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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 (EPRA, 2020). This research investigates the long-run 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 are particularly relevant to determine the level of aftermarket performance.

Keywords: long-run performance, REIT, direct listing, Spanish market, abnormal return.

JEL Codes: G12, G14, G23, G32.

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 model 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).

This paper analyses the aftermarket performance of 44 REITs during the two years following their listing on the Spanish market over the period from November 2013 to January 2020 and investigates the underlying explanatory factors. 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.[1]

Due to statistical and conceptual problems related to the estimation and testing of long-horizon returns, we have used different approaches to estimate long-term 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). In brief, 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 is worth noting that (i) the procedure of matching firms according to size and illiquidity characteristics does not lead to significant abnormal performance; and (ii) 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.

There are several reasons that have led us to analyse the performance of these companies after their going public in Spain. The first is the importance of real estate activity in the Spanish economy as well as its attractiveness to the international investment community. Thus, 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 and 56% higher than in 2017, reaching a new record for the sixth consecutive year. Around 60% of the total was made by foreign direct investment. REITs invested 9% of the total, while the rest consisted of national investment (CBRE, 2020). Data show the growing attractiveness of this sector for international investors. In this regard, it should be mentioned that foreign investors owned 50.2% of the total value of Spanish listed companies at the close of 2019, up by more than 10 percentage points over the last decade and more than 20 percentage points since 1995 (Bolsas y Mercados Españoles, 2020). The second reason 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). Finally, the sample comprises all the admissions

[1] In this context, 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.

carried out on the Spanish Alternative Stock Market (*Mercado Alternativo Bursátil* – MAB), a recently created market that, due to its special characteristics, allows it to address questions that cannot be tackled on other markets.[2] The most important features are how REITs have been incorporated into the market and how the initial price of the quotation is set. Unlike other markets, Spanish REITs go public not through an Initial Public Offering (IPO) but through a 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 on the basis of 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 the market entry (up to 6 months before), in which case the initial listing price is determined by the price of that private placement. Our results suggest that the characteristics of the 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 above the equilibrium price determined by the appraiser underperform more 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 on which 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 long-term 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] This market was renamed BME MTF EQUITY in September 2020.

[3] See Bancel & Mittoo (2009), Pagano et al. (1998) and Röell (1996) for considerations on the decision to go public. Sanchis et al. (2019) analysed the determinants affecting the decision to go public of a sample of non-financial firms that were listed on the Spanish Market.

2. The REITs 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).

INSERT FIGURE 1

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.

INSERT FIGURE 2

INSERT FIGURE 3

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 the *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-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

[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 promoted the incorporation of these investment vehicles in Spain, making the Spanish real estate market more dynamic and providing real estate investments with liquidity.

(Bolsas y Mercados Españoles, 2018).[5] 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 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,[6] 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 for the *Mercado Continuo*.

INSERT TABLE 1

3. Empirical evidence of long-term performance in REITs

The long-term performance of IPO share prices 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.[7] There are also studies that examine the long-term performance of companies

[5] 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.

[6] 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.

[7] Relevant papers are those by Baker & Wurgler (2000), Ibbotson (1975), Jegadeesh (2000), Loughran (1993), Loughran & Ritter (1995), Ritter (1991) and Spiess & Affleck-Graves (1995) in the American market. For other markets, see Lee et al. (1996) for the Australian market, Page & Reyneke (1997) for the South African market, Kang et al. (1999) for the Japanese market, Kim et al. (1995) for Korean market, Chan et al. (2004) for the Chinese market, Aggarwal et al. (1993)

that go public through direct listing or introduction (firms do not issue new equity immediately prior to listing), firms that have private placements of equity before their IPOs, firms that carry out direct public offerings and others that use a two-stage IPO offering process (it is first established in a pre-IPO market) (Alhashel, 2018; Cai et al., 2011; Chen & Chu, 2010; Ma & Tsai, 2001).

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 which 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 & Ong, 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.[8] In Table 2 we provide a summary of the evidence on the long-run 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, the majority 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.

INSERT TABLE 2

Evidence on long-run abnormal 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-listing five-year period for a sample of 90 REITs in the US

for Latin American markets (Brazil, Mexico and Chile), Espenlaub et al. (2000) for the British market, Ljungqvist (1997) and Stehle et al. (2000) for the German market, and Keloharju (1993) for the Finnish market.

[8] See, for example, Brueggeman et al. (1984, 1992); Capozza & Seguin (1999); Chan et al. (1990); Chen et al. (1997); Chen et al. (1998); Chiang et al. (2004); Chui et al. (2003); Firstenberg et al. (1988); Giacomini et al. (2017); Howe & Shilling (1990); Hsieh & Sirman (1991); Ling & Naranjo (1997); Liu et al. (1990); Morri & Jostov (2018); Peterson & Hsieh (1997); Schulte et al. (2011); Serrano & Hoesli (2007); Titman & Warga (1986).

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 long-run 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 & 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 value / book value ratios experience economically and statistically significant underperformance during the year after the issue.[9] As far as we know, there are no studies that have analysed the long-term 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 study from being conducted.

4. Theoretical framework and hypotheses

There is a significant body of academic literature on long-term negative abnormal performance after going public. However, there is also evidence of not underperforming after going public when firms select direct listing (Alhashel, 2018). In the case of REITs, as we have seen in the previous section, there is no consensus on the long-term performance after their IPO, as it depends on various factors. This inconclusive evidence, together with the special characteristics of the market analysed 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.

As we show in section 2, one key characteristic of the Spanish market for REITs is its reduced liquidity, which prevents institutional investors from entering. Following Hensler (1998) and Loughran & Ritter (2000), in a non-zero market friction, even if the market perceives an overvaluation of the company after going public, the existence of obstacles, such as wide bid–ask spreads that imply higher trading costs and/or the

[9] It is not possible to include SEOs in this study because only three operations (excluding non-monetary contributions) were carried out by the REITs in the sample during the study period.

existence of barriers to institutional investors, would explain why mispricing may persist over time. Therefore, we may expect a long-term abnormal performance from the REITs on the Spanish market in the years following their listing.

As the results obtained show the existence of a long-term abnormal performance in 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 key determinants that can impact on these long-term abnormal returns. These variables and hypotheses have been selected within the context of the different existing long-term abnormal 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.

Beginning with existing long-term abnormal performance theories, 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 long-term 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 of the issuing company is, the better the long-term performance will be.*
- ***H2****. The older the company is, the better the expected long-term performance will be.*

We have also taken into account the level of leverage as a measure of *ex ante* uncertainty. Following Ling & Ryngaert (1997), Brounen & 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 long-term 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 long-term performance will be.*

If we take into account the initial-day return, the literature is inconclusive.[10] 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 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 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 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 long-term 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 long-term performance will be.*

We formulate the following hypothesis based on the 'fads' explanation. Ritter (1991) suggested that the low 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 long-term return would be negative. Following Ascherl & 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:

[10] See Acedo-Ramírez & Ruiz-Cabestre (2019) to see how the specific characteristics of the Spanish IPO market influence the level of *ex-ante* asymmetric information.

- ***H6***. *Long-term 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 & Eichholtz (2002) and Eichholtz et al. (2000) found that REITs with a diversified property strategy have a worse long-term return than those that follow a specialised strategy.[11] It is possible that the longer-run 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 long-term 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.*** *Long-term performance is better when the management of the company is internal.*

In the framework of the theoretical model put forward by Chemmanur & Fulghieri (1999), we assume that companies that have made a private placement have less information asymmetry than those that have not done so. Also, investors would interpret a successful previous private placement (PPP) as a valuable signal (of the REIT's 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 long-term 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

[11] See Capozza & Seguin (1999) for the relationship between focus and firm value in REITs.

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 long-term performance is worse when the reference price is higher than the equilibrium 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 (*Mercado Alternativo Bursátil* – MAB) since the creation of their own particular REIT segment on 15 February 2013 up until 31 January 2020.[12] During this period, there have been 88 admissions. We analyse the long-run performance of REIT admissions using three windows: 6-, 12- and 24-month post-admission windows.[13] To assess our long-run performance study, only those admissions that have completed 24 months since the date of listing (the cases in which there are monthly returns over the entire horizon) 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.[14] 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. Long-term returns

We used two event time method approaches generally employed in the literature, as we have seen in section 3, for estimating long-term returns: (i) compounding monthly returns (buy-and-hold abnormal return, BHAR), and (ii) adding monthly returns

[12] 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).
[13] The window begins in the natural month following the admission.
[14] 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.

