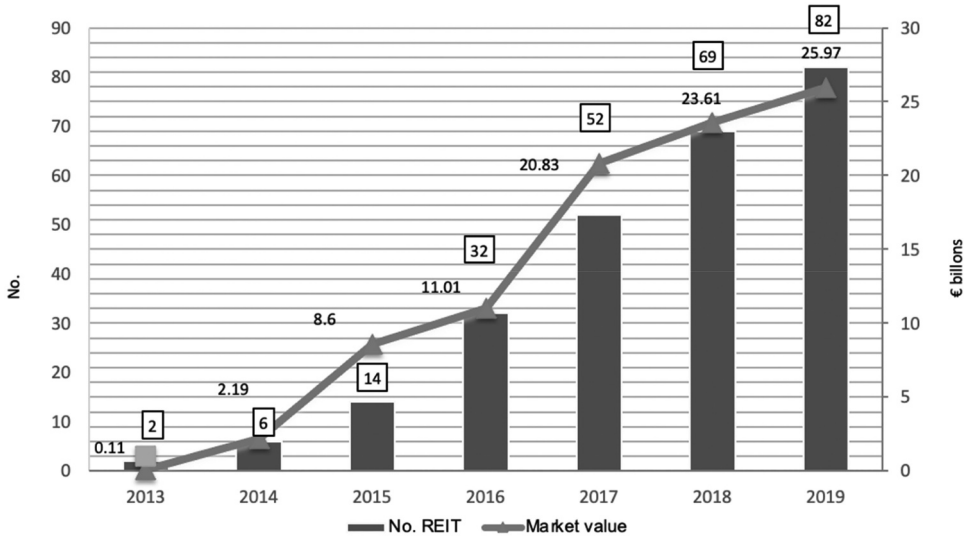

Figure 3. Time profile of REITs in the Spanish stock market during the period 2013–2019. *Source*: Own elaboration based on Bolsas y Mercados Españoles (2019).

by the board of directors of the REIT based on the valuation of the company carried out by an independent expert (appraiser). In some cases, however, a private placement of shares occurs prior to listing for trading. If said placement complies with the requirements established in Circular 2/2018 of the MAB (Bolsas y Mercados Españoles, 2018), the reference price for the initial trading of the company's shares on the market will be the price of the aforementioned placement.

The market under study was only recently born and is still undergoing development. For this reason, despite the existence of the figure of the Liquidity Provider,[7] the MAB still has a reduced liquidity compared to other more mature markets. In order to shed light on this important question, and following Martínez et al. (2005), we have calculated an illiquidity proxy based on the measure proposed by Amihud (2002) (see expression (2) from section 6.1.1) both for the REIT sample and for the sample of control firms by size from the *Mercado Continuo* in the period under study (December 2013 to January 2020). The illiquidity ratio of both samples is significantly different from zero (Panel A of Table 1), the illiquidity ratio of REITs being significantly higher in mean and median than the illiquidity ratio of the matching firms from the *Mercado Continuo* (Panel B of Table 1). Therefore, the liquidity of the MAB segment for REITs is lower than that for the *Mercado Continuo*.

3. Empirical evidence of aftermarket performance in REITs

The aftermarket performance of the IPO share price (in either the long or the medium term) following the process of going public is one of the most interesting topics in the financial literature in recent years. Numerous studies have been conducted on almost all the capital markets around the world.[8]

Table 1. Illiquidity of REIT sample and control firms by size from the *Mercado Continuo (MC)* during the period December 2013 to January 2020.

Panel A. Statistics	ILLIQ. REIT	ILLIQ. CONTROL FIRM (MC)
Mean	*** 3.589 [a]	*** 0.558 [a]
Median	1.611 [a]	0.348 [a]
Maximum	45.827	2.857
Minimum	0.000	0.002
Standard deviation	7.302	0.630
Sample size (N)	44	44
Panel B. Test of differences	**ILLIQ. REIT – ILLIQ. CONTROL FIRM (MC)**	
Mean differences	*** 3.031 [a]	
Median differences	1.262 [a]	

ILLIQ. REIT: illiquidity proxy for the REIT sample estimated through the illiquidity ratio proposed by Amihud (2002). Data obtained according to expression (2) multiplied by one million.

ILLIQ. CONTROL FIRM (MC): illiquidity proxy of control firms by size from the *Mercado Continuo* estimated through the illiquidity ratio proposed by Amihud (2002). Data obtained according to expression (2) multiplied by one million.

[a,b,c]significant at the 1%, 5% and 10% levels, respectively.

***, **, *significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.

To test the mean, a parametric test based on the conventional *t* statistic is used. To compute the differences between the mean values, the *t* test is computed. Differences in medians are tested with the Kruskal-Wallis test.

However, in the case of REITs this phenomenon has been investigated separately from the rest of the companies, given the specific characteristics of these investment vehicles. Some differential characteristics of REITs are that (i) they invest in tangible assets that can be rented so as to generate income; (ii) they are required to distribute most of their profit to their shareholders each year; and (iii) they have specific organisational structures and shareholder limitations; among others (Stevenson, 2013). The nature of REITs, as well as the regulatory restrictions to which they are subject, make them far more transparent than usual stocks (Below et al., 1995; Brounen & Eichholtz, 2002; Ling & Ryngaert, 1997; Wang et al., 1992; Wong et al., 2013). This transparency makes it relatively easy for investors to value this sort of firms. Therefore, REITs can be considered a separate case of study. Today, there is a significant volume of studies evaluating the performance of REITs. In Table 2 we provide a summary of the evidence on the after-market performance of IPO REITs and property firms from selected studies whose methodology is similar to that used in the present study. As we can observe, most of them refer to the North America market (US and Canadian stock markets). To date, only a handful of studies have examined the performance of REIT IPOs in countries outside the USA. In Europe, although some studies have been conducted in the real estate sector, the late popularisation of REITs means that, to date, studies addressing them are practically inexistent.

Evidence on performance of real estate after going public is mixed, even contradictory. It depends on the period of time studied, the country, and the method used to calculate the returns. As shown in Table 2, the results are very diverse, ranging from a negative mean return of −24.70% using the market adjusted BHAR methodology over a post-

Table 2. Summary of aftermarket performance of REITs and property firms from selected studies.

	Country	Sample size and type	Sample period	Methodology	Abnormal returns (%) and period
Global					
Chan et al. (2013)	Global	370 REITs	1996–2010	Market-adjusted CAR	1.32** (Days 1–30) −1.99*** (Days 2–30) −0.76 (Days 1–90) −4.07*** (Days 2–90) −4.05*** (Days 1–190) −7.36*** (Days 2–190)
North America					
Wang et al. (1992)	US	87 REITs	1971–1988	Matching REIT-adjusted CAR	−10.11** (Days 1–190) −7.48* (Days 2–190)
Ling and Ryngaert (1997)	US	85 REITs	1991–1994	Market-adjusted BHAR	2.20* (Days 1–100)
Londerville (2002)	Canada	13 REITs	1993–1998	Market-adjusted CAR	8.34** (Days 1–20)
Joel-Carbonell and Rottke (2009)	US	90 REITs	1991–2008	Market adjusted BHAR	−4.10 (one year) −8.30 (three years) −24.70** (five years)
Dimovski et al. (2017)	US	56 REITs	2010–2015	Market adjusted total return Market adjusted dividend yield	−2.18 (6 months) 4.23 (12 months) 0.88*** (6 months) 1.90*** (12 months)
Asia-Pacific					
Chan et al. (2001)	Hong Kong	56 PROP	1986–1997	Market-adjusted CAR	−4.73* (Days 2–60) −9.62** (Days 2–60) −8.92 (Days 2–200)
Ooi et al. (2018)	Japan, Hong Kong, Singapore and Malaysia	107 REITs	2001–2013	Market-adjusted BHAR	−1.31 (100 days) −0.35 (one year) 2.22 (three years)
Europe					
Brounen and Eichholtz (2002)	France	17 PROP	1984–1999	Market adjusted CAR Market adjusted BHAR	−12.62** (12 months) 10.76** (12 months)
Brounen and Eichholtz (2002)	Sweden	13 PROP	1984–1999	Market adjusted CAR Market adjusted BHAR	18.89 (12 months) 22.16* (12 months)
Brounen and Eichholtz (2002)	UK	24 PROP	1984–1999	Market adjusted CAR Market adjusted BHAR	−4.53 (12 months) −5.83 (12 months)

PROP: property firms or Real Estate Operating Company (REOC).
CAR: cumulated abnormal returns.
BHAR: abnormal buy-and-hold returns.
***, **, * significant at the 1%, 5% and 10% levels, respectively.

listing five-year period for a sample of 90 REITs in the US market over the period 1991–2008 (Joel-Carbonell & Rottke, 2009) to a positive mean performance of 22.16% with the market adjusted BHAR methodology over a post-listing 12-month period for a sample of 13 IPOs carried out by property firms in the Sweden market over the period 1984–1999 (Brounen & Eichholtz, 2002). If we do not include the real estate companies, the positive average return of REITs is 8.34% for the 20-day period analysed in Canada by Londerville (2002) or 2.22% for a longer period of 3 years studied by Ooi et al. (2018) in the Asian market. Therefore, evidence on the aftermarket performance is still inconclusive.

With regard to the Spanish market, some papers have studied the long-term performance of non-REIT companies that carried out an initial public offering of shares. Álvarez and González (2005), Farinós (2001) and Farinós et al. (2007a, 2007b) did not find that firms underperform in the year following the IPO. Their results showed that only seasoned equity issues (SEO) driven by private medium-sized and small firms with low market-to-book ratios experience economically and statistically significant underperformance during the year after the issue. As far as we know, there are no studies that have analysed the aftermarket performance of REITs in Spain when going public. The reduced sample available until now, because of the recent creation of this investment vehicle in Spain, has prevented this sort of studies from being conducted.

