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Public versus Private Market Arbitrage: International Evidence for Listed Property Companies

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Abstract

This paper examines the performance of real estate firms that issue seasoned equity with the stated purpose of investing in private market assets. Prior literature documents that (i) firms, in general, underperform following a season equity offering and (ii) growth firms underperform value firms. We propose a stylized model where firms may arbitrage a public market premium relative to the private market by investing seasoned equity proceeds in the latter market. We hypothesize and test this "public versus private market arbitrage" hypothesis for an international sample of 531 listed property companies spanning 12 countries. Consistent with the predictions of our model, we find that growth firms, those with relatively higher public market values, outperform value firms only under the condition where the stated use of proceeds is for investment purposes as opposed to all other uses, i.e., not investment-related. Our empirical evidence is based on buy-and-hold abnormal returns, time-series portfolio regressions, and firm-level, cross-sectional analysis. Overall, our results are consistent with a value-added strategy of public versus private market arbitrage and highlight the key consideration in the related capital allocation decision.

Key words: public versus private market arbitrage, net asset value, value versus growth, seasoned equity offerings

1. Introduction

Real Estate Investment Trusts (REITs), and Real Estate Operating Companies (REOCs) transform illiquid, private market real estate assets into liquid securities that can trade on public stock exchanges. While the returns between private and public real estate differ in the short term, prior research documents a long-term relationship between the performance indices of public and private real estate markets (e.g. Tuluca et al., 2000, and Yunus et al., 2012). Still, public real estate seems to enjoy a performance advantage relative to private real estate. Specifically, Riddiough et al. (2005) find that public real estate leads private real estate returns by 3% per annum. Ling et al. (2018) attribute the performance advantage of public real estate to the individual property selection of REITs within geographic locations. Our study examines the potential for public real estate managers to capitalize on private market pricing.

REITs and REOCs, as listed property companies, operate at the interface of public and private real estate markets. Their business model is to invest in properties in the private real estate market, while their shares trade on public exchanges. In theory, there should be a close relationship between a listed property company's stock market valuation and the net asset value or NAV implied by the private market values of their underlying property portfolio. In practice, however, there are often substantial deviations between the two metrics. This raises the question whether REITs, or other listed property companies, can take advantage of their share prices trading at a substantial premium relative to the private market values of their property portfolios.

Seasoned equity offerings (SEOs) are a potential channel for exploiting the divergence between public and private market real estate valuations. REITs trading at a premium to their NAV may be able to capitalize on their public market valuation by raising equity in order to acquire private market real estate.

We refer to this value-creation strategy as "public versus private market arbitrage." In this paper, we define such arbitrage as an attempt to increase the value of a company by exploiting price differences between public and private markets. In the case of real estate securities, this means arbitraging valuation divergences between the public and the private real estate markets. In essence, multiple arbitrage hinges on asset valuations varying across different types of markets (i.e., public versus private).[1]

To illustrate how public versus private market arbitrage may create shareholder value, consider the following example. Given a REIT with a NAV of $100 million and a market capitalization of $150 million, i.e. the REIT trades at a premium to NAV of 50%. If this REIT raises $50 million in equity through an SEO,

[1] In general, the academic literature on "multiple arbitrage" is relatively sparse, although the term has been associated with a type of value-creation strategy for private equity firms. See, for example, the citation of a McKinsey Study by Matthews et al. (2009).

the NAV increases from $100 to $150 million. Assuming the REIT ultimately trades at the pre-SEO NAV premium of 50% would result in a market capitalization of $225, i.e. an increase of $75 million with only $50 million being raised in the SEO. To account for the increase in the number of outstanding shares through the SEO, we set the pre-SEO share price at $1, resulting in an initial number of shares equal to the initial market cap of $150 million. Assuming that the new shares in the SEO are issued at the pre-SEO share price of $1, an SEO with a $50 million size increases the number of outstanding shares from 150 to 200 million. Dividing the post-SEO market capitalization of $225 million by the new number of outstanding shares results in a diluted price per share of $1.125, or a return of 12.5% relative to the initial share price of $1.

We generalize the preceding concept in the following section with a simple model that highlights the relation between a firm's relative value, equity offerings, and performance. The model yields three propositions that form the basis for our overarching hypothesis: property companies trading at a premium to NAV prior to issuance will outperform those companies trading at a discount to NAV following their SEOs. The model further illustrates that the same transaction as the one described in the preceding example would result in a negative return for property companies trading at a discount to NAV. Consequently, the model propositions and overarching hypothesis yield three empirically testable implications.

We test the public versus private market arbitrage hypothesis using a sample of 531 REITs and REOCs from 12 countries over the period January 2000 to May 2014. The sample is based on the historical constituents of the FTSE/EPRA NAREIT Global Real Estate Index. The public versus private market arbitrage hypothesis hinges on the property companies actually using their SEO proceeds for investment purposes, i.e. to expand the property portfolio, rather than repaying debt, financing dividend distributions, or using the proceeds for general corporate purposes. We retrieve information about the intended use of proceeds from SNL Financial, which provides written statements from the REITs that were published prior to the SEO. In total, we observe 249 SEOs with the primary stated use of proceeds being "investment" or "acquisition."

For the purpose of our empirical tests, we form portfolios of value and growth stocks, whereby growth (value) stocks are defined as the tercile of stocks with the highest (lowest) NAV-spread for that firm's country in a given period. Our empirical design classifies value and growth firms relative to country-specific NAV-spreads, thereby mitigating the potential for growth or value firms to be concentrated in a country or region. In addition, we find that throughout our sample period, growth stocks trade on average at a significant premium to their NAVs, whereas value stocks tend to trade at substantial NAV discounts. This partition enables us to build equal-size portfolios of growth stocks, which we hypothesize will benefit the most from SEOs, versus value stocks, which should obtain negative abnormal returns following SEOs.

We take a multi-pronged empirical approach to test the public versus private market arbitrage hypothesis. First, we calculate average buy-and-hold abnormal returns (BHARs) over the 12 months following the SEO, to examine whether growth firms outperform value firms. We find that growth REITs with investment SEOs on average outperform the listed real estate index of their home country by 4.46% over the 12 months following the SEO. In contrast, value REITs on average underperform their peers (-2.87%). Consistent with the public versus private market arbitrage hypothesis, the difference (7.33%) is statistically and economically significant.

Next, we follow the calendar-time approach advocated by Fama (1998), as well as Mitchell and Stafford (2002), and build portfolios of value and growth stocks that issued SEOs over the previous 12 months. We then benchmark the portfolio returns against the four-factor model of Carhart (1997), using time series regressions. Consistent with the prediction that Investment-SEOs are value-destroying for REITs trading at a discount to NAV, the risk-adjusted performance of value REITs following SEOs is negative and statistically significant (-0.39% per month). In contrast, growth REITs outperform their benchmark following SEOs by 0.49% per month, although the effect is not statistically different from zero. We also form long-short portfolios of growth and value stocks with SEOs over the previous 12 months. The investment strategy of buying growth stocks with SEOs and selling short value stocks with SEOs produces positive and significant abnormal returns (0.99% per month). In summary, our findings are consistent with the public versus private market arbitrage hypothesis.

Finally, and as a third empirical approach, we examine the public versus private market arbitrage hypothesis using a firm-level, cross-sectional analysis. This strategy enables us to control for firm size, REIT status, and country fixed effects. Consistent with the portfolio regression results, we find a positive marginal effect associated with the SEOs of growth stocks, and a negative marginal effect for value stocks with SEOs. We also provide evidence that the marginal effect on performance is robust across global regions.[2]

Our paper contributes to several strands of the literature. First, we contribute to a growing literature which increasingly distinguishes by the stated use of proceeds when examining the shareholder wealth effects of SEOs. Early papers document a significant underperformance following the SEOs (e.g. Spiess and Affleck-

[2] We gratefully acknowledge the suggestions of two anonymous referees for motivating this additional analysis and the third prong of our empirical approach. A cross-sectional analysis allows us to control for heterogeneity across countries that cannot be accounted for in our time-series, portfolio analysis. Furthermore, it is important to note that there are considerable institutional differences across international listed-property markets. For instance, and as stated by a referee, in Hong Kong, the real estate markets are dominated by large cap real estate operating firms (mostly developers), and the REIT market in Hong Kong is relatively small and fragmented; whereas in the US, the REOCs are small in size compared to REITs, and operate in technically very different environments across the world. Our firm-level analysis, which is described in the empirical strategy section, along with the corresponding results, account for these concerns.

Graves, 1995). The effect is attributed to firms issuing equity when their shares are overvalued (Myers and Majluf, 1984). Howton et al. (2000) and Cline et al. (2014) find that REITs, too, tend to underperform following SEOs. Walker and Yost (2008) find that the market reacts more favorably to SEOs when the firm provides specific plans for the use of the soon-to-be-raised capital. Autore et al. (2009) find that non-REIT issuers stating "investment" as their use display little or no subsequent underperformance, whereas "recapitalization" or "general corporate purposes" experience abnormally poor performance in the subsequent three years. Also, Silva and Bilinski (2015) find that firms citing investment needs show no abnormal performance after the offering. We go beyond the extant literature by considering the firm`s stock market valuation, relative to the private market value of its underlying assets, when examining the shareholder wealth effects of Investment-SEOs.

Second, our paper contributes to the literature on asset growth. Existing studies document a negative relation between a firm`s asset growth rate and future stock returns (e.g. Cooper, Gulen and Schill, 2008, and Lipson, Mortal and Schill, 2011). Focusing on U.S. REITs, Ling et al. (2019) find the effect of asset growth on returns is negative only when financed with debt, whereas equity-financed growth has a neutral effect.[3] In additional analyses, the authors find that the asset growth effect is less negative for REITs trading at a premium to NAV, suggesting that these REITs possess a (debt) cost of capital advantage. Building up on the work of Ling et al. (2019), we demonstrate under which conditions asset growth can actually *increase* shareholder value rather than merely being less destructive.[4] While Ling et al. (2019) is not explicit about the potential cost of capital advantages, our theoretical model demonstrates how REITs trading at a premium (discount) to NAV can create (destroy) shareholder value through the channel of increasing *equity* (rather than debt). In contrast to Ling et al. (2019), we provide empirical evidence that REITs trading at NAV premiums create shareholder value. Moreover, we provide empirical evidence that SEOs are value-destroying for REITs trading at a discount to NAV. The differences with respect to our results may be attributed to a more refined empirical approach, which enables us to account for the precise timing and nature of the capital issuance. We follow the event study literature and use the exact timing of the SEO. Moreover, the data we use to differentiate between REITs trading at NAV discounts or premia are updated on a monthly basis. In contrast, the lower frequency annual balance sheet data that is commonly used in the asset-growth literature may be criticized as being stale.

