

Board Diversity and NAV Discounts

European REIT Evidence

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Abstract

In this paper, we examine the effects of board diversity on the relative pricing – stock price to net asset values – of European REITs. Board diversity has been theorized as a virtue that can enhance corporate agility. We assess whether the heterogenous perspectives that are associated with gender, age, and ethnic diversity within corporate boards have indeed helped firms to trade at a premium over fundamental values. Making good use of the tangible asset base of European REITs, we find evidence that age and gender diversity have strengthened the PNAV ratios of REITs, especially in the most turbulent times and market segments.

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1. Introduction

Just as we need variety in our diet to ensure good health, we need diversity in our investments to mitigate risks. Ever since Markowitz (1952) put forward his modern portfolio theory, investors around the globe are keen on combining low-correlating assets, as these low correlations help them to reduce their exposure to idiosyncratic risks. But this validated diversification effect does not limit itself to investment assets. Diversity on the workforce has also gained attention, both in the public debate and in academic research. Several European countries, such as France, Norway, Spain and the Netherlands, have introduced either hard or soft gender quota through legislative initiatives to increase gender diversity within corporate boards. Adams and Ferreira (2009) find that more gender-diverse boards have higher attendance records, higher CEO turnover after poor stock price performance, and a higher fraction of equity-based directors' compensation. The authors interpret these results as the results of improved monitoring by more diverse boards.

Board diversity can be regarded as an important element of modern corporate governance. In fact, there are different channels through which board diversity may benefit firm performance. The behavioral theory of the firm (Cyert and March, 1963) states that decision making processes are often biased by the knowledge of the decision-making group, especially when the decisions regard areas in which the decision makers have previous experiences (Hambrick and Mason, 1984). In homogeneous boards, these previous experiences are a guideline of how things should be done, resulting in a pressure towards conservatism. The subsequent conflict within the board which occurs within diverse group dynamics has a positive effect on the controlling capabilities of the board, mitigating the agency problem. Furthermore, board diversity helps firms understand their diverse customers better, helps integrating their diverse workforce and adds effectiveness to problem-solving (Carter et al., 2003). The

variety of perspectives stimulates the management to evaluate more alternatives and their consequences, resulting in both more effective decision making and leadership. Ali et al. (2014) find that age diversity has a positive effect on the return on assets up to an age diversity, measured by dividing the standard deviation of the board members' ages by the average age of the board. Robinson and Dechant (1997) state that a diversified board increases innovation and creativity because "attitudes, cognitive functioning and beliefs are not randomly distributed in the population, but tend to vary systematically with demographic variables such as age, race and gender".

Most of the available studies on board diversity measure firm performance by means of Tobin's Q, which in many cases is operationalized as a simple market-to-book ratio. Tobin's Q, however, is a noisy metric for firm performance and valuation, as it requires stringent assumptions regarding the accuracy of market versus book values¹. In this paper, we use the European Real Estate Investment Trust (REIT) market as a laboratory to better assess the interlink between several aspects of board diversity and firm valuation, using the price to net asset value ratio. Given that listed real estate companies share a homogeneous and very tangible asset base, the net asset value (NAV) is a much more reliable measure than the typical book value of assets. This NAV is defined as the appraised value of the real estate assets less the market value of the firm's liabilities. The PNAV ratio varies over time and differs greatly across individual firms. If the listed real estate shares are traded at a price higher than the NAV per share, there is a PNAV premium. By the year-end of 2019, European REITs trade at an average PNAV discount of 23 percent.

We are not the firsts to study board diversity within the settings of REITs. Schrand et al. (2018) reported a positive effect of female directors on the PNAV ratio of U.S. REITs. REITs with a female executive director presence of over 30% outperformed REITs with a fully male board with 5.7% on the PNAV ratio. Furthermore, they note that female board presence is higher in the boards of REITs with more institutional ownership. For institutions a better internal control is extra important since due to the restriction on share ownership, there are often no large shareholders who control the REIT management (Ghosh and Sirmans, 2003).

¹ For a full and elegant discussion on the virtues and misuse of Tobin's Q, we gladly refer to Bartlett and Partnoy (2018). They traced the history of Tobin's q, beginning with its original role as a mean-reverting construct that macroeconomists used to model investment policy, and document how this original version of q morphed into the simplified market-to-book ratio version that law and finance scholars regularly use today to examine regulatory policy, corporate governance, and other economic phenomena.

We contribute to this literature, by assessing the effects of board diversity on PNAV oscillations, using post-GFC data on 89 European REITs, within a regression model that controls for earlier identified rational, behavioural, and corporate governance factors. Our results show that, besides momentum and investor sentiment, age diversity has had a statistically significant positive effect on the PNAV ratio. Besides this positive individual effect of age diversity, the three board diversity variables – gender, ethnic, and age - are jointly statistically significant at the 10% level, indicating that diverse boards are appreciated by stock investors..

This paper continues with a review of the relevant literature on REIT valuation and board diversity. After we state our key hypotheses, we introduce our European dataset and specify our regression model. After presenting our results and their implications, we finalize our paper with a summary of our most important conclusions.

2. REIT Values and Board Diversity

REITs offer an unique environment to examine the overvaluation or undervaluation of public companies. Given that REIT portfolios consist of very tangible assets that are traded and frequently appraised on a secondary market, the net asset values (NAVs) of REITs are easier to compute than the NAV of most other public firms (Liow, 2003). The fact that these NAVs rarely equal the observed pricing of REIT stocks in the stock market has puzzled both investors and academics around the world for decades. According to Liow, REITs ought to trade at a NAV discount because they are a special sort of closed-end fund, a fund that holds other tradeable assets and issues a fixed number of shares. Closed-end funds commonly trade at a discount as described in the closed-end fund puzzle (Lee et al, 1991). A discount that differs across firms, and appears to change over time. The determinants of this discount variation have been examined by the literature and can be divided into three categories: rational, behavioral and corporate governance factors.

The *rational* literature assumes that equity markets are efficient and explains the firm-specific NAV discount with use of firm-characteristic data. Rationally, there should always be a NAV discount due to liquidation costs. If the REIT wants to convert its assets relatively quickly into cash in the underlying real estate market, it would have to sell its assets below the NAV due to the sheer size of its portfolio, as the sudden increase in supply will lower the price buyers are willing to pay (Barkham and Ward, 1999). Therefore, larger REITs should trade at a higher discount due to higher liquidation costs.