4. Theoretical framework and hypotheses

There is a significant body of academic literature on long-term underperformance after going public. However, there is also evidence of not underperformance after going public when firms select direct listing (Alhashel, 2018). In the case of REITs, as we stated in the previous section, there is no consensus on the aftermarket performance after their IPO, as it depends on various factors. This inconclusive evidence, together with the special characteristics of the going public and the market under analysis, and the lack of previous evidence of this phenomenon in the Spanish REIT market, encourages us to study it and to explore whether abnormal performance after listing exists.

If we analyse the theories that attempt to explain the abnormal performance after going public, we observe that the more classical part is based on market efficiency. Thus, Fama (1998) argued that the abnormal long-term performance detected is the result of biased methodologies and/or poorly specified valuation models. Brav et al. (2000) and Mitchell and Stafford (2000), among others, detected that long-term anomalies are sensitive to the methodology used, which would reinforce the argument that this anomaly is not evidence against market efficiency. Loughran and Ritter (2000) argued that if the market really does not value securities adequately, then abnormal returns should not be robust to alternative methodologies. Furthermore, these authors criticised the fact that proxies related to poor valuation rather than true risk factors were included as references on a widespread basis, as they bias their contrasts against the detection of abnormal returns. Eckbo et al. (2000) and Eckbo and Norli (2005) proposed a rational interpretation of abnormal returns after the event that is related to a change in risk.

Part of the literature questions the efficiency of the market and attributes the anomalies observed to irrational investors suffering from different cognitive biases (Barberis

et al., 1998; Daniel et al., 1998). Alternatively they are ascribed to rational investors immersed in a context of asymmetric information in relation to the issuing companies, with the hypothesis of windows of opportunity being more predictable in the literature (Loughran & Ritter, 1995; Ritter, 1991).

The windows of opportunity assumption requires, in addition to the incorrect valuation of the company by investors, some additional circumstance to explain the slow price adjustment, such as certain obstacles that prevent the rapid adjustment of prices. Thus, in a frictionless market, arbitrageurs eliminate all pricing deviations, but with non-zero market friction, mispricing can persist because of the existence of barriers to institutional investors or different arbitrage costs as higher bid–ask spreads (Hensler, 1998; Loughran & Ritter, 2000).

As we show in section 2, one key characteristic of the Spanish REITs market is its reduced liquidity, which prevents institutional investors from entering. Following Hensler (1998) and Loughran and Ritter (2000), the existence of this sort of obstacles would explain why mispricing, if it exists, may persist over time.

As our results show the existence of an underperformance following the listing of REITs on the stock exchange in Spain, we have selected a series of variables and put forward some hypotheses to be tested on the firm, flotation and market characteristics that may be related with the existence of post-flotation abnormal returns. These variables and hypotheses have been selected within the context of the different existing post-performance theories and are designed to cover the specific characteristics of this type of investment vehicle and the peculiarities of the market where they are listed.

Within the theories of information asymmetry, and following Beatty and Ritter (1986), we assume that the greater the ex-ante uncertainty about the value of the company is the worse the aftermarket performance will be. The approaches to the ex-ante uncertainty that we propose, which have to do with the characteristics of the issuing company and are commonly used in the literature, are size and age. In general, it is considered that there is greater uncertainty in small and younger companies (Brounen & Eichholtz, 2002; Ling & Ryngaert, 1997). Therefore, we formulate the following hypotheses:

H1. The larger the size the issuing company is, the better the aftermarket performance will be.

H2. The older the company is, the better the expected aftermarket performance will be.

We have also taken into account the level of leverage as a measure of ex ante uncertainty. Following Ling and Ryngaert (1997), Brounen and Eichholtz (2002) argued that the higher a company's level of leverage is, the fewer opportunities for growth there will be and therefore it will be easier to value it. Likewise, the higher the level of leverage is, the more supervision or monitoring there will be (Álvarez, 2001). Based on the above, we propose the following hypothesis:

H3. The higher the company's level of leverage is, the better the aftermarket performance will be.

Continuing with the monitoring hypothesis and assuming that the higher the percentage of shares held by executives is, the lower the external monitoring will be (Wu, 2004), we propose the following hypothesis:

H4. The higher the percentage of shares retained by shareholders in executive positions is, the worse the aftermarket performance will be.

If we take into account the initial-day return, the literature is inconclusive. On the one hand, many researchers (Bradley et al., 2009; Hanley, 1993; Omran, 2005; Ritter, 1991) have found a negative relation between this variable and abnormal long-run returns. According to the overreaction explanation, investors are optimistic about the expected performance and overprice stocks when the firm goes public, and this gives rise to a high positive return at the time of the IPO. However, this mispricing would be revealed in the future and the abnormal long-term return would be negative. Nevertheless, other studies (Álvarez & González, 2005; Grinblatt & Hwang, 1989; Michaely & Shaw, 1994), based on the idea that underpricing reflects the quality of the company (signalling hypothesis) and its ability to issue shares at market prices in subsequent offerings, have reported a positive relation between this variable and long-run abnormal returns. Therefore, in keeping with the overreaction explanation we formulate the following hypothesis:

H5.a. The higher the adjusted initial day return of the REIT is, the worse the aftermarket performance will be.

However, based on the signalling theory, the hypothesis that we propose is the following:

H5.b. The higher the adjusted initial day return of the REIT is, the better the aftermarket performance will be.

We formulate the following hypothesis based on the 'fads' explanation. Ritter (1991) suggested that the low abnormal long-run returns of IPOs are caused by many firms simultaneously going public in hot sectors and implies that investors can be periodically overoptimistic as regards the potential profits of new firms. However, this mispricing would be revealed in the future and the abnormal long-term return would be negative. Following Ascherl and Schaefers (2018), Brobert (2016), and Buttimer et al. (2005), we have considered whether listing takes place in a period of hot (cold) market when there have been ten or more (fewer) flotations in the year the REIT was launched on the market. Therefore, we test the following hypothesis:

H6. Aftermarket performance will be worse when the listing occurs during a hot market.

Finally, we have included a series of hypotheses regarding the characteristics of REITs and the peculiarities of the market in which they are listed.

In relation to the property strategy followed by REITs, Brounen and Eichholtz (2002) and Eichholtz et al. (2000) found that REITs with a diversified property strategy have

a worse post-flotation abnormal return than those that follow a specialised strategy.[9] It is possible that the aftermarket performance is negative if the market needs time to decide on the true value of the property, and REITs with a diversified property strategy are more difficult to value. Accordingly, we propose the following hypothesis:

H7. The aftermarket performance is worse when the property strategy is diversified.

Chan et al. (2013), based on the well documented shift in US equity REITs from being externally managed to internally managed in the late 1980s, found evidence that this change in the management structure of REITs has a positive effect on long-term performance. Thus, following Chan et al. (2013), better performance is expected in internally managed REITs than in the case of those with external management. Hence:

H8. Aftermarket performance is better when the management of the company is internal.

In the framework of the theoretical model put forward by Chemmanur and Fulghieri (1999), we assume that companies that have made a private placement have less information asymmetry than those that have not done so.[10] Also, investors would interpret a successful previous private placement (PPP) as a valuable signal of the REIT quality in their pricing decisions (certification role played by PPP investors) (Cai et al., 2011; Hertzel & Smith, 1993). Furthermore, following the monitoring hypothesis, we expect that PPP could improve monitoring of the management of the REITs (Wu, 2004). Thus, we formulate the following hypothesis:

H9. REITs that perform a previous private placement of shares will show better aftermarket performance than REITs that do not.

Finally, we examine the possible effects on long-term performance of setting the initial share price above its fundamental value (Hanley, 1993; Ooi et al., 2018). Assuming that the more the price is separated from its fundamental value at the time of listing, the higher the subsequent adjustment will be, we propose the following hypothesis:

H10. The aftermarket performance is worse when the reference price is higher than the price determined by the appraiser.

5. Sample

Our initial sample consisted of all the REITs that had been listed on the Spanish Alternative Stock Market (MAB) since the creation of their own particular REIT segment on 15 February 2013 up until 31 January 2020.[11] During this period, there have been 88 admissions. We analyse the aftermarket performance of REIT admissions using three windows: 6-, 12- and 24-month post-admission windows.[12] To assess our aftermarket performance study, only those admissions that have a complete 24-month window have been taken into consideration. Besides, we have discarded those companies that have not

traded in this period or have only traded block trading, as the latter is not considered an official closing price.[13] Imposing these requirements resulted in a sample of 44 REITs.

Data on market admissions, financial information and other information about the REITs were hand-collected from the Informational Document on Admission to the Market (IDAM) and the relevant facts available on the MAB website. Information on SIBE companies has been obtained from the Thomson Reuters Datastream database. The stock market data are from the Bolsas y Mercados Españoles Group, with the exception of the SIBE companies and FTSE EPRA/NAREIT Spain index, which was obtained from the Thomson Reuters Datastream database.

6. Methodology

6.1. Post-flotation abnormal return estimation

We used two event time method approaches generally employed in the literature, as we have seen in section 3, for estimating abnormal returns: (i) compounding monthly returns (buy-and-hold abnormal return, BHAR), and (ii) adding monthly returns (cumulative average abnormal return, CAR). Next, we introduce the references (controls) used for the generation of the abnormal performance in those approaches.

