Managerial Aspects of Listed Real Estate Companies

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1 Introduction

1.1 General Motivation

The global financial crisis of 2007/2008 is an alarming example of the consequences stemming from managerial entrenchment and corporate behaviour not compliant with U.S. policy makers' regulations or good corporate governance practises. Considering that the crisis was triggered by the burst of a housing bubble and that the REIT industry has experienced significant market capitalisation growth[1] ever since, REIT management has to be aware of its past, current and future responsibility and take appropriate action to prevent any repetition of incentive misalignment and short-term risk taking from reoccurring again. As a result of the crisis, investor sensitivity towards corporate governance and transparency problems has intensified. Hence, a growing investment community now seeks to generate positive social and sustainable impacts by integrating environmental, social and governance (ESG) factors, alongside profits, into their decision-making (PWC, 2016; Responsible Investment Association, 2017). With respect to growing investor demand for ESG factors and overall growth of the REIT industry, the implementation of well-developed corporate governance mechanisms will become increasingly important for REIT management. These efforts have been fostered early on by U.S. policy makers with the adoption of reforms such as the Sarbanes Oxley Act of 2002 and the 'Say-on-Pay'[2] rule of 2011 to strengthen shareholder rights and ensure access to as well as quality of substantial investor information. Several studies on listed real estate companies already provide evidence that enhanced corporate governance is associated with better company performance (Bauer, Eichholtz, & Kok, 2010; Feng, Ghosh, & Sirmans, 2005; Ghosh & Sirmans, 2003; Kohl & Schaefers, 2012).

In the context of corporate governance, a large and growing stream of finance literature investigates how women in high-level leadership roles affect performance. The disadvantages and advantages of having a gender-diverse board can be explained by means of similarity/attraction theory and stakeholder theory. Similarity/attraction theory argues that greater diversity is a potential source of intragroup conflict (Lau & Murnighan, 1998) and reduced group cohesion, since the level of trust and loyalty are likely to depend on the similarity of board members (Byrne, 1971; Williams & O'Reilly, 1998). In turn, stakeholder theory states that firms need to cooperate with their stakeholders and consider stakeholders' needs within

[1] The market capitalisation growth for US Equity REITs amounted to 295% in the period of 2009-2018 (National Association of Real Estate Investment Trusts, 2019).
[2] For further information on the 'Say-on-Pay' rule see: https://www.sec.gov/rules/final/2011/33-9178-secg.htm.

the management decision-making process (Clarkson, 1995; Donaldson & Preston, 1995). Thus, developing good relations with female stakeholders and matching board composition to the diversity of customers, shareholders and employees can create a competitive advantage (Carter, Simkins, & Simpson, 2003). In the US, the number of women in senior leadership positions has been increasing slowly compared to some European countries, which adopted quota legislations (e.g. Germany, Norway, France). Due to the absence of female quota in the US market, the US REIT sector offers an unbiased setting for analysing the link between gender diversity and performance. Considering the unique legal circumstances of the REIT sector, the effectiveness of both corporate governance and the impact of gender-diverse boards is expected to differ from that of companies from other industries. Since no five or fewer shareholders are entitled to own 50% of the company, extensive external monitoring through large blockholders is impaired with respect to REITs (Feng et al., 2005), and internal monitoring structures gain importance. Hence, gender diversity may be considered as a proxy for enhanced corporate social responsibility (Boulouta, 2013; Harjoto, Laksmana, & Lee, 2015), which may ultimately increase investor demand for those REITs (Bear, Rahman, & Post, 2010; Reguera-Alvarado, De Fuentes, & Laffarga, 2017). If diverse boards enhance internal monitoring (Adams & Ferreira, 2009), gender diversity in senior leadership positions may be a decisive corporate governance factor within REITs, for which extensive external monitoring through large blockholders is weakened.

With regard to monitoring and control of REIT management, compensation can be a key determinant in aligning the interests of REIT management and shareholders. As REIT shareholders tend to be widely dispersed, agency problems arise, since investors cannot effectively control the daily operations of the company. Agency theory argues that compensation encourages executive directors to act in the interest of the company's shareholders, suggesting that CEO/executive compensation should be determined primarily by company performance (Bloom & Milkovich, 1998; Jensen & Meckling, 1976). Managerial power theory, however, states that powerful CEOs and entrenched executives have a significant impact on board member decisions, and ultimately on the level of their own compensation (Bebchuk, Fried, & Walker, 2002). In the light of the devastating consequences of the financial crisis of 2007/2008, which revealed that managers had been rewarded for excessive short-term risk taking (Bebchuk, Cohen, & Spamann, 2010; Cheng, Hong, & Scheinkman, 2015; Clementi, Cooley, Richardson, & Walter, 2009), a fundamental concern is the degree to which executives and especially CEOs are held accountable by investors for the remuneration packages they receive (Tosi, Werner, Katz, & Gomez-Mejia, 2000). As a result of the crisis, the US Securities and Exchange Commission (SEC) adopted reforms to reduce managerial entrenchment. With

the so-called 'Say-on-Pay' rule, the SEC grants shareholders an advisory vote on executive compensation, thereby providing a framework which ties compensation to long-term company performance, and ultimately increases transparency.

In this vein, the SEC's mission is to ensure that investors have access to fundamental information about any firm in which they invest.[3] As mandated by the Sarbanes-Oxley Act of 2002, the SEC has to review the periodic financial statements of listed companies at least every three years (Bozanic, Dietrich, & Johnson, 2017). Within this procedure, the SEC may identify potential deficiencies such as inconsistencies between the funds from operations (FFO) disclosed by the REIT and NAREIT's definition. Once any inconsistencies have been discovered, the SEC sends a comment letter to the REIT's management requesting clarification, more discussion and/or improvements in future filings. Such reviews can be considered a form of external, involuntary and independent auditing of firms. It is commonly argued that additional or enhanced disclosure improves the information environment between a firm and its investors (Amihud & Mendelson, 1986; Diamond & Verrecchia, 1991; Kohl & Schaefers, 2012; Leuz & Verrecchia, 2000; Welker, 1995). If the investment community gains new decision-relevant information about a REIT from these SEC comment letter reviews, such external audits may be a powerful tool for investment and pricing decisions.

Both, non-compliance with regulatory provisions during the financial crisis and literature on corporate governance and disclosure, show that corporate governance-related topics pose a major challenge to REIT management. Therefore, the aim of this thesis is to evaluate corporate governance mechanisms, namely gender diversity, pay-for-performance contracts and enhanced disclosure, from an investor's point of view. In a US REIT context, the three articles of this dissertation provide first insight into: (1) the determinants which explain the presence of women on the board of directors, and the resulting gender diversity / performance relationship; (2) the link between management compensation arrangements and sustainable company performance during and after the financial crisis; (3) the REIT-specific content of SEC comment letters and their impact on the information environment of REIT investors.

This dissertation sheds light on how a REIT's management should position and best prepare itself in order to detect and cope with the aforementioned challenges. Further, these insights will guide REIT investors and U.S. policy makers to more appropriately evaluate transparency, disclosure and corporate governance mechanisms.