(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 aftermarket long-term abnormal performance 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).[15] We employed the illiquidity ratio instead of the book-to-market ratio owing to 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].

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

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].

$$ILIQ_t = \frac{1}{N_t} \sum_{j=1}^{N_t} ILIQ_{it}, \qquad [2]$$

where N_t is the number of firms available in the portfolio (or market) in 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 could leave the market during the 6 (12, 24) months following the date of issue since the match was maintained

[15] To identify a matched control firm, we followed Barber & Lyon (1997) and Lyon et al. (1999).

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 & French (1993) to ensure that each REIT was placed in the appropriate portfolio. To avoid the problem of portfolio contamination discussed in Loughran & 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+τ) in accordance with expression [3].

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

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].

$$BHAR_{i\tau} = BHR_{i\tau} - BHR_{\,CONTROL,\tau}\,, \qquad [4]$$

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.[16] 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 returns 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 & Sergeant (2001) methodology in

[16] The BHR corresponding to the control or references was calculated in an analogous way to expression [3].

expression [5]. In computing *Z*, we winsorised the extreme values of the abnormal return to three times their standard deviation.

$$Z = \frac{\overline{BHAR}}{\sqrt{\frac{\hat{\sigma}^2 SAMPLE}{N} * \frac{\hat{\sigma}^2 CONTROL}{N}}}, \quad [5]$$

6.1.3. Computing cumulative average abnormal returns (CAR)

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 [6].

$$CAR_\tau = \sum_{t=s}^{\tau} \overline{AR}_t \,, \quad [6]$$

where the average abnormal cross-sectional return ($\overline{AR}_t$) is computed as shown in expression [7].

$$\overline{AR_t} = \frac{1}{N} \sum_{i=1}^{N} AR_{it} \,, \quad [7]$$

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 used in order to compute BHARs (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 contrast this null hypothesis, we used the conventional *t* statistic:

$$t = \frac{\overline{AR_t}}{\sigma\,(AR_i)/\sqrt{N}} \,, \quad [8]$$

where $\sigma(\overline{AR_t})$ is the cross-sectional standard deviation of abnormal returns in month *t* after the listing of the sample of *N* firms.

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 [9].

$$t = \frac{CAR_\tau}{\sqrt{(\tau \cdot (\sum_{t=s}^{\tau} \left(\overline{AR_t} - \frac{1}{\tau} \sum_{t=1}^{\tau} \overline{AR_t}\right)^2)/(\tau - 1)}} \,. \quad [9]$$

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

6.2. Explanatory factors

The definitions of the explanatory variables selected to test the hypotheses set out in section 4 are shown in Appendix 1. Table 3 offers a summary of the main characteristics of these explanatory variables.

INSERT TABLE 3

In order to test the different hypotheses, we carried out a univariate analysis dividing the sample, with the exception of 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 calculate 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.

7. Results

7.1. Long-term returns

Table 4 shows the abnormal long-run performance for our REIT sample during the 6-month, 12-month and 24-month windows following the listing, respectively, employing the buy-and-hold methodology. 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 on the basis of some characteristic (i.e. size, illiquidity or industry). In these cases, we find significant long-run abnormal returns that range from -8% to -17% during the 6 months after the listing (Panel A from Table 4) and between -10% 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 long-run abnormal returns that range from -10% to -34% (Panel C from Table 4).

INSERT TABLE 4

When a board market index (IGBM) and firm size and firm illiquidity controls are used, BHARs during the 6, 12 and 24 months after listing are not significantly different

from zero.[17] 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.

Table 5 shows the estimation of the abnormal performance with the CAR methodology. Results from Table 5 are similar to those found in Table 4 with the buy-and-hold methodology. In brief, our results suggest a statistically significant underperformance during the 24 months after going public, except when we adjust REIT returns with firm size and firm illiquidity controls, finding that CARs are not significant in most months. When REIT returns are adjusted with the IGBM control, we find some non-significant months.

INSERT TABLE 5

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

INSERT FIGURE 4

The significant post-listing stock price underperformance reveals, in line with Castaño et al. (2020), that Spanish REITs were overpriced when they went public.

7.2. Explanatory factors

Under the univariate analysis, the relationship of various key factors described in section 4 and Appendix 1 with 6-, 12- and 24-month buy-and-hold abnormal returns (BHAR) is examined in Table 6. The results are similar when the cumulative abnormal return (CAR) methodology is used.[18]

[17] We obtain significant positive abnormal returns with an IGBM reference when we use the statistic proposed by Cowan & Sergeant (2001) (see Panel C from Table 4).
[18] These results can be obtained from the authors on request.

INSERT TABLE 6

The data reveal that, a priori, the smallest (Panel B), youngest (Panel C), least indebted (Panel D) companies, and the companies with the highest shares retained by executives (Panel E), positive adjusted initial-day return (Panel F), with a diversified property type (Panel H), 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 the 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 market, namely Previous Private Placement (PPP) and reference price (Panels J and K), are the only ones that have statistically significant differences in the 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 equilibrium price determined by the appraiser experience worse long-term performance than REITs in which this reference price is equal to or less than the equilibrium price determined by the appraiser (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 long-run performance of listing REITs has not been explored by earlier studies, the evidence is in line with results documented by Cai et al. (2011) for non-REIT companies.

In summary, our results suggest that the key factors that explain the long-term underperformance of Spanish REITs are the chosen market entry mechanism and the way of determining the price for the start of trading.

8. Conclusions

This study analyses the long-term abnormal performance of Spanish REITs during a period of 6, 12 and 24 months after their listing from November 2013 to January 2020. Our final sample is made up of 44 REITs that trade on the Spanish Multilateral Trading Facility known as the *Mercado Alternativo Bursátil* (MAB). We measure long-term abnormal performance by computing buy-and-hold and cumulative abnormal returns, using a wide range of references.

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 (i) the matching-firm procedure according to size and illiquidity characteristics does not lead to significant abnormal performance; and (ii) that the underperformance increases in the first months after the listing to slightly improve around months 11–12 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 reveals that, in line with Castaño et al. (2020), REITs were overpriced at the issue.

Finally, our results suggest that the theories commonly used to explain long-run abnormal performance are not relevant in explaining the aftermarket behaviour of Spanish REITs. Instead, we propose that the differentiating characteristics of the market analysed are the key features that explain it. Specifically, we focus on the fact that (i) all REITs in this market have been incorporated by direct listing; (ii) some REITs have 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 equilibrium price established by the appraiser.

This finding provides valuable information for national and international investors and analysts with added value in 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. Future research may include the implications of this phenomenon in relation to the rational valuation of stocks, market efficiency, investor's behaviour and resource allocation.

References

Acedo-Ramírez, M., & Ruiz-Cabestre, F. J. (2019). Total and primary underpricings in the IPO market: are they explained by the same variables? *Revista Española de Financiacion y Contabilidad*, *48*(2), 134–159. https://doi.org/10.1080/02102412.2018.1468642

Aggarwal, R., Leal, R., & Hernandez, L. (1993). The aftermarket performance of Initial Public Offerings in Latin America. *Financial Management*, *22*(1), 42–53. https://doi.org/10.2307/3665964

Alhashel, B. S. (2018). The new stock that did not underperform. *Emerging Markets Finance and Trade*, *54*(12), 2765–2777. https://doi.org/10.1080/1540496X.2017.1410472

Álvarez, S. (2001). El efecto de las señales informativas en la valoración de las salidas

a bolsa. *Revista Espanola de Financiacion y Contabilidad*, *30*(108), 409–454. https://doi.org/10.1080/02102412.2001.10779421

Álvarez, S., & González, V. (2005). The long-run underperformance of initial public offerings: a methodological problem? *Revista de Economía Aplicada*, *13*(37), 51–67. Retrieved from https://www.redalyc.org/pdf/969/96915883003.pdf

Amihud, Y. (2002). Illiquidity and stock returns: cross-section and time-series effects. *Journal of Financial Markets*, *5*(1), 31–56. https://doi.org/10.1016/S1386-4181(01)00024-6

Ascherl, C., & Schaefers, W. (2018). REITs and REOCs and their initial stock market performance: an European perspective. *Journal of European Real Estate Research*, *11*(1), 4–27. https://doi.org/10.1108/JERER-10-2016-0036

Baker, M., & Wurgler, J. (2000). The equity share in new issues and aggregate stock returns. *The Journal of Finance*, *55*(5), 2219–2257. https://doi.org/10.1111/0022-1082.00285

Bancel, F., & Mittoo, U. R. (2009). Why do European firms go public? *European Financial Management*, *15*(4), 844–884. https://doi.org/10.1111/j.1468-036x.2009.00501.x