6.1.1. References used to estimate the post-flotation abnormal return of REITs

To measure abnormal performance, we used various references divided into three groups. The first group is related to market indexes. We selected the Madrid Stock Exchange General Index (IGBM), indicative of the general performance of the Spanish market; the IBEX Small Cap (SMALL), indicative of the performance of the medium-sized and small companies on the Spanish market (similar size to the Spanish REITs); and the FTSE EPRA/NAREIT Spain (EPRA or EPRA NAREIT), indicative of the specific performance of REITs on the Spanish stock market. Second, we used a control firm procedure by matching the listed REITs with firms according to size and liquidity characteristics, based on the illiquidity ratio proposed by Amihud (2002).[14] We employed the illiquidity ratio instead of the book-to-market ratio given the characteristics of the MAB (see section 2). Amihud's (2002) illiquidity ratio was computed as in Martínez et al. (2005). Thus, we first calculated the illiquidity ratio of firm i in month t ($ILIQ_{it}$) as shown in expression (1).

$$ILIQ_{it} = \frac{1}{Days_{it}} \sum_{d=1}^{Days_{it}} \frac{|R_{itd}|}{V_{itd}}, \tag{1}$$

where R_{itd} and V_{itd} are, respectively, the return and the volume (in euros) of company i on day d of month t, and $Days$ represents the number of days that firm i has traded in month t. In order to obtain the illiquidity ratio for a portfolio (or even the whole market) in month t, we computed the average illiquidity ratio as in expression (2).

$$ILIQ_t = \frac{1}{N} \sum_{i=1}^{N} ILIQ_{it}, \tag{2}$$

where N is the number of firms available in the portfolio (or market) in each month t.

We identified all the firms from the *Mercado Continuo* and the MAB (in the growth companies' segment) that had not carried out an admission in the previous 6, 12 or 24 months (depending on the window analysed) and selected the one whose size (illiquidity ratio) was the closest to that of the sample firm. In addition, we imposed two further requirements: first, we required that the selected company does not leave the market during the 6 (12, 24) months following the date of issue since the match was maintained throughout the period of study; and second, the selected control company could not be reassigned to a sample company until the window under study ends.

Finally, we matched each REIT with a portfolio according to size and liquidity characteristics. Specifically, from the whole Spanish *Mercado Continuo*, we formed ten portfolios on the basis of size and ten portfolios on the basis of the illiquidity ratio. We followed the matching procedure of Fama and French (1993) to ensure that each REIT was placed in the appropriate portfolio. To avoid the problem of portfolio contamination discussed in Loughran and Ritter (2000), firms that had made a listing in the previous 6 (12, 24) months were not included in the portfolio (Brav et al., 2000; Brav & Gompers, 1997).

6.1.2. Computing buy-and-hold abnormal returns (BHAR)

First, we calculated the return obtained through a buy-and-hold strategy for REIT i during investment period τ (6, 12 and 24 months, respectively), that is, $BHR_{i\tau}$. This was calculated by composing its monthly return from the month following the admission (s) until the end of the horizon considered ($s+\tau$) in accordance with expression (3).

$$BHR_{i\tau} = \left[\prod_{t=s}^{s+\tau}(1+R_{it})\right] - 1, \tag{3}$$

where R_{it} is the return of company i from the sample in month t.

The abnormal buy-and-hold return of REIT i ($BHAR_{i\tau}$) was computed as in expression (4).

$$BHAR_{i\tau} = BHR_{i\tau} - BHR_{CONTROL,\tau}, \tag{4}$$

where $BHR_{CONTROL,\tau}$ is the monthly buy-and-hold return of the control (see section 6.1.1) for the window of τ months.[15] A positive $BHAR_{i\tau}$ indicates better performance of the admission REIT as compared to the benchmark.

The null hypothesis to be tested was that the mean of the cross-section of the abnormal buy-and-hold return ($\overline{BHAR_{\tau}}$) was equal to zero. We tested the null hypothesis through the standard t statistic controlling for heteroskedasticity using White's (1980) method.

One aspect that still remains unsolved in the literature concerns the poor specification of the statistical contrast of the previous null hypothesis (Barber & Lyon, 1997; Lyon et al., 1999; Mitchell & Stafford, 2000). For this reason, in order to make our results more robust, we employ the Cowan and Sergeant (2001) methodology in expression (5).

$$Z = \frac{\overline{BHAR}}{\sqrt{\frac{\hat{\sigma}^2 SAMPLE}{N} + \frac{\hat{\sigma}^2 CONTROL}{N}}} \tag{5}$$

6.1.3. Computing cumulative average abnormal returns (CAR)

We have calculated the *CAR* in two alternative ways. On the one hand, we have calculated *CARs* similar to the *BHARs* in section 6.1.2. Thus, we calculated the abnormal return for REIT i for every month t during the investment period of τ months (τ being 6, 12 and 24 months, respectively) since the first calendar month s after the listing date (AR_{it}) by computing the difference between the return of REIT i in month t and the return corresponding to each of the references selected in section 6.1.1 in the same month t. We then computed the cumulative abnormal return for REITi in the post-listing period $\tau(CAR_{i\tau})$ as in expression (6).

$$CAR_{i\tau} = \sum_{t=s}^{s+\tau} AR_{it}. \tag{6}$$

We tested the null hypothesis that the cross-section cumulative average abnormal return $\left(\overline{CAR_\tau}\right)$was equal to zero using the conventional t statistic. Moreover, we employed the Cowan and Sergeant (2001) methodology in expression (7).

$$Z = \frac{\overline{CAR}}{\sqrt{\frac{\hat{\sigma}^2 SAMPLE}{N} + \frac{\hat{\sigma}^2 CONTROL}{N}}} \tag{7}$$

On the other hand, and in order to follow the progressive aftermarket performance of REITs, we computed the cumulative abnormal return in the post-listing period of τ months for the sample of REITs (CAR_τ) by accumulating the average abnormal cross-sectional return in each month t after the REIT admission $(\overline{AR_t})$, as in expression (8).

$$CAR_\tau = \sum_{t=s}^{s+\tau} \overline{AR_t}\ , \tag{8}$$

where the average abnormal cross-sectional return $(\overline{AR_t})$ is computed as shown in expression (9).

$$\overline{AR_t} = \frac{1}{N}\sum_{i=1}^{N} AR_{it}\ , \tag{9}$$

where AR_{it} is the abnormal return of firm i in month t after the event, computed as the difference between the return of the REIT and the return corresponding to each of the references selected in section 6.1.1.

Here, we tested two hypotheses. First, we tested the null hypothesis that the average abnormal return $(\overline{AR_t})$ in each month t after the listing was significantly different from zero. To test this null hypothesis, we used the conventional t statistic.

Second, we tested whether the cumulated abnormal return for the window of τ months after the listing (CAR_τ) was significantly different from zero. We corrected the cross-sectional correlation problem as shown in expression (10).

$$t = \frac{CAR_\tau}{\sqrt{(\tau \cdot [\sum_{t=s}^{\tau}\left(\overline{AR_t} - \frac{1}{\tau}\sum_{t=1}^{\tau}\overline{AR_t}\right)^2]/(\tau - 1)}} \tag{10}$$

Table 3. Descriptive statistics of the explanatory variables.

	N	Mean	Std. dev.	Min.	Median	Max.
SIZE (million €)	44	143.60	328.30	5.91	52.02	2,054.00
AGE (years)	44	6.95	9.78	0.19	2.31	42.27
DEBT (%)	44	37.40	30.30	0.00	33.90	104.80 [(1)]
EXECUTIVES (%)	44	46.26	41.28	0.00	45.16	100.00
AR (%)	44	2.40	5.10	−2.80	1.20	26.30

Dummy variables	Total Dummy	Dummy 0	*Dummy 0/Total Dummy (%)*	Dummy 1	*Dummy1/Total Dummy (%)*
MARKET	44	11	25.00	33	75.00
PROPERTY	44	31	70.45	13	29.55
MANAGEMENT	44	34	77.27	10	22.73
PPP	44	33	75.00	11	25.00
REFERENCE PRICE	39	21	53.85	18	46.15

The variables are described in Table A1.
N: sample size.
[(1)]This data corresponds to a newly incorporated REIT whose main assets were from a recently acquired company with a debt ratio of 75%. At the time of going public the REIT did not have consolidated accounts.

This statistic is a variant proposed by Espenlaub et al. (2000) of the procedure that Brown and Warner (1980) called the Crude Dependence Adjustment test, with which it is possible to correct the cross-sectional correlation problem.

6.2. Firm, flotation and market characteristics analysis

The definitions of the explanatory variables selected to test the hypotheses set out in section 4 are shown in Table A1. Table 3 offers a summary of the main characteristics of these explanatory variables.

In order to test the different hypotheses, we carried out both a univariate and a multivariate analysis. In the univariate analysis, we split the sample, except for the dummy variables, into two subgroups per variable, taking the median as the cut-off point. The null hypothesis to be tested was that the mean (median) of the returns of each subgroup was equal to zero. To test the mean, we used a parametric test based on the conventional t statistic. In addition, in order to make our results more robust, we employed the bootstrap methodology (Efron, 1982; Wehrens et al., 2000). With regard to the median, we use the Wilcoxon signed rank test. To test the differences in the mean values between subgroups we performed the parametric t test and applied the bootstrap methodology. The difference in the medians between subgroups was tested using the Kruskal-Wallis test.

In order to check the robustness of the results from the univariate analysis, we carried out a multivariate analysis through several multiple regression models in accordance with expression (11) for the longest window studied.

$$AP_{i24} = \alpha + \sum_{j=1}^{m} \beta_j \, X_{ij} + \epsilon, \tag{11}$$

where AP_{i24} is the REIT$_i$ aftermarket performance measured by both $BHAR_{i24}$ and CAR_{i24}, and X_{ij} is the set of independent variables that correspond to the selected explanatory variables shown in Table A1.