[3] In other recent studies, Feng and Wu (2021) find that firm-level local economic growth is positively related to the equity value of REITs that allocate more assets in high growth areas. Huerta-Sanchez, Ngo and Pyles (2020) find a net positive effect in REIT operating performance for asset acquisitions relative to equity acquisitions. These studies address REIT growth and complement our work on public versus private market arbitrage.

[4] Riddiough and Wu (2009) investigate REIT investment from a different perspective. Although their study includes equity offerings as a control, the primary focus is on the interplay between investment and liquidity management.

Third, our results lend indirect support to the market timing theory of capital structure by Baker and Wurgler (2002) and the value versus growth debate. According to Baker and Wurgler (2002), firms time the market opportunistically with their capital issuance decisions. Boudry et al. (2010) provide evidence that the equity issuance decisions of REITs are also consistent with the market timing theory of capital structure. Such a strategy makes sense, particularly, if the degree of stock over- or undervaluation relative to the underlying firm value is of a mean-reverting nature. This dynamic is examined by Woltering et al. (2018), who document substantial abnormal returns from the investment strategy of systematically buying value REITs and shorting growth REITs. As NAVs and share prices converge, value REITs outperform, whereas growth REITs underperform. While those findings suggest that, *on average,* NAV discounts and premiums are too extreme, they are not irrational per se.[5] Focusing on U.S. REITs, Ooi et al. (2007) document that investors may also be rewarded with superior returns when the share price of undervalued REITs revert to their fundamental values. However, these authors find no evidence that growth REITs are overpriced. This lack of mean reversion suggests that at least some growth REITs can trade at a premium relative to their NAVs on an ongoing basis. Our results provide a rational explanation for this phenomenon. Public versus private market arbitrage can enable growth REITs to produce positive abnormal returns on an ongoing basis, not despite, but *because* of their high stock prices relative to their underlying asset values.

The remainder of this paper is organized as follows: Section 2 presents a stylized model of public versus private market arbitrage. Section 3 outlines the empirical strategy and describes the data. Section 4 contains the empirical results and Section 5 concludes.

2. A Stylized Model of Public versus Private Market Arbitrage

The overall aim of this paper is to examine the public versus private market arbitrage hypothesis. The basic premise is that a firm whose public stock market valuation exceeds the private market value of its underlying assets can create shareholder value by issuing new shares through an SEO and investing the proceeds to expand their underlying asset portfolio. If the newly raised and invested capital ultimately trades at the pre-SEO premium valuation, shareholders will benefit from a positive abnormal return. Conversely, SEOs will destroy shareholder value if the firm trades at a discount to its private market value before and after the SEO.

[5] Yavas and Yildirim (2011) find the correlation as well as the lead-lag relationship of returns in public versus private real estate markets is dynamic, and that it can change across real estate sectors and within individual firms. In the context of our analysis, Yavas and Yildirim's results suggest that CEOs of listed property companies have only a limited window to benefit from potential arbitrage opportunities. We incorporate this implication in our empirical design.

In this section, we provide a stylized model in order to more formally express these concepts. To isolate the public versus private market arbitrage scheme, we assume there are no idiosyncratic factors other than the SEO that have an effect on the firm`s stock price over the examination period. In our model, we also assume that there are no market-wide or systematic factors that drive the returns of the particular stock or the sector as a whole. As a result, any positive stock performance between two periods is also a positive abnormal return or excess return relative to the market portfolio or another reasonably defined benchmark.

Whether or not an SEO generates shareholder value depends solely on the change in the price per share between period *t* and *t+1*. We define the share price in period *t* as the *pre*-SEO share price. The share price in period *t+1* is the *post*-SEO share price. We assume that by the end of period *t+1*, the firm has completed the SEO process. The process involves having invested the proceeds in private market assets of similar quality, using similar financial leverage, and that the assets are completely integrated into the firm`s existing asset portfolio. This leaves us with three scenarios concerning the multiple arbitrage (excess) return:

$$r_{t+1} = \begin{cases} > 0, \; if \; P_{t+1} > P_t \\ = 0, \; if \; P_{t+1} = P_t \\ < 0, \; if \; P_{t+1} < P_t \end{cases} \qquad (1)$$

A key aspect of our theory is that the effect of the SEO on the shareholder return depends on the ratio of the firm's public-to-private market valuation. The private market value of a firm`s property portfolio less debt, is typically referred to as Net Asset Value or NAV. The NAV per share can then be compared to the equity market capitalization (MC), in order to determine the NAV-spread, or Δ:

$$\Delta = \frac{MC}{NAV} - 1 \qquad (2)$$

An implicit assumption is that Δ is time invariant. Under the premise that Δ remains constant, it follows that the market capitalization is a function of the firm`s NAV and Δ:

$$MC_t = NAV_t * (1 + \Delta) \qquad (3)$$

$$MC_{t+1} = NAV_{t+1} * (1 + \Delta) \qquad (4)$$

The total size of the capital raised in the SEO has a direct impact on the firm`s post-SEO NAV:

$$NAV_{t+1} = NAV_t + SEO \qquad (5)$$

From equation (4) it follows that the post-SEO market capitalization is:

$$MC_{t+1} = (NAV_t + SEO) * (1 + \Delta) = MC_t + SEO * (1 + \Delta) \qquad (6)$$

As a consequence of the SEO, the number of outstanding shares increases. This has a diluting effect on existing shareholders, as earnings are to be shared over a larger base of shares following the SEO. We therefore express the initial share price P_t (and later P_{t+1}) as a function of the firm`s MC and the number of outstanding shares:

$$P_t = \frac{MC_t}{NOSH_t} \qquad (7)$$

$$NOSH_t = \frac{MC_t}{P_t} \qquad (8)$$

Assuming that the new shares issued in the SEO are priced at the pre-SEO share price, the number of shares increases in proportion to the SEO size:[6]

$$NOSH_{t+1} = NOSH_t + \frac{SEO}{P_t} = \frac{MC_t + SEO}{P_t} \qquad (9)$$

This enables us to express the public versus private market return generated in the SEO process as follows:

$$r_{t+1} = \frac{P_{t+1}}{P_t} - 1 \qquad (10)$$

$$= \frac{\frac{MC_{t+1}}{NOSH_{t+1}}}{P_t} - 1 = \frac{MC_{t+1}}{NOSH_{t+1} * P_t} - 1$$

$$= \frac{MC_t + SEO(1 + \Delta)}{\frac{MC_t + SEO}{P_t} * P_t} - 1$$

$$= \frac{MC_t + SEO(1 + \Delta)}{MC_t + SEO} - 1$$

$$= \frac{SEO * \Delta}{MC_t + SEO} = \frac{SEO}{MC_t + SEO} * \Delta$$

[6] This is not a strong assumption. Goodwin (2013) compares the SEO share price with the prior day closing price and finds an average discount of only 1.77%.

From the final transformation of equation (10) it follows that the public versus private market (excess) return is proportional to Δ and also depends on the SEO issue size.

In summary, our model shows that SEOs have a neutral impact on the share price if Δ is 0. In this case, the increase in NAV is exactly offset by the dilution associated with the increase in the number of shares. On the other hand, if Δ is positive, the increase in market capitalization is more than proportional to the increase in the number of shares, resulting in a positive abnormal return. Finally, our model predicts a negative abnormal return if Δ is negative. These propositions are summarized as follows:

$$r_{t+1} = \begin{cases} > 0, \ if \ \Delta > 0 \\ = 0, \ if \ \Delta = 0 \\ < 0, \ if \ \Delta < 0 \end{cases} \qquad (11)$$

Together, the three propositions form the basis for our empirical strategy to test the public versus private market arbitrage hypothesis. We note that in a narrow sense the first proposition alone (i.e. positive abnormal performance following SEOs for firms trading at a premium to NAV) may be sufficient to test the public versus private market arbitrage hypothesis. However, the third proposition contributes to a more robust empirical strategy and can provide complementary evidence. If the empirical evidence shows that SEOs have a negative effect for firms trading at NAV discounts, then our analysis has addressed all elements of the overarching hypothesis that property firms trading at a premium to NAV prior to SEO issuance will outperform those trading at a discount to NAV at issuance.

3. Data and Empirical Strategy

3.1 Data

Our empirical study is based on the firms comprising the *FTSE EPRA/NAREIT Global Real Estate Index* over the period 2000:01 to 2015:05. The index is based on listed property companies with "relevant real estate activities," as defined by the ownership, trading and development of income-producing real estate. In our analyses, we calculate the excess return of property companies relative to the average real estate sector return in the respective country. To ensure that the number of firms per country is sufficiently high, we exclude observations from countries with less than five listed property companies. Our final sample consists of 531 firms from the world's 12 major listed property (i.e., REIT and REOC) markets. Panel A of Table 1 shows the country-level and total number of firms in our sample.

We collect information on the stated use of proceeds from *S&P Global Market Intelligence* (formerly *SNL Financial)*. *SNL* provides qualitative statements issued by firms when filing for an SEO regarding their intended use of proceeds. We classify the use of proceeds into *investments*, *general corporate purposes*, *improvement of the financial situation* and *other uses*. Firms often provide a mixture of these reasons for the use of proceeds. In our analysis, we focus on SEOs for which acquisitions or investments are the exclusive or, at least, primary stated use of proceeds. Overall, our sample includes 2074 SEOs, of which 707 have the exclusive or primary stated use of proceeds as being "acquisitions" or "investments" (see Table 1, Panels B and C, respectively). Of the total SEOs, 1366 are classified as SEOs for which the use of proceeds is not investment-related or there was at least another primary use (see Table 1, Panel D). In our empirical analysis, this last subgroup serves as a counterfactual for which we do not predict abnormal returns as we do for investment-related SEOs.

Based on the propositions of our model, only growth firms are expected to benefit from investment SEOs, whereas negative abnormal returns are predicted for value firms with investment SEOs. At the same time, it is possible that a potential selection bias exists if – arguably, based on rational actions – only growth firms choose to issue SEOs, whereas value firms pursue other strategies. However, and to the contrary of this intuition, Panel C, Table 1 documents a total number of 150 investment SEOs for value firms and 107 investment SEOs for growth firms. The fact that we observe a higher number of investment SEOs by value firms suggests that our sample is not biased towards investment SEOs by growth firms. The use of SEOs for investment purposes by both growth and value firms lends supports to the appropriateness of our empirical strategy.[7]

A key metric in our study is the NAV from which we derive the NAV-spread to distinguish between value and growth stocks. For a significant portion of our sample, the NAV is equal to the book value of equity per share. This condition is evident for firms that report according to the International Financial Reporting Standards (IFRS), which was introduced in Europe and many other countries in 2005. In these cases, the NAV is the sum of the firm's valuation components, which comprise its underlying property values and other assets less liabilities. In particular, IFRS accounting standard IAS 40 requires investment properties to be reported at fair value (or market value). We, thus, control for differences in property investment type, age, and other differences, since these factors are all captured by market value. Such fair value, or mark-to-market accounting applies to the REITs and REOCs from the 11 non-U.S. countries considered in our study.[8] Only U.S. firms do not fulfill this condition since they use the historical cost-based U.S.-GAAP

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[7] We thank an anonymous referee for drawing our attention to this potential selection issue.
[8] Our choice of the 11 IFRS countries included in our sample follows Woltering et al. (2018), who require a minimum of five listed property companies at each point in time.

accounting system. For U.S. firms, we use the average NAV per-share estimates of financial analysts as provided by SNL on a historical basis. These NAV estimates are available for U.S. REITs and REOCs from the beginning of our analysis in 2000. For the small part of the non-U.S. sample before 2005, our sorting procedure is less precise. Nevertheless, the book value of equity per share is still a reasonable proxy for the partition between value and growth firms that is used in almost all asset-pricing studies.