[3] Further information on the mission, purpose and organisational structure, see SEC website on "What We Do": https://www.sec.gov/Article/whatwedo.html.

1.2 Research Questions

The following section contains an overview of the research questions investigated in this dissertation with regard to the three articles.

Paper 1: Gender Diversity and Financial Performance: Evidence from US REITs

- Does gender diversity in senior leadership positions constitute a corporate governance factor?
- What are the factors that determine the likelihood of a REIT having a female director on the board of directors?
- Does female representation in executive and non-executive board positions impact on the financial performance of REITs?
- Does female leadership have a greater impact on the accounting results (FFO/SHARE) of a company, or rather on market performance (PRICE/NAV)?
- Is there a critical threshold of female representation, represented by a U-shaped relationship between gender diversity and performance?
- Are there real estate sector differences concerning gender diversity and its impact on performance?

Paper 2: The Determinants of Executive Compensation in US REITs: Performance vs. Corporate Governance Factors

- Did the 'Say-on-Pay' rule, which was introduced after the financial crisis of 2007/2008, strengthen the pay-for-performance link?
- Do well-regarded corporate governance mechanisms (e.g. independent shareholders) constrain excessive compensation arrangements?
- Is CEO/executive director compensation determined by performance and/or managerial entrenchment?
- Do CEOs and executive directors exert significant influence on the level of their own compensation and pay sensitivity to performance?
- Are there striking differences between the determinants of short-term cash, long-term total and incentive-based equity compensation packages?
- Are compensation packages adequately structured with regard to long-term performance and value-driven growth?

Paper 3: SEC Comment Letters and Information Asymmetries in REITs

- Does the SEC comment letter review enhance the information environment for REIT investors?
- Which types of comments (e.g. asset-, transaction-specific issues) are most frequently received by REITs?
- Does the SEC particularly scrutinise REIT-specific non-GAAP metrics like FFO?
- Which types of comments have the strongest impact on the reduction of REIT information asymmetries, as measured by the bid-ask spread?
- Is a higher complexity of SEC comment letter correspondences (e.g. number of comments) related to a stronger impact on the REIT information environment?

1.3 Course of Analysis

The following synopsis provides an overview of the three research articles with regard to their originality and research design, authorship, current publication status, and conference presentations.

Paper 1: Gender Diversity and Financial Performance: Evidence from US REITs

This article is the first to identify the determinants which explain the presence of women on the board of directors, and to study the relationship between gender diversity and financial performance in a US REIT context. A two-stage Heckman (1976) approach is applied to a unique panel dataset of 112 US Equity REITs over the period 2005-2015. The findings constitute a strong case for gender diversity by demonstrating that investors consider female leadership as a signal for enhanced corporate governance and develop a stronger demand for REITs which promote gender diversity.

Authors: Liesa Schrand, Claudia Ascherl, Wolfgang Schaefers
Submission to: Journal of Property Research (JPR)
Current Status: published in 2018, DOI: 10.1080/09599916.2018.1549587

This paper was presented at the 2017 Annual Conference of the American Real Estate Society (ARES) in San Diego, USA and at the 2017 Annual Conference of the European Real Estate Society (ERES) in Delft, Netherlands.

Paper 2: The Determinants of Executive Compensation in US REITs: Performance vs. Corporate Governance Factors

This article investigates whether REIT CEO and executive director compensation packages are determined by performance and/or by managerial entrenchment. Using a panel data fixed-effects methodology on a sample of 83 REITs in the period of 2006-2015, this study is the first to systematically assess the arrangement of REIT CEO and executive director compensation contracts after the financial crisis, while considering the 'Say-on-Pay' reform of 2011. The results show that there was no pay-performance link during the crisis. However, after the financial crisis, a strong link between remuneration and corporate success was identified.

Authors: Claudia Ascherl, Liesa Schrand, Wolfgang Schaefers, Sofia Dermisi

Submission to: Journal of Property Research (JPR)
Current Status: under review

This paper was presented at the 2018 Annual Conference of the American Real Estate Society (ARES) in Bonita Springs, USA and at the 2018 Annual Conference of the European Real Estate Society (ERES) in Reading, United Kingdom.

Paper 3: SEC Comment Letters and Information Asymmetries in REITs

This study is the first to investigate the impact of SEC comment letters on information asymmetries, as measured by the bid-ask spread, in the REIT market. The dataset of the empirical analysis comprises 85 REITs that received 452 comment letters with 2,846 comment letter issues on their annual financial statements (10-K Form) over the period of 2006-2016. The results show that SEC comment letters, as a form of external audit, indeed enhance the information environment of REIT investors, as they reveal deficiencies in REIT disclosure with regard to asset-specific (e.g. leasing), transaction-specific (e.g. joint ventures), liquidity and performance measurement (e.g. FFO and AFFO) issues.

Authors: Liesa Schrand, Julia Freybote, Wolfgang Schaefers
Submission to: Journal of Real Estate Finance and Economics (JREFE)
Current Status: under review

This paper was presented at the 2018 Annual Conference of the American Real Estate Society (ARES) in Bonita Springs, USA and at the 2018 Annual Conference of the European Real Estate Society (ERES) in Reading, United Kingdom.

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2 Gender Diversity and Financial Performance: Evidence from US REITs

Abstract

Our paper is the first to identify the determinants which explain the presence of women on the board of directors, and to study the relationship between gender diversity and financial performance in a US REIT context. We apply a two-stage Heckman (1976) approach to a unique panel dataset of 112 US Equity REITs over the period 2005-2015. Our results show that a REIT's likelihood of having a woman on the board of directors depends strongly on board attributes. Especially institutional investors support gender-diverse leadership teams, which might be driven by the perception that women contribute to an enhanced internal monitoring in the REIT context, in which external monitoring is weakened through ownership restrictions. We find evidence of a U-shaped relationship between gender diversity in executive positions and price per net asset value (PRICE/NAV). In the case of REITs, a critical mass of female executives is reached at approximately 30% representation. This finding holds especially for real estate sectors with a strong consumer orientation and a high proportion of women in the workforce, such as retail and health care. Our performance analysis demonstrates that gender diversity has a positive effect on market performance (PRICE/NAV), but not on operating performance (FFO/SHARE).

2.1 Introduction

In recent years, there has been a decisive investment trend towards socially responsible investments (PWC, 2016). Alongside financial returns, numerous investors now seek to generate a positive social and sustainable impact, by applying a so-called 'Impact Investing' strategy (Responsible Investment Association, 2017). As one example of an impact investment opportunity, State Street Global Advisors created the SSGA Gender Diversity Index ETF (ticker: SHE) in 2016. With the aim of increasing gender diversity in companies' senior leadership, this exchange-traded fund (ETF) invests exclusively in US large-cap companies with a relatively high proportion of women in both executive and non-executive positions.