Barber, B. M., & Lyon, J. D. (1997). Detecting long-run abnormal stock returns: the empirical power and specification of test statistics. *Journal of Financial Economics*, *43*(3), 341–372. https://doi.org/10.1016/S0304-405X(96)00890-2

Beatty, R. P., & Ritter, J. R. (1986). Investment banking, reputation, and the underpricing of initial public offerings. *Journal of Financial Economics*, *15*(1–2), 213–232. https://doi.org/10.1016/0304-405X(86)90055-3

Below, S., Zaman, M. A., & McIntosh, W. (1995). The pricing of Real Estate Investment Trust Initial Public Offerings. *Journal of Real Estate Finance and Economics*, *11*(1), 55–64. https://doi.org/10.1007/BF01097936

Bolsas y Mercados Españoles. (2017). Circular 7/2017. Normas de contratación de acciones de Empresas en Expansión y de Sociedades Anónimas Cotizadas de Inversión en el Mercado Inmobiliario (SOCIMI) a través del Mercado Alternativo Bursátil. Retrieved from https://www.bolsasymercados.es/mab/docs/normativa/esp/circulares/2017/CIRCULAR_7_2017_NORMAS_CONTRATACIÓN_MAB.pdf

Bolsas y Mercados Españoles. (2018). Circular 2/2018. Requisitos y procedimiento aplicables a la incorporación y exclusión en el Mercado Alternativo Bursátil de acciones emitidas por Empresas en Expansión y por Sociedades Anónimas Cotizadas de Inversión en el Mercado Inmobiliario (SOCIMI). Retrieved from https://www.bolsasymercados.es/mab/docs/normativa/esp/circulares/2018/MAB_Circular_2-2018.pdf

Bolsas y Mercados Españoles. (2019). Informe de Mercado 2019. Retrieved from https://www.bolsasymercados.es/docs/infmercado/2019/esp/IM2019.pdf

Bolsas y Mercados Españoles. (2020). Annual report on the ownership of listed shares 2020. Retrieved from https://www.bolsasymercados.es/esp/Estudios-Publicaciones/Documento/5388_50_2__of_the_shares_listed_on_the_Spanish_Stock_Market_held_by_on_residents

Bradley, D. J., Gonas, J. S., Highfield, M. J., & Roskelley, K. D. (2009). An examination of IPO secondary market returns. *Journal of Corporate Finance*, *15*(3), 316–330. https://doi.org/10.1016/j.jcorpfin.2009.01.003

Brav, A., Geczy, C., & Gompers, P. A. (2000). Is the abnormal return following equity issuances anomalous? *Journal of Financial Economics*, *56*(2), 209–249. https://doi.org/10.1016/S0304-405X(00)00040-4

Brav, A., & Gompers, P. A. (1997). Myth or reality? The long-run underperformance of initial public offerings: evidence from venture and nonventure capital-backed companies. *Journal of Finance*, *52*(5), 1791–1821. https://doi.org/10.1111/j.1540-6261.1997.tb02742.x

Brobert, G. (2016). The global REIT market: initial-day performance of IPOs. *Journal of European Real Estate Research*, *9*(3), 231–249. https://doi.org/10.1108/JERER-03-2016-0015

Brounen, D., & Eichholtz, P. (2002). Initial public offerings: evidence from the British, French and Swedish property share markets. *Journal of Real Estate Finance and Economics*, *24*(1–2), 103–117. https://doi.org/10.1023/A:1013934422479

Brown, S. J., & Warner, J. B. (1980). Measuring security price performance. *Journal of Financial Economics*, *8*(3), 205–258. https://doi.org/10.1016/0304-405X(80)90002-1

Brueggeman, W. B., Chen, A. H., & Thibodeau, T. G. (1984). Real estate investment funds: performance and portfolio considerations. *Real Estate Economics*, *12*(3), 333–354. https://doi.org/10.1111/1540-6229.00326

Brueggeman, W. B., Chen, A. H., & Thibodeau, T. G. (1992). Some additional evidence on the performance of commingled Real Estate Investment Funds: 1972-1991. *Journal of Real Estate Research*, *7*(4), 433–448. https://doi.org/10.5555/rees.7.4.c132858v9p441003

Buttimer, R. J., Hyland, D. C., & Sanders, A. B. (2005). REITs, IPO waves and long-run performance. *Real Estate Economics*, *33*(1), 51–87. https://doi.org/10.1111/j.1080-8620.2005.00112.x

Cai, K. N., Lee, H. W., & Sharma, V. (2011). Underpricing of IPOs that follow private placement. *Journal of Financial Research*, *34*(3), 441–459.

https://doi.org/10.1111/j.1475-6803.2011.01297.x

Capozza, D. R., & Seguin, P. J. (1999). Focus, transparency and value: the REIT evidence. *Real Estate Economics*, *27*(4), 587–619. https://doi.org/https://doi.org/10.1111/1540-6229.00785

Castaño, L., Farinós, J. E., & Ibáñez, A. M. (2020). The Underpricing of Spanish REITs when going public. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3577594

CBRE. (2020). *CBRE Spain Real Estate Outlook 2020*. Retrieved from https://researchgateway.cbre.com/Layouts/GKCSearch/DownloadHelper.ashx

Chan, K. C., Patric, H., & Sanders, A. B. (1990). Risk and return on real estate: evidence from equity REITs. *The American Real Estate and Urban Economics Association Journal*, *18*(4), 431–452. https://doi.org/10.3386/w3311

Chan, K., Wang, J., & Wei, K. C. J. (2004). Underpricing and long-term performance of IPOs in China. *Journal of Corporate Finance*, *10*(3), 409–430. https://doi.org/10.1016/S0929-1199(03)00023-3

Chan, S. H., Chen, J., & Wang, K. (2013). Are REIT IPOs unique? The global evidence. *Journal of Real Estate Finance and Economics*, *47*(4), 719–759. https://doi.org/10.1007/s11146-013-9428-x

Chan, S. H., Stohs, M., & Wang, K. (2001). Are real estate IPOs a different species? Evidence from Hong Kong IPOs. *Journal of Real Estate Research*, *21*(3), 201–220. https://doi.org/10.5555/rees.21.3.930721l36417552

Chemmanur, T. J., & Fulghieri, P. (1999). A theory of the going-public decision. *The Review of Financial Studies*, *12*(2), 249–279. https://doi.org/10.1093/rfs/12.2.249

Chen, S. J., Hsieh, C. H., & Jordan, B. D. (1997). Real estate and the arbitrage pricing theory: macrovariables vs. derived factors. *Real Estate Economics*, *25*(3), 506–523. https://doi.org/10.1111/1540-6229.00725

Chen, S. J., Hsieh, C. H., Vines, T., & Chiou, S. N. (1998). Macroeconomic variables, firm-specific variables and returns to REITs. *The Journal of Real Estate Research*, *16*(3), 269. https://doi.org/10.5555/rees.16.3.7n88q87x4361470x

Chen, Y., & Chu, S. M. (2010). On IPO market anomalies through the Emerging Stock Market in Taiwan. *International Journal of Business and Economics*, *9*(1), 57–76. Retrieved from https://search.proquest.com/docview/759328008?accountid=14777

Chiang, K. C. H., Lee, M. L., & Wisen, C. H. (2004). Another look at the asymmetric REIT-beta puzzle. *Journal of Real Estate Research*, *26*(1), 25–42. https://doi.org/10.2469/dig.v34.n3.1502

Chui, A. C. W., Titman, S., & Wei, K. C. J. (2003). The cross section of expected REIT returns. *Real Estate Economics*, *31*(3), 451–479. https://doi.org/10.1111/1540-6229.00073

Cowan, A. R., & Sergeant, A. M. A. (2001). Interacting biases, non-normal return distributions and the performance of tests for long-horizon event studies. *Journal of Banking and Finance*, *25*(4), 741–765. https://doi.org/10.1016/S0378-4266(00)00094-7

Dimovski, B., Ratcliffe, C., & Keneley, M. (2017). Another piece of the puzzle: REIT IPO underpricing after the financial crisis. *Journal of Property Investment and Finance*, *35*(3), 264–276. https://doi.org/10.1108/JPIF-07-2016-0060

Eckbo, B. E., Masulis, R. W., & Norli, Ø. (2000). Seasoned public offerings: resolution of the "new issues puzzle." *Journal of Financial Economics*, *56*(2), 251–291. https://doi.org/10.1016/S0304-405X(00)00041-6

Efron, B. (1982). *The jackknife, the bootstrap and other resampling plans.* Philadelphia, USA.: Society for Industrial and applied mathematics.