The majority of asset pricing studies separate value and growth stocks only once per year and base this on end-of-June data for the book-to-market ratio of equity (e.g., Fama and French 1993). The rationale behind this procedure is to ensure that financial reporting data for the previous year are published and available to all investors. We obtain quarterly updated book values of equity per share using Datastream's "Earnings per share report date (EPS)." We can thus ensure that financial reporting data are actually published as new portfolios are formed. For example, if the annual report for calendar year 2014 is published in April 2015, Datastream will report a new book value of equity from December 2014 onward. We control for this by shifting this information forward by four months using the "Earnings per share report date." Our NAVs are updated on a monthly basis, as the NAV-spread changes with each new share price by the end of the month. Table 1, Panel E shows the average price-to-NAV ratios for the firms in our sample. The average total returns, which we also obtain from Datastream, are shown in Panel F of Table 1.

3.2 Empirical Strategy and Hypotheses

The public versus private market arbitrage hypothesis states that firms whose stock market valuation exceeds the private market value of their assets can create shareholder value by issuing equity and investing the proceeds to buy more private market assets. Likewise, the same reaction will result in negative abnormal returns for firms whose stock price is lower than the private market value of their assets. Consequently, a portfolio of stocks from the former group should outperform a portfolio of stocks from the latter group.

As shown in equation 10, the magnitude of the predicted abnormal return depends on the size of the NAV-spread. One challenge in testing our public versus private market arbitrage hypothesis is finding a sufficient number of firms with Investment-SEOs, while also trading at a significant premium (or discount) to NAV. Listed property companies that trade at only a minor premium (or discount) to NAV do not appear suitable for detecting potential abnormal returns, as there are also idiosyncratic risk factors that impact an individual firm's returns over the post-SEO observation period.

In order to achieve a clear separation between firms that are predicted to benefit from public versus private market arbitrage compared to firms that are expected to destroy shareholder value, we pursue a so-called portfolio approach. In any given period, we split the sample into terciles based on the NAVS (or price-to-

NAV ratios). Next, we form the following three portfolios: 1) The "growth" portfolio, which consists of the tercile of stocks with the highest NAV premiums, 2) the "mid" portfolio, which consists of the tercile of stocks with median NAV premiums, and 3) the "value" portfolio consisting of the tercile with the greatest discount to NAV (i.e., lowest NAV premium).

This approach is analogous to the value versus growth separation in the finance literature that is typically based on the price-to-book ratios of common stocks. In our study, we use NAVs instead of book values as this has the advantage that they are based on frequently updated private market valuations of the property portfolio. Another advantage of the portfolio-approach is that it ensures an equal number of observations for the two groups with the most extreme NAVSs. These groups are of particular interest to us. This is important since the number of relevant SEOs in our sample is limited.

A potential concern with this approach of building portfolios is whether they do a reasonably good job of actually separating firms trading at significant NAV premium from firms with significant NAV discounts. The second (third) row of Panel E in Table 1 shows the average price-to-NAV ratios for the tercile portfolio of value (growth) stocks. The average price-to-NAV ratio of growth stocks in our sample is 1.68, which corresponds to a 68% premium to NAV. In contrast, the average price-to-NAV ratio of value stocks is 0.81, or a discount to NAV of 19%. These numbers indicate that the separation works well with respect to the average over the complete sample period.

Figure 1 shows the evolution of the price-to-NAV ratios over the sample period. The figure reveals that the value and growth separation works well throughout the whole sample period. The grey line with the long dashes shows that growth stocks trade at a premium to NAV throughout the sample period, including the 2009 financial crisis. In contrast, the dark solid line shows that value stocks trade continuously at a discount to NAV.

A necessary condition for public versus private market arbitrage to generate abnormal returns is that the firms ultimately trade close to their pre-SEO stock market valuation as measured by the NAVS or, at least, not much lower. Figure 2 shows the average price-to-NAV ratios for value and growth stocks for the 12 months around the date of the SEO. The figure reveals that the price-to-NAV ratios remain relatively constant around the SEO date, which is consistent with our theory.

Based on the propositions from the model in Section 2 and the empirical strategy outlined in this section, we formulate our testable hypotheses as follows:

Hypothesis 1: Investment-SEOs are associated with positive abnormal returns for property companies that trade at a premium to NAV (i.e., Growth REITs).

Hypothesis 2: Investment-SEOs are associated with negative abnormal returns for property companies that trade at a discount to NAV (i.e., Value REITs).

Hypothesis 3: The portfolio of growth property companies with Investment-SEOs outperforms the portfolio of value property companies with Investment-SEOs.

We emphasize that the first hypothesis is most closely aligned with the arguments for public versus private market arbitrage opportunities. However, the second and third hypotheses provide for a more comprehensive analysis of our overarching hypothesis. In one sense, all three hypotheses are complementary; although, none alone is sufficient as evidence for public versus private market arbitrage.

The hypotheses derived from our model provide clear arguments in favor of conducting investment-related SEOs when firms trade at a premium to NAV. On the other hand, it remains less obvious why the management of firms trading at a discount to NAV would think it is a good idea to issue equity. While this may hint at a potentially endogeneity in the decision to issue seasoned equity, it is noteworthy that there are more investment-related SEOs by value stocks (150 SEOs), in our data (See Table 1, Panel C), as opposed to SEOs by growth stocks (107 SEOs).

4. Empirical Results

In this section, we present the results obtained using the three prongs of our empirical strategy: (1) buy-and-hold abnormal returns, (2) time-series portfolio regressions, and (3) firm-level, cross-sectional analysis for an international sample of property firms with SEOs.[9]

4.1 Buy-and-Hold Abnormal Returns

To empirically test our hypotheses, we first follow the traditional literature on SEOs and calculate buy-and-hold abnormal returns (BHARs) to measure the post SEO investment performance. We use BHARs rather than cumulative abnormal returns (CARs), since this method more closely reflects the investor experience when buying SEO shares and holding them subsequently. BHARs also avoid the unrealistic rebalancing assumption implicit in CARs, which leads to high transaction costs (Barber and Lyon, 1997). According to Kothari and Warner (1997), CARs also lead to positively biased abnormal returns.

To calculate BHARs, we first calculate a firm's post-SEO buy-and-hold return (BHR):

$$BHR_i = \prod_{t=1}^{T}\left(1 + R_{i,t}\right) - 1 \qquad (12)$$

[9] We, again, gratefully acknowledge two anonymous referees for suggesting the firm-level, cross-sectional analysis.

where $R_{i,t}$ is the return of firm i in month t, and T is the earlier of the 12-month issue anniversary or the delisting date.

We then calculate the BHAR by subtracting a benchmark return from the BHR. Specifically, *BHAR* for issuing firm i is calculated as the difference between the *BHR* of the issuing firm and the *BHR* of the benchmark:

$$BHAR_i = \prod_{t=1}^{T}(1 + R_{i,t}) - \prod_{t=1}^{T}(1 + R_{benchmark,t}) \qquad (13)$$

where $R_{benchmark,t}$ is the EPRA/NAREIT index for the home country of firm i.

Figure 3 shows the average cumulative buy-and-hold abnormal returns (BHARs) over the 12 months following an SEO. The benchmark return for each company is the country-level EPRA/NAREIT index based on the firm's domicile. All BHARs are based on non-overlapping events (i.e. for a firm with a second SEO within 12 months, the first SEO and the subsequent performance are excluded from the sample).[10] The graphs on the left side of Figure 3 show the post-SEO performance for all firms, whereas the graphs on the right distinguish between the subsamples of value and growth stocks. Value (growth) stocks are defined as the tercile of stocks with the lowest (highest) price-to-NAV ratio in their country. Following a capital offering, the value or growth classification of a stock is held constant for the following 12 months.

The first pair of graphs shows the post-SEO performance for firms in general. Here, the use of proceeds is "any," which includes Investment-SEOs and "all other"-SEO purposes. The first graph on the top left indicates that the SEOs in our sample are on average not associated with abnormal excess returns. The respective average BHARs after 12 months and their t-statistics are reported in Table 2. The average SEO in our sample has an abnormal return of 0.97% after 12 months, which is not statistically different from zero. This result differs from the underperformance of SEOs documented in the general finance literature, as well as Howton et al. (2000), which finds significant underperformance for a sample of U.S. REITs that precedes our sample period.[11] The graph on the top right of Figure 3 distinguishes between the post-SEO performance of value and growth stocks. While value stocks tend to perform slightly better on average, the mean BHARs are again not statistically different from zero as reported in Table 2, Panel A.

[10] Due to the exclusion of overlapping SEOs, the number of SEOs used in this section is generally lower than shown in the descriptive statistics (Table 1) and also lower than in the subsequent "portfolio-approach" analysis, which includes overlapping SEOs. Removing overlapping SEOs also has the advantage of reducing the possibility that our results are driven by a few high-frequency SEO firms.

[11] Gokkaya et al. (2013) provide evidence of lower direct issuance costs for REITs versus comparable industrial firms, which may explain the relatively better performance of SEOs for the listed property companies in our sample. Moreover, Devos et al. (2019) document that REIT analysts tend to be highly optimistic around IPOs, and not optimistic surrounding SEOs. The corporate finance literature, generally, associates capital issuance optimism with low future returns.