However, increasing the number of women in senior leadership positions has been slow in the United States, compared to some European countries, which have seen dramatic changes, due to quota legislation (e.g. Norway, Spain, France) or other regulatory disclosure requirements or recommendations (e.g. Austria, United Kingdom). Recent data shows that 5.2% of US companies in the S&P 500 are led by a woman Chief Executive Officer (CEO) and 21.2% of corporate board seats are occupied by female directors (Catalyst, 2017). Since the US market has no quota legislation, the US REIT sector offers an unbiased setting for analysing the link between gender diversity and REIT performance.

The significant market capitalisation growth of 194% for US Equity REITs within our sample period (2005-2015) means that REITs have become a stand-alone asset class for institutional investors (National Association of Real Estate Investment Trusts, 2016), implying that well-developed corporate governance mechanisms within REITs will become increasingly important. Considering the unique legal setting of the REIT sector, we expect both the effectiveness of corporate governance, and the impact of gender diversity on REITs, to differ from other C corporations. Since the five largest REIT shareholders cannot own more than 50% of the company, extensive external monitoring through large blockholders is impaired with respect to REITs, and internal monitoring structures gain importance. For example, Ghosh & Sirmans (2003) provide evidence that weak corporate governance, as measured by long CEO tenure and a duality of the CEO and chairman position, adversely affects performance. Feng et al. (2005) find that companies with good governance (small boards, majority outside directors and a separated CEO/chairman position) perform better on average, although the effect is only significant for the best and worst boards. Shakir (2008) demonstrates that investors in listed property firms in Malaysia prefer small boards with a higher share of executive directors. Similarly, the findings of Kohl & Schaefers (2012) show that market participants investing in European listed real estate companies appreciate smaller

boards, higher levels of ownership by the executive management and greater transparency of real-estate-specific disclosure. Bauer et al. (2010) find that REITs scoring high in a governance rating are associated with better performance, but this only holds for REITs with low payout ratios.

In summary, gender-diverse boards may be considered as a proxy for enhanced corporate social responsibility (Boulouta, 2013; Harjoto et al., 2015), which may ultimately increase the demand for those REITs (Bear et al., 2010; Reguera-Alvarado et al., 2017). If diverse boards enhance internal monitoring (Adams & Ferreira, 2009), we expect women to improve performance especially within REITs, where extensive external monitoring through large blockholders is weakened. Moreover, we expect that female board members are especially important for the financial performance of REITs with a high proportion of women in the workforce or strong consumer-orientation, like retail and health care. Within the REIT corporate governance literature, we aim to identify the determinants of female representation in leadership positions, and to analyse the relationship between gender diversity and financial performance, by applying a two-stage Heckman (1976) approach to a unique panel dataset of 112 US Equity REITs over the period 2005-2015.

Previous gender studies commonly measure firm performance in terms of return on assets (ROA) and Tobin's Q (Adams & Ferreira, 2009; Campbell & Mínguez-Vera, 2008; Carter et al., 2010; Terjesen et al., 2015). However, these performance measures are not reliable for REITs, since their business is long-term investment in real estate assets. The accounting policy for real estate assets is the historical cost method under US-GAAP. Hence, ROA and Tobin's Q do not reflect the market value of real estate assets, since the balance sheet item 'total assets' reflects depreciated book values. For analysing gender diversity in a real estate context, it is necessary to apply real estate performance measures, so that we apply funds from operations per share (FFO/SHARE) and price per net asset value (PRICE/NAV).

Our methodology includes two steps. First, we derive the factors that determine the likelihood of a REIT having a female director on the board. Second, we analyse the gender diversity / performance link within REITs. The results of our first step regression show, that gender diversity within the board of directors depends substantially on board attributes and less on firm characteristics and macroeconomic circumstances. Specifically, institutional investors have a positive impact on female board appointments. Due to REIT ownership restriction, institutional investors may expect women to contribute to an enhanced internal monitoring and thus do support gender-diverse leadership teams.

The performance analysis demonstrates that gender diversity has a positive effect on market performance (PRICE/NAV), but not on accounting-based performance (FFO/SHARE). Hence, investor perceptions drive the positive effect of female directors on performance. However, gender diversity has no impact on operating performance. Intuitively, these results make good economic sense and constitute a strong case for gender diversity. Assuming women and men to be equally qualified, the impact of an increased share of women within REITs on financial realties like FFO/SHARE should be insignificant. However, stock market prices are also determined by soft factors and future expectations. Therefore, a positive impact of gender diversity on PRICE/NAV might signal for enhanced corporate governance mechanisms and social responsibility.

The remainder of this paper is organised as follows. The related literature and hypothesis Section discusses the existing research on the gender diversity / performance relationship and develops testable hypotheses for gender diversity within REITs. The methodology Section considers the sample design, variables from the multivariate analysis and the model specification. In the results Section, we report univariate statistics, present results from the multivariate analysis and discuss the implications of the results. The final Section concludes.

2.2 Related Literature and Hypotheses

An all-inclusive definition of diversity not only covers gender diversity, but also the dimensions of race, nationality, religion and education. Empirical evidence of diversity shows, that each dimension has a unique impact on group outcome or rather on performance (Bell et al., 2011; Harrison & Klein, 2007). Nonetheless, we focus on gender diversity for reasons discussed earlier in the introduction.

A large and growing stream of finance literature investigates how women in high-level leadership roles affect a firm's performance, but the empirical evidence on the relationship is ambiguous. Several economic reasons promote the advancement of women in management positions. Among these arguments is the fact that only a small number of women occupy a corporate board seat, which implies that there is a huge, untapped pool of board candidates or rather underutilised female talents (Simpson et al., 2010). If almost only men are considered as potential board candidates, the quality of board appointments may be impaired, since women's abilities and knowledge are not taken into consideration sufficiently. Females in senior positions may serve as role models, and thus encourage women in lower positions to strive for higher career levels (Burke & McKeen, 1996; Hillman et al., 2007). Thus, the

existence of female role models is of particular importance to company mentoring and career-support programs for women employees.

The advantages of having a gender-diverse board can be explained in consideration of decision-making and stakeholder theory. Decision making theory suggests, that with women's distinct attributes, boardrooms gain an increased variety of perspectives and a broader range of knowledge, skills and experience, which fosters creativity and innovation as well as the quality of decision-making (Cox & Blake, 1991; Robinson & Dechant, 1997). Thus, narrow, monolithic group thinking and self-assurance, rather likely in homogeneous boards, can be reduced by considering women's divergent views and their different approach to complex issues (Carter, Simkins, & Simpson, 2003). With regard to the multifaceted problems in the real estate industry, a female perspective can be a valuable contrast to that of male counterparts. Therefore, the inclusion of varying perspectives, may be especially important for real estate company sectors, which are particularly consumer-orientated (e.g. retail), or for those sectors where women represent the majority of the workforce (e.g. heath care).