However, Capozza and Lee (1995) find that larger REITs tend to trade at a NAV premium while smaller REITs tend to trade at a NAV discount. A counterintuitive finding, which they explained by pointing out that larger REITs tend to have better access to capital markets, benefit from economies of scale and have a higher trading liquidity and a lower expense ratio. Later findings by Capozza and Seguin (1998) and Brounen and ter Laak (2005) argue that a reduced leverage ratio adds value to the REIT and lowers its NAV discount because a lower leverage ratio reduces the REIT's risk level. Leverage is less beneficial for REITs compared to other business since REITs do not benefit from a tax shield as REITs do not pay taxes on the corporate level (Feng, Ghosh, and Sirmans, 2007). Moreover, Brounen and ter Laak (2005) state that momentum, the average annualized total stock return over a 3-year period, has a negative correlation with the NAV discount. The REIT market is in principle opaque as it is difficult for investors to obtain knowledge about the exact characteristics of the REIT's assets (Kohl and Schaefer, 2012). Therefore, investors appreciate transparency, which is lower for diversified REITs as it is even harder to determine the REIT's assets. Moreover, the loss of transparency increases information costs resulting in both higher agency costs and information asymmetry. This leads to a decrease in liquidity and therefore a loss of value due to a higher required rate of return. A higher level of transparency can be obtained by complying with the EPRA Best Practice Policy Recommendations disclosure guidelines and more analyst coverage (Devos et al., 2007). According to Brounen and ter Laak (2005), EPRA members have a higher share PNAV ratio due to both the obligation to apply the EPRA disclosure guidelines and their increased popularity among institutional investors as they use the EPRA index as a REIT tracker and therefore invest more in EPRA members.

In their early work, Barkham and Ward (1999) already established that rationalized firm characteristics explain only a small portion of NAV discounts. Hence, they extended their cross sectional model specification with *behavioral* determinants that were related to investor sentiment. Rehugler et al. (2012) find that for European REITs, investor sentiment explains 76% of the NAV spread. Clayton and MacKinnon (2000) conclude that the initial movement of stock prices away from the NAV is induced by informed traders. After the initial movement, the transaction costs decrease which increases the liquidity of the shares and the uninformed noise traders enter the market, creating a further diffusion from the NAV. Chiang (2009) finds that the relationship between stock prices of REITs and their NAV is mean reverting, which is confirmed for European REITs by Mueller and Pfner (2013). The share price moves first, then the NAV follows to maintain the long-run equilibrium. Barkham and Ward (1999) state that the NAV discount of 25.2% in the long run equilibrium of their UK sample is explained by both rational factors and noise traders. Morri and Baccarin (2016) observe a substantial difference per

European country. The main determinant in France is the investor sentiment, while in the Netherlands rational firm characteristics are dominant, and in the United Kingdom both categories are explanatory.

Although REITs are subject to relatively strict regulations, there is still room left for variations in *corporate governance*. Kohl and Schaefer (2012) defined corporate governance as “a complex system of interdependent mechanisms by which corporate management is controlled with the intention to protect the invested capital of shareholders against a potential misuse or expropriation”. One cause of potential misuse is the agency problem, which is infamous in the world of finance (Jensen and Meckling, 1976; Shleifer and Vishny, 1997). Managers tend to take decisions that result in the highest payoff for themselves, which are not necessarily the best decisions for the firm’s shareholders. Therefore, agency problem typically lead to riskier decisions. One solution to partially mitigate the agency problem is internal ownership. The interests of the management are more aligned with shareholders’ interests if the management holds partial ownership of the firm. Capozza and Seguin (2003) find that the absolute returns on REITs with a higher level of internal ownership are lower, but that the risk-adjusted returns are not statistically significant different from the returns on REITs with less internal ownership. The REITs with more internal ownership have both a lower business risk (risk of the underlying assets) and a lower financial risk level, supporting the theory that internal ownership mitigates the risk-taking decisions resulting from the agency problem. Friday and Sirmans (1998) support that internal ownership decreases the NAV discount due to a better alignment of the interests of the management and stockholders. However, Kohl and Schaefer (2012) find evidence for a larger discount when internal ownership is high due to reverse causality: managers tend to sell their shares when the shares trade at a NAV premium. Han (2006) states that this relation between internal ownership and the NAV discount is nonlinear. When internal ownership rises above 25%, the NAV discount increases. Friday et al. (1999) set the turning point at 5% internal ownership.

One subcategory of corporate governance is *board diversity*. In a market which has to deal with high impact innovations and new trends such as e-commerce and the energy transition, board diversity could enhance the agility of REIT management. If REIT management consists of heterogeneous backgrounds, the implied differences in beliefs and opinions allow for a more thorough debate. It is unlikely that board diversity factors will have an effect on the by appraisers determined NAV of REITs, but it might have an effect on the market valuation of the REIT: the P in the P/NAV ratio. The behavioral theory of the firm (Cyert and March, 1963) states that decision making processes are biased by the knowledge of the decision making group, especially when the decisions regard areas in which the

decision makers have previous experiences (Hambrick and Mason, 1984). In homogeneous boards, the previous experiences are a guideline of how things should be done, resulting in a pressure towards conservatism. A heterogeneous board has more knowledge about innovations and therefore sees innovations as an opportunity instead of a risky deviation of the conservative way of doing things. Robinson and Dechant (1997) state that a diversified board increases innovation and creativity because “attitudes, cognitive functioning and beliefs are not randomly distributed in the population, but tend to vary systematically with demographic variables such as age, race and gender”. Miller and Triana (2009) confirm the positive relation between board gender diversity and innovation in their US study. Further empirical studies on board gender diversity conclude that there is either no effect (Carter et al., 2010) or a positive effect (Campbell and Mínguez-Vera, 2008) of board gender diversity on firm value.