For the purpose of minimising the influence of extreme values on expression (11), the natural logarithms of the variables SIZE (LNSIZE), AGE (LNAGE) and DEBT (LN (1 + DEBT)) have been used (Brobert, 2016; Brounen & Eichholtz, 2002; Ling & Ryngaert, 1997).

Each model in expression (11) has been estimated by cross-sectional Ordinary Least Squares (OLS), applying the methodology proposed by White (1980) to obtain a robust estimation of the parameters in the presence of heteroscedasticity. As we have a small sample size, we have also estimated the significance of the parameters through the bootstrap procedure (Fox, 2008). For the same reason, we have not included more than six explanatory variables in the same model in order to preserve enough degrees of freedom, and so we have designed five different models. To analyse the absence of multicollinearity among the regressors, we used Spearman's Rho correlation coefficient among the different variables of each model. We have also used the Variance Inflation Factor (VIF).

Table 4. Buy-and-hold abnormal return (BHAR) and cumulative abnormal return (CAR) calculated for an equally weighted portfolio during a 6-, 12- and 24-month post-REIT admission window.

	N	BHAR (%)	t test p-value	Z test p-value	CAR (%)	t test p-value	Z test p-value
Panel A: 6 month post-listing window							
IGBM	44	−2.959	0.259	0.129	−3.287	0.272	0.121
SMALL	44	−12.294	0.000	0.000	−12.116	0.000	0.000
EPRA NAREIT	44	−9.102	0.001	0.000	−9.646	0.002	0.000
Firm size control	44	−4.891	0.423	0.296	−3.476	0.523	0.231
Firm illiquidity control	44	−3.893	0.327	0.125	−4.310	0.325	0.129
Size portfolio	44	−16.905	0.000	0.000	−15.078	0.001	0.000
Illiquidity portfolio	44	−8.130	0.009	0.008	−7.867	0.015	0.006
Panel B: 12 month post-listing window							
IGBM	44	−2.050	0.515	0.339	−1.232	0.718	0.329
SMALL	44	−16.117	0.000	0.000	−14.343	0.000	0.000
EPRA NAREIT	44	−10.882	0.000	0.000	−10.403	0.001	0.000
Firm size control	44	−4.893	0.526	0.344	−2.981	0.698	0.349
Firm illiquidity control	44	−0.651	0.890	0.402	−1.158	0.821	0.375
Size portfolio	44	−18.867	0.000	0.000	−17.279	0.001	0.000
Illiquidity portfolio	44	−9.838	0.011	0.011	−8.538	0.031	0.003
Panel C: 24 month post-listing window							
IGBM	44	5.535	0.144	0.031	4.568	0.263	0.048
SMALL	44	−23.451	0.000	0.000	−19.913	0.000	0.000
EPRA NAREIT	44	−19.340	0.000	0.000	−18.008	0.000	0.000
Firm size control	44	−2.667	0.813	0.469	2.470	0.814	0.402
Firm illiquidity control	44	−1.326	0.860	0.461	−0.648	0.929	0.457
Size portfolio	44	−33.835	0.000	0.000	−30.321	0.000	0.000
Illiquidity portfolio	44	−10.377	0.066	0.035	−8.712	0.088	0.024

N: sample size.

BHAR: equally weighted average cross-sectional buy-and-hold abnormal return. Controls or references are defined in section 6.1.1.

CAR: equally weighted average cross-sectional cumulative abnormal return. Controls or references are defined in section 6.1.1.

t: *t* statistic corrected by heteroscedasticity using White's (1980) methodology.

Z: statistic proposed by Cowan and Sergeant (2001). See expression (5) and (7). The returns for the sample and controls have been winsorised at the three standard deviations.

7. Results

7.1. Aftermarket abnormal returns

Table 4 shows the abnormal returns for our REIT sample during the 6-month, 12-month and 24-month windows following the listing, respectively, employing both the buy-and-hold and cumulative return methodology. Results obtained with both methodologies are similar. In general, we find significant abnormal underperformance during the 6 and 12 months after the listing that extends until 24 months when we match REITs with either market indexes or portfolios based on some characteristic (i.e., size, illiquidity or industry). In these cases, we find significant abnormal returns that range from −8% to −17% during the 6 months after the listing (Panel A from Table 4) and between −8.5% and −19% for the 12 months following the event (Panel B from Table 4). When we extend the window under study to 24 months, we find significant abnormal returns that range from −9% to −34% (Panel C from Table 4).

When a board market index (IGBM) and firm size and firm illiquidity controls are used, BHARs and CARs during the 6, 12 and 24 months after listing are not significantly different from zero.[16] Although Lyon et al. (1999) suggested that a control firm matched for characteristics produces well-specified statistical tests, some authors disapprove of its use (Brav et al., 2000; Brav & Gompers, 1997; Eckbo et al., 2000; Jegadeesh, 2000). Stehle et al. (2000) found that for studies with a small number of observations (like the present study) it is more appropriate to use a control portfolio than a control firm. Regarding the use of a broad market index (the IGBM), our results may be the consequence of the great difference in terms of liquidity between the components of this market index and the companies in the sample analysed, which causes asynchronies in the trading.

In order to see the time profile of the abnormal returns, Table 5 shows the CAR from the first calendar month after the listing up to month 24. Results from Table 5 are similar to those found in Table 4. In brief, our results suggest a statistically significant underperformance during the 24 months after going public, except when we adjust REIT returns for firm size and firm illiquidity controls, finding that CARs are not significant in most months. When REIT returns are adjusted for the IGBM control, we find some non-significant months.

Figure 4 shows the CAR for the SMALL, EPRA NAREIT and size and illiquidity portfolio references from Table 5. Interestingly, the REITs' performance undergoes a worsening during the first ten months after their listing. This leads them to accumulate an underperformance that goes from −10.66% to −18.96% depending on the control, to then improve slightly in the 11th and 12th and then worsen again (except for the illiquidity portfolio reference) until the end of the study horizon of 24 months.[17]

The significant post-listing stock price underperformance reveals, together with the evidence of positive and significant adjusted initial returns found by Castaño et al. (2020), that Spanish REITs were overpriced when they went public.

7.2. Underperformance and firm, flotation and market characteristics analysis

In the univariate analysis, the relationship among various firm, flotation and market characteristics described in section 4 and Table A1 with 6-, 12- and 24-month buy-and-

Table 5. Cumulative average abnormal return (*CAR*) calculated for an equally weighted portfolio up to 24-month post-REIT admission window.

MONTH	N	IGBM (%)	p-value	SMALL (%)	p-value	EPRA NAREIT (%)	p-value	Firm size control (%)	p-value	Firm illiquidity control (%)	p-value	Size portfolio (%)	p-value	Illiquidity portfolio (%)	p-value
1	44	−1.657	0.032	−2.769	0.001	−1.912	0.013	0.004	0.998	−2.768	0.046	−4.382	0.001	−2.805	0.002
2	44	−2.260	0.024	−4.887	0.000	−3.348	0.000	−1.293	0.386	−1.382	0.293	−6.428	0.000	−3.723	0.000
3	44	−1.916	0.082	−5.761	0.000	−3.778	0.001	−0.705	0.717	1.581	0.314	−8.774	0.000	−4.128	0.003
4	44	−3.263	0.130	−8.194	0.000	−6.603	0.011	−1.654	0.509	0.453	0.848	−10.194	0.000	−6.756	0.002
5	44	−3.067	0.006	−10.250	0.000	−8.087	0.000	−1.807	0.474	−2.905	0.091	−11.191	0.000	−7.166	0.000
6	**44**	**−3.287**	**0.000**	**−12.116**	**0.000**	**−9.646**	**0.000**	**−3.476**	**0.079**	**−4.310**	**0.004**	**−15.078**	**0.000**	**−7.867**	**0.000**
7	44	−4.325	0.000	−13.556	0.000	−10.573	0.000	−5.801	0.012	−5.564	0.004	−17.139	0.000	−9.370	0.000
8	44	−4.724	0.000	−15.404	0.000	−10.965	0.000	−5.312	0.002	−6.867	0.000	−18.761	0.000	−10.773	0.000
9	44	−4.903	0.000	−15.770	0.000	−11.392	0.000	−7.758	0.029	−5.046	0.000	−18.005	0.000	−10.376	0.000
10	44	−5.036	0.000	−16.610	0.000	−12.539	0.000	−3.750	0.065	−5.134	0.000	−18.958	0.000	−10.657	0.000
11	44	−3.516	0.000	−16.079	0.000	−11.875	0.000	−3.019	0.162	−5.022	0.001	−19.306	0.000	−10.066	0.000
12	**44**	**−1.232**	**0.483**	**−14.343**	**0.000**	**−10.403**	**0.000**	**−2.981**	**0.435**	**−1.158**	**0.556**	**−17.279**	**0.000**	**−8.538**	**0.000**
13	44	−1.863	0.005	−16.445	0.000	−12.521	0.000	−8.133	0.022	−1.037	0.311	−23.714	0.000	−10.779	0.000
14	44	−2.222	0.000	−17.375	0.000	−13.118	0.000	−7.689	0.000	−3.094	0.002	−25.623	0.000	−11.771	0.000
15	44	−2.131	0.028	−18.079	0.000	−13.519	0.000	−5.886	0.001	−2.353	0.138	−24.683	0.000	−12.760	0.000
16	44	−2.780	0.000	−20.472	0.000	−15.093	0.000	−7.509	0.000	−4.631	0.001	−28.745	0.000	−14.645	0.000
17	44	−0.997	0.092	−20.674	0.000	−15.339	0.000	−4.262	0.017	−5.170	0.001	−28.312	0.000	−14.140	0.000
18	44	−1.537	0.043	−21.487	0.000	−16.557	0.000	−4.377	0.079	−4.870	0.001	−30.237	0.000	−14.148	0.000
19	44	−0.764	0.194	−21.555	0.000	−16.406	0.000	−0.186	0.924	−6.739	0.000	−31.275	0.000	−13.637	0.000
20	44	0.672	0.237	−21.855	0.000	−17.528	0.000	−1.530	0.496	−4.627	0.019	−31.931	0.000	−12.644	0.000
21	44	0.469	0.438	−21.857	0.000	−18.457	0.000	−4.773	0.035	−5.224	0.005	−30.608	0.000	−11.974	0.000
22	44	2.073	0.006	−21.333	0.000	−18.713	0.000	−0.271	0.858	−4.115	0.016	−29.657	0.000	−10.996	0.000
23	44	3.742	0.004	−20.874	0.000	−18.400	0.000	−0.302	0.897	−2.591	0.067	−30.904	0.000	−9.973	0.000
24	**44**	**4.568**	**0.000**	**−19.913**	**0.000**	**−18.008**	**0.000**	**2.470**	**0.163**	**−0.648**	**0.673**	**−30.321**	**0.000**	**−8.712**	**0.000**

N: sample size.