In turn, stakeholder theory argues that firms need to cooperate with their stakeholders and consider stakeholder's needs within the management decision-making process (Clarkson, 1995; Donaldson & Preston, 1995; Freeman, 1983). Thus, developing good relations with women stakeholders and matching board composition to the diversity of customers, shareholders and employees, can create a competitive advantage (Carter et al., 2003). Appointments of the women stakeholder group, may also be an asset for the corporate image. The increasing popularity of socially responsible investments shows that investors do pay attention to companies' ethical behaviour and gender diversity in their investment decisions. Bear et al. (2010) and Reguera-Alvarado et al. (2017) show that by considering women in high-level leadership roles as a positive investment factor, investors raise the demand for shares of highly gender-diverse companies and ultimately raising their price.

Based on these theories in favour of a higher female representation in top management positions, several non-REIT studies have found a positive impact of the percentage of women on the board of directors on various performance measures (Campbell & Mínguez-Vera, 2008; Carter et al., 2003; Terjesen et al., 2015). However, the positive effects of gender diversity may be neutralised by certain disadvantages of heterogeneous teams. Greater diversity is a potential source of intragroup conflict (Lau & Murnighan, 1998). A clash of divergent opinions and more critical questioning may lead to prolonged and less efficient board meetings, resulting in delayed decision-making. Reduced board effectiveness may also result from reduced group cohesion, since the level of trust and loyalty are likely to depend on the

similarity of board members (Williams & O'Reilly, 1998). Accordingly, female representation in top management teams may have no significant effect (Carter et al., 2010; Rose, 2007) or even a negative effect on financial performance (Adams & Ferreira, 2009; Shrader, Blackburn, & Iles, 1997). Within the REIT corporate governance literature, there is only one paper by Dimovski et al. (2014) investigating the impact of female directors on the board of directors of 37 Australian REITS from 2008-2011. Their findings show that female directors are not statistically related to Tobin's Q, or to ROA. However, they neglect the possible endogenous relationship between performance and gender diversity.

These mixed results of previous studies can be explained in various ways. First, these studies differ in their sample design, such as time period, examined countries and industry sectors. Second, there is no uniform statistical method[4] applied by all studies and third, there is no identical measurement of performance[5] or gender[6] diversity.

Apart from the aforementioned lack of consensus, the critical mass theory (Kanter, 1977b, 1977a) postulates that the benefits of gender diversity outweigh the disadvantages of heterogeneous teams, if a certain threshold of female representation is reached. In her studies, Kanter (1977a, 1977b) created four groups (uniform, skewed, tilted and balanced), which differ concerning their gender composition. A uniform group is a homogeneous one with exclusively male or female members. The individuals of such a group, as well as the group as a whole, can develop their / its own uniqueness, although all members of a uniform group have a salient characteristic in common, such as gender or race. Skewed groups have a dominant proportion of one type of person, which takes control of the group and its culture. The few non-integrated group members are called 'tokens', for example, one women in a group of six men. Tilted groups display a less extreme group composition in terms of gender, compared to skewed ones. Hence, the 'token woman' status changes to a female minority group, which can impact on the group's culture by creating alliances. As a minority, women are no longer seen as representatives of their social type, but as individuals. In balanced groups, the minority and majority turns into subgroups, in which gender loses importance.

In real estate companies, women in leadership positions often find themselves in a skewed group, where a woman's situation can be described as 'tokenism'. Accordingly, a 'token woman' is not seen as an individual, but rather as representing the 'women category'. Kanter

[4] The statistical methods applied in the discussed studies are mean comparison test, anova, pooled OLS, panel data fixed-effects, 2SLS, 3SLS and GMM.

[5] The most widely used performance measures are return on assets (ROA), return on equity (ROE), return on sales (ROS), return on investment (ROI), earnings before interest and tax (EBIT), stock price growth, Tobin's Q and market to book value.

[6] Gender diversity is measured in terms of binary variables for the presence of at least one woman in the boardroom, the percentage of women in the boardroom or specific diversity indices (e.g. Blau-Index).

(1977a, 1977b) stated three typical tendencies facing 'tokens': hypervisibility, polarisation and assimilation. In daily business, hypervisibility is associated with increased pressure on the female representative. Hence, each decision, reaction or failure receives increased and often excessive attention. Second, polarisation refers to the sense of community and self-consciousness of the dominating part of the group, which increases by aligning commonalities and differences to the 'token'. Finally, the tendencies of hypervisibility and polarisation may result in assimilation, which often involves 'tokens' being seen as mere stereotypes or representatives for their social type or rather their gender.

Hypotheses

In a male-dominated REIT sector, we assume that a sole woman on the board of directors does not have much influence on decision-making, since tokenism is likely to prevail. Considering REITs unique governance structure, an increased share of women might add an 'external monitoring perspective' and thus be considered as a proxy for increased corporate social responsibility (Boulouta, 2013; Harjoto et al., 2015). Accordingly, firms which effectively exploit the advantages of heterogeneous teams may demonstrate improved performance. Therefore, we hypothesise that:

H1: *An increased percentage of women on the board of directors has a positive impact on financial performance.*

In addition to the board gender-composition analysis, we extend previous literature by explicitly distinguishing between executive and non-executive positions. In contrast to non-executive directors, who are responsible for advisory tasks, executive directors operate the daily business and take crucial corporate decisions. Thus, they are highly visible and the subject of considerable media attention, leading to coverage by market analysts and attracting investor interest. Since gender diversity within executive positions is a strong signal of company commitment to diversity, it might be appreciated especially by socially responsible investors.

H2: *An increased share of women in executive positions has a stronger impact on financial performance than an increased share of women in non-executive positions.*

We extend hypotheses *H1* and *H2* by accounting for a possible non-linear relationship between gender diversity and financial performance. We assume that a critical mass of female representation is reached when the female status changes from 'token woman' to a female minority group. In this context, we also assume that a separate analysis of executive and non-

executives positions leads to different impacts on financial performance. With regard to the critical mass of female representation, we hypothesise that:

H3: *Women's contribution in leadership teams*[7] *has a positive impact on financial performance, in particular when 'tokenism' no longer prevails (i.e. tilted or balanced teams).*

In a further step, we run an in-depth real estate analysis to examine which property sectors benefit particularly from gender diversity. The reason behind our expectation of different performance outcomes is twofold. First, unequal performance levels and variations can be observed for different property sectors. Therefore, we control for companies' specific property focus within REITs. Second, companies which have a strong female client base, should also represent their clients' needs in its leadership structure. Thus, female consumer-orientated companies that are matched in the sense of having management with the same traits (in this case gender), will perform better (Oystein Strom et al., 2014). In the analysis of different property sectors, we focus explicitly on company decision-makers, the group of executives, since they create and define the strategy.

H4: For property sectors which are more consumer-orientated (health care, hotel, residential and retail), we expect a positive impact of female executives.

We empirically examine the above mentioned hypotheses by simultaneously optimising the caveats of previous analyses, and assessing the financial impacts of gender diversity in a real estate context. This study applies panel data fixed-effects, includes an extensive set of board and firm control variables and accounts for the possibility of endogeneity.