There is a lack of literature regarding board diversity within REITs. Thus far, Schrand et al. (2018) are the sole providers of empirical evidence on the matter. They investigate the effect of board diversity on the NAV discount of US REITs and find a positive effect of female directors on the share price/NAV ratio, but only if the female directors are executive directors. REITs with a female executive director presence of over 30% outperform REITs with a fully male board with 5.7% on the share price/NAV ratio. Furthermore, they note that female board presence is higher in the boards of REITs with more institutional ownership.

3. Our Model, Data, and Method

Figure 1 offers an overview of the PNAV dynamics of European REITs across different property sectors for the period 2006-2019. Especially during the most recent years, we can observe a difference between the PNAV European retail REITs versus other sectors. At the start of 2014, European retail REITs were associated with the highest NAV premia. But this has changed dramatically in the subsequent year. While the PNAV of REITs investing in other sectors remained relatively stable, retail REITs PNAVs plummeted, resulting in NAV discount of around 44% by the end of 2019. Clearly the PNAV dynamics of retail REITs have been different during our sample period, hence, we also test our hypotheses on board diversity for a subset of retail REITs, to enhance our understanding.

- Insert figure 1 (European sector PNAVs) around here -

Currently, 13 European countries have organized their listed real estate markets with a REIT regime. Hungary and Ireland are excluded from the sample because their REIT regimes were created more than 5 years after the start of our sample period in 2006. It may appear that Belgium should be dropped for the same reason, since the Belgian BE-REIT regime was created in 2014, but there was already a REIT regime in place before the introduction of the BE-REIT (also known as RRECs): the in 1995 introduced SICAFI regime. All SICAFI firms became BE-REITs after its introduction in 2014. Therefore, Belgium is included in this research. Spain is a special case. By June 2018, 59 Spanish REITs were listed, but only 6 traded actively. Due to an amendment to the SOCIMI act in December 2012, a notation of the Spanish alternative stock exchange, the Mercado Alternativo Bursátil, is sufficient to be able to obtain the SOCIMI status. With a notation on the Mercado Alternativo Bursátil, SOCIMIs benefit from the special fiscal status, but are less controlled by regulators and have less alternative requirements to comply with than if they had been traded on the regular Spanish stock exchange. Especially small real estate firms use this construction to benefit from the tax advantages, as the market capitalization of the 59 REITs (€ 23,184 million) is lower than the five Dutch REITs (€ 30,616 million). Because of the lack of liquidity of the equities on the alternative stock exchange, only the six continuously traded Spanish REITs are included in our sample. After the above steps, there were 121 REITs in the sample. One UK REIT fails to trade on a daily basis and has therefore been excluded. 11 REITs have been deleted because no NAV data can be found. For 15 other REITs, there is less than three years of (NAV) data available, resulting in an exclusion from the sample. Lastly, five REITs are neglected because there is no board diversity data. The final sample consists of 89 REITs. The characteristics of the final sample consisting of 89 REITs is shown below in Table 1.

- Insert table 1 (sample characteristics) around here -

All variables, except for board size, EPRA membership and the board diversity variables regarding gender, ethnicity and age, are retrieved from Bloomberg. The EPRA membership data comes from the EPRA Corporate Actions History file. Data regarding board size and the board diversity variables used to measure gender, ethnical and age diversity are downloaded from the BoardEx database.

Table 2A provides the number of observations, mean, standard deviation and dispersion numbers of every variable. The maximum PNAV ratio of 5.15 comes from Officiis Properties (FR) during the first quarter of 2018 when its NAV was 0.34 euro per share and its share price 1.74 euro per share. All observations with a PNAV ratio below 0.15 are reported in the 2009-2011 period during the economic

crisis. French and British firms have the highest leverage ratios as there is no maximum leverage ratio in the REIT regulations in France and the United Kingdom. Only Capital & Regional (UK) exceeds the 60% level of internal ownership with its observations in 2012, 2013 and 2014. Table 2B reports the mean, standard deviation and median on the variables after the sample is split across retail and non-retail REITs. The only compelling differences between these groups are documented for momentum, which was weaker for retail REITs.

- Insert table 2 (descriptive statistics) around here -

Table 3 reports the Pearson correlation coefficients between all variables. The first noteworthy correlations are the strong significant positive correlations between the PNAV ratio and both momentum and investor sentiment which are both in accordance with the literature (Lee et al, 1991; Barkham and Ward, 1999; Brounen and ter Laak, 2005; Rehkugler, Schindler, and Zajonz; 2012; Mueller and Pfner, 2013). Furthermore, the significant positive correlation between liquidity and EPRA membership confirms the findings by Brounen and ter Laak (2005) that EPRA members' stocks have a higher liquidity. More logical significant positive correlations are those between board size and firm size: larger firms will need a larger board to manage the company, and between internal ownership and the squared internal ownership. The significant positive correlation between EPRA membership and firm size is explained by the minimum market capitalization of 0.10% of their regional index that EPRA index members need to be included. One final noteworthy result is the correlation between momentum and investor sentiment. Firms with a positive momentum trade at a PNAV premium and vice versa.

- Insert table 3 (correlation matrix) around here -

In figure 2, we plot the PNAV distribution of our sample selection since 2006. A figure, which shows that are different from the par value of 1.0 for all but two years. But perhaps more importantly, a figure which shows a wide variation around these time varying means, indicating that each firm and year has a different story to tell when it comes to their PNAV.

- Insert figure 2 (PNAV ratio distributions) around here -

To assess whether board diversity factors can help explain the variations in PNAV ratios of European REITs, we formulate a set of hypotheses that result directly from the reviewed literature.

- H1: Gender diversity in the board is positively related to the share PNAV ratio of European REITs.
- H2: Ethnic diversity in the board is positively related to the share PNAV ratio of European REITs.
- H3: Age diversity in the board is positively related to the share PNAV ratio of European REITs.
- H4: The board diversity variables gender, ethnic, and age diversity are jointly significant.

To test these hypotheses, we run a set of multi-variate regressions, which include board diversity variables, while controlling for the PNAV explainers that have been identified by the available literature. The model includes four categories of variables: rational (firm size, leverage, momentum, EPRA membership, and liquidity), behavioural (investor sentiment), corporate governance (internal ownership, internal ownership squared², and board size³) and board diversity (gender, ethnic and age). Table 1 describes the variables in more detail. Our regressions use unbalanced panel data and include both country and year fixed effects. The Hausman-test results in a p-value of 0.0000, indicating that fixed effects are appropriate for this model. The robust standard errors are clustered at firm-level.