Eichholtz, P., Schweitzer, M., & Op't Veld, H. (2000). REIT performance: does managerial specialization pay. In *The performance of financial institutions.* (pp. 199–220). Cambridge: Cambridge University Press. Retrieved from https://books.google.es/books?hl=es&lr=&id=uyhKV9Mok1YC&oi=fnd&pg=PA199&ots=yR1hkprgT1&sig=S9a64D8PiipTOaNbyXym2FB79Tc#v=onepage&q&f=false

EPRA. (2020). *Global Real Estate Total Markets Table Q4-2019*. Retrieved from https://prodapp.epra.com/media/EPRA_Total_Markets_Table_-_Q4-2019_1580381101760.pdf

Espenlaub, S., Gregory, A., & Tonks, I. (2000). Re-assessing the long-term underperformance of UK Initial Public Offerings. *European Financial Management*, *6*(3), 319–342. https://doi.org/10.1111/1468-036X.00127

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, *33*(1), 3–56. https://doi.org/10.1016/0304-405X(93)90023-5

Farinós, J. E. (2001). Rendimientos anormales de las OPV en España. *Investigaciones Económicas*, *25*(2), 417–437. Retrieved from https://www.redalyc.org/pdf/173/17325208.pdf

Farinós, J. E., García, C. J., & Ibáñez, A. M. (2007a). Is the long-run underperformance of seasoned equity issues irrational? Evidence from Spain. *International Review of Financial Analysis*, *16*(2), 183–199. https://doi.org/10.1016/j.irfa.2005.07.003

Farinós, J. E., García, C. J., & Ibáñez, A. M. (2007b). Operating and stock market performance of state-owned enterprise privatizations: the Spanish experience. *International Review of Financial Analysis*, *16*(4), 367–389. https://doi.org/10.1016/j.irfa.2007.01.001

Firstenberg, P., Ross, S., & Zisler, R. (1988). Real estate: the whole story. *The Journal of Portfolio Management*, *14*(3), 22–34. https://doi.org/10.3905/jpm.1988.409154

Giacomini, E., Ling, D. C., & Naranjo, A. (2017). REIT leverage and return performance: keep your eye on the target. *Real Estate Economics*, *45*(4), 930–978. https://doi.org/10.1111/1540-6229.12179

Grinblatt, M., & Hwang, C. Y. (1989). Signalling and the pricing of new issues. *The Journal of Finance*, *44*(2), 393–420. https://doi.org/10.2307/2328596

Hanley, K. W. (1993). The underpricing of initial public offerings and the partial adjustment phenomenon. *Journal of Financial Economics*, *34*(2), 231–250. https://doi.org/10.1016/0304-405X(93)90019-8

Hensler, D. A. (1998). The nature and persistence of initial public offering aftermarket returns predictability. *Review of Quantitative Finance and Accounting*, *10*(1), 39–58. https://doi.org/10.1023/A:1008296013545

Hertzel, M., & Smith, R. L. (1993). Market discounts and shareholder gains for placing eequity privately Source : The Journal of Finance , Vol . 48 , No . 2 (Jun ., 1993), pp . 459-485 Published by : Wiley for. *The Journal of Finance*, *48*(2), 459–485. https://doi.org/10.2307/2328908

Howe, J. S., & Shilling, J. D. (1990). REIT Advisor performance. *Real Estate Economics*, *18*(4), 479–500. https://doi.org/10.1111/1540-6229.00533

Hsieh, C. H., & Sirmans, C. F. (1991). REITs as captive-financing affiliates: Impact on financial performance. *The Journal of Real Estate Research*, *6*(2), 179–189. https://doi.org/10.5555/rees.6.2.f2212249w764524

Ibbotson, R. G. (1975). Price performance of common stock new issues. *Journal of Financial Economics*, *2*(3), 235–272. https://doi.org/10.1016/0304-405X(75)90015-X

Jegadeesh, N. (2000). Long-term performance of Seasoned Equity Offerings: benchmark errors and biases in expectations. *Financial Management*, *29*(3), 5–30. https://doi.org/10.2307/3666227

Joel-Carbonell, A., & Rottke, N. B. (2009). Efficient markets versus behavioral anomalies: the case of REITs. *Journal of Property Investment and Finance*, *27*(4), 413–424. https://doi.org/10.1108/14635780910972314

Kang, J. K., Kim, Y. C., & Stulz, R. M. (1999). The underreaction hypothesis and the new issue puzzle: evidence from Japan. *Review of Financial Studies*, *12*(3), 519–534. https://doi.org/10.1093/revfin/12.3.0519

Keloharju, M. (1993). The winner's curse, legal liability, and the long-run price performance of initial public offerings in Finland. *Journal of Financial Economics*, *34*(2), 251–277. https://doi.org/10.1016/0304-405X(93)90020-C

Kim, J. B., Krinsky, I., & Lee, J. (1995). The aftermarket performance of initial public offerings in Korea. *Pacific-Basin Finance Journal*, *3*(4), 429–448. https://doi.org/10.1016/0927-538X(95)00016-E

Lee, P. J., Taylor, S. L., & Walter, T. S. (1996). Australian IPO pricing in the short and long run. *Journal of Banking and Finance*, *20*(7), 1189–1210. https://doi.org/10.1016/0378-4266(95)00053-4

Ling, D. C., & Naranjo, A. (1997). Economic risk factors and commercial real estate returns. *Journal of Real Estate Finance and Economics*, *15*(3), 283–307. https://doi.org/10.1023/A:1007754312084

Ling, D. C., & Ryngaert, M. (1997). Valuation uncertainty, institutional involvement, and the underpricing of IPOs: the case of REITs. *Journal of Financial Economics*, *43*(3), 433–456. https://doi.org/10.1016/S0304-405X(96)00891-4

Liu, C. H., Hartzell, D. J., Grissom, T. V., & Greig, W. (1990). The composition of the market portfolio and real estate investment performance. *Real Estate Economics*, *18*(1), 49–75. https://doi.org/10.1111/1540-6229.00509

Ljungqvist, A. P. (1997). Pricing initial public offerings: further evidence from Germany. *European Economic Review*, *41*(7), 1309–1320. https://doi.org/10.1016/S0014-2921(96)00035-9

Londerville, J. (2002). Canadian Real Estate Investment Trusts: a review of the IPO literature and preliminary analysis of Canadian REIT IPO pricing. *Canadian Journal of Administrative Sciences*, *19*(4), 359–368. https://doi.org/10.1111/j.1936-4490.2002.tb00281.x

Loughran, T. (1993). NYSE vs NASDAQ returns: market microstructure or the poor performance of initial public offerings? *Journal of Financial Economics*, *33*(2), 241–260. https://doi.org/10.1016/0304-405X(93)90006-W

Loughran, T., & Ritter, J. R. (1995). The new issues puzzle. *The Journal of Finance*, *50*(1), 23–51. https://doi.org/10.1111/j.1540-6261.1995.tb05166.x

Loughran, T., & Ritter, J. R. (2000). Uniformly least powerful tests of market efficiency. *Journal of Financial Economics*, *55*(3), 361–389. https://doi.org/10.1016/S0304-405X(99)00054-9

Lyon, J. D., Barber, B. M., & Tsai, C. L. (1999). Improved methods for tests of long-run abnormal stock returns. *Journal of Finance*, *54*(1), 165–201. https://doi.org/10.1111/0022-1082.00101

Ma, T., & Tsai, P. R. (2001). Are initial return and IPO discount the same thing? A comparison of Direct Public Offerings and underwritten IPOs. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.300880

Martínez, M. A., Nieto, B., Rubio, G., & Tapia, M. (2005). Asset pricing and systematic

liquidity risk: an empirical investigation of the Spanish stock market. *International Review of Economics and Finance*, *14*(1), 81–103. https://doi.org/10.1016/j.iref.2003.12.001

Michaely, R., & Shaw, W. H. (1994). The pricing of Initial Public Offerings: test of adverse-selection and signaling theories. *The Review of Financial Studies*, *7*(2), 279–319. https://doi.org/10.1093/rfs/7.2.279

Mitchell, M. L., & Stafford, E. (2000). Managerial decisions and long-term stock price performance. *Journal of Business*, *73*(3), 287–329. https://doi.org/10.1086/209645

Morri, G., & Jostov, K. (2018). The effect of leverage on the performance of real estate companies: a pan-European post-crisis perspective of EPRA/NAREIT index. *Journal of European Real Estate Research*, *11*(3), 284–318. https://doi.org/10.1108/JERER-01-2018-0004