The second pair of graphs in Figure 3 shows the post-SEO performance following Investment-SEOs. The graph on the left reveals that the average Investment-SEO also neither adds nor destroys shareholder value. The average BHAR after 12 months for Investment-SEOs is 0.92%, which as shown in Table 2 is not statistically different from zero. Next, we come to the graph on the right, which is of primary interest in our study as it distinguishes between the BHARs of value and growth stocks following Investment-SEOs. The graph shows a pronounced difference between the post-SEO performance following Investment-SEOs of value (solid line) and growth stocks (dashed line). Panel B of Table 2 reports that the average 12-month BHAR of growth stocks following SEOs is 4.46%. This effect is considerable in economic terms, although not statistically significant, which may be explained by the relatively small number of 67 non-overlapping Investment-SEOs for growth stocks. Similarly, value stocks with Investment-SEOs underperform their benchmark by 2.87%, although the average 12-month BHAR is also not statistically significant (t-statistic: -1.55). However, we find statistical evidence in favor of Hypothesis 3. The average 12-month BHAR of growth stocks following Investment-SEOs is 7.33% higher than for value stocks. This abnormal return is statistically significant (t-statistic: 2.23).[12, 13]

The third pair of graphs in Figure 3 shows the cumulative BHARs following non-investment-related SEOs (i.e., "all other" proceed uses). This group serves as a counterfactual to the Investment-SEOs, as our public versus private market arbitrage hypothesis hinges on the SEO proceeds being invested in the private real estate market as opposed to being used to fund general corporate purposes, repay debt, or finance dividends. In contrast to the Investment-SEO results, we do not find statistical evidence of abnormal returns following "all other" SEOs. It is notable that in this setting, value stocks tend to perform slightly better than growth stocks, which contrasts with the effect observed for Investment-SEOs. This may be explained by the general tendency of value stocks to outperform growth stocks (see Woltering et al., 2017). This effect, which is also dubbed the "value premium," is also evident in our sample. Table 1, Panel F documents that the average monthly return of value stocks is considerably higher than the average for growth stocks (1.46% versus 0.81%). The effect has important implications for our analysis, as it represents a relatively high hurdle for our hypotheses, which effectively predict the opposite, i.e. that growth stocks outperform value stocks under the specific public versus private market arbitrage conditions described in this paper. As a result, obtaining

[12] Following the suggestion of an anonymous referee, we also compute BHARs using an alternative performance benchmark, where the control group (i.e. the benchmark return) is limited to property firms that had no SEOs over the same periods. Again, growth firms with investment SEOs perform noticeably better than their value counterparts, although the difference (4.89%) is not statistically different from zero. The results are available from the authors upon request.

[13] In unreported results we also examine the abnormal returns of investment SEOs for the 12 months preceding the SEO. We note a comparable underperformance in the 12 months preceding an investment SEO for both value stocks (-5.0%) and growth stocks (-6.0%). Although, most of the underperformance can be attributed to the period at least eight months prior to the SEO, which suggests that a relationship between the announcement effect and other events directly linked to the SEO event is less likely.

significant results becomes effectively more difficult compared to a setting without this opposing tendency. In the following sections, we examine this issue in more detail.

4.2 Portfolio Regressions

Fama (1998) and Mitchell and Stafford (2000) advocate the use of a calendar-time approach for event studies, rather than using CARs or BHARs. This method is less susceptible to the "bad model" problem and does not compound spurious abnormal returns. The disadvantage of using the calendar-time method is that the approach has lower power to detect abnormal performance compared to event-time analysis. Loughran and Ritter (2000) show that using the Fama and French (1993) model captures only 50% of true abnormal returns, compared with 80% captured by BHARs, with size and book-to-market matched firms as benchmarks.[14]

In our study, using the calendar-time approach requires forming portfolios of value and growth stocks, whereby the portfolio constituents have an SEO in the previous 12 months, including the month of portfolio formation. To test for abnormal (risk-adjusted) performance after the SEO, we use a real-estate-sector-specific variation of the Carhart (1997) four-factor model.

$$R_{p,t} - r_{f,t} = \propto_p + \beta_1 \left(R_{M,t} - r_{f,t}\right) + \beta_2 SMB_t + \beta_3 HML_t + \beta_3 WML_t \qquad (14)$$

We use equally-weighted portfolio returns, as opposed to value-weighted returns, to be consistent with the event study literature and prior studies that employ calendar-time regression analysis.[15] Consequently, we also use the equally-weighted return of all real estate stocks of a country as the benchmark portfolio. The size factor (SMB), book-to-market factor (HML), and the momentum factor (WML) are also equally weighted, thereby representing a country-weighted average that reflects the time-varying population of

[14] Our empirical approach using BHARs and calendar-time portfolio regressions precludes using firm-fixed effects.

[15] We follow the recent SEO literature which reports mean BHARs and calendar-time regressions using equally-weighted portfolio returns. Autore et al. (2009), Cline et al. (2014), Chan and Walter (2014), Silva and Bilinski (2015), and Kim et al. (2018) are all examples that follow Loughran and Ritter (2000). The latter stresses that value-weighted portfolio returns can be driven by individual, large firms. This concern is particularly acute for our sample as it is limited by the number of firms in the property sector and the fact that firms in some countries are systematically larger than in other countries. In the next section, we specifically address the potential influence that country- and regional-specific differences may have on our results. Moreover, Fisher et al. (2012) contend the upward bias of equally-weighted return indices is less pronounced for REITs relative to non-REIT stocks and that the bias has diminished over time. Any remaining bias in our sample should not impact the conclusions of our analysis as both our portfolio return and benchmark return are equally-weighted.

international real estate stocks in our sample.[16] Note that in the preceding analysis of BHARs, we use the national EPRA indices (value-weighted) as opposed to the EPRA index as a benchmark. That approach is appropriate as BHARs require no rebalancing. Due to our relatively small sample size, we must deal with outliers in the calendar-time portfolio analysis. Consequently, the benchmark employed is equally weighted.

In the following, we discuss the portfolio-level regression results using the calendar-time approach. All regression specifications are based on the Carhart four-factor model (equation 14). First, we estimate regressions for the full value and growth portfolios to determine whether there is evidence of a "value premium" in our sample. This analysis is noteworthy as positive abnormal returns for value stocks and negative abnormal returns for growth stocks would imply a higher hurdle for testing our public versus private market arbitrage hypothesis as reflected in Hypothesis 3.

Table 3 reports the Carhart four-factor regression results for our full sample (i.e., not restricted to firms with SEOs). The first column contains the regression results for growth stocks. The growth stocks in our sample on average obtain negative risk-adjusted returns of -0.17% per month. The effect is statistically significant at the 10% level. In contrast, value stocks obtain positive and significant risk-adjusted returns of 0.24% per month (column 2). Accordingly, it is no surprise that the long-short portfolio (column 3), which is long growth stocks and short value stocks, obtains significantly negative risk-adjusted returns of -0.41% per month. We note that the reported R-squares are relatively high; however, this is not uncommon. In our case, we are explaining portfolio returns in a time-series setting using a sector-specific benchmark return. When using a four-factor model, R-squares of 90% and higher can be expected in time-series portfolio regressions (see, for example, Asness et al., 2013), especially when sector-specific benchmark returns are employed (see Woltering et al., 2018 and Chen et al., 2020).

In summary, the results are consistent with Woltering et al. (2018), whose sample only starts in 2005 and excludes U.S. stocks. The Table 3 findings imply that portfolios consisting of value stocks exhibit an advantage in outperforming portfolios consisting of growth stocks. Accordingly, this tendency represents a hurdle for our subsequent tests that aim to detect whether growth stocks *outperform* value stocks subsequent to Investment-SEOs.

Next, we restrict the value and growth portfolios to the subset of those firms with SEOs in the previous months. This analysis enables us to compare our sample to prior SEO studies. Table 4 contains the Carhart four-factor regression results for diverse portfolios of REITs and REOCs with any type of SEO in the prior

[16] The monthly SMB, HML and WML factors are obtained from Kenneth French's website (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/datalibrary.html). French's data library provides regional factors for Asia Pacific ex Japan, Europe, Japan, and North America, so we use the regional factors for the respective countries.

12 months, i.e. we do not distinguish by the use of proceeds. Column 1 contains the results for the portfolio consisting of all stocks with any type of SEO in the prior 12 months. The average abnormal return is not statistically different from zero. In contrast to earlier studies, we do not find that SEOs tend to destroy shareholder value. Column 2 shows the results for the subsample of growth stocks with SEOs. Again, the risk-adjusted return is not significantly different from zero. However, and in contrast to growth stocks in general (see Table 3), it is also not negative. Likewise, value stocks with SEOs no longer obtain positive abnormal returns. In joint consideration with the Table 3 results, these findings suggest that the performance of value and growth listed property companies are affected by SEO activity. We examine this issue in more detail, reported in Tables 5 and 6, by distinguishing among the intended use of SEO proceeds.

Table 5 reports the primary results related to hypotheses 1-3. The first column reports the estimation results for the portfolio consisting of all stocks with Investment-SEOs. As in Table 4, the risk-adjusted return is not statistically different from zero. The results in the second column refer to the portfolio of growth stocks with Investment-SEOs in the prior 12 months. Here, we find an economically high abnormal return of 0.49% per month. While it is remarkable that growth stocks with Investment-SEOs seem able to evade the typically negative abnormal returns for growth stocks, we do not find statistical evidence in favor of Hypothesis 1 (t-statistic: 1.03).[17] The third column reveals that the portfolio of value stocks with Investment-SEOs has a negative and statistically significant abnormal return. This result supports Hypothesis 2. The regression results in column 4 test whether growth stocks with Investment-SEOs outperform value stocks with Investment-SEOs (Hypothesis 3). The monthly alpha of the long-short portfolio is 0.98% and statistically significant. Overall, the Table 5 results are consistent with the public versus private market arbitrage hypothesis. The fact that the growth stock results are not significant can be attributed to a lack of statistical power in this test due to the headwind or hurdle for growth stocks to outperform their benchmark (i.e., the reverse of the value premium as seen in Table 3, column 1).

Table 6 reports the regression results for portfolios consisting of non-investment-related SEOs. These regressions serve as counterfactuals for the Table 5 results. The Table 6 results reveal that value and growth stocks do not perform differently following non-investment related SEOs. This result lends indirect support to our central hypothesis for Investment-SEOs. We offer two potential explanations for the lack of NAV-spread-dependent outperformance for value and growth stocks following non-investment related SEOs. First, when SEO proceeds are not used to expand the property portfolio, the diluting effect of the increase in the number of shares is not accompanied by an increase in the operational performance metrics such as

[17] Note that the number of observations for growth stocks with Investment-SEOs is slightly reduced as there are some periods where none of the firms satisfy both criteria. The relatively small number of observations for this particular and critical aspect of our analysis prohibits a further split of the sample (e.g. by countries or regions).

FFO. We thus cannot reasonably expect the REITs to continue trading at pre-SEO ratios of price to fundamental value. Second, value stocks are more likely than growth stocks to suffer from financial distress due to excessive debt (Fama and French, 1995). Hence, these value stocks tend to raise equity through SEOs in order to improve their financials and reduce the risk of insolvency. Such a non-investment-related SEO is typically perceived positively by the market, pushing the share price higher and closing the discount to NAV. This is the opposite reaction to the SEO, compared to our Investment-SEO prediction, according to which value stocks underperform following SEOs. Our results highlight the importance of distinguishing by the use of SEO proceeds when it comes to evaluating post-SEO performance of property companies.