- Insert table 4 (variable description) around here -

$$\begin{aligned}
 \frac{\text{Shareprice}}{\text{NAV}} \text{ratio}_{it} &= a_{it} \\
 &+ \beta_1 (\text{firm size})_{it} + \beta_2 (\text{leverage})_{it} + \beta_3 (\text{momentum})_{it} \\
 &+ \beta_4 (\text{EPRA membership})_{it} + \beta_5 (\text{liquidity})_{it} \\
 &+ \beta_6 (\text{investor sentiment})_{it} + \beta_7 (\text{internal ownership})_{it} \\
 &+ \beta_8 (\text{internal ownership}^2)_{it} + \beta_9 (\text{boardsize})_{it} \\
 &+ \beta_{10} (\text{female board})_{it} + \beta_{11} (\text{minority board})_{it} + \beta_{12} (\text{age diversity})_{it} \\
 &+ \text{Fixed Effects} + e_{it}
 \end{aligned}$$

² Internal ownership has been examined as a non-linear convex factor, which has an impact on PNAV that varies across ownership levels. To assess this non-linearity, we include a polynomial.

³ See Cheng (2008) for a full discussion on the empirical evidence that firms with larger boards have lower variability of corporate performance.

The first factors, β_1 to β_5 , represent the rational factors as identified by the available literature. β_6 is the behavioural factor of investor sentiment. The corporate governance factors β_7 up to β_9 and the board diversity factors β_{10} , β_{11} and β_{12} are added as the last elements of the model. These groups of variables are introduced stepwise to the regression. The ϵ adds the error term to the model. The sample period starts at the 1st of January 2006 and ends at the 31st of December 2018, using quarterly data.

4. Results

4.1. Full sample analysis

The effect of board diversity on the PNAV ratio is tested while controlling for specific firm and time specific effects by including both firm and year fixed effects. The robust standard errors are clustered at firm-level. In total, there are 12 independent variables included in the regression. Table 5 reports the coefficient estimates and p-values calculated with robust standard errors, clustered at firm-level. Column (1) provides the results of a regression with only the rational and behavioural factors without including fixed effects. Apart from leverage, we find significance for six variables. As expected, momentum, EPRA membership, and investor sentiment all carry positive signs. All three have had a positive effect on the relative pricing of the European REITs in our sample. The PNAV effect of firm size and stock liquidity turned out negative, which is different than expected, but may also be affected by misspecifications of this first baseline model. Hence, we extend our model with a set of validated corporate governance factors (internal ownership and board size). The results, in column (2), report a significantly negative effect of internal ownership, while a positive effect was theorized. Internal ownership was identified as disciplining mechanism, which should strengthen the PNAV of a firm. On the other hand, when we extend our model later on, we find that this significance is gradually reduced. This may well indicate that other factors may overlap with some of our initial internal ownership finding. The same holds for board size. Here we expected a negative sign – since small board enhance risks – but we find the opposite, initially. As soon as our model is completed with diversity factor and is controlling for fixed effects, this board size effect fades out.

- Insert table 5 (full sample regression analysis) around here –

We focus our analysis on the effects of board diversity. Therefore, we continue our PNAV analysis by including three additional variables, each capturing different aspects of board diversity: gender, ethnicity, and age. In column (3) of table 5, we estimate coefficients for these variables without fixed effects, and find a significant and negative effect for all three. In other words, these initial results imply that more diverse boards weaken the relative pricing of European REITs. According to the rich literature that we discussed in section 2 of this paper, we would have expected the opposite. However, once we correct our estimate by including the relevant fixed effects for time (column 4) and firms (column 5), our diversity coefficients switch signs. The introduction of fixed effects turns several variables insignificant due to the explanatory power of the fixed effects. For firm size, female board participation, and age diversity, the introduction of year fixed effects has the largest effect, indicating that some year-specific events reduce the significance of those variables. For leverage, EPRA membership, internal ownership and the nationality variable, the firm fixed effects have the largest effect, indicating that some firm specific events reduce the significance of those variables. Correcting for both firm and time fixed effects, as presented in column 6, yields positive effects for gender- and age diversity with significance for the latter. In fact, in column 6 we find that European REIT PNAVs respond positively to momentum, investor sentiment, and board age diversity, all as expected. The negative signs of size and internal ownership have lost most of their initial significance in the specification in which the model fit peaks at an adjusted R-squared of 0.63. All in all we can conclude that during our 2006 to 2018 sample period, European REIT PNAV ratios have been strengthened by stock momentum and investor sentiment, results which corroborate earlier findings by Morri and Baccarin (2016). We also find proof that board diversity matters too. REITs with age diverse boards are associated with higher PNAVs. Moreover, a F-test performed on the joint board diversity factors yields a p-value of 0.0806 implicating that the board diversity factors are jointly statistically significant at the 10% level.

4.2. Board diversity effects in turbulent times and markets

Our full sample results indicate that board diversity matters to PNAV dynamics. Age diversity increases the PNAV of European REITs and the joint effect of age, gender, and ethnicity have a pervasive effect on the cross section of REIT PNAVs. It appears that the heterogenous perspectives of diverse boards pay off. REITs with more diverse boards are appreciated more by their investors,

perhaps due to the assumed benefits of increased corporate agility. But to properly assess this interpretation we need to stress test our findings. Hence, we repeat our regressions for sample subsets in which market dynamics have been more prominent. If board diversity leads to higher PNAV due to gains in market responsiveness and corporate agility, we would expect to find the most compelling evidence in the more challenging market circumstances. Hence, we now focus our analysis on the more turbulent post GFC years and on a subset of retail REITs. Did board diversity matter more, when the going got tough?

In the first two columns of table 6, we compare results for a split sample analysis to control for structural breaks in time. If market responsiveness is driving the observed variation in PNAV, we would expect that board diversity mattered most in the period when real estate markets faced more turmoil. Within our sample period of 2006 – 2018, this turmoil has been most prominent in the post-GFC years when real estate markets across Europe were contending with high vacancy rates and weakened economies. It is in this 2013 - 2018 period, that we document the strongest results for board diversity. Especially, gender diversity was appreciated most in those years. At the same time, we find no evidence for a change in the control variables. Before and after the crisis the same controls matter, and their effects have been of similar size. This can be interpreted as evidence that board diversity effects are time variant and are more pronounced in times when management needs to be more agile.