2.3 Methodology

2.3.1 Sample Design

We start the sample selection process, using the constituent list of the FTSE EPRA / NAREIT United States Index. The index's admission criteria ensures a homogeneous sample with regard to the features of REITs (e.g. market capitalisation). In order to avoid survivorship bias, current and historical companies of the FTSE EPRA / NAREIT United States Index are included in the sample. Another requirement is that the companies have been publicly traded for more than five contiguous years during 2005-2015. The initial sample consists of 206 US listed real

[7] In the context of critical mass theory, 'teams' refer to the board of directors, as well as the group of executives and non-executives.

estate companies. The dataset was developed by combining various sources. Accounting and stock market data are collected from Thomson Reuters Datastream and SNL financial institution database. Data on corporate governance mechanisms is first extracted from the Bloomberg database and, secondly, from the company's proxy statements (DEF 14A). The availability of corporate governance data restricts us to 2005 as the first year of our sample. After the selection process, our final sample includes 112 US Equity REITs, resulting in 1,232 firm-year observations.

2.3.2 Measures

Performance Variables

As mentioned above, previous gender diversity studies mainly use ROA and Tobin's Q as independent performance variables. However these measures are not reliable for REITs, which carry investment properties at historical cost, whereby ROA and Tobin's Q do not reflect the market value of those assets. Considering the unique structure of REITs, we apply the real-estate-specific performance measures funds from operations per share (FFO/SHARE) and price per net asset value (NAV). In accordance with NAREIT guidelines, the FFO is calculated as GAAP net income, excluding gains or losses from sales of properties or debt restructuring, and adding back real estate depreciation. PRICE/NAV represents the ratio of the market price to the book value of equity. For real estate companies, the NAV is quite similar to the book value of equity. Specifically, the PRICE/NAV is calculated by the market valuation divided by the NAV.

Diversity Variables

The likelihood that a company has a female director is measured by WOMAN BOARD. This binary variable equals 1, if at least one woman occupies a corporate board seat. In the performance regressions, gender diversity is measured by the percentage of female board directors (% WOMEN). Additionally, we determine the critical mass of gender diversity by introducing a quadratic term (% WOMEN SQ), and translate this critical percentage into different gender distributions within the board of directors. In accordance with critical mass theory (Kanter, 1977b, 1977a), we create the following four binary variables:

- UNIFORM BOARD refers to a homogeneous male board.
- SKEWED BOARD refers to a male-dominated board with less than 15% female directors.
- TILTED BOARD refers to a less extreme domination of men in the board, with a female representation ranging from 15% to less than 30%.
- BALANCED BOARD refers to heterogeneous board with more than 30% female directors.

This categorisation approach is also applied to the group of executive and non-executive directors.

Board, Firm and Macro Control Variables

We include various board and firm structure as well as macro variables in our models, so as to control for their influence on the presence of a woman on the board of directors, as well as on the performance metrics. With regard to board or governance characteristics of a company, CEO DUALITY represents an indicator variable for the power-sharing between CEO and chairman. % INDEPENDENT denotes the percentage of independent directors which do not have any business or employment relationship with the company[8]. INSIDERS represents the percentage of equities held by current officers and directors. INSTITUTIONALS is the percentage of shares held by all institutional investors. The variable BMEETING measures the total number of board meetings during a fiscal year, including all special meetings. CEO TENURE is the CEO's time in office. QUALS WOMEN represents the average qualification level of female board members. BOARDSIZE is measured by the natural logarithm of the sum of directors on the board. We further subdivide the board of director positions into executive and non-executive positions. EXECUTIVES and NON-EXECUTIVES are measured by the natural logarithm of the sum of executive or non-executive directors, respectively. The variables BOARDSIZE, EXECUTIVES and NON-EXECUTIVES represent the 'exclusion variable' in the first stage probit models of the Heckman (1976) procedure.

Concerning the firm structure variables, FIRMAGE is measured by the years for which a company has been listed on the stock exchange. The variable FIRMSIZE is a proxy for future growth opportunities, which is measured by the sum of total assets. We measure firm risk with two different variables. First, VOLATILITY, which is the standard deviation of the stock return, based on the weekly values divided by the mean price and multiplied by 40, and secondly LEVERAGE, which is the ratio of total debt to total assets. Finally, we control for liquidity using the ratio of traded shares to shares outstanding.

Lastly, we include macro variables to control for general market movements. UNEMPLOYRATE is the average unemployment rate in the US. NTBI TR represents the total return of the NCREIF transaction-based index. TERMSTRUCTURE is the difference between 10-year and 3-month treasury yield, and thus represents the spread of long-term to short-term interest rates.

[8] Our definition of an independent board member is in accordance with New York Stock Exchange's independence requirements.

2.3.3 Model Specification

With regard to the gender diversity / performance relationship, endogeneity problems can arise in different forms. Omitted unobservable variables could affect the selection of women in leadership positions, as well as corporate performance at the same time, which may lead to spurious correlations between gender diversity and firm financial performance. To address the problem of omitted variable bias, we apply fixed-effect panel estimation with period and firm dummies.[9] This approach accounts for time-constant firm heterogeneity, caused by unobserved firm characteristics (e.g. corporate culture) and for time-varying heterogeneity caused by omitted variables which are constant over firms, but change over time (e.g. crisis or changes in government regulation).

The association between female leadership and the performance metrics may be driven by reverse causality. On the one hand, it is possible that financially successful firms are more likely to hire female directors, since they attract a higher level of public attention, and therefore experience more pressure to conform to a certain level of female representation in boardrooms. On the other hand, since female representation in top management is scarce, women who are suitable for a senior management position may self-select into better performing firms (Dezsö & Ross, 2012). Finally, sample selection bias may arise if qualified women do not seek a board director position, even though being as eligible as the observed female directors. Following current gender literature (e.g. Hutchinson et al. 2015; Oystein Strom et al. 2014; Srinidhi et al. 2011), we control for sample selection bias by applying a two-stage Heckman (1976) procedure. In a first step of this procedure, we apply probit estimation to predict the factors associated with female leadership. We then compute the inverse Mill's ratio (MILLS) from the predicted values for the likelihood that a company has a female director. In a second step, MILLS is included in the performance regressions, in order to control for the performance between companies with and without female directors.

[9] We apply the Hausmann test to determine the existence of a correlation between the unobserved effects and the explanatory variables. Since the unobserved heterogeneity is correlated with the observed variables, the fixed-effects method is applied.

First-stage probit model

We run the following probit regression to predict the presence of females on the board of directors:

$$\Pr(woman\ board_{i,t} = 1) = \Phi\left[\alpha + \beta\ board\ size_{i,t} + \gamma\ controls_{i,t} + \varepsilon_{i,t}\right] \quad \textbf{(1)}$$

In the above equation, Φ denotes the probit function, *i* the firm, *t* the year (2005–2015) and $\boldsymbol{\varepsilon}$ the error term. *Controls* refers to a variety of board and firm structure as well as macro variables as described in Section 'Measures'. The two-stage Heckman (1976) procedure is especially robust in cases where the variables in the first and second stage equations are not the same. Therefore, we need to include a variable in the first stage, which has an impact on the likelihood of a company having a female director (first stage), but no impact on the financial performance of a company (second stage). Since the probability of a woman occupying a corporate board seat is higher for larger boards, we use the *board size* as an 'exclusion variable'. We do not expect the size of the board to directly affect the dependent performance variables in the second stage. The included board and firm controls in the first stage are identical to those in the performance regressions in the second stage.