Omran, M. (2005). Underpricing and long-run performance of share issue privatizations in the Egyptian stock market. *Journal of Financial Research*, *28*(2), 215–234. https://doi.org/10.1111/j.1475-6803.2005.00122.x

Ooi, J. T. L. (2009). The compensation structure of REIT managers: impact on stock valuation and performance. *Journal of Property Research*, *26*(4), 309–328. https://doi.org/10.1080/09599916.2009.485416

Ooi, J. T. L., Mori, M., & Wong, W. C. (2018). Rationale behind IPO underpricing: evidence from Asian REIT IPOs. *Real Estate Economics*, *47*(1), 1–34. https://doi.org/10.1111/1540-6229.12243

Pagano, M., Panetta, F., & Zingales, L. (1998). Why do companies go public? An empirical analysis. *Journal of Finance*, *53*(1), 27–64. https://doi.org/10.1111/0022-1082.25448

Page, M. J., & Reyneke, I. (1997). The timing and subsequent performance of initial public offerings (IPOs) on the Johannesburg stock exchange. *Journal of Business Finance and Accounting*, *24*(9–10), 1401–1420. https://doi.org/10.1111/1468-5957.00170

Peterson, J. D., & Hsieh, C. H. (1997). Do common risk factors in the returns on stocks and bonds explain returns on REITs? *Real Estate Economics*, *25*(2), 321–345. https://doi.org/10.1111/1540-6229.00717

Reino de España. (2009). Ley 11/2009, de 26 de octubre, por la que se regulan las Sociedades Anónimas Cotizadas de Inversión en el Mercado Inmobiliario (texto consolidado). *Boletín Oficial Del Estado, 27 de Octubre*. no. 259.

Reino de España. (2012). Ley 16/2012, de 27 de diciembre, por la que se adoptan diversas medidas tributarias dirigidas a la consolidación de las finanzas públicas y al impulso de la actividad económica. *Boletín Oficial Del Estado, 28 de Diciembre*.

no. 312.

Ritter, J. R. (1991). The Long-Run performance of Initial Public Offerings. *The Journal of Finance*, *46*(1), 3–27. https://doi.org/10.1111/j.1540-6261.1991.tb03743.x

Röell, A. (1996). The decision to go public: an overview. *European Economic Review*, *40*(3–5), 1071–1081. https://doi.org/10.1016/0014-2921(95)00114-X

Sanchis, V. A., Pardo, F., Farinós, J. E., & Conesa, D. (2019). Do Spanish IPO firms fit the Continental European model for going public? *Revista Espanola de Financiacion y Contabilidad*, 1–25. https://doi.org/10.1080/02102412.2019.1650238

Schulte, K. M., Dechant, T., & Schaefers, W. (2011). Systematic risk factors in European real estate equities. *Journal of European Real Estate Research*, *4*(3), 185–224. https://doi.org/10.1108/17539261111183416

Serrano, C., & Hoesli, M. (2007). Forecasting EREIT returns. *Journal of Real Estate Portfolio Management*, *13*(4), 293–309. https://doi.org/10.5555/repm.13.4.a0020120j1630472

Spiess, D. K., & Affleck-Graves, J. (1995). Underperformance in long-run stock returns following seasoned equity offerings. *Journal of Financial Economics*, *38*(3), 243–267. https://doi.org/10.1016/0304-405X(94)00817-K

Stehle, R., Ehrhardt, O., & Przyborowsky, R. (2000). Long-run stock performance of German initial public offerings and seasoned equity issues. *European Financial Management*, *6*(2), 173–196. https://doi.org/10.1111/1468-036X.00119

Stevenson, S. (2013). The global real estate investment trust market: development and growth. In R. Sotelo & S. McGreal (Eds.), *Real Estate Investment Trusts in Europe: Evolution, Regulation, and Opportunities for Growth* (pp. 17–25). Heidelberg, Alemania.: Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-36856-1_2

Titman, S., & Warga, A. (1986). Risk and the performance of Real Estate Investment Trusts: a multiple index approach. *American Real Estate and Urban Economics Association Journal*, *14*(3), 414–431. https://doi.org/10.1111/1540-6229.00395

Wang, K., Chan, S. H., & Gau, G. W. (1992). Initial public offerings of equity securities: anomalous evidence using REITs. *Journal of Financial Economics*, *31*(3), 381–410. https://doi.org/10.1016/0304-405X(92)90039-Z

Wehrens, R., Putter, H., & Buydens, L. M. C. (2000). The bootstrap: A tutorial. *Chemometrics and Intelligent Laboratory Systems*, *54*(1), 35–52. https://doi.org/10.1016/S0169-7439(00)00102-7

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, *48*(4), 817–838.

Wong, W. C., & Ong, S. E. (2013). Sponsor Backing in Asian REIT IPOs. *Journal of Real Estate Finance and Economics*, *46*(2), 299–320. https://doi.org/10.1007/s11146-011-9336-x

Wu, Y. L. (2004). The choice of equity-selling mechanisms. *Journal of Financial Economics*, *74*(1), 93–119. https://doi.org/10.1016/j.jfineco.2003.08.003

Tables

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]	

Notes:
Data in % except sample size.
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.

Table 2. Summary of long-run performance of REITs and property firms from selected studies.

	Country	Sample size and type	Sample period	Long-run returns (%)
Global				
Chan et al. (2013)	Global	370 REITs	1996-2010	Market-adjusted CAR = 1.32**; -1.99*** (Days 1-30; 2-30); -0.76; -4.07*** (Days 1-90; 2-90); -4.05***; -7.36*** (Days 1-190; 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 & Ryngaert (1997)	US	85 REITs	1991-1994	Market-adjusted BHAR (Days 1-100) = 2.20*.
Londerville (2002)	Canada	13 REITs	1993-1998	Market-adjusted CAR (Days 1-20) = 8.34**.
Joel-Carbonell & Rottke (2009)	US	90 REITs	1991-2008	Market adjusted BHAR = -4.10 (one year); -8.30 (three year); -24.70** (five year).
Dimovski et al. (2017)	US	56 REITs	2010-2015	Market adjusted total return = -2.18 (6 month); -4.23 (12 month). Market adjusted dividend yield = 0.88*** (6 month); 1.90*** (12 month).
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 year).

Europe				
Brounen & Eichholtz (2002)	France	17 PROP	1984-1999	Market adjusted CAR (12 month) = -12.62**. Market adjusted BHAR (12 month) = -10.76**.
Brounen & Eichholtz (2002)	Sweden	13 PROP	1984-1999	Market adjusted CAR (12 month) = 18.89. Market adjusted BHAR (12 month) = 22.16*.
Brounen & Eichholtz (2002)	UK	24 PROP	1984-1999	Market adjusted CAR (12 month) = -4.53. Market adjusted BHAR (12 month) = -5.83.

Notes:
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.

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	2054.00
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
SHARE RETAINED BY EXECUTIVES (%)	44	46.26	41.28	0.00	45.16	100.00
ADJUSTED INITIAL RETURN (%)	44	2.40	5.10	-2.80	1.20	26.30

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

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

	N	REIT BHR (%)	Control BHR (%)	BHAR (%)	*t*	p-value	Z	p-value
PANEL A: 6 MONTHS								
IGBM	44	-1.807	1.152	-2.959	-1.140	0.259	-1.131	0.129
SMALL	44	-1.807	10.487	-12.294	-4.620	0.000	-4.547	0.000
EPRA NAREIT	44	-1.807	7.295	-9.102	-3.580	0.001	-3.840	0.000
Firm size control	44	-1.807	3.084	-4.891	-0.810	0.423	-0.536	0.296
Firm illiquidity control	44	-1.807	2.086	-3.893	-0.990	0.327	-1.152	0.125
Size portfolio	44	-1.807	15.098	-16.905	-3.860	0.000	-3.462	0.000
Illiquidity portfolio	44	-1.807	6.323	-8.130	-2.730	0.009	-2.430	0.008
PANEL B: 12 MONTHS								
IGBM	44	-0.432	1.618	-2.050	-0.660	0.515	-0.415	0.339
SMALL	44	-0.432	15.685	-16.117	-5.050	0.000	-4.877	0.000
EPRA NAREIT	44	-0.432	10.449	-10.882	-4.180	0.000	-4.308	0.000
Firm size control	44	-0.432	4.460	-4.893	-0.640	0.526	-0.401	0.344
Firm illiquidity control	44	-0.432	0.219	-0.651	-0.140	0.890	0.248	0.402
Size portfolio	44	-0.432	18.434	-18.867	-4.220	0.000	-4.131	0.000
Illiquidity portfolio	44	-0.432	9.405	-9.838	-2.650	0.011	-2.283	0.011
PANEL C: 24 MONTHS								
IGBM	44	5.825	0.290	5.535	1.490	0.144	1.872	0.031
SMALL	44	5.825	29.276	-23.451	-4.720	0.000	-4.988	0.000
EPRA NAREIT	44	5.825	25.164	-19.340	-5.380	0.000	-6.763	0.000
Firm size control	44	5.825	8.492	-2.667	-0.240	0.813	-0.078	0.469
Firm illiquidity control	44	5.825	7.151	-1.326	-0.180	0.860	-0.097	0.461
Size portfolio	44	5.825	39.659	-33.835	-4.730	0.000	-4.832	0.000
Illiquidity portfolio	44	5.825	16.202	-10.377	-1.890	0.066	-1.807	0.035