4.3 Firm-Level Regressions

In this section, we extend our empirical analysis of the public versus private market arbitrage hypothesis with individual, firm-level data as opposed to portfolio analysis. Firm-level regressions allow us to directly control for firm size, REIT status, and regional differences. Considering these control factors, we estimate variations of the following cross-sectional, panel-regression model:

$$R_{i,t} - r_{f,t} = \propto_i + \beta_1 Inv\_SEO_t + \beta_2 NAVS\_tercile_{t-1} + \beta_3 Inv\_SEO_t * NAVS\_tercile_{t-1} + \gamma Controls_{i,t} \quad (15)$$

$R_{i,t} - r_{f,t}$ is a firm's excess return over the country-specific risk-free rate. Inv_SEO_t is an indicator variable that is equal to one if firm *i* has an Investment SEO in the current or previous 11 months. $NAVS\_tercile_{t-1}$ is an ordinal variable that represents a firm's NAV-spread tercile at the end of the previous month. For ease of interpretation, we define $NAVS\_tercile$ as -1 for value firms, 0 for the middle tercile firms, and 1 for growth firms, the latter being those firms that fall into the highest NAV-spread tercile for their respective countries.

Our primary focus is on β_3, the coefficient on the interaction term between Inv_SEO_t and $NAVS\_tercile_{t-1}$. This interaction term measures the marginal effect of an Investment-SEO on abnormal performance, conditional on the firm's relative valuation at the end of the previous period. Based on the propositions of our model in section 2, we expect a positive (negative) marginal effect for growth (value) firms. Mirroring the empirical approach in our portfolio regressions, we interact the SEO indicator variable with $NAVS\_tercile$ at the end of the previous month. For example, if a firm had an SEO in t-10, $NAVS\_tercile$ measures the *NAV tercile* as of the end of t-11.

Table 7 reports the cross-sectional, panel regression results at the individual firm level based on equation 15. As in the case of the portfolio-level regressions, all models control for the Carhart four-factor variables

MKT, SMB, HML, and WML. In addition, we control for idiosyncratic variables such as firm size and REIT status, and we directly test for the impact of SEOs on REIT returns. Moreover, all models shown in Table 7 are estimated using heteroscedasticity robust standard errors and control for regional effects by way of country fixed effects.

Table 7, model (i) represents our baseline regression results. We first note that the returns of REITs are not statistically different from those of REOCs. The positive and significant coefficient on size captures scale economies enjoyed by larger REITs, which is consistent with the US REIT literature. Firms with an SEO in the current or previous 11 months experience negative abnormal returns; however, the effect is not statistically significant in model (i).

Model (ii) shows a positive marginal effect associated with SEOs for growth firms, but the effect is not statistically different from zero. The coefficient on the growth firm indicator variable is negative and significant, which is consistent with the negative alpha for the portfolio of growth firms documented in Table 3, model (i).

Turning to model (iii), we document a negative and significant marginal effect of SEOs for value firms, which is consistent with the propositions of our model. In fact, SEOs by value firms more than offset their return advantage, which is indicated by the positive and significant coefficient on the value-firm indicator variable.

In lieu of using growth- or value-indicator variables, model (iv) uses more information by introducing the ordinal variable *NAVS_tercile*. In particular, *NAVS_tercile* is equal to 1 in the case of growth firms, -1 in the case of value firms, and zero for the middle tercile of stocks between the value and growth firms. The coefficient on *NAVS_tercile* is negative and significant, which is consistent with the results on the growth and value indicator variables in models (ii) and (iii). The coefficient on the interaction term between *SEO* and *NAVS_tercile* is positive and significant indicating that property firms trading at a premium to NAV (i.e., growth firms) prior to SEO issuance outperform those trading at a discount to NAV at issuance. This result provides strong empirical support for the public versus private market arbitrage hypothesis. It is particularly noteworthy that the growth-SEO effect holds while controlling for size, REIT status, and country fixed effects.

We next ask whether the positive (negative) marginal effect of SEOs for growth (value) firms holds across different regions? As a robustness test, we interact the marginal effect of SEO*NAVS-tercile with regional indicator variables for Europe, North America, and Asia Pacific. Table 8 reports the respective firm-level regression results controlling for regional effects. Model (i) is our baseline model, which corresponds to

Table 7, model (iv); however, we now estimate the model with the regional indicator variables as opposed to country fixed effects. In models (ii) to (iv), we introduce our three regional indicator variables successively, each as a base effect, as well as interacted with *SEO*NAVS_tercile* to test for regional differences in the marginal effects of SEOs on excess returns. The reference groups in each model are the other two regions, respectively.

The Table 8, model (i) results are qualitatively and quantitatively consistent with those reported in Table 7, model (iv). Specifically, we point out the negative and significant coefficients associated with *NAVS_tercile* and *SEO*. As documented in the corporate finance literature, in general, growth firms underperform value firms, and firms underperform following SEOs. However, and to the heart of our analysis, the interaction term for *NAVS_tercile* and *SEO* is positive and statistically significant providing empirical support for the propositions of our model; specifically, that growth firms, those with relatively higher public market values, outperform value firms only under the condition where the stated use of proceeds is for investment purposes as opposed to all other uses, i.e., not investment-related.

We turn to the question of whether this result holds across regions. In Table 8, models (ii) and (iii), the marginal effects for Europe and Asia Pacific (i.e., *SEO*NAVS_tercile*Europe* and *SEO*NAVS_tercile*AsiaPacific*), are statistically insignificant. Importantly, the interaction term *SEO*NAVS-tercile* remains positive and significant in each case. This result suggests that the positive (negative) effect of SEOs on the performance of growth (value) firms holds across international regions. Overall, the results for Table 7, where country fixed effects are included, and the results for Table 8, which includes regional interactions, show that our empirical findings are robust for our international sample of property companies.

In summary, our regression results support the public versus private market arbitrage hypothesis. While our findings are based on listed property companies, the principle should be applicable to any sector in which firms that are priced at a premium have the opportunity to issue equity for the purpose of expanding their asset portfolio through additional investments in the private market. Sectors with relatively homogenous and price-transparent private market assets appear particularly well-suited for the strategy. As a caveat, it is important to note that the public versus private market arbitrage strategies that we examine produce abnormal returns even without addressing efficiency gains. However, transaction and integration costs may reduce potential excess returns of growth stocks and increase abnormal negative returns for value stocks. Furthermore, the public versus private market arbitrage argument stands and falls with the premium to NAV of growth stocks remaining relatively constant over time. Patel et al. (2009) provide evidence of NAV-discount reversion toward a long-term mean, on average. Figure 2 reveals that NAV spreads are at least constant over the +/- 12 months around the SEO, potentially long enough for growth REITs to capitalize on the public versus private market arbitrage strategy. A potential risk of the strategy is that investments are merely made for the purpose of exploiting the arbitrage opportunity. The risk of negative NPV investments increases if transactions are not pursued with the necessary attention being paid to detail. Recent research by Kim and Wiley (2018) indicates that this risk is significant. The authors find that REITs, which tend to increase investment activity following increases in NAV premiums, on average pay significantly higher prices relative to other investors. In addition to a reduction in the NAV due to the underlying assets, negative NPV investments by management may lead to a reassessment of the public NAV premium, potentially outweighing any positive public versus private market arbitrage return.

5. Conclusion

This study investigates the public versus private market arbitrage hypothesis. Based on a stylized model, we demonstrate that listed property companies that trade a premium NAV (i.e., growth firms), can benefit from their high stock market valuations by raising equity in order to buy private market real estate at a price lower than their implied stock market valuation.

Our empirical results show that growth firms with Investment-SEOs outperform a general benchmark portfolio of property companies. While the effect is not statistically different from zero, our results suggest that Investment-SEOs counteract the significantly negative excess returns that are typically associated with growth REITs. A successful public versus private market arbitrage strategy may, therefore, provide a rational explanation as to why some growth REITs trade at a sustainable premium to NAV.

Consistent with the proposition of our model, we find significant evidence that value REITs with Investment-SEOs underperform a general real estate benchmark index. Also consistent with the public versus private market arbitrage investment strategy is our finding that the long-short portfolios (i.e., long growth firms with Investment-SEOs and short value firms with Investment-SEOs), produce significant annualized risk-adjusted returns of more than 10%. Importantly, our results only hold for Investment-SEOs and not when the proceeds are used for non-investment-related reasons, such as general corporate purposes, paying back debt, or financing the dividend. Our empirical results are robust at the individual firm level, controlling for idiosyncratic factors such as firm size and REIT status, and they are also robust when controlling for country and regional effects.

Our findings have important implications for REIT and REOC managers and investors, collectively international listed property market participants. To the best of our knowledge, this is the first evidence as to which types of capital allocation decisions are rewarded by the stock market under different circumstances. We also contribute to the literature on the long-run performance following SEOs, by highlighting the importance of considering the ratio of stock price-to-fundamental value of issuing firms at time of the SEO.

References

Allen, P.R. and C.F. Sirmans. 1987. An analysis of gains to acquiring firm's shareholders: The special case of REITs. *Journal of Financial Economics* 18(1): 175-184.

Asness, C.S., Moskowitz, T.J., and L.H. Pedersen. 2013. Value and Momentum Everywhere. *The Journal of Finance*. 68(3): 929-985.

Autore, D.M., D.E. Bray and D.R. Peterson. 2009. Intended use of proceeds and the long-run performance of seasoned equity issuers. *Journal of Corporate Finance* 15: 358-367.

Barber, B.M. and J.D. Lyon. 1997. Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics* 43: 341-372.

Boudry, W.I., J.G. Kallberg, and C.H. Liu. 2010. An Analysis of REIT Security Issuance Decisions. *Real Estate Economics*, 38(1): 91-120.

Carhart, M. 1997. On persistence in mutual fund performance. *Journal of Finance* 52: 57–82.

Chan, P.T., and Walter, T. 2014. Investment performance of "environmentally-friendly" firms and their initial public offers and seasoned equity offers. *Journal of Banking & Finance*. 44: 177-188.

Chen, H., Harrison, D.M., and M. Khoshnoud. 2020. Investors' Limited Attention: Evidence from REITs. *Journal of Real Estate Finance and Economics*. 61:408-422.

Cline, B., Fu, X., Springer, T., and Tang, T. 2014. Insider trading in REITs: evidence from informed stock option exercise around seasoned equity offerings. *Journal of Real Estate Research*. 36: 511–540.

Cooper, M.J., H. Gulen and M.J. Schill. 2008. Asset Growth and the Cross-Section of Stock Returns. *The Journal of Finance* 63(4): 1609–1651.

Devos, E., Devos, E., S.E. Ong and A.C. Spieler. 2019. Are REIT Investors Overly Optimistic after Equity Offerings? Evidence from Analyst Forecast Errors. *The Journal of Real Estate Finance and Economics*. 59: 148–165.

Fama, E. 1998. Market efficiency, long-term returns, and behavioral finance. *Journal of Financial Economics* 49: 283-306.

Fama, E. and K. French. 1993. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33: 3–56.

Fama, E. and K. French. 1995. Size and book-to-market factors in earnings and returns. *Journal of Finance* 50(1): 131-155.

Feng, Z. and Z. Wu. 2021. Local Economy, Asset Location and REIT Firm Growth. *The Journal of Real Estate Finance and Economics*. 1-28.