Second-stage fixed effects model

The proposed hypotheses are tested by estimating the following fixed-effects regression model:

$$performance_{i,t} = \alpha + \beta\ gender\ diversity_{i,t} + \gamma\ controls_{i,t} + mills_{i,t} + \delta_i + \tau_t + \varepsilon_{i,t} \quad \textbf{(2)}$$

In this model, *i* denotes the firm, and *t* the year (2005-2015). *Mills* represents the inverse Mills ratio, which is estimated from the first stage probit model so as to account for sample selection bias. δ refers to *firm* fixed-effects and τ to *time* fixed-effects for the years 2005 to 2015 and $\boldsymbol{\varepsilon}$ represents the error term. *Performance* refers, on the one hand, to the market-based performance measures Tobin's Q and Price per NAV and, on the other hand, to the accounting-based performance measures ROA and FFO per share. *Gender diversity* denotes either the percentage of women on board or Kanter's critical mass board groups. *Controls* represents a broad set of board characteristics (e.g. INSIDERS, CEO DUALITY), firm characteristics (e.g. LEVERAGE, FIRMSIZE) and macroeconomic factors (e.g. UNEMPLOYRATE, TERMSTRUCTURE) with a potential impact on financial performance.

The fixed-effects specification (2) is estimated with robust standard errors, which are valid in the presence of heteroscedasticity and serial correlation of arbitrary forms for panels with a small T and a large N (Arellano, 1987). Furthermore, a diagnostic test for multicollinearity is performed. All explanatory variables have variance inflation factors (VIF) below 10, suggesting that multicollinearity is not a problem in this regression analysis.

2.4 Results

2.4.1 Descriptive Statistics

Table 2.1 provides an overview of descriptive statistics for the whole sample. The variables are sorted by 'performance variables', 'female participation variables', 'board and firm control variables', 'macro variables' and provide the key statistics: number of observations, median, mean, standard deviation, maxima and minima.

On average, REITs yield an average Price/NAV ratio of 0.5 and a FFO per share ratio of 2.4. Approximately 58% of the firms have at least one woman on the board of directors. On average, a US REIT has 9% female representation on the board of directors. These female directors possess an average of two qualifications, within a range of 0-5 qualifications (e.g. high school diploma, Bachelor's / Master's degree, RICS title etc.). The average board comprises 8 directors, thereof 76% independent directors. The boards meet on average about seven times per year. More than half of the US listed real estate companies have separate CEO and board chair positions. The CEO's average time in office is 8 years. About 7.3% of the shares are owned by insiders and about three quarters by institutional shareholders. Most of the companies have been listed for about 14.7 years on the stock exchange. The average total assets of a US REIT amount to $ 4.650 billion. The average company's gearing is about 50%, liquidity about 20% and stock price volatility 5%. Concerning our macroeconomic control factors, the 11-year average unemployment rate is 6.8%, the NCREIF transaction-based index yields an average total return of 2.2%. On average, the spread between long- and short-term interest rates (term structure) from 2005-2015 has been positive at 1.9%.

Table 2.1: Summary Statistics

	Obs.	Median	Mean	Std. Dev.	Max.	Min.
Panel A: Performance Variables						
PRICE/NAV	1,097	0.486	0.507	0.220	2.117	0.013
FFO/SHARE	1,050	1.955	2.415	2.537	31.140	-10.590
Panel B:Female Participation Variables						
WOMAN BOARD	1,115	1.000	0.576	0.494	1.000	0.000
% WOMEN BOARD	1,115	0.100	0.093	0.129	0.429	0.000
Panel C: Board and Firm Control Variables						
BOARDSIZE	1,115	8.000	8.360	1.979	14.000	4.000
CEO DUALITY	1,115	0.000	0.471	0.499	1.000	0.000
% INDEPENDENT	1,112	0.750	0.758	0.158	4.814	0.375
INSIDERS	1,117	0.036	0.073	0.099	0.665	0.000
INSTITUTIONALS	1,067	0.802	0.768	0.211	1.861	0.001
BMEETING	1,113	7.000	7.799	3.736	32.000	0.000
CEO TENURE	1,073	7.000	8.118	6.177	32.000	0.000
QUALS WOMEN	584	2.000	2.134	0.979	5.000	0.000
FIRMSIZE (in $000)	1,122	2,823,109	4,649,625	5,418,166	33,324,574	194,139
FIRMAGE	1,232	14.000	14.735	10.697	42.000	0.000
LEVERAGE	1,122	0.505	0.503	0.1621	1.080	0.000
LIQUIDITY	1,100	0.151	0.179	0.111	0.886	0.016
VOLATILITY	1,119	4.083	5.057	3.140	39.248	1.000
Panel D: Macro Variables						
UNEMPLOYRATE	1,232	0.062	0.068	0.018	0.096	0.046
NTBI TR	1,232	0.026	0.022	0.030	0.059	-0.046
TERMSTRUCTURE	1,232	0.023	0.019	0.010	0.031	-0.001

Table 2.1 gives an overview of the descriptive statistics of all variables. PRICE/NAV is the natural logarithm of the market valuation divided by the NAV. FFO/SHARE is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. WOMAN BOARD is a binary variable equal to 1 if at least one female director occupies a corporate board seat, 0 otherwise. % WOMEN BOARD represents the percentage of women in the board of directors. BOARDSIZE represents the natural logarithm of the sum of directors on the board. CEO DUALITY is a binary variable equal to 1 if a firm's CEO is simultaneously chair of the board, 0 otherwise. % INDEPENDENT is the percentage of independent directors on the company's board. INSIDERS represents the percentage of outstanding shares currently held by insiders (including relatives). INSTITUTIONALS is the percentage of shares held by all institutional investors. BMEETING represents the natural logarithm of the number of all board meetings during a fiscal year. CEO TENURE is the CEO's time in office. QUALS WOMEN represents the average qualification level of female board members. FIRMSIZE is the natural logarithm of total assets. FIRMAGE is the natural logarithm of the firm's age, whereby age is measured by the years since listing on the stock exchange. LEVERAGE is the ratio of total debt to total assets. LIQUIDITY represents the ratio of traded shares to shares outstanding. VOLATILITY is the standard deviation of the share price, based on the weekly values, divided by the mean price and multiplied by 40. UNEMPLOYRATE is the average unemployment rate in the US. NTBI TR represents the total return of the NCREIF transaction-based index. TERMSTRUCTURE is the difference between 10yr and 3month treasury yield.