CAR: cumulative average abnormal return over a corresponding month after the REIT admission. Controls or references are defined in section 6.1.1.

For the determination of the statistical significance of the *CARs* the test proposed by Espenlaub et al. (2000) of the Crude Dependence Adjustment test by Brown and Warner (1980) was used, as shown in expression (10).

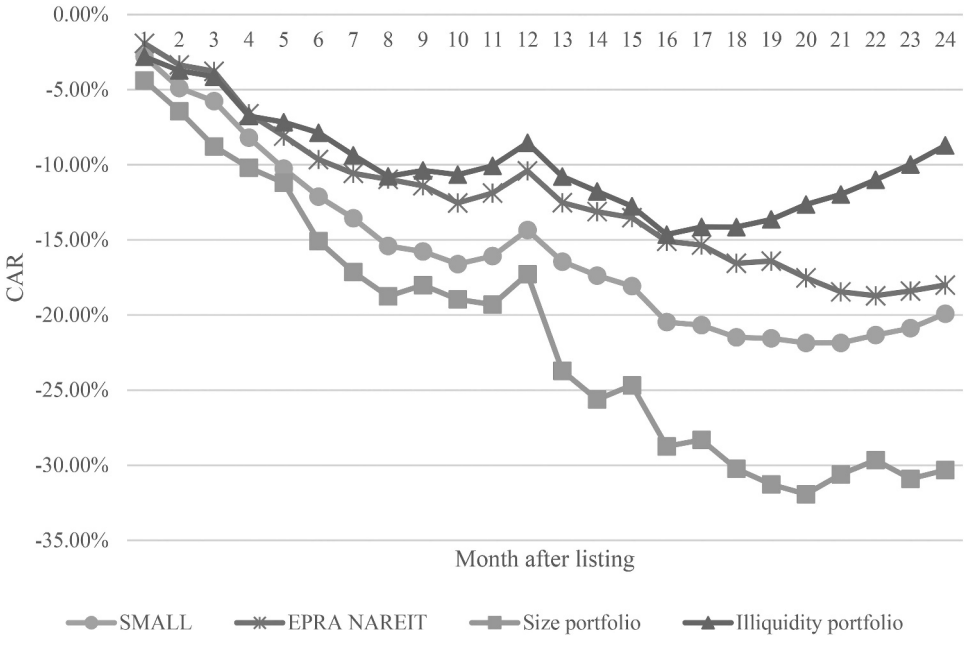

Figure 4. After REIT listing cumulative average abnormal returns (*CAR*) for an equally weighted portfolio.

hold abnormal returns (BHAR) is examined in Table 6. The results are similar when the cumulative abnormal return (CAR) methodology is used.[18]

The data reveal that the smallest (Panel B), youngest (Panel C) and the companies with the highest shares retained by executives (Panel E), positive adjusted initial-day return (Panel F), external management (Panel I) and that went public in a hot market (Panel G) underperform more severely than their counterparts. However, the differences with their counterparts in mean and median are not statistically significant for most controls, so the results obtained are not conclusive.

Nevertheless, the two variables that capture the characteristics of the flotation on this market, namely Previous Private Placement (PPP) and reference price (Panels J and K, respectively), are the only ones that have statistically significant differences in mean and median values between subgroups for most controls. Thus, for all periods, we observe in Panel K of Table 6 that the REITs in which the members of the board of directors set a reference price for the start of trading above the price determined by the appraiser experience a worse aftermarket performance than REITs in which this reference price is equal to or less than the price determined by the appraiser, confirming hypothesis *H10*. Furthermore, panel J of Table 6 exhibits the results found with respect to the aftermarket performance obtained by dividing the sample into the REITs that have carried out previous private placement and those that have not. In line with hypothesis *H9*, the performance of the subsample with PPP is better than that of the sample without previous placement in all the periods except for 6 months, where the difference is only statistically significant for an illiquidity portfolio control. While the effect of this variable on the aftermarket performance of listing REITs has not been explored by earlier studies,

Table 6. Univariate analysis of buy-and-hold abnormal return (*BHAR*) by explanatory firm, flotation and market characteristics.

Time Characteristics /Control	Sample size	BHAR (%) 6 MONTHS SMALL	6 MONTHS EPRA NAREIT	6 MONTHS SIZE PORTF.	6 MONTHS ILLIQ. PORTF.	12 MONTHS SMALL	12 MONTHS EPRA NAREIT	12 MONTHS SIZE PORTF.	12 MONTHS ILLIQ. PORTF.	24 MONTHS SMALL	24 MONTHS EPRA NAREIT	24 MONTHS SIZE PORTF.	24 MONTHS ILLIQ. PORTF.
Panel A. Total sample	44	*** −12.29 [a] (−12.36) [a]	*** −9.10 [a] (−6.76) [a]	*** −16.90 [a] (−12.95) [a]	*** −8.13 [a] (−3.87) [b]	*** −16.12 [a] (−16.20) [a]	*** −10.88 [a] (−6.00) [a]	*** −18.87 [a] (−14.93) [a]	*** −9.84 [b] (−5.39) [b]	*** −23.45 [a] (−17.72) [a]	*** −19.34 [a] (−18.71) [a]	*** −33.83 [a] (−22.08) [a]	* −10.38 [c] (−5.99)
Panel B. Size													
Large ≥ €52 m	22	** −9.63 [b] -(8.81) [b]	** −9.00 [b] (−4.80) [b]	* −11.89 c (−2.74)	* −8.24 (0.18)	*** −14.73 [a] (−12.65) [a]	*** −10.49 [a] (−4.03) [b]	** −14.65 [b] (−6.26) c	** −11.45 c (−4.26) c	*** −20.84 [a] (−17.72) [b]	*** −16.46 [a] (−20.05) [a]	** −22.90 [b] (−14.67) [a]	* −16.51 [c] (−6.58)
Small < €52 m	22	*** −14.96 [a] (−13.08) [a]	*** −9.20 [a] (−7.39) [a]	*** −21.92 [a] (−15.61) [a]	** −8.02 [b] (−6.31) b	*** −17.50 [a] (−24.9) [a]	***-11.28 [b] (−11.67) [a]	*** −23.09 [a] (−18.04) [a]	* −8.23 (−5.60)	*** −26.06 [a] (−20.12) [a]	*** −22.22 [a] (−17.50) [a]	*** −44.77 [a] (−27.66) [a]	−4.25 (−2.57)
Mean test of differences		*−5.33*	*−0.20*	*−10.03*	*0.22*	*−2.77*	*−0.79*	*−8.44*	*3.22*	*−5.22*	*−5.76*	* *−21.87* [c]	*12.26*
Median test of differences		*−4.27* [c]	*−2.59*	*−12.87*	*−6.49*	*−12.25*	*−7.64*	*−11.78*	*−1.34*	*−2.40*	*2.55*	*−12.99* [c]	*4.01*
Panel C. Age													
Old ≥ 2.3 years	22	*** −6.97 [b] (−10.35) [b]	** −5.58 [b] (−6.62) [b]	* −14.72 [c] (−9.24)	** −9.04 [b] (−7.45) [b]	*** −13.60 [a] (−14.18) [a]	*** −9.20 [a] (−9.87) [b]	** −16.12 [b] (−9.15) [b]	*** −15.50 [a] (−15.50) [b]	*** −19.46 [b] (−16.72) [b]	*** −15.21 [a] (−17.46) [a]	*** −27.98 [b] (−16.65) [a]	** −18.55 [c] (−15.18)
Young < 2.3 years	22	*** −17.61 [a] (−13.08) [a]	*** −12.62 [a] (−6.76) [a]	*** −19.09 [a] (−18.29) [b]	* −7.22 (−1.64)	*** −18.63 [a] (−19.37) [b]	*** −12.57 [a] (−4.85) [b]	***- 21.61 [a] (−21.91) [b]	−4.17 (−4.39)	*** −27.44 [a] (−23.32) [b]	*** −23.47 [a] (−19.80) [a]	*** −39.69 [a] (−27.88) [a]	−2.21 (0.61)
Mean test of differences		*** *−10.64* [b]	* *−7.04* [c]	*−4.37*	*1.82*	*−5.03*	*−3.37*	*−5.49*	* *11.33* [c]	*−7.98*	*−8.26*	*−11.71*	* *16.34* [c]
Median test of differences		*−2.73* [c]	*−0.14*	*−9.05*	*5.81*	*−5.19*	*5.02*	*−12.76*	*11.11*	*−6.60*	*−2.34*	*−11.23*	*15.79*
Panel D. Debt													
High ≥ 0.34	22	*** −11.27 [b] (−12.69) [a]	** −8.61 [b] (−6.60) [b]	** −17.76 [b] (−8.63) [b]	** −10.30 [b] (−4.27)	*** −17.18 [a] (−19.37) [a]	***-11.61 [a] (−9.41) [a]	*** −22.06 [a] (−20.34) [a]	*** −13.66 [b] (−10.20) [b]	*** −23.84 [a] (−20.46) [a]	*** −16.61 [a] (−19.55) [a]	*** −35.99 [a] (−27.30) [a]	* −14.63 [c] (−9.31)
Low < 0.34	22	*** −13.31 [a] (−11.23) [a]	*** −9.60 [b] (−6.96) [a]	*** −16.05 [a] (−13.16) [a]	* −5.96 [c] (−3.19)	*** −15.05 [a] (−13.2) [a]	** −10.15 [b] (−4.90) [b]	** −15.67 [b] (−9.15) [b]	−6.02 (−3.26)	*** −23.06 [a] (−15.99) [a]	*** −22.07 [a] (−17.90) [a]	*** −31.68 [a] (−18.58) [a]	−6.13 (3.48)
Mean test of differences		*−2.04*	*−0.99*	*1.72*	*4.34*	*2.13*	*1.46*	*6.39*	*7.64*	*0.78*	*−5.45*	*4.31*	*8.50*
Median test of differences		*1.46*	*−0.36*	*−4.53*	*1.08*	*6.17*	*4.51*	*11.19*	*6.94*	*4.47*	*1.65*	*8.72*	*12.79*
Panel E. Share retained by executives													
High ≥ 45%	22	*** −16.83 [a] (−13.71) [a]	*** −13.95 [a] (−7.87) [a]	*** −16.08 [a] (−13.70) [a]	** −10.70 [b] (−4.98) [c]	*** −19.88 [a] (−17.46) [a]	*** −16.50 [a] (−12.07) [a]	*** −15.98 [b] (−11.04) [a]	** −13.41 [b] (−10.40) [b]	*** −25.45 [a] (−19.66) [a]	*** −25.78 [a] (−18.96) [a]	*** −29.23 [b] (−23.34) [a]	−3.90 (0.67)
Low < 45%	22	*** −7.76 [a] (−11.65) [a]	**-4.25 [b] (−4.75) [b]	** −17.73 [b] (−8.39) [b]	−5.56 (−3.19)	*** −12.35 [a] (−14.67) [a]	** −5.26 [c] (−2.45)	*** −21.76 [a] (−27.40) [a]	−6.27 (0.26)	*** −21.45 [a] (−17.72) [a]	*** −12.90 [a] (−18.39) [a]	*** −38.44 [a] (−18.22) [a]	* −16.85 [c] (−10.02)
Mean test of differences		** *9.07* [b]	*** *9.70* [b]	*−1.65*	*5.14*	* *7.53*	*** *11.24* [b]	*−5.78*	*7.14*	*4.00*	** *12.88* [b]	*−9.21*	*−12.95*
Median test of differences		*2.06*	*3.12*	*5.31*	*1.79*	*2.79*	*9.62 c*	*−16.36*	*10.66*	*1.94*	*0.57*	*5.12*	*−10.69*