- Insert table 6 (subsample regression analysis) around here –

By the same token, we run a separate analysis on a subset of Retail REITs. Retail has faced hard times during our sample period, as a consequence of various trends like the surge of internet platforms and volatile swings in consumer confidence and spending. Much more than residential, office, and industrial real estate, returns in retail have to be earned by making tough decisions at the right moment in time. Hence, we analyse whether in this tough market, the virtues of an agile and diverse board have been more distinct.

In the last two columns of table 6, we present the regressions results of post-crisis PNAVs of retail (column 4) versus non-retail REITs (column 3). These columns show some noteworthy results. Again, we find that the important and significant effects of momentum and investor sentiment remain virtually unaffected. In both markets, these factors carry the expected positive signs, indicating that market circumstances are not relevant for the loading of these variables. This is, also again, different

when it comes to board diversity. Here we find that the markets mattered. In the non-retail markets only gender diversity turned out significant. For the retail REITs in our subsample, we find that both gender and age diversity carry a significant and positive signs. Please keep in mind that both subsamples have been studied during the more turbulent post-GFC years 2013 through 2018. Any difference that we document at this stage in our analysis, is due to the difference in property type focus. This difference again offers proof that board diversity matters more when markets are challenging to management. During the rocky years in retail, REITs with more diverse boards, outperformed their homogenous peers.

An F-test performed on the joint significance of the board diversity variables gender, ethnicity and age, yields a p-value of 0.008 for retail REITs and a p-value of 0.142 for non-retail REITs. This implies that these board diversity variables are jointly statistically significant at the 1% level for retail REITs and jointly insignificant for non-retail REITs.

5. Conclusions and Implications

This paper adds to the current literature by performing a study on the PNAV ratio of European REITs with four categories of determinants: rational, behavioural, corporate governance and board diversity. The PNAV ratio of REITs has been investigated in several settings across the world, but this thesis is the first academic paper that includes all determinant categories and applies them to the young European REITs. Initially, the unbalanced panel data sample contains 89 REITs over the time period 2006-2018, after which the sample period is reduced to 2013-2018 and split into retail and non-retail REITs for the second part of the study.

Our full sample regressions show that momentum, investor sentiment and age diversity have a statistically significant positive effect on the PNAV ratio of European REITs, while firm size and internal ownership have a statistically significant negative effect. Besides the positive individual effect of age diversity, the three board diversity variables are jointly statistically significant at the 10% level. Results, which offer evidence that the acclaimed benefits of blended perspectives can help to strengthen the relative pricing of firms.

The second part of the statistical analysis covers the analysis of the reduced sample, separating the sample in pre- and post-crisis periods, and zooming into the differences between retail and non-retail REITs. We expect that if the variation of perspectives that is associated with board diversity is improving PNAV's because of enhanced corporate responsiveness, then we will find the most compelling proof of this in periods and markets that have been the most challenging (post-crisis and retail). Our results offer this proof. First of all, we find that the full sample results for board diversity are more pronounced during the later and more challenging years of our sample. Furthermore, we find that within this period, these results are most distinct for the retail REITs, who have been faced with the most turbulent real estate dynamics. For the non-retail REITs, only momentum, investor sentiment and female board presence are statistically significant. Furthermore, the board diversity factors are jointly insignificant. For the retail REITs, we also find that firm size, EPRA index membership, liquidity and age diversity are statistically significant. Moreover, the three board diversity factors are jointly statistically significant at the 1% level. This confirms the hypothesis that board diversity factors have a bigger positive impact for retail REITs compared to non-retail REITs during recent years. Taking the above conclusions into account, the recommendation for REITs is to increase their board diversity. The main focus point is board age diversity as it has the most significant effect in the regressions. Facing the prospect of post-covid19 market turbulence, REIT performance may well benefit from lively boardroom dynamics that help to challenge old assumptions.

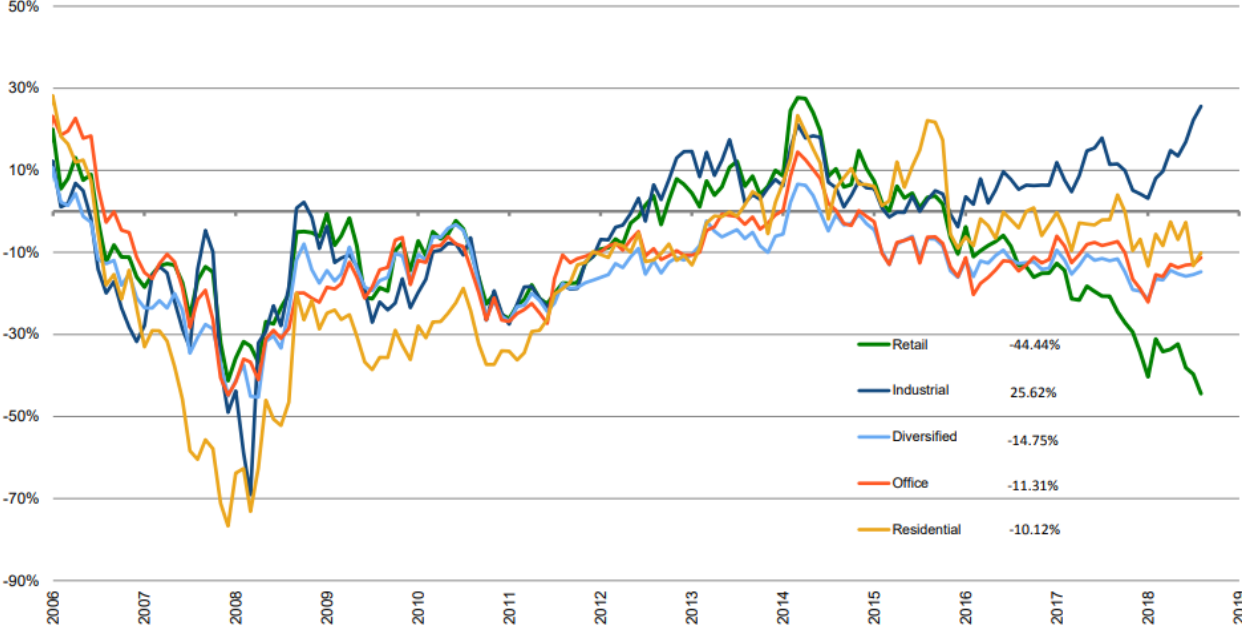
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Figure 1: FTSE EPRA Nareit Europe Sector Indices Discounts to Published NAV (2009 – 2019)