Notes:
N: sample size.
REIT BHR: average cross-sectional buy-and-hold return for the listing REIT portfolio.
Control BHR: average cross-sectional buy-and-hold return for the controls or references. Controls or references are defined in section 6.1.1.
BHAR: average cross-sectional buy-and-hold abnormal return. Abnormal return calculated for an equally weighted portfolio.
t: t statistic corrected by heteroscedasticity using White's (1980) method.
Z: statistic proposed by Cowan & Sergeant (2001). See expression [5].

Table 5. Cumulative average abnormal return (CAR) calculated for an equally weighted portfolio during 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**

Notes:
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 variant proposed by Espenlaub et al. (2000) of the Crude Dependence Adjustment test by Brown & Warner (1980) was used, as shown in expression [9].

Table 6. Univariate analysis of buy-and-hold abnormal return (BHAR) by explanatory factors.

		BHAR (%)											
Time		6 MONTHS				12 MONTHS				24 MONTHS			
Factor/Control	Sample size	SMALL	EPRA NAREIT	SIZE PORTF.	ILLIQ. PORTF.	SMALL	EPRA NAREIT	SIZE PORTF.	ILLIQ. PORTF.	SMALL	EPRA NAREIT	SIZE PORTF.	ILLIQ. PORTF.
Panel A. Total sample	44	*** -12.29 [a]	*** -9.10 [a]	*** -16.90 [a]	*** -8.13 [a]	*** -16.12 [a]	*** -10.88 [a]	*** -18.87 [a]	*** -9.84 [b]	*** -23.45 [a]	*** -19.34 [a]	*** -33.83 [a]	* -10.38 [c]
		(-12.36) [a]	(-6.76) [a]	(-12.95) [a]	(-3.87) [b]	(-16.20) [a]	(-6.00) [a]	(-14.93) [a]	(-5.39) [b]	(-17.72) [a]	(-18.71) [a]	(-22.08) [a]	(-5.99)
Panel B. Size													
Large ≥ €52m	22	** -9.63 [b]	** -9.00 [b]	* -11.89 c	* -8.24	*** -14.73 [a]	*** -10.49 [a]	** -14.65 [b]	** -11.45 c	*** -20.84 [a]	*** -16.46 [a]	** -22.90 [b]	* -16.51 [c]
		-(8.81) [b]	(-4.80) [b]	(-2.74)	(0.18)	(-12.65) [a]	(-4.03) [b]	(-6.26) c	(-4.26) c	(-17.72) [b]	(-20.05) [a]	(-14.67) [a]	(-6.58)
Small < €52m	22	*** -14.96 [a]	*** -9.20 [a]	*** -21.92 [a]	** -8.02 [b]	*** -17.50 [a]	***-11.28 [b]	*** -23.09 [a]	* -8.23	*** -26.06 [a]	*** -22.22 [a]	*** -44.77 [a]	-4.25
		(-13.08) [a]	(-7.39) [a]	(-15.61) [a]	(-6.31) b	(-24.9) [a]	(-11.67) [a]	(-18.04) [a]	(-5.60)	(-20.12) [a]	(-17.50) [a]	(-27.66) [a]	(-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]	** -5.58 [b]	* -14.72 [c]	** -9.04 [b]	*** -13.60 [a]	*** -9.20 [a]	** -16.12 [b]	*** -15.50 [a]	*** -19.46 [b]	*** -15.21 [a]	*** -27.98 [b]	** -18.55 [c]
		(-10.35) [b]	(-6.62) [b]	(-9.24)	(-7.45) [b]	(-14.18) [a]	(-9.87) [b]	(-9.15) [b]	(-15.50) [b]	(-16.72) [b]	(-17.46) [a]	(-16.65) [a]	(-15.18)
Young < 2.3 years	22	*** -17.61 [a]	*** -12.62 [a]	*** -19.09 [a]	* -7.22	*** -18.63 [a]	*** -12.57 [a]	***- 21.61 [a]	-4.17	*** -27.44 [a]	*** -23.47 [a]	*** -39.69 [a]	-2.21
		(-13.08) [a]	(-6.76) [a]	(-18.29) [b]	(-1.64)	(-19.37) [b]	(-4.85) [b]	(-21.91) [b]	(-4.39)	(-23.32) [b]	(-19.80) [a]	(-27.88) [a]	(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]	** -8.61 [b]	** -17.76 [b]	** -10.30 [b]	*** -17.18 [a]	***-11.61 [a]	*** -22.06 [a]	*** -13.66 [b]	*** -23.84 [a]	*** -16.61 [a]	*** -35.99 [a]	* -14.63 [c]
		(-12.69) [a]	(-6.60) [b]	(-8.63) [b]	(-4.27)	(-19.37) [a]	(-9.41) [a]	(-20.34) [a]	(-10.20) [b]	(-20.46) [a]	(-19.55) [a]	(-27.30) [a]	(-9.31)
Low < 0.34	22	*** -13.31 [a]	*** -9.60 [b]	*** -16.05 [a]	* -5.96 [c]	*** -15.05 [a]	** -10.15 [b]	** -15.67 [b]	-6.02	*** -23.06 [a]	*** -22.07 [a]	*** -31.68 [a]	-6.13
		(-11.23) [a]	(-6.96) [a]	(-13.16) [a]	(-3.19)	(-13.2) [a]	(-4.90) [b]	(-9.15) [b]	(-3.26)	(-15.99) [a]	(-17.90) [a]	(-18.58) [a]	(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]	*** -13.95 [a]	*** -16.08 [a]	** -10.70 [b]	*** -19.88 [a]	*** -16.50 [a]	*** -15.98 [b]	** -13.41 [b]	*** -25.45 [a]	*** -25.78 [a]	*** -29.23 [b]	-3.90
		(-13.71) [a]	(-7.87) [a]	(-13.70) [a]	(-4.98) [c]	(-17.46) [a]	(-12.07) [a]	(-11.04) [a]	(-10.40) [b]	(-19.66) [a]	(-18.96) [a]	(-23.34) [a]	(0.67)