With regard to the correlation matrix, Table 2.2 presents the correlation coefficients of the independent variables in the second stage performance regressions. By examining the correlations among these variables, we run a first test of multicollinearity. A widely used threshold, indicating multicollinearity issues, is reached at a correlation coefficient of 0.8 (absolute value) or above. The highest correlation coefficient of 0.613 is reported between the binary variable WOMAN BOARD and the percentage of women on the board (% WOMAN BOARD). This does not pose any problem, since these two variables are never simultaneously in the same regression.[10] Further correlations vary from -0.349 between a company's liquidity and the PRICE/NAV, to a correlation coefficient of 0.563 between a company's liquidity and price volatility.

Firms which have at least one woman on the board of directors are larger, have more board members and a longer company history. However, these positive relations are difficult to interpret in one direction, as larger (correlation coefficient of 0.487) and older firms (correlation coefficient of 0.271) have larger boards. Thus, it is possible that the probability of a female board member simply be driven by the board size. In addition, companies with a higher rate of independent board members are more likely to have a woman on the board. The CEO power measured by CEO DUALITY is also related to the presence of a female director. Thus, firms with CEO's who are simultaneously the chair of the board, are more likely to have a female board member. Finally, the volatility of the share price is lower if the firm has at least one woman on the board.

[10] WOMAN BOARD is the dependent variable in the first stage probit model and % WOMEN BOARD is the independent variable of particular interest in the second stage performance regression.

Table 2.2: Correlation Matrix

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. WOMAN BOARD	1.000															
2. % WOMEN BOARD	0.613***	1.000														
3. QUALS WOMEN	0.065	0.068	1.000													
4. BOARDSIZE	0.171***	-0.165***	0.040	1.000												
5. % INDEPENDENT	0.093**	0.151***	0.069	-0.032	1.000											
6. CEO DUALITY	0.079*	0.030	-0.087**	0.094**	-0.063	1.000										
7. CEO TENURE	-0.038	-0.103	-0.043	0.044	-0.045	0.313***	1.000									
8. INSIDERS	0.007	-0.103**	-0.137**	0.110**	-0.167***	-0.042	0.061	1.000								
9. INSTITUTIONALS	0.009	-0.007	-0.012	-0.027	0.133***	0.035	0.064	-0.257***	1.000							
10. BMEETING	0.013	0.069	0.040	-0.007	-0.012	-0.022	-0.158***	-0.071	-0200***	1.000						
11. FIRMSIZE	0.195***	0.087**	0.104**	0.487***	0.064	0.048	0.062	-0.027	0.204***	0.076*	1.000					
12. LEVERAGE	0.032	-0.195***	0.226***	0.187***	0.034	-0.003	0.156***	0.179***	0.192***	-0.087**	0.104**	1.000				
13. VOLATILITY	-0.092**	-0.094**	0.071	0.112**	0.007	0.069	-0.027	0.009	0.147***	0.003	-0.016	0.196***	1.000			
14. LIQUIDITY	-0.050	-0.061	0.047	0.093**	0.120***	0.007	0.075*	-0.050	0.401***	-0.062	0.128**	0.210***	0.563***	1.000		
15. FIRMAGE	0.231***	0.049	-0.030	0.271***	0.025	-0.063	0.206***	0.042	-0.163***	-0.098*	0.248***	0.136***	-0.066	0.011	1.000	
16. PRICE NAV	0.114***	0.148***	-0.024	0.026	0.015	0.023	0.120***	-0.019	0.034	0.014	0.257***	-0.235***	-0.502***	-0.349***	-0.033	1.000

Table 2.2 provides the correlation coefficients. WOMAN BOARD is a binary variable equal to 1 if at least one female director occupies a corporate board seat, 0 otherwise. % WOMEN BOARD represents the percentage of women on the board of directors. QUALS WOMEN represents the average qualification level of female board members. BOARDSIZE represents the natural logarithm of the sum of directors on the board. % INDEPENDENT is the percentage of independent directors on the company's board. CEO DUALITY is a binary variable equal to 1 if a firm's CEO is simultaneously chair of the board, 0 otherwise. CEO TENURE is the CEO's time in office. INSIDERS represents the percentage of outstanding shares currently held by insiders (including relatives). INSTITUTIONALS is the percentage of shares held by all institutional investors. BMEETING represents the natural logarithm of the number of all board meetings during a fiscal year. FIRMSIZE is the natural logarithm of total assets. LEVERAGE is the ratio of total debt to total assets. VOLATILITY is the standard deviation of the share price, based on the weekly values, divided by the mean price and multiplied by 40. LIQUIDITY represents the ratio of traded shares to shares outstanding. ROA is the ratio of net income to total assets. FIRMAGE is the natural logarithm of the firm's age, whereby age is measured by the years since listing on the stock exchange. PRICE/NAV is the natural logarithm of the market valuation divided by the NAV. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively.

Table 2.3 shows the results of the mean-comparison tests between firms with and without female directors. We test whether the mean of various characteristics differs between these two groups. Most of the tested variables display significant mean differences, which are consistent with the pattern found in the correlation table. Larger and older firms tend to have women on the board. Firms with a larger board are more likely to have female directors. On the one hand, the ownership structure shows that firms with a higher percentage of insider shareholders are less likely to have a woman on the board. On the other hand, a higher percentage of institutional investors increases the probability of female representation on the board. An initial indication of a significant relationship between female directors and market performance is provided by a significant mean difference for PRICE/NAV. The mean value of this performance measure is higher for firms with women on the board of directors. Concerning our macro variables, a normal term structure with long-term interest rates that exceed short-term ones, seems to positively affect the presence of female directors on boards. Hence, a stable macroeconomic environment contributes to an increased appointment of female directors.

Table 2.3: Mean-Comparison of Firms with and without Female Directors

Variable	Mean for WOMAN BOARD =1 (n= 473)	Mean for WOMAN BOARD =0 (n= 642)	Difference	t-stats
BOARDSIZE	8.811	7.746	-1.07***	-9.21
% INDEPENDENT	0.779	0.731	-5.06	-0.05
CEO DUALITY	0.438	0.516	0.08***	2.59
INSIDERS	0.060	0.092	0.03***	5.42
INSTITUTIONALS	0.796	0.736	-0.06***	-4.61
BMEETING	7.914	7.642	-0.27	-1.20
CEO TENURE	7.372	9.303	1.93***	5.07
FIRMSIZE (in $000)	5,848,270	3,018,773	-2,829,497***	-8.87
LEVERAGE	0.507	0.500	-0.01	-0.67
VOLATILITY	4.935	5.354	0.42**	2.18
LIQUIDITY	0.183	0.175	-0.01	-1.28
FIRMAGE	17.590	13.490	-4.1***	-6.70
QUALS WOMEN	2.116	2.309	0.19	1.39
UNEMPLOYRATE	6.894	6.869	-0.02	-0.22
NTBI TR	0.021	0.022	0	0.41
TERMSTRUCTURE	2.004	1.879	-0.12**	-2.02
PRICE NAV	0.536	0.465	-0.07***	-5.28
FFO/SHARE	2.385	2.454	0.07	0.44