(*Continued*)

Table 6. (Continued).

Time Characteristics /Control	Sample size	BHAR (%) 6 MONTHS SMALL	6 MONTHS EPRA NAREIT	6 MONTHS SIZE PORTF.	6 MONTHS ILLIQ. PORTF.	12 MONTHS SMALL	12 MONTHS EPRA NAREIT	12 MONTHS SIZE PORTF.	12 MONTHS ILLIQ. PORTF.	24 MONTHS SMALL	24 MONTHS EPRA NAREIT	24 MONTHS SIZE PORTF.	24 MONTHS ILLIQ. PORTF.
Panel F. Adjusted initial-day return													
Positive ≥ 0 (winner)	30	*** −13.42 [a] (−12.36) [a]	*** −9.39 [a] (−6.33) [a]	*** −17.00 [a] (−8.95) [b]	** −7.80 [b] (−5.33) c	*** −15.98 [a] (−14.18) [a]	*** −11.29 [a] (−3.75) [a]	*** −20.19 [a] (−20.34) [a]	** −9.33 [b] (−4.47) [c]	*** −24.87 [a] (−17.72) [a]	*** −19.78 [a] (−19.20) [a]	*** −38.06 [a] (−22.08) [a]	−11.04 (0.61) [c]
Negative <0 (loser)	14	*** −9.88 [a] (−11.29) [a]	*** −7.97 [b] (−7.62) [a]	*** −16.70 [b] (−12.95) [b]	* −8.83 (−2.85)	*** −16.41 [a] (−25.65) [a]	* −9.31 c (−13.68) [b]	*** −16.03 [b] (−10.47) [b]	−10.92 (−5.39)	*** −20.42 [a] (−18.99) [a]	*** −17.62 [a] (−18.22) [a]	*** −24.78 [a] (−22.03) [a]	−8.95 (−9.31)
Mean test of differences		*3.54*	*1.42*	*0.31*	*−1.03*	*−0.43*	*1.98*	*4.16*	*−1.59*	*4.45*	*2.16*	*13.28*	*2.09*
Median test of differences		*1.07*	*−2.29*	*−4.00*	*2.48*	*−11.47*	*−9.93*	*9.87*	*−0.92*	*−1.27*	*0.98*	*0.05*	*−9.92*
Panel G. Market													
Hot	33	*** −14.51 [a] (−12.99) [a]	*** −8.25 [a] (−7.18) [a]	*** −21.90 [a] (−17.78) [a]	*** −9.47 [a] (−6.45) [a]	*** −18.97 [a] (−25.22) [a]	*** −9.99 [a] (−10.45) [a]	*** −19.23 [a] (−18.97) [a]	** −8.90 [b] (−6.18)	*** −23.38 [a] (−16.47) [b]	*** −15.19 [a] (−17.43) [a]	*** −28.88 [a] (−21.06) [b]	−1.69 (3.21)
Cold	11	−5.65 (−4.95)	* −11.65 [c] (−2.72)	−1.92 (−1.22)	−4.10 (2.23)	−7.55 (−7.72)	* −13.56 [c] (−0.62)	−17.76 (−3.39)	−12.64 (−4.18)	** −23.67 [c] (−18.47) [b]	*** −31.78 [a] (−21.34) [a]	*** −48.71 [a] (−23.10) [b]	*** −36.43 [b] (−22.96) [b]
Mean test of differences		*8.86*	*−3.40*	*** 19.98 [b]*	*5.37*	** 11.42 [c]*	*−3.57*	*1.47*	*−3.74*	*−0.29*	*** −16.59 [c]*	*−19.83*	*** −34.74 [b]*
Median test of differences		*8.04 [b]*	*4.46*	*16.56 [b]*	*8.68*	*17.50 [b]*	*9.83*	*15.58*	*2.00*	*−2.00*	*−3.91*	*−2.04*	*−26.17 [b]*
Panel H. Property type													
Diversified	13	** −13.81 [c] (−12.99) [c]	** −13.43 [c] (−7.59) [a]	** −16.08 [b] (−22.55) [b]	−8.48 (−2.17)	−11.16 (−7.72)	** −11.55 [c] (−5.94) [c]	** −14.33 [b] (−24.84) [b]	−7.83 (−7.52)	** −19.85 [c] (−5.95)	*** −25.68 [a] (−25.75) [a]	*** −29.91 [a] (−23.10) [a]	−3.55 (−10.84)
Specialised	31	*** −11.66 [a] (−11.20) [a]	*** −7.29 [a] (−6.33) [a]	*** −17.26 [a] (−12.88) [a]	** −7.98 [b] (−4.21) [b]	*** −18.19 [a] (−20.63) [a]	*** −10.60 [a] (−10.45) [a]	*** −20.77 [a] (−12.75) [a]	** −10.68 [b] (−4.61) [c]	*** −24.96 [a] (−22.44) [a]	*** −16.68 [a] (−17.57) [a]	*** −35.48 [a] (−21.06) [a]	** −13.24 [a] (−3.74)
Mean test of differences		*2.15*	*6.14*	*−1.18*	*0.50*	*−7.03*	*0.95*	*−6.44*	*−2.85*	*−5.11*	*9.00*	*−5.57*	*−9.69*
Median test of differences		*1.79*	*1.26*	*9.67*	*−2.04*	*−12.91*	*−4.51*	*12.09*	*2.91*	*−16.49*	*8.18*	*2.04*	*7.10*
Panel I. Management													
Internal	10	−6.29 (−5.53) [c]	−5.61 (−0.27)	−1.44 (−3.12)	−6.75 (−7.45)	** −11.44 [b] (−10.90) [b]	*** −10.85 [b] (−3.97) [b]	** −13.06 [c] (−13.97) [c]	** −15.21 [c] (−21.04) [c]	−11.95 (−15.99)	** −19.48 [c] (−14.89) [c]	−22.04 (−15.81)	−6.79 (−4.79)
External	34	*** −14.06 [a] (−12.84) [a]	*** −10.13 [a] (−7.40) [a]	*** −21.45 [a] (−20.17) [a]	** −8.54 [b] (−2.85) [c]	*** −17.49 [a] (−21.34) [a]	*** −10.89 [a] (−8.20) [a]	*** −20.58 [a] (−14.93) [a]	*-8.26 [c] (−4.39)	*** −26.83 [a] (−20.46) [a]	*** −19.30 [a] (−18.96) [a]	*** −37.30 [a] (−24.83) [a]	* −11.43 [c] (−5.99)
Mean test of differences		** −7.77*	*−4.52*	*** −20.01 [c]*	*−1.79*	*−6.05*	*−0.04*	*−7.52*	*6.95*	** −14.88*	*0.18*	*−15.26*	*−4.64*
Median test of differences		*−7.31*	*−7.13*	*−17.05*	*4.60*	*−10.44*	*−4.23*	*−0.96*	*16.65*	*−4.47*	*−4.07*	*−9.02*	*−1.20*
Panel J. Previous private placement													
Yes	11	*** −10.84 [a] (−12.04) [b]	*** −5.79 [b] (−5.22) [b]	*** −25.50 b (−24.93) b	−0.19 (2.61)	−5.67 (−3.60)	* −1.82 (−0.22)	−14.05 (−9.34)	6.54 (11.14)	−5.69 (−1.89)	** −8.19 [b] (−11.59) [b]	** −23.82 c (−13.95) c	8.46 (13.98) [c]
No	33	*** −12.78 [a] (−12.69) [a]	*** −10.21 [a] (−7.21) [a]	*** −14.04 [a] (−12.31) [a]	*** −10.78 [a] (−6.45) [b]	*** −19.60 [a] (−24.98) [a]	*** −13.90 [a] (−13.68) [a]	*** −20.47 [a] (−17.11) [a]	*** −15.30 [a] (−11.18) b	*** −29.37 [a] (−23.77) [a]	*** −23.06 [a] (−21.34) [a]	*** −37.17 [a] (−27.23) [a]	** −16.66 [b] (−11.71) [b]