Low < 45%	22	*** -7.76 [a]	**-4.25 [b]	** -17.73 [b]	-5.56	*** -12.35 [a]	** -5.26 [c]	*** -21.76 [a]	-6.27	*** -21.45 [a]	*** -12.90 [a]	*** -38.44 [a]	* -16.85 [c]
		(-11.65) [a]	(-4.75) [b]	(-8.39) [b]	(-3.19)	(-14.67) [a]	(-2.45)	(-27.40) [a]	(0.26)	(-17.72) [a]	(-18.39) [a]	(-18.22) [a]	(-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*
Panel F. Adjusted initial-day return													
Positive ≥ 0 (winner)	30	*** -13.42 [a]	*** -9.39 [a]	*** -17.00 [a]	** -7.80 [b]	*** -15.98 [a]	*** -11.29 [a]	*** -20.19 [a]	** -9.33 [b]	*** -24.87 [a]	*** -19.78 [a]	*** -38.06 [a]	-11.04
		(-12.36) [a]	(-6.33) [a]	(-8.95) [b]	(-5.33) c	(-14.18) [a]	(-3.75) [a]	(-20.34) [a]	(-4.47) [c]	(-17.72) [a]	(-19.20) [a]	(-22.08) [a]	(0.61) [c]
Negative <0 (loser)	14	*** -9.88 [a]	*** -7.97 [b]	*** -16.70 [b]	* -8.83	*** -16.41 [a]	* -9.31 c	*** -16.03 [b]	-10.92	*** -20.42 [a]	*** -17.62 [a]	*** -24.78 [a]	-8.95
		(-11.29) [a]	(-7.62) [a]	(-12.95) [b]	(-2.85)	(-25.65) [a]	(-13.68) [b]	(-10.47) [b]	(-5.39)	(-18.99) [a]	(-18.22) [a]	(-22.03) [a]	(-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]	*** -8.25 [a]	*** -21.90 [a]	*** -9.47 [a]	*** -18.97 [a]	*** -9.99 [a]	*** -19.23 [a]	** -8.90 [b]	*** -23.38 [a]	*** -15.19 [a]	*** -28.88 [a]	-1.69
		(-12.99) [a]	(-7.18) [a]	(-17.78) [a]	(-6.45) [a]	(-25.22) [a]	(-10.45) [a]	(-18.97) [a]	(-6.18)	(-16.47) [b]	(-17.43) [a]	(-21.06) [b]	(3.21)
Cold	11	-5.65	* -11.65 [c]	-1.92	-4.10	-7.55	* -13.56 [c]	-17.76	-12.64	** -23.67 [c]	*** -31.78 [a]	*** -48.71 [a]	*** -36.43 [b]
		(-4.95)	(-2.72)	(-1.22)	(2.23)	(-7.72)	(-0.62)	(-3.39)	(-4.18)	(-18.47) [b]	(-21.34) [a]	(-23.10) [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]	** -13.43 [c]	** -16.08 [b]	-8.48	-11.16	** -11.55 [c]	** -14.33 [b]	-7.83	** -19.85 [c]	*** -25.68 [a]	*** -29.91 [a]	-3.55
		(-12.99) [c]	(-7.59) [a]	(-22.55) [b]	(-2.17)	(-7.72)	(-5.94) [c]	(-24.84) [b]	(-7.52)	(-5.95)	(-25.75) [a]	(-23.10) [a]	(-10.84)
Specialised	31	*** -11.66 [a]	*** -7.29 [a]	*** -17.26 [a]	** -7.98 [b]	*** -18.19 [a]	*** -10.60 [a]	*** -20.77 [a]	** -10.68 [b]	*** -24.96 [a]	*** -16.68 [a]	*** -35.48 [a]	** -13.24 [a]
		(-11.20) [a]	(-6.33) [a]	(-12.88) [a]	(-4.21) [b]	(-20.63) [a]	(-10.45) [a]	(-12.75) [a]	(-4.61) [c]	(-22.44) [a]	(-17.57) [a]	(-21.06) [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	-5.61	-1.44	-6.75	** -11.44 [b]	*** -10.85 [b]	** -13.06 [c]	** -15.21 [c]	-11.95	** -19.48 [c]	-22.04	-6.79
		(-5.53) [c]	(-0.27)	(-3.12)	(-7.45)	(-10.90) [b]	(-3.97) [b]	(-13.97) [c]	(-21.04) [c]	(-15.99)	(-14.89) [c]	(-15.81)	(-4.79)
External	34	*** -14.06 [a]	*** -10.13 [a]	*** -21.45 [a]	** -8.54 [b]	*** -17.49 [a]	*** -10.89 [a]	*** -20.58 [a]	*-8.26 [c]	*** -26.83 [a]	*** -19.30 [a]	*** -37.30 [a]	* -11.43 [c]
		(-12.84) [a]	(-7.40) [a]	(-20.17) [a]	(-2.85) [c]	(-21.34) [a]	(-8.20) [a]	(-14.93) [a]	(-4.39)	(-20.46) [a]	(-18.96) [a]	(-24.83) [a]	(-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]	*** -5.79 [b]	*** -25.50 b	-0.19	-5.67	* -1.82	-14.05	6.54	-5.69	** -8.19 [b]	** -23.82 c	8.46
		(-12.04) [b]	(-5.22) [b]	(-24.93) b	(2.61)	(-3.60)	(-0.22)	(-9.34)	(11.14)	(-1.89)	(-11.59) [b]	(-13.95) c	(13.98) [c]
No	33	*** -12.78 [a]	*** -10.21 [a]	*** -14.04 [a]	*** -10.78 [a]	*** -19.60 [a]	*** -13.90 [a]	*** -20.47 [a]	*** -15.30 [a]	*** -29.37 [a]	*** -23.06 [a]	*** -37.17 [a]	** -16.66 [b]
		(-12.69) [a]	(-7.21) [a]	(-12.31) [a]	(-6.45) [b]	(-24.98) [a]	(-13.68) [a]	(-17.11) [a]	(-11.18) b	(-23.77) [a]	(-21.34) [a]	(-27.23) [a]	(-11.71) [b]
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*

Notes:

Data in % except sample size.

BHAR: average cross-sectional buy-and-hold abnormal return. Abnormal return calculated for an equally weighted portfolio. Controls or references (SMALL, EPRA NAREIT and size and illiquidity portfolio) are defined in section 6.1.1.

The median is reported between parentheses.

[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.

Figures

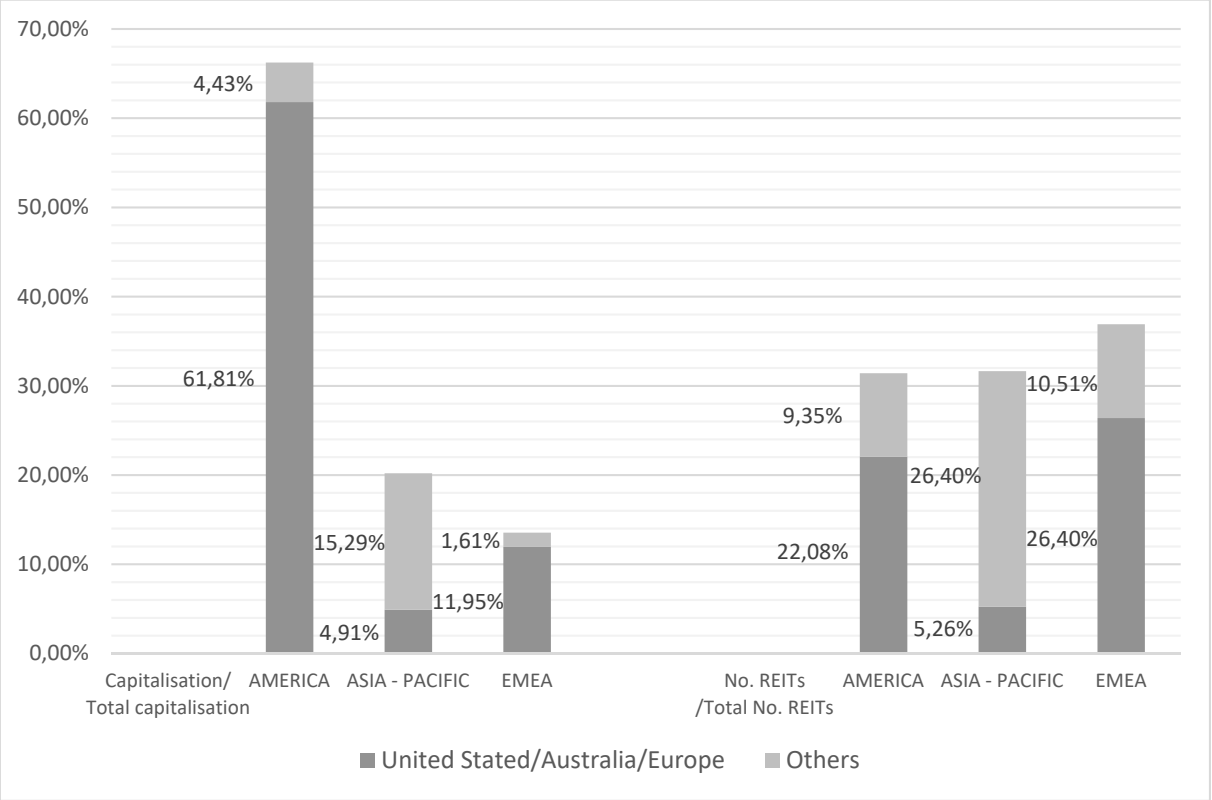

Figure 1. REIT markets around the world at the end of 2019.
Notes:
Europe includes Europe Union and Russian Federation.
EMEA includes Europe, Israel, South Africa, Turkey, United Arab Emirates and Saudi Arabia.
Source:
Own elaboration based on EPRA (2020).