Fisher, L., D.G. Weaver, and G. Webb. 2012. Removing Biases in Computed Returns: An Analysis of Bias in Equally-Weighted Return Indexes of REITs. *International Real Estate Review*, 15(1): 43-71.

Ghosh, C., E. Giambona, J. Harding and C. Sirmans. 2011. How Entrenchment, Incentives and Governance Influence REIT Capital Structure. *Journal of Real Estate Finance and Economics* 43(1): 39–72.

Gokkaya, S., Hill, S., and G.W. Kelly. 2013. On The Direct Costs of REIT SEOs. *Journal of Real Estate Research*. 35(4): 407-444.

Goodwin, K. 2013. Discounting and Underpricing of REIT Seasoned Equity Offerings. *Journal of Real Estate Research* 35 (2): 153-172.

Huerta-Sanchez, D., T. Ngo and M.K. Pyles. 2020. Equity versus Asset Acquisitions in the REIT Industry. *Journal of Real Estate Research*, 42(1): 1-36.

Howton, F. and S. Howton. 2000. Anomalous Evidence on Operating Performance Following Seasoned Equity Offerings: The Case of REITs. *Financial Management* 30: 76–87.

Kim, D., J.S. Kim and S. W. Seo. 2018.What options to trade and when: Evidence from seasoned equity offerings. *Journal of Financial Markets*. 37:70-96.

Kim, D. and J. Wiley. 2019. NAV Premiums & REIT Property Transactions. *Real Estate Economics.* 47 (1), 138-177.

Kothari, S. and J. Warner. 1997. Measuring long-horizon security price performance. *Journal of Financial Economics* 43: 301-339.

Ling, D., Naranjo, A., and B. Scheick. 2018. Geographic portfolio allocations, property selection and performance attribution in public and private real estate markets. *Real Estate Economics*. 46(2): 404-448.

Ling, D.C., J.T.L. Ooi and R. Xu. 2019. Asset Growth and Stock Performance: Evidence from REITs. *Real Estate Economics* 47(3): 884-927.

Lipson, M.L., S. Mortal and M.J. Schill. 2011. On the Scope and Drivers of the Asset Growth Effect. *Journal of Financial and Quantitative Analysis* 46(6): 1651–1682.

Loughran, T., and Ritter, J.R. (2000). Uniformly least powerful tests of market efficiency. *Journal of Financial Economics*. 55: 361-389.

Myers, S. C. and N. Majluf. 1984. Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have. *Journal of Financial Economics* 13(2): 187-221.

Matthews, G., M. Bye, and J. Howland. 2009. Operational Improvement: The Key to Value Creation in Private Equity. *Journal of Applied Corporate Finance.* 21(3): 21-27.

Ooi, J., J.R. Webb, and D. Zhou. 2007. Extrapolation Theory and the Pricing of REIT Stocks. *Journal of Real Estate Research*. 29(1): 27-56.

Ooi, J., S.E. Ong, and N.E. Neo. 2011. The Wealth Effects of Property Acquisitions: Evidence from Japanese and Singaporean REITs. *Real Estate Economics*. 39(3): 487–505.

Patel, K., R.A.M.G. Pereria, and K.V. Zavodov. 2009. Mean-Reversion in REITs Discount to NAV & Risk Premium. *Journal of Real Estate Finance and Economics*. 39: 229-247.

Riddiough, T., Moriarty, M., and Yeatman, P. 2005. Privately versus publicly held asset investment performance. *Real Estate Economics*. 33(1): 121-146.

Riddiough, T.J. and Z. Wu. 2009. Financial Constraints, Liquidity Management and Investment. *Real Estate Economics* 37: 447-481.

Silva, A. and P. Bilinski. 2015. Intended Use of Proceeds, Underwriter Quality and the Long-run Performance of SEOs in the UK. *Journal of Business Finance & Accounting* 42(9): 1282-1309.

Spiess, K. and J. Affleck-Graves. 1995. Underperformance in long-run stock returns following seasoned equity offerings. *Journal of Financial Economics.* 38(3): 243-267.

Tuluca, S. A., Myer, F. N., and Webb, J. R. 2000. Dynamics of private and public real estate markets. *The Journal of Real Estate Finance and Economics*. 21(3): 279-296.

Walker, M.D. and K. Yost. 2008. Seasoned Equity Offerings: What Firms Say, Do, and how the Market Reacts. *Journal of Corporate Finance.* 14(4): 376-386.

Woltering, R.O., C. Weis, F. Schindler, and S. Sebastian. 2018. Capturing the value premium – global evidence from a fair value-based investment strategy. *Journal of Banking and Finance.* 86: 53-69.

Yavas, A. and Y. Yildirim. 2011. Price Discovery in Real Estate Markets: A Dynamic Analysis. *Journal of Real Estate Finance and Economics*. 42(1): 1-29.

Yunus, N., Hansz, J. A., and Kennedy, P. J. 2012. Dynamic interactions between private and public real estate markets: Some international evidence. *The Journal of Real Estate Finance and Economics*. 45(4): 1021-1040.

Acknowledgements: (To be included with final accepted version.)

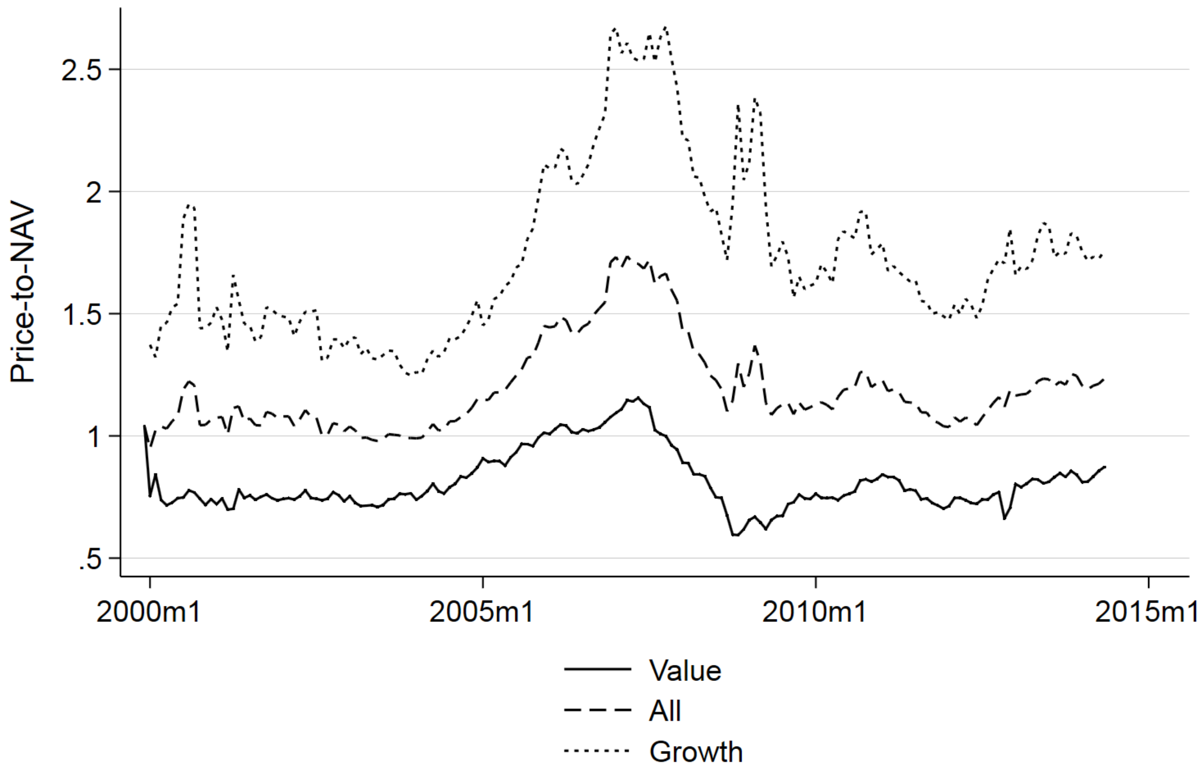

Figure 1: Average Price-to-NAV Ratios from 2000-2014. This figure shows the average price-to-NAV ratios based on our sample of international listed property companies (i.e., REITs and REOCs). Value (growth) stocks are defined as the tercile of stocks with the lowest (highest) price-to-NAV ratio in their country.

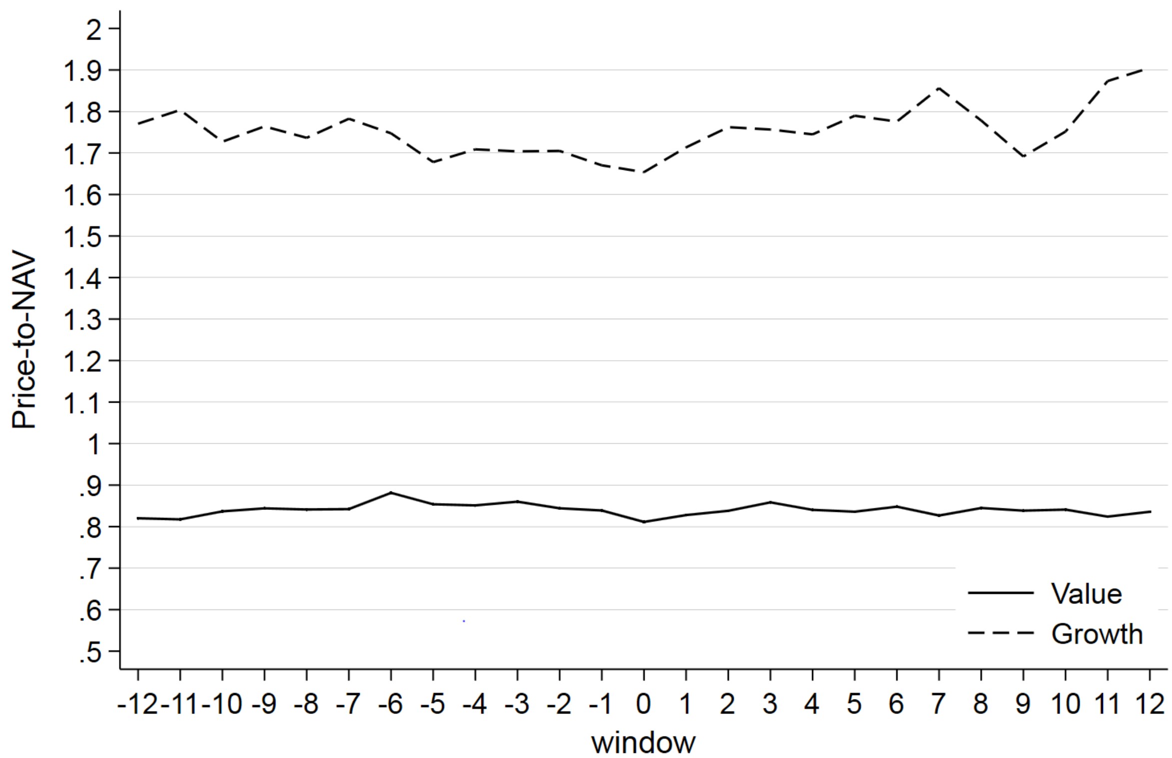

Figure 2: Average Price-to-NAV Ratios around SEOs. This figure shows the average price-to-NAV ratios for the 12 months before and after the month of the SEO. The dashed line represents the average price-to-NAV ratio of growth stocks. The solid line represents the average price-to-NAV ratio of value stocks.