Source: EPRA

Figure 2: PNAV ratio distributions over time

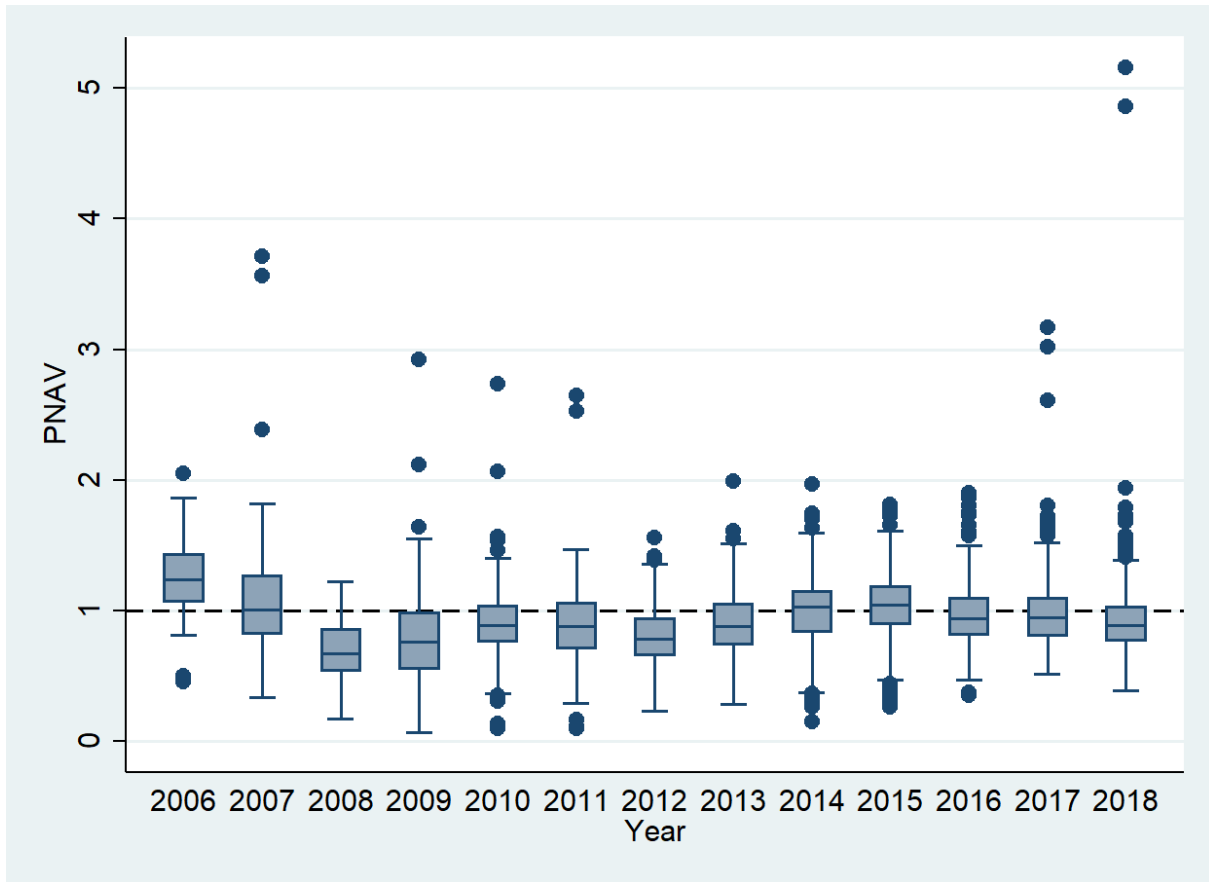


Table 1: Sample characteristics

Country	PNAV ratio <i>End</i>	Annualized stock return (%) <i>2014-2018</i>	Market cap (million €) <i>End 2018</i>	% of market cap	REITs	% of REITs
Belgium	1.2482	8.2218	10,082	7.30	10	11.24
Finland	0.6985	-4.3598	1,690	1.22	1	1.12
France	0.7309	9.5942	46,556	33.69	24	26.97
Germany	0.8760	3.7443	4,812	3.48	3	3.37
Italy	0.7049	9.0917	2,504	1.81	2	2.25
Netherlands	0.7683	-2.0328	4,180	3.03	4	4.49
Spain	0.9589	24.5078	12,449	9.01	4	4.49
UK	0.8565	8.5855	55,909	40.46	41	46.07
Total			138,182	100	89	100

Sources: EPRA and Bloomberg. The PNAV ratio is the country average of the PNAV ratio: the share price of the REIT divided by its net asset value. The annualized stock return is the country average of its stocks annualized stock returns, measured by the sum of $(1 + \text{yearly return})$, squared with $(1 / \text{number of years of data})$ minus 1. The market capitalization is the sum of the REIT's market capitalization: the product of the number of shares outstanding times the share price at the end of 2018. % of market cap is the percentage of the total market capitalization of the Western European REIT market. REITs is the number of REITs in the sample per country. % of REITs is the percentage of the total number of Western European REITs.