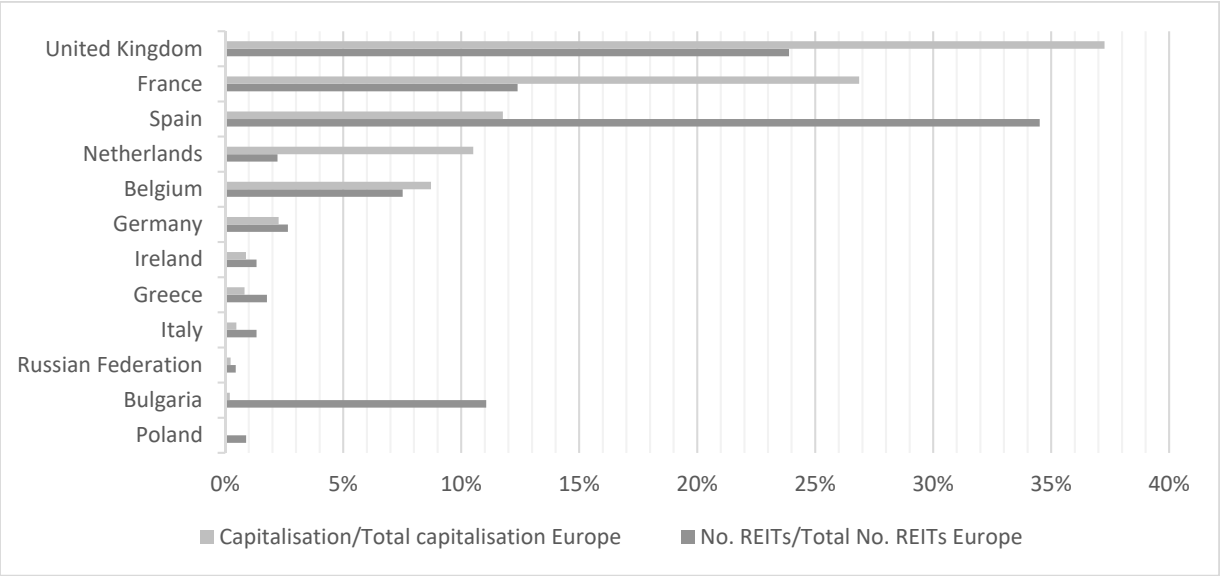

Figure 2. REIT markets in Europe at the end of 2019.
Source:
Own elaboration based on EPRA (2020).

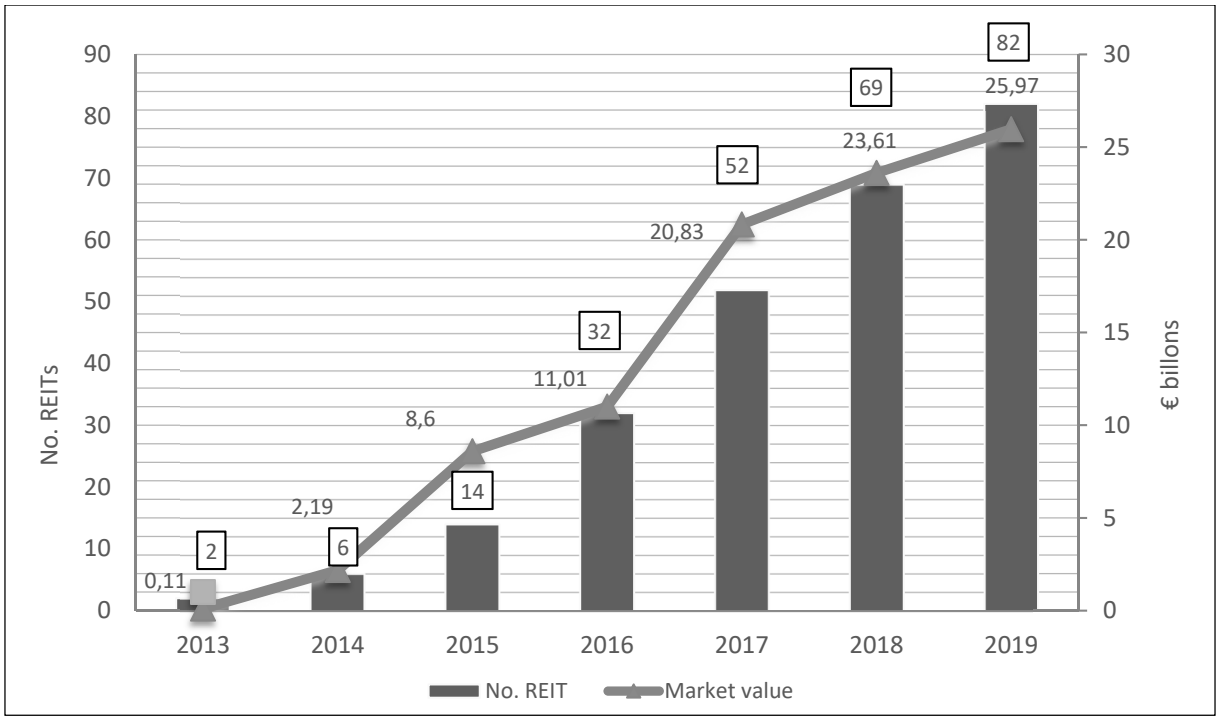

Figure 3. Time profile of REITs in the Spanish stock market during the period 2013–2019.
Source:
Own elaboration based on Bolsas y Mercados Españoles (2019).

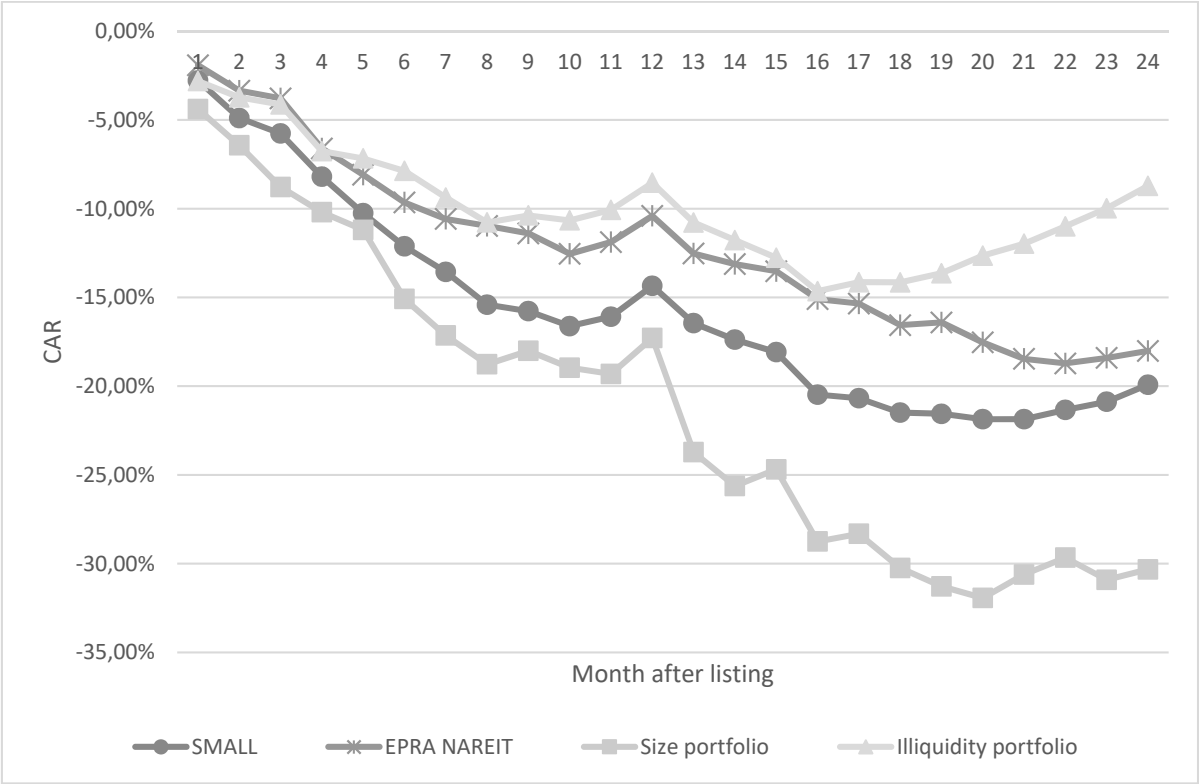

Figure 4. Cumulative average abnormal returns (CAR) calculated for an equally weighted portfolio for a post-REIT admission window of 24 months.

Appendices

Appendix 1. Definition of the explanatory variables.

Definition of the explanatory variables.

SIZE	Market capitalisation on 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	Percentage of shares directly and indirectly retained by shareholders in executive positions according to IDAM information.
ADJUSTED INITIAL RETURN	Adjusted initial-day return. Return on the first day the REIT trades adjusted by the IBEX Small Cap (SMALL) 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	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 & 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	Dummy variable equal to one if the REITs have 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 equilibrium price determined by the appraiser and zero otherwise.