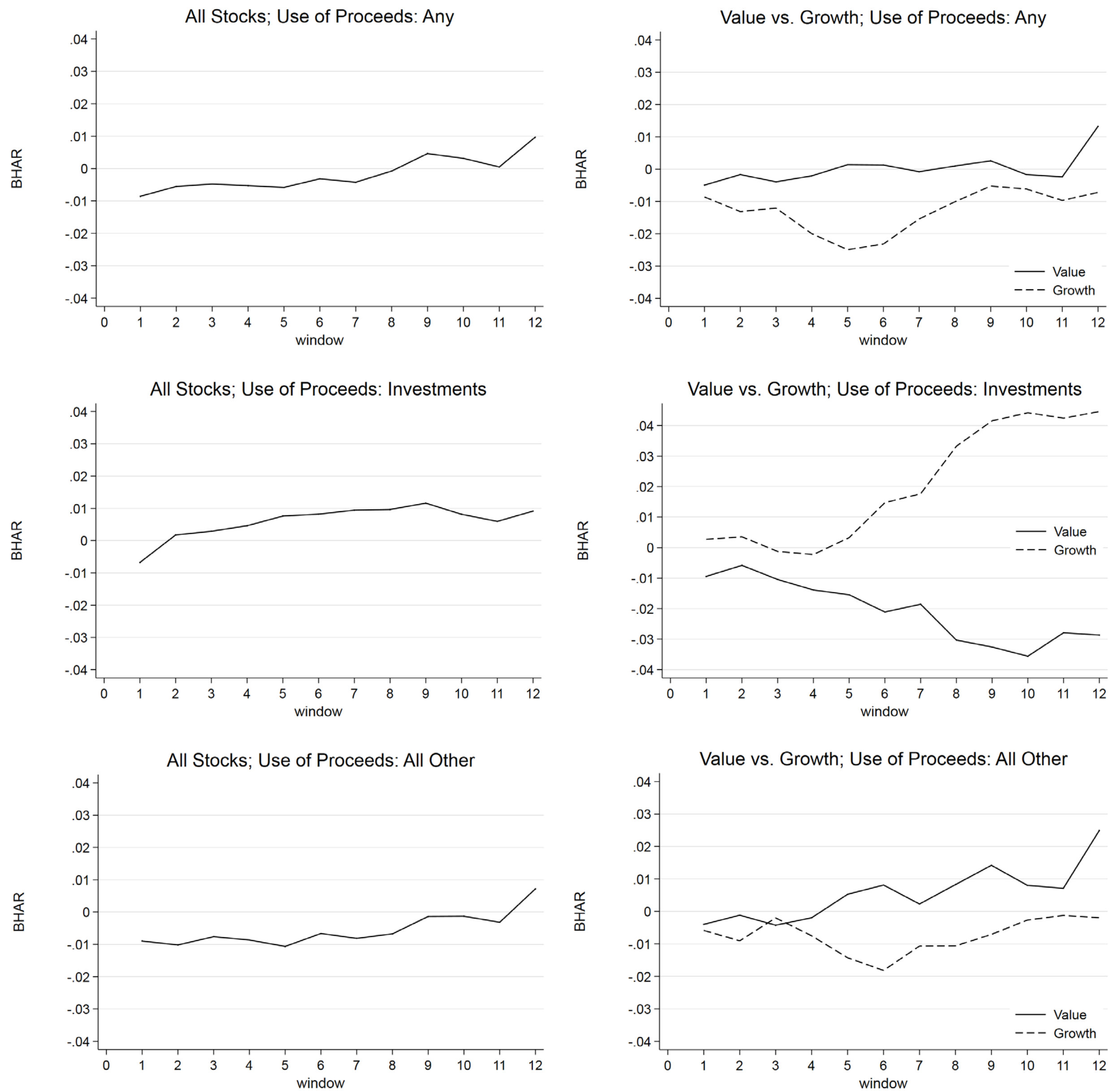

Figure 3: Buy-and-hold abnormal returns following SEOs. This figure shows the post-SEO performance based on average cumulative buy-and-hold abnormal returns (BHARs) over the 12 months following an SEO. The benchmark return for each stock is the country-level EPRA/NAREIT index based on the stock`s domicile. All BHARs are based on non-overlapping events, i.e. when a stock had a second SEO within 12 months, the first SEO and the subsequent performance are excluded from the sample. The graphs on the left-hand side show the post-SEO performance for all stocks. The graphs on the right distinguish between the subsamples of value and growth stocks. Value (growth) stocks are defined as the tercile of stocks with the lowest (highest) price-to-NAV ratio in their country. Following a capital offering, the categorization as a value or growth stock is held constant for the following 12 months. The first pair of graphs shows the post-SEO performance for SEOs with "Any" use of proceeds. The second pair of graphs restricts the sample to the post-SEO performance following SEOs with the stated use of proceeds being "investments." The third pair of graphs shows the post-SEO performance following SEOs where the stated use of proceeds is "all other," (i.e., non-investment related SEOs).

Table 1: Descriptive Statistics

	Total	AUS	BEL	CAN	FR	GER	HK	JAP	NED	SP	SW	UK	USA
Panel A: No. of Stocks													
All	531	47	7	37	14	20	37	41	12	22	16	75	203
Panel B: SEOs (all)													
All	2074	132	16	239	10	76	73	164	21	82	12	172	1077
Value	463	22	2	33	2	8	12	33	6	12	0	21	312
Growth	391	25	5	31	1	12	18	14	10	15	2	45	213
Panel C: SEOs (investments)													
All	708	38	4	117	2	33	19	99	6	34	6	78	272
Value	150	10	0	15	0	3	1	24	2	3	0	6	86
Growth	107	6	2	11	0	10	4	10	2	6	1	15	40
Panel D: SEOs (all other)													
All	1366	94	12	122	8	43	54	64	15	48	6	94	805
Value	313	12	2	18	2	5	11	9	4	9	0	15	226
Growth	284	19	3	20	1	2	14	4	8	9	1	30	173
Panel E: Price-to-NAV													
All	1.18	1.17	1.08	1.88	1.45	1.23	1.18	1.67	0.94	1.13	1.19	1.00	1.02
Value	0.81	0.79	0.95	1.12	0.89	0.79	0.52	0.99	0.78	0.70	0.93	0.71	0.79
Growth	1.68	1.71	1.26	3.14	2.20	1.86	2.05	2.69	1.13	1.70	1.53	1.40	1.29
Panel F: Total Return													
All	1.14%	0.48%	0.72%	1.18%	0.97%	-0.04%	1.56%	1.16%	0.94%	1.28%	1.78%	1.01%	1.28%
Value	1.46%	0.70%	1.09%	1.31%	1.01%	0.03%	1.63%	1.48%	1.19%	1.67%	2.30%	1.60%	1.67%
Growth	0.81%	0.24%	0.24%	0.98%	0.97%	-1.51%	1.29%	0.67%	0.54%	0.55%	0.83%	0.58%	1.11%

This table shows the descriptive statistics for our sample of international listed property companies. Panel A shows the total number of stocks for the whole sample (first column), as well as on an individual country basis. Panels B shows the total number of SEOs in our sample. Panel C shows the number of SEOs with the stated use of proceeds "investments." Panel D shows the number of all non-investment related SEOs ("all other"). Panel E shows the average price to NAV ratios, and Panel F shows the average total returns. The second (third) row of Panels B to F show the respective descriptive statistics for the subgroup of value (growth) stocks. In each period we form portfolios of value (growth) stocks as the tercile of stocks with the lowest (highest) price-to-NAV ratio in their respective country.

Table 2: Post-SEO Performance (BHARs)

	Mean BHAR	t-statistic	N
Panel A: Use of Proceeds: Any			
All SEOs	0.97%	0.91	662
Value	1.33%	0.68	224
Growth	-0.72%	-0.37	178
Growth -Value	-2.05%	-1.06	178
Panel B: Use of Proceeds: Investments			
All SEOs	0.92%	0.60	294
Value	-2.87%	-1.55	108
Growth	4.46%	1.36	67
Growth -Value	7.33%	2.23**	67
Panel C: Use of Proceeds: All Other			
All SEOs	1.13%	0.90	510
Value	2.49%	1.01	165
Growth	-1.93%	-0.08	149
Growth -Value	-4.42%	-1.13	149

This table reports the post-SEO performance in the 12 months following an SEO based on average buy-and-hold abnormal returns (BHARs). The benchmark return for each stock is the country-level EPRA/NAREIT index based on the stock`s domicile. All BHARs in Table 2 are based on non-overlapping events, i.e. when a stock had a second SEO within 12 months, the first SEO and the subsequent performance are excluded from the sample. Panel A shows the mean BHARs, t-statistics, and the number of observations based on all SEOs. Panel B restricts the sample to SEOs where the stated use of proceeds is “investments.” Panel C restricts the sample to “all other” SEOs, i.e. all SEOs where the use of proceeds is not “investments.” The first row of each panel shows the BHARs for all SEOs, the second (third) row shows the BHAR for the subset of value (growth) stocks. Value (growth) stocks are defined as the tercile of stocks with the lowest (highest) price-to-NAV ratio in their country. BHARs in the fourth row are based the difference between the BHARs of value and growth stocks. Following a capital offering, the categorization as a value or growth stock is held constant for the following 12 months. T-statistics marked ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Table 3: Portfolio Regressions – All REITs & REOCs

	Growth	Value	Growth-Value
Alpha	-0.171*	0.235*	-0.407**
	(-1.78)	(1.91)	(-2.02)
MKT	0.970***	1.046***	-0.076
	(32.86)	(34.17)	(-1.33)
SMB	0.118*	-0.061	0.179
	(1.83)	(-0.82)	(1.35)
HML	0.009	-0.081	0.090
	(0.22)	(-1.03)	(0.81)
WML	-0.023	-0.007	-0.016
	(-0.55)	(-0.19)	(-0.21)
Observations	173	173	173
R^2	0.957	0.953	0.037

This table reports the Carhart four-factor regressions for all property companies in our sample, i.e. the results are not specific to SEOs. The dependent variable is the equally-weighted portfolio return. Control variables are the market return (MKT), the size factor (SMB), the value factor (HML), and the momentum factor (WML). The first (second) column contains the results for the portfolio of growth (value) stocks defined as the tercile of stocks with the highest (lowest) price-to-NAV ratio relative to the average price-to-NAV ratio in the stocks' home country at the end of the previous month. The third column contains the results for the long-short portfolio, which is long the portfolio of growth stocks and short the portfolio of value stocks. T-statistics are in parentheses and parameters marked ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively. All models are estimated using Newey-West standard errors.