Table 2A: Descriptive Statistics

	N	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
PNAV	3,436	0.93	0.32	0.07	0.75	0.91	1.10	5.16
SIZE	3,436	6.67	1.00	1.10	6.25	6.99	7.41	7.66
LEV (%)	3,436	35.15	17.43	0.00	25.59	37.12	46.90	94.29
MOM (%)	3,372	5.51	28.23	-	-8.39	5.24	19.00	317.56
EPRA	3,436	0.61	0.49	0.00	0.00	1.00	1.00	1.00
LIQ (%)	3,436	11.51	13.23	0.00	2.63	8.63	14.55	179.36
INV.S (%)	3,436	-6.83	13.03	-	-13.72	-4.07	-0.94	32.92
INT.O (%)	2,789	5.11	12.00	0.00	0.01	0.26	2.39	91.19
INT.O2 (%)	2,789	1.70	6.16	0.00	0.00	0.00	0.06	83.16
B.SIZE	3,120	2.09	0.37	0.69	1.79	2.08	2.40	3.14
FEM (%)	3,120	15.46	14.56	0.00	0.00	12.50	25.00	60.00
NAT (%)	3,120	15.44	21.47	0.00	0.00	0.00	30.00	60.00
AGE	3,120	7.88	2.59	0.00	6.30	7.60	9.60	17.10

Table 2B: Descriptive statistics – retail and non-retail REITs

	Non-retail REITs			Retail REITs			Mean-comp	
	Mean	Std.	Median	Mean	Std. Dev.	Median	Diff	p-value
PNAV	0.99	0.32	0.98	0.93	0.24	0.88	0.06***	0.00
SIZE	7.12	1.27	7.00	7.06	1.47	7.18	0.06	0.40
LEV (%)	0.34	0.16	0.34	0.32	0.16	0.36	0.02**	0.04
MOM (%)	12.08	19.17	9.95	2.87	17.88	2.42	9.21***	0.00
EPRA	0.61	0.49	1.00	0.60	0.49	1.00	0.01	0.55
LIQ (%)	0.10	0.11	0.08	0.10	0.09	0.09	-0.00	0.38
INV.S (%)	-2.85	5.31	-1.88	-2.96	5.39	-1.88	0.12	0.66
INT.O (%)	0.05	0.12	0.00	0.05	0.11	0.00	-0.00	0.62
INT.O2	0.02	0.06	0.00	0.01	0.07	0.00	0.00	0.73
B.SIZE	2.06	0.37	2.08	2.11	0.38	2.20	-0.06***	0.00
FEM (%)	0.22	0.15	0.20	0.20	0.14	0.20	0.02**	0.02
NAT (%)	0.14	0.20	0.00	0.17	0.25	0.00	-0.03***	0.01
AGE	7.68	2.99	7.20	7.81	2.33	7.50	-0.13	0.39

***, **, * indicate two-tailed significance at the 1%, 5% and 10% levels. PNAV is measured by dividing the share price by the net asset value. SIZE is the natural logarithm of total assets. LEV is long term debt divided by total assets. MOM is the stock return over the last year. EPRA is a dummy variable for EPRA NAREIT index membership. LIQ is the number of quarterly traded shares divided by the total number of shares. INV.S is the average PNAV ratio of all the REITs. INT.O is the % of shares owned by insiders with INT.O2 being the squared value. B.SIZE is the natural logarithm of the number of board members. FEM is the percentage of female board members. NAT is the % of board members who originate from different countries. AGE is the standard deviation of the age of the board members.

Table 3: Correlations

	PNAV	SIZE	LEV	MOM	EPRA	LIQ	INV.S	INT.O	INT.O2	B.SIZE	FEM	NAT
SIZE	-0.013 (0.46)											
LEV	-0.086*** (0.00)	-0.078*** (0.00)										
MOM	0.324*** (0.00)	0.012 (0.48)	-0.080*** (0.00)									
EPRA	0.139*** (0.00)	0.567*** (0.00)	-0.177*** (0.00)	0.041** (0.02)								
LIQ	-0.017 (0.31)	0.357*** (0.00)	-0.140*** (0.00)	-0.071*** (0.00)	0.413*** (0.00)							
INV.S	0.408*** (0.00)	0.026 (0.12)	-0.137*** (0.00)	0.462*** (0.00)	0.047*** (0.01)	0.008 (0.66)						
INT.O	-0.181*** (0.00)	-0.074*** (0.00)	0.079*** (0.00)	0.020 (0.29)	-0.224*** (0.00)	-0.127*** (0.00)	-0.083*** (0.00)					
INT.O2	-0.169*** (0.00)	-0.064*** (0.00)	0.049** (0.01)	0.0301 (0.11)	-0.242*** (0.00)	-0.130*** (0.00)	-0.050*** (0.01)	0.934*** (0.00)				
B.SIZE	0.014 (0.42)	0.635*** (0.00)	0.032* (0.07)	0.032* (0.08)	0.203*** (0.00)	0.081*** (0.00)	0.005 (0.77)	0.012 (0.55)	0.016 (0.41)			
FEM	0.019 (0.29)	0.151*** (0.00)	0.070*** (0.00)	0.029 (0.10)	-0.101*** (0.00)	-0.184*** (0.00)	0.148*** (0.00)	-0.137*** (0.00)	-0.085*** (0.00)	0.1905*** (0.00)		
NAT	-0.106*** (0.00)	0.363*** (0.00)	0.034* (0.06)	-0.032* (0.08)	0.147*** (0.00)	0.019 (0.29)	-0.046*** (0.01)	-0.073*** (0.00)	-0.019 (0.34)	0.1871*** (0.00)	0.023 (0.20)	
AGE	-0.090*** (0.00)	0.140*** (0.00)	0.052*** (0.00)	0.038** (0.03)	-0.119*** (0.00)	-0.071*** (0.00)	-0.008 (0.67)	0.130*** (0.00)	0.1183*** (0.00)	0.344*** (0.00)	-0.013 (0.45)	0.114*** (0.00)

***, **, * indicate two-tailed significance of the correlation at the 1%, 5% and 10% levels. P-values are reported in parentheses.