(*Continued*)

Table 6. (Continued).

Time Characteristics /Control	Sample size	BHAR (%)											
		6 MONTHS				12 MONTHS				24 MONTHS			
		SMALL	EPRA NAREIT	SIZE PORTF.	ILLIQ. PORTF.	SMALL	EPRA NAREIT	SIZE PORTF.	ILLIQ. PORTF.	SMALL	EPRA NAREIT	SIZE PORTF.	ILLIQ. PORTF.
Mean test of differences		*−1.94*	** −4.42*	*11.46*	*** −10.59* [b]	*** −13.93* [b]	**** −12.08* [b]	**** −6.42* [a]	**** −21.84* [a]	*** −23.68* [b]	**** −14.87* [a]	** −13.35*	*** −25.12* [b]
Median test of differences		*−0.65*	*−1.99*	*12.62*	*−9.06 c*	*−21.38* [c]	*−13.46* [b]	*−7.77*	*−22.32* [a]	*−21.88* [b]	*−9.75* [b]	*−13.28*	*−25.69* [b]
Panel K. Reference price													
Higher than that determined by the appraiser	18	*** −19.15 [a]	** −12.24 [b]	*** −24.17 [a]	*** −15.23 [a]	*** −25.17 [a]	*** −16.38 [a]	*** −33.13 [a]	*** −19.17 [a]	*** −42.25 [a]	*** −30.01 [a]	*** −58.43 [a]	*** −24.00 [b]
		(−13.95) [a]	(−7.20) [b]	(−18.46) [a]	(−7.23) [a]	(−25.10) [a]	(−14.94) [a]	(−25.08) [a]	(−21.04) [a]	(−49.82) [a]	(−25.88) [a]	(−44.29) [a]	(−14.75) [b]
Equal to or below that determined by the appraiser	21	*** −8.44 [a]	*** −7.53 [a]	** −12.12 [b]	−3.83	*** −12.20 [a]	*** −8.84 [a]	** −10.92 [b]	−7.19	* −11.02	*** −13.12 [b]	** −16.47 [b]	−4.87
		(−9.59) [a]	(−7.62) [a]	(−12.88) [b]	(−0.26)	(−14.06) b	(−5.94) [a]	(−8.19) c	(2.86)	(−14.31)	(−17.43) [b]	(−17.92) [b]	(−8.24)
Mean test of differences		**** 10.71* [b]	*4.71*	** 12.05* [c]	*** 11.40* [b]	*** 12.97* [b]	** 7.54* [c]	**** 22.21* [a]	*** 11.98* [c]	**** 31.23* [a]	**** 16.89* [b]	**** 41.96* [a]	*** 19.13* [c]
Median test of differences		*4.36*	*−0.42*	*5.58*	*6.97* [b]	*11.04* [c]	*9.00*	*16.89* [b]	*23.90* [c]	*35.51* [a]	*8.45* [b]	*26.37* [a]	*6.51*

Figures in % except sample size.

BHAR: equally weighted average cross-sectional buy-and-hold abnormal return. Controls or references (SMALL, EPRA NAREIT and size and illiquidity portfolio) are defined in section 6.1.1. Median values are reported between parentheses.

Differences between mean values are tested by the *t* test. Differences in medians are tested by the Kruskal-Wallis test.

[a, b, c]significant at the 1%, 5% and 10% levels, respectively.

***, **, * significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.

Table 7. Multivariate analysis of buy-and-hold abnormal return (BHAR) for a post-REIT admission window of 24 months by explanatory firm, flotation and market characteristics.

	M1			M2			M3			M4			M5		
	SMALL	EPRA	SIZE PORT.	SMALL	EPRA	SIZE PORT.	SMALL	EPRA	SIZE PORT.	SMALL	EPRA	SIZE PORT.	SMALL	EPRA	SIZE PORT.
Intercept	**- 0.391 [b]	**-0.371 [a]	***-0.858 [a]	**-0.263 [b]	**-0.198 [b]	**-0.355 [b]	**-0.320 [b]	***-0.407 [a]	**-0.523 [c]	−0.333	***-0.547 [a]	***-0.923 [a]	−0.294	***-0.455 [a]	***-0.965 [a]
LNSIZE	0.013	0.049	***0.129 [a]							0.004 [c]	0.044 [c]	**0.127 [a]	0.029	**0.057 [a]	***0.135 [a]
LNAGE				0.051	0.049	0.084	*0.075 [c]	0.046	0.093	0.074 [c]	0.028	0.043			
LNDEBT	**0.450 [b]	0.271	0.211				*0.464 [c]	*0.359 [c]	0.266	*0.459	0.296	0.089			
EXECUTIVES	−0.001	**-0.001 [b]	0.002										0.001	**0.002 [b]	0.001
AR SMALL/EPRA				1.254 [c]	−0.117	1.096 [b]									
MARKET							−0.117	0.114	0.179	−0.116	0.126	0.216	−0.015	**0.215 [b]	0.233
PROPERTY				−0.026	−0.127	−0.038									
MANAGEMENT	**0.254 [b]	0.068	0.086										*0.220 [c]	0.094	0.112
PPP	**0.314 [b]	** 0.176 [b]	0.111	**0.254 [b]	*0.136 [c]	0.084	**0.285 [b]	0.106	0.007	**0.286 [b]	0.117 [c]	0.037	**0.303 [b]	**0.119 [b]	0.052
REFERENCE PRICE	***-0.329 [a]	***-0.196 [b]	***-0.468 [a]	***-0.266 [b]	*-0.130 [b]	**-0.361 [b]	**-0.301 [b]	**-0.173 [b]	**-0.390 [b]	*** −0.308 [a]	**-0.187 [a]	*** −0.429 [b]	***-0.282 [a]	*-0.016 [b]	***-0.437 [a]
N	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
R^2	43.85%	37.73%	35.70%	35.00%	25.14%	28.49%	40.55%	33.71%	28.18%	40.57%	38.18%	37.37%	36.88%	45.89%	38.82%
Adjusted R2	33.32%	26.05%	23.63%	25.14%	13.80%	17.66%	31.54%	23.67%	17.29%	29.43%	26.60%	25.63%	25.05%	35.74%	27.35%
F-test statistic	4.87 [a]	2.91 [b]	3.77 [a]	5.97 [a]	2.67 [b]	4.29 [a]	5.82 [a]	2.60 [c]	3.33 [b]	4.90 [a]	2.80 [b]	4.68 [a]	3.80 [a]	4.53 [a]	5.12 [a]
VIF	1.09–1.20	1.09–1.20	1.09–1.20	1.03–1.11	1.03–1.11	1.03–1.11	1.11–1.16	1.11–1.16	1.11–1.16	1.11–1.27	1.11–1.27	1.11–1.27	1.04–1.22	1.04–1.22	1.04–1.22

Multiple linear regression models estimated by cross-sectional Ordinary Least Squares (OLS). Dependent variable is the buy-and-hold abnormal return for a post-REIT admission window of 24 months. Controls or references (SMALL, EPRA and size portfolio) are defined in section 6.1.1. Heteroscedasticity has been corrected using White's methodology.
The variables are described in Table A1.
N: sample size
VIF: Variance Inflation Factor. Minimum-maximum values are reported.
[a,b,c] significant at the 1%, 5% and 10% levels, respectively.
***, **, * significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.

the evidence is in line with results documented by Cai et al. (2011) for non-REIT companies.

Table 7 shows the multivariate analysis, in which several regression models (see equation (11)) are estimated, $BHAR_{i24}$ being the dependent variable.[19] Neither the correlation matrix in Table A2 nor the Variance Inflation Factors (VIF_i) suggest that multicollinearity is a concern. The *F*-statistic suggests a significant linear relationship between the dependent variables and the explanatory variables taken together, except when the illiquidity portfolio is employed as a control.[20]

The results are similar to those obtained in the univariate analyses. Thus, the REFERENCE PRICE variable is significant in all the regression models whose level of adjustment is significant (SMALL, EPRA and size portfolio). The negative sign of the coefficient indicates that the aftermarket performance is worse when the reference price is higher than the price determined by the appraiser (*H10*). In relation to the PPP variable, the result is not as clear as in Table 6. It is only significant when the control used is a market index (SMALL, EPRA in models 1, 2, 4 and 5 and SMALL in model 3). Its positive sign indicates that REITs that carry out a previous private placement of shares will show better aftermarket performance than REITs that do not. As for the other variables, we find weak evidence of the relationship between aftermarket performance and the variables because they are not significant in almost any case.