Table 4: Portfolio Regressions – All SEOs

	All SEOs	Growth	Value	Growth–Value
Alpha	-0.193	0.153	-0.194	0.281
	(-1.20)	(0.62)	(-1.24)	(0.93)
MKT	1.029***	0.958***	1.061***	-0.093
	(27.65)	(13.90)	(23.83)	(-1.04)
SMB	-0.003	-0.062	-0.066	0.100
	(-0.02)	(-0.49)	(-0.75)	(0.86)
HML	0.156	-0.113	0.180	-0.397**
	(1.01)	(-0.79)	(1.26)	(-2.03)
WML	0.153**	0.076	0.132***	-0.099
	(2.48)	(0.73)	(3.16)	(-1.04)
Observations	183	165	163	163
R^2	0.846	0.791	0.903	0.072

This table reports the Carhart four-factor regressions for portfolios constructed from property companies (i.e., our sample of international REITs and REOCs), with an SEO in the prior 12 months. The dependent variable is the equally-weighted portfolio return. Control variables are the market return (MKT), the size factor (SMB), the value factor (HML), and the momentum factor (WML). The first column contains the regression results for the portfolio consisting of all SEO stocks. The second (third) column restricts the portfolio to growth (value) stocks defined as the tercile of stocks with the highest (lowest) price-to-NAV ratio relative to the average price-to-NAV ratio in the stocks' home country at the end of the previous month. The fourth column contains the result for the long-short portfolio, which is long the portfolio of growth stocks with SEOs and short the portfolio of value stocks with SEOs. T-statistics are in parentheses and parameters marked ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively. All models are estimated using Newey-West standard errors.

Table 5: SEO Portfolio Regressions – Use of Proceeds: Investments

	All SEOs	Growth	Value	Growth–Value
Alpha	0.163	0.488	-0.386*	0.985*
	(1.10)	(1.03)	(-1.84)	(1.82)
MKT	0.902***	0.713***	0.919***	-0.202
	(22.10)	(6.16)	(13.06)	(-1.43)
SMB	0.022	0.219	-0.199	0.390
	(0.28)	(1.04)	(-1.55)	(1.33)
HML	-0.123	-0.711*	0.202	-0.940**
	(-1.21)	(-1.92)	(1.25)	(-2.18)
WML	0.073	0.051	0.240***	-0.264
	(1.46)	(0.37)	(2.81)	(-1.30)
Observations	163	134	163	134
R^2	0.888	0.368	0.783	0.135

This table reports the Carhart four-factor regressions for portfolios constructed from property companies (i.e., our sample of international REITs and REOCs), with an SEO in the prior 12 months, whereby the stated use of proceeds is "investments". The dependent variable is the equally-weighted portfolio return. Control variables are the market return (MKT), the size factor (SMB), the value factor (HML), and the momentum factor (WML). The first column contains the regression results for the portfolio consisting of all SEO stocks with the stated use of proceeds "investments". The second (third) column restricts the portfolio to growth (value) stocks defined as the tercile of stocks with the highest (lowest) price-to-NAV ratio relative to the average price-to-NAV ratio in the stocks' home country at the end of the previous month. The fourth column contains the result for the long-short portfolio, which is long the portfolio of growth stocks with Investment-SEOs and short the portfolio of value stocks with Investment-SEOs. T-statistics are in parentheses and parameters marked ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively. All models are estimated using Newey-West standard errors.

Table 6: SEO Portfolio Regressions – Use of Proceeds: All other

	All SEOs	Growth	Value	Growth–Value
Alpha	-0.278	0.091	-0.131	0.156
	(-1.65)	(0.37)	(-0.70)	(0.49)
MKT	1.076***	0.996***	1.110***	-0.104
	(28.53)	(14.88)	(21.09)	(-1.10)
SMB	-0.018	-0.078	-0.022	0.041
	(-0.15)	(-0.57)	(-0.23)	(0.31)
HML	0.157	-0.071	0.157	-0.331*
	(1.02)	(-0.51)	(1.05)	(-1.68)
WML	0.175***	0.091	0.138***	-0.090
	(2.75)	(0.89)	(2.86)	(-0.97)
Observations	183	165	163	163
R^2	0.845	0.793	0.882	0.057

This table reports the Carhart four-factor regressions for portfolios constructed from property companies (i.e., our sample of international REITs and REOCs), with an SEO in the prior 12 months, whereby the stated use of proceeds is "all other" (relative to "investments"). The dependent variable is the equally-weighted portfolio return. Control variables are the market return (MKT), the size factor (SMB), the value factor (HML), and the momentum factor (WML). The first column contains the regression results for the portfolio consisting of all SEO stocks with the stated use of proceeds "all other". The second (third) column restricts the portfolio to growth (value) stocks defined as the tercile of stocks with the highest (lowest) price-to-NAV ratio relative to the average price-to-NAV ratio in the stocks' home country at the end of the previous month. The fourth column contains the result for the long-short portfolio, which is long the portfolio of growth stocks with "all other" SEOs and short the portfolio of value stocks with "all other" SEOs. T-statistics are in parentheses and parameters marked ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively. All models are estimated using Newey-West standard errors.

Table 7: Cross-sectional, Panel Regression Results with Country Fixed Effects

	(i)	(ii)	(iii)	(iv)
Constant	-0.000	0.001	-0.001	0.000
	(-0.07)	(0.38)	(-0.30)	(0.14)
MKT	1.013***	1.013***	1.013***	1.016***
	(41.46)	(41.47)	(41.46)	(41.40)
SMB	0.004	0.004	0.004	0.007
	(0.15)	(0.14)	(0.15)	(0.26)
HML	0.009	0.011	0.011	0.012
	(0.41)	(0.45)	(0.46)	(0.50)
WML	-0.006	-0.006	-0.006	-0.004
	(-0.29)	(-0.31)	(-0.31)	(-0.21)
REIT	0.001	0.000	0.000	-0.000
	(0.25)	(0.03)	(0.13)	(-0.03)
Size	0.114*	0.142**	0.153**	0.218***
	(1.84)	(2.09)	(2.37)	(2.95)
Inv_SEO	-0.001	-0.002**	-0.000	-0.002*
	(-1.61)	(-2.15)	(-0.37)	(-1.68)
Growth	-	-0.002**	-	-
	-	(-2.14)	-	-
Inv_SEO*Growth	-	0.002	-	-
	-	(0.94)	-	-
Value	-	-	0.002***	-
	-	-	(2.58)	-
Inv_SEO*Value	-	-	-0.003*	-
	-	-	(-1.69)	-
NAVS_tercile	-	-	-	-0.002***
	-	-	-	(-2.93)
Inv_SEO*NAVS_tercile	-	-	-	0.003**
	-	-	-	(1.97)
Country Effects	Yes	Yes	Yes	Yes
Observations	34070	34015	34015	33344
R^2	0.497	0.498	0.498	0.500

This table reports the cross-sectional, panel regression results at the individual firm level with country fixed effects. Control variables are the market return (MKT), the size factor (SMB), the value factor (HML), the momentum factor (WML), size as measured by a firm's market capitalization at the end of the previous month, an indicator variable that is equal to one for REITs and zero otherwise, as well as an Investment-SEO indicator variable that is equal to one if a firm had an SEO with the stated use of proceeds "investments" in the current or previous 11 months (Inv_SEO). Model (ii) introduces the indicator variable (Growth) that is equal to one for growth stocks. Likewise, model (iii) introduces the indicator variable (Value) that is equal to one for value stocks. Growth (Value) stocks are defined as the tercile of stocks with the highest (lowest) price-to-NAV ratio relative to the average price-to-NAV ratio in the stocks' home country at the end of the previous month. Instead of the value or growth indicator variable, model (iv) uses the ordinal variable $NAVS\_tercile_{t-1}$, which is -1 for value stocks, 0 for the middle tercile, and 1 for growth stocks. T-statistics are in parentheses and parameters marked ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively. All models are estimated using heteroscedasticity robust standard errors.

Table 8: Cross-sectional, Panel Regression Results – Regional Effects

	(i)	(ii)	(iii)
Constant	-0.001	-0.001	-0.001
	(-0.60)	(-0.41)	(-0.61)
MKT	1.016***	1.016***	1.016***
	(41.44)	(41.44)	(41.44)
SMB	0.008	0.008	0.007
	(0.28)	(0.29)	(0.26)
HML	0.011	0.011	0.012
	(0.46)	(0.46)	(0.50)
WML	-0.005	-0.005	-0.004
	(-0.24)	(-0.24)	(-0.22)
REIT	0.000	0.000	0.001
	(0.33)	(0.21)	(0.75)
Size	0.158**	0.156**	0.215***
	(2.33)	(2.31)	(2.88)
NAVS_tercile	-0.002***	-0.002***	-0.002***
	(-2.88)	(-2.87)	(-2.93)
Inv_SEO	-0.002*	-0.001	-0.002*
	(-1.65)	(-1.40)	(-1.65)
Inv_SEO*NAVS_tercile	0.002**	0.003**	0.003**
	(1.97)	(2.27)	(2.08)
Europe	-	-0.000	-
	-	(-0.02)	-
Inv_SEO*NAVS_tercile*Europe	-	-0.003	-
	-	(-0.75)	-
AsiaPacific	-	-	-0.002**
	-	-	(-2.19)
Inv_SEO*NAVS_tercile*AsiaPacific	-	-	-0.002
	-	-	(-0.91)
Observations	33344	33344	33344
R^2	0.50	0.50	0.50

This table reports the firm-level, panel regression results controlling for regional effects. Model (i) is similar to the Table 7, model (iv), without country fixed effects. Control variables are the market return (MKT), the size factor (SMB), the value factor (HML), the momentum factor (WML), size as measured by a firm's market capitalization at the end of the previous month, an indicator variable that is equal to one for REITs and zero otherwise, as well as an Investment-SEO indicator variable that is equal to one if a firm had an SEO with the stated use of proceeds "investments" in the current or previous 11 months (Inv_SEO). The ordinal variable $NAVS\_tercile_{t-1}$, is -1 for value stocks, 0 for the middle tercile, and 1 for growth stocks. Growth (Value) stocks are defined as the tercile of stocks with the highest (lowest) price-to-NAV ratio relative to the average price-to-NAV ratio in the stocks' home country at the end of the previous month. In models (ii) and (iii), regional indicator variables for Europe and Asia Pacific are introduced subsequently. Moreover, these indicator variables are interacted with Inv_SEO*NAVS_tercile to test for regional differences in the marginal effects of SEOs on excess returns. T-statistics are in parentheses and parameters marked ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively. All models are estimated using heteroscedasticity robust standard errors.