Table 4: Variables description

Variable	Description	Pred. sign
<i>Dependent variable</i>		
PNAV	Share price divided by the net asset value	
<i>Independent variables</i>		
SIZE	Firm size. Natural logarithm of total assets.	(+)
LEV	Leverage. Long term debt divided by total assets.	(-)
MOM	Momentum. Previous year stock return.	(+)
EPRA	Dummy for EPRA index membership. 1 if member.	(+)
LIQ	Liquidity: turnover ratio. Traded shares / total shares.	(+)
INV.S	Investor sentiment. Average REIT PNAV ratio.	(+)
INT.O	Internal ownership. % of shares owned by insiders.	(+)
INT.O2	Squared internal ownership %.	(-)
B.SIZE	Board size. Natural logarithm of board size.	(-)
FEM	Female board membership. % of females in the board.	(+)
NAT	Nationality ratio as a proxy of ethnical diversity. % of board members who are from different countries.	(+)
AGE	Age diversity. Standard deviation of board age.	(+)

Table 5: Regression results with PNAV as the dependent variable

Var.	Pred.	(1)	(2)	(3)	(4)	(5)	(6)
SIZE	(+)	-0.028*** (0.00)	-0.029*** (0.00)	-0.017** (0.01)	-0.018 (0.42)	-0.049* (0.06)	-0.045* (0.06)
LEV	(-)	-0.008 (0.78)	0.056* (0.10)	0.078** (0.02)	0.113 (0.27)	-0.010 (0.91)	-0.009 (0.92)
MOM	(+)	0.002*** (0.00)	0.002*** (0.00)	0.002*** (0.00)	0.002*** (0.001)	0.002*** (0.00)	0.002*** (0.00)
EPRA	(+)	0.141*** (0.00)	0.116*** (0.00)	0.097*** (0.00)	0.095** (0.03)	0.035 (0.30)	0.032 (0.34)
LIQ	(+)	-0.138*** (0.01)	-0.009 (0.88)	-0.049 (0.42)	-0.039 (0.81)	0.044 (0.68)	0.050 (0.63)
INV.S	(+)	0.008*** (0.00)	0.009*** (0.00)	0.009*** (0.00)	0.009*** (0.00)	0.008*** (0.00)	0.009*** (0.00)
INT.O	(+)		-0.382*** (0.00)	-0.489*** (0.00)	-0.526* (0.07)	-0.512 (0.14)	-0.583* (0.10)
INT.O2	(-)		0.118 (0.62)	0.304 (0.21)	0.348 (0.41)	0.365 (0.30)	0.416 (0.24)
B.SIZE	(-)		0.060*** (0.00)	0.089*** (0.00)	0.102 (0.18)	0.063 (0.21)	0.066 (0.19)
FEM	(+)			-0.126*** (0.00)	-0.216 (0.22)	0.176** (0.03)	0.167 (0.13)
NAT	(+)			-0.122*** (0.00)	-0.124 (0.13)	-0.076 (0.42)	-0.076 (0.41)
AGE	(+)			-0.011*** (0.00)	-0.010 (0.23)	0.011** (0.04)	0.011** (0.05)
Year Fixed Eff.		No	No	No	Yes	No	Yes
Firm Fixed Eff.		No	No	No	No	Yes	Yes
N		3.372	2.508	2.508	2.508	2.508	2.508
Adj. R2		0.21	0.15	0.16	0.17	0.63	0.63
F-test board diversity							2.32*

***, **, * indicate two-tailed significance of the coefficient estimate at the 1%, 5% and 10% levels. p-values are reported in parentheses. PNAV is measured by dividing the share price by the net asset value. SIZE is the natural logarithm of total assets. LEV is long term debt divided by total assets. MOM is the stock return over the last year. EPRA is a dummy variable for EPRA NAREIT index membership. LIQ is the number of quarterly traded shares divided by the total number of shares. INV.S is the average PNAV ratio of all the REITs. INT.O is the % of shares owned by insiders with INT.O2 being the squared value. B.SIZE is the natural logarithm of the number of board members. FEM is the percentage of female board members. NAT is the % of board members who originate from different countries. AGE is the standard deviation of the age of the board members.

Table 6: Regression results with PNAV as the dependent variable

Variable	Predicted sign	All REITs	All REITs	Non-retail	Retail
		2006-2018	2013-2018	2013-2018	2013-2018
SIZE	(+)	-0.045* (0.06)	-0.056** (0.02)	-0.049 (0.37)	-0.072*** (0.00)
LEV	(-)	-0.009 (0.92)	-0.054 (0.53)	-0.014 (0.90)	-0.059 (0.660)
MOM	(+)	0.002*** (0.00)	0.004*** (0.00)	0.004*** (0.00)	0.003*** (0.00)
EPRA	(+)	0.032 (0.34)	0.019 (0.55)	0.015 (0.70)	0.069* (0.06)
LIQ	(+)	0.050 (0.63)	0.079 (0.51)	0.138 (0.28)	-0.242** (0.05)
INV.S	(+)	0.009*** (0.00)	0.008*** (0.00)	0.009** (0.01)	0.007*** (0.00)
INT.O	(+)	-0.583* (0.10)	-0.160 (0.58)	-0.361 (0.52)	-0.212 (0.38)
INT.O2	(-)	0.416 (0.24)	-0.221 (0.47)	0.365 (0.670)	-0.191 (0.49)
B.SIZE	(-)	0.066 (0.19)	0.070 (0.26)	0.075 (0.26)	0.044 (0.55)
FEM	(+)	0.167 (0.13)	0.276** (0.01)	0.281** (0.03)	0.332* (0.07)
NAT	(+)	-0.076 (0.41)	-0.093 (0.36)	-0.068 (0.50)	-0.180 (0.42)
AGE	(+)	0.011** (0.05)	0.008 (0.20)	-0.002 (0.71)	0.021*** (0.03)
Year Fixed Effects		Yes	Yes	Yes	Yes
Firm Fixed Effects		Yes	Yes	Yes	Yes
N		2.508	1,857	1.346	511
Adj. R2		0.63	0.65	0.63	0.84
F-test board diversity		2.32*	3.04**	1.88	5.08***

***, **, * indicate two-tailed significance of the coefficient estimate at the 1%, 5% and 10% levels. p-values are reported in parentheses. PNAV is measured by dividing the share price by the net asset value. SIZE is the natural logarithm of total assets. LEV is long term debt divided by total assets. MOM is the stock return over the last year. EPRA is a dummy variable for EPRA NAREIT index membership. LIQ is the number of quarterly traded shares divided by the total number of shares. INV.S is the average PNAV ratio of all the REITs. INT.O is the % of shares owned by insiders with INT.O2 being the squared value. B.SIZE is the natural logarithm of the number of board members. FEM is the percentage of female board members. NAT is the % of board members who originate from different countries. AGE is the standard deviation of the age of the board members.