In brief, our results suggest that firm and market characteristics are not relevant, so we are unable to conclude that size (*H1*), age (*H2*), level of leverage (*H3*), percentage of shares retained by shareholders in executive positions (*H4*), adjusted initial day return, stock market sentiment (*H6*), property strategy (*H7*) and the type of management (*H8*) explain the underperformance. They also imply that flotation characteristics, that is, the chosen market entry mechanism and the determination of the reference price are the ones that explain the aftermarket underperformance of Spanish REITs. Consequently, they support the hypothesis that REITs that carry out a previous private placement of shares will show better aftermarket performance than REITs that do not (*H9*) and that the aftermarket performance is worse when the reference price is higher than the price determined by the appraiser (*H10*).

8. Conclusions

This study analyses the aftermarket performance of Spanish REITs during a period of 6, 12 and 24 months after their listing from November 2013 to January 2020. We measure aftermarket abnormal returns by computing buy-and-hold and cumulative abnormal returns, using a wide range of references. Our final sample is made up of 44 REITs that trade on the Spanish Multilateral Trading Facility known as MAB, which has a far more flexible regulation than the *Mercado Continuo* in terms of admission and trading requirements, without foregoing an adequate level of transparency. One of the differentiating characteristics of REITs going public in this market with regard to those previously studied in other markets is that the flotations were not carried out through an Initial Public Offering but through direct listing. However, some REITs have opted for a private placement of shares prior to market entry. A key characteristic of the Spanish REITs market analysed is its reduced liquidity, which prevents institutional investors from entering. As a result, mispricing may persist over time.

In general, we find that REITs experience a significant underperformance that extends up to 24 months after their listing regardless of the methodology we employ to estimate abnormal returns. It is worth noting that the underperformance increases in the first months after the listing to slightly improve around the 11th and 12th months (possibly due to the dissemination carried out in order to comply with the minimum free float requirement previously mentioned in section 7.1) and then increases again and extends until month 24 after the listing. Therefore, we show that investors experience economically and statistically significant negative abnormal returns during the two years after the listing. This post-listing stock price underperformance, together with the evidence of positive and significant initial adjusted returns from Castaño et al. (2020), suggests that Spanish REITs were overpriced when listed.

Finally, our results suggest that the theories commonly used to explain aftermarket underperformance are not relevant in explaining the aftermarket behaviour of Spanish REITs. Instead, our evidence hints at the differentiating characteristics of going public in this market as the key features that explain it. Specifically, (i) all REITs in this market have been incorporated by direct listing; (ii) some REITs carried out a previous private placement and others have not; and (iii) the members of the board of directors of the REIT determine the reference price for the start of trading based on the price established by the appraiser.

These findings provide valuable information for national and international investors and analysts for their analysis of investment opportunities across a relevant and growing industry like that of Spanish real estate and across a booming vehicle such as REITs. The recent creation of the REIT market in Spain is a limitation because of the small sample of REITs available, but it is also an opportunity to analyse a newer and growing market.

Future research may include the implications of this phenomenon in relation to the rational valuation of stocks, market efficiency, investor's behaviour and resources allocation.

Notes

1. MAB is a recently created market that, due to its special characteristics, makes it possible to study some issues that cannot be addressed in other markets. In October 2020 this market was renamed BME MTF Equity and Spanish REITs have been listed since then in the so-called BME Growth segment of BME MTF Equity. Nevertheless, we have kept the original name as it was the one in force during the period under analysis.
2. Castaño et al. (2020) studied the related phenomenon of underpricing for a sample of Spanish REITs. They found that Spanish REITs underprice by around 1.58% when going public.
3. See Bancel and Mittoo (2009), Pagano et al. (1998), and Röell (1996) for considerations on the decision to go public. Sanchis et al. (2020) analysed the determinants affecting the decision to go public of a sample of non-financial firms that were listed on the Spanish Market.
4. Law 16/2012 modified Law 11/2009 (Reino de España, 2009) and introduced flexibility, less restrictive conditions, and tax advantages for this type of companies. This law promoted the incorporation of these investment vehicles in Spain, making the Spanish real estate market more dynamic and providing real estate investments with liquidity.
5. Minimum free floating capital condition: it shall be necessary for shareholders who hold less than 5% of the share capital of the company to hold a number of shares that corresponds to

at least one of the following figures: i) an estimated market value of €2 million; or ii) 25% of the shares issued by the company.

6. Article 35 of Royal Legislative Decree 4/2015, of 23 October, approving the consolidated text of the Spanish Securities Market Act, includes the definition of an initial public offering and secondary offerings.
7. The main task of the Liquidity Provider is to favour the liquidity of transactions and achieve a sufficient liquidity frequency (Bolsas y Mercados Españoles, 2017). Its presence is mandatory for all REITs.
8. See, for example, Gregoriou (2006).
9. See Capozza and Seguin (1999) for the relationship between focus and firm value in REITs.
10. See Acedo-Ramírez and Ruiz-Cabestre (2019) to see how the specific characteristics of the Spanish IPO market influence the level of ex-ante asymmetric information.
11. To carry out the study, the four REITs of the Spanish *Mercado Continuo* (which is a regulated market) have not been included in the sample so that the results are not distorted by differences in the characteristics and regulation of this market and the MAB (see section 2).
12. All the windows begin in the natural month following the admission.
13. Block trading is a system designed to allow members to apply cross opposite-side orders or carry out bilateral trades, provided that they meet the volume requirements established for gaining access to block trading conditions.
14. To identify a matched control firm, we followed Barber and Lyon (1997) and Lyon et al. (1999).
15. The BHR corresponding to the control or references was calculated in an analogous way to expression (3).
16. We obtain significant positive abnormal returns with the IGBM reference when we use the statistic proposed by Cowan and Sergeant (2001) in Panel C from Table 4.
17. The possible reason for this improvement in the 11th and 12th months is that until August 2017 REITs could be incorporated without the minimum free float required by the regulations (see section 2) with the commitment to disseminate the capital within one year as of their admission.
18. The results can be obtained from the authors on request.
19. Evidence remains unaltered when the dependent variable in the regression models is CAR_{i24}. For the sake of brevity, results are not shown but they can be obtained from the authors on request.
20. For the sake of brevity, results are not shown when the control used is the illiquidity portfolio, but they can be obtained from the authors on request.

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No potential conflict of interest was reported by the author(s).

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Appendices

Table A1. Definition of the explanatory variables.

SIZE	Market capitalisation on the listing day (number of shares by reference price), in millions of euros.
AGE	Age of the issuing company from the constitution date to the listing day.
DEBT	Total debt to total assets ratio (both from the latest annual audited accounts or interim financial information subject to a limited review by its auditor, published in the IDAM).
SHARE RETAINED BY EXECUTIVES (EXECUTIVES)	Percentage of shares directly and indirectly retained by shareholders in executive positions according to IDAM information.
ADJUSTED INITIAL RETURN (AR)	Return on the first day of trading adjusted by the IBEX Small Cap or FTSE EPRA/NAREIT Spain (SMALL/EPRA) market index, as a percentage.
MARKET	Dummy variable equal to one if there have been ten or more flotations in the year the REIT was listed (hot market), and zero (cold market) otherwise.
PROPERTY TYPE (PROPERTY)	Dummy variable equal to one if the property strategy followed by the REIT is diversified and zero if the property strategy followed by the REIT is specialised. Following Brounen and Eichholtz (2002), REITs with more than 80% of their total assets in one property type are regarded as specialised.
MANAGEMENT	Dummy variable equal to one if the management of the company is internal and zero if the management is external.
PREVIOUS PRIVATE PLACEMENT (PPP)	Dummy variable equal to one if the REIT has performed a private placement of shares (up to six months) before going public and zero otherwise.
REFERENCE PRICE	Dummy variable equal to one if the reference price determined by the board of directors of the REIT is higher than the price determined by the appraiser and zero otherwise.

Table A2. Correlation matrix computed with the Spearman Rho for the explanatory variables in the regression models.

	LNSIZE	LNAGE	LNDEBT	EXECUTIVES	MARKET	PROPERTY	MANAG.	PPP	PREFERENCE PRICE	AR SMALL	AR EPRA
LNSIZE	1										
LNAGE	0.2061	1									
LNDEBT	0.2237	0.1202	1								
EXECUTIVES	−0.0300	0.2251	−0.0122	1							
MARKET	−0.0930	0.0434	0.0931	0.2008	1						
PROPERTY	−0.0961	−0.0373	−0.1669	0.0377	−0.0863	1					
MANAG.	0.0683	0.4057 [a]	−0.0684	0.2313	−0.1879	0.1243	1				
PPP	−0.0599	−0.2914 [c]	−0.2918 [c]	−0.1381	0.2121	0.0863	−0.3131 [b]	1			
PREFERENCE PRICE	0.1188	−0.2788 [c]	0.2423	0.0277	−0.0453	−0.0088	−0.0725	−0.1097	1		
AR SMALL	0.2942 [c]	0.0576	−0.1314	−0.0033	−0.3327 [b]	0.1706	0.3758 [b]	−0.0103	0.2879 [c]	1	
AR EPRA	0.1870	−0.0182	−0.1717	−0.1114	−0.2707 [c]	0.1706	0.2904 [c]	0.0227	0.2148	0.8930 [a]	1

The sample size is of 44, except in PREFERENCE PRICE which is 39.
The variables are described in Table A1.
[a, b, c]significant at the 1%, 5% and 10% levels, respectively.