Table 2.3 shows the mean differences of firms with a woman on the board (WOMAN BOARD = 1) or not (WOMAN BOARD = 0). BOARDSIZE represents the natural logarithm of the sum of directors on the board. % INDEPENDENT is the percentage of independent directors on the company's board. CEO DUALITY is a binary variable equal to 1 if a firm's CEO is simultaneously chair of the board, 0 otherwise. INSIDERS represents the percentage of outstanding shares currently held by insiders (including relatives). INSTITUTIONALS is the percentage of shares held by all institutional investors. BMEETING represents the natural logarithm of the number of all board meetings during a fiscal year. CEO TENURE is the CEO's time in office. FIRMSIZE is the natural logarithm of total assets. LEVERAGE is the ratio of total debt to total assets. VOLATILITY is the standard deviation of the share price, based on the weekly values, divided by the mean price and multiplied by 40. LIQUIDITY represents the ratio of traded shares to shares outstanding. FIRMAGE is the natural logarithm of the firm's age, whereby age is measured by the years since listing on the stock exchange. QUALS WOMEN represents the average qualification level of female board members. UNEMPLOYRATE is the average unemployment rate in the US. NTBI TR represents the total return of the NCREIF transaction-based index. TERMSTRUCTURE is the difference between 10yr and 3month treasury yield. PRICE/NAV is the natural logarithm of the market valuation divided by the NAV. FFO/SHARE is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively.

2.4.2 Main Regression Results

Impact of women on the board of directors

Table 2.4 shows the first stage regression results for the likelihood that a firm has a woman on the board of directors. We follow the gender literature in determining the board and firm variables that may impact on the likelihood that a company has a female director (Campbell & Mínguez-Vera, 2008; Carter et al., 2003; Dimovski et al., 2013; Hillman et al., 2007). With regard to the size of the board, more leadership positions being available may increase the likelihood of females occupying those positions (BOARDSIZE). Moreover, larger companies may face more societal pressure to increase their boardroom diversity, so that we control for organisational size (FIRMSIZE). Furthermore, women are often associated with risk aversion (Faccio et al., 2016). If women are indeed more risk averse, they would be less likely to occupy a board seat of a high-risk firm. Therefore, we include LEVERAGE and VOLATILITY as proxies for firm risk. We also control for the liquidity of a company (LIQUIDITY), and include firm age (FIRMAGE) in our models. Older firms may have more conservative structures with boardrooms that might resemble an 'old boys network'. Assuming that firms with deep-rooted conservative structures are not inclined to appoint female directors, we expect a negative relationship between FIRMAGE and WOMAN BOARD. Based on the premise that women do not yet belong to this 'old boys network', they conform more to independent director characteristics. Therefore, we expect an increased female representation in firms with a high percentage of independent directors (% INDEPENDENT). Since institutional shareholders increasingly emphasise diversity, we expect INSTITUTIONALS to have a positive impact on female board appointments. Additionally, board diversity can be influenced by powerful insider ownership concentration (INSIDERS). Since most of the insider shareholders are men, a high percentage of insider equity owner may lead to a decreased number of female directors. Once again, we assume that company insiders are more likely to appoint boardroom candidates from within their 'old boys network'. The impact of CEO DUALITY on the variable WOMAN BOARD is not clearly determined in advance. On the one hand, the availability of leading board positions increases the probability of a female board appointment. On the other hand, a CEO who also holds the board chair position, has a substantial say in the appointment of directors (Ozdemir & Upneja, 2012), and may therefore enforce an increased female participation. We included PRICE/NAV as a market-based performance metric, since it may be that performance precedes diversity. If women themselves choose to serve on the boards of companies with higher future cash flows, PRICE/NAV should have a positive impact on the presence of female directors.

In most cases, our coefficients show the expected sign. Thus, larger real estate companies with a larger board and a higher share of independent directors are more likely to employ female directors. Our results also show that REIT institutional investors do support gender-diverse leadership teams. Due to REIT ownership restriction, institutional investors may expect women to contribute to an enhanced internal monitoring and thus do support gender-diverse leadership teams. The coefficient of CEO DUALITY is positive and statistically significant. If the CEO is simultaneously the board chair, he/she has a strong say in personal matters, which increases the probability of having female board members. The qualification of female directors neither enhances nor decreases their probability of being appointed to the board. With regard to the performance of the company, PRICE/NAV has no significant impact on female participation[11]. We cannot support the theory of women being more risk averse, since LEVERAGE and VOLATILITY have no impact on the presence of women on boards. Summarising the determinants of female representation on the board, firm-level characteristics do not seem to drive female board participation, except for size and age of the company, although board-level characteristics do.

[11] We also tested the performance effects of FFO/SHARE on the likelihood that a REIT has a woman on the board of directors. Similarly to PRICE/NAV, FFO/SHARE has no impact on female participation.

Table 2.4: Heckman Procedure: 1st-Stage Analysis for the Determinants of Female Representation

	WOMAN BOARD
BOARDSIZE	0.841* (1.79)
% INDEPENDENT	2.38*** (3.01)
CEO DUALITY	0.508*** (3.21)
INSIDERS	-0.196 (-0.23)
INSTITUTIONALS	0.850* (1.86)
FIRMSIZE	0.367*** (3.63)
LEVERAGE	0.158 (0.33)
VOLATILITY	-0.056 (-1.54)
LIQUIDITY	-1.112 (-1.23)
PRICE NAV	-0.118 (-0.31)
QUALS WOMEN	-0.058 (-0.78)
INTERCEPT	-8.114*** (-5.35)
Observations	562
Pseudo R^2	0.16
LR	69.58***

Table 2.4 provides the results of the first stage Heckman procedure (pooled probit regression) for the likelihood of a company having a woman on the board of directors. WOMAN BOARD is a binary variable equal to 1 if at least one female director occupies a corporate board seat, 0 otherwise. BOARDSIZE represents the natural logarithm of the sum of directors on the board. % INDEPENDENT is the percentage of independent directors on the company's board. CEO DUALITY is a binary variable equal to 1 if a firm's CEO is simultaneously chair of the board, 0 otherwise. INSIDERS represents the percentage of outstanding shares currently held by insiders (including relatives). INSTITUTIONALS is the percentage of shares held by all institutional investors. FIRMSIZE is the natural logarithm of total assets. LEVERAGE is the ratio of total debt to total assets. VOLATILITY is the standard deviation of the share price, based on the weekly values, divided by the mean price and multiplied by 40. LIQUIDITY represents the ratio of traded shares to shares outstanding. PRICE/NAV is the natural logarithm of the market valuation divided by the NAV. QUALS WOMEN represents the average qualification level of female board members.***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively. z-statistics are shown in parentheses.

Table 2.5 presents the estimation results for the second-stage regressions with the real-estate-specific performance measures (PRICE/NAV, FFO/SHARE) as the dependent variables. With regard to our main hypothesis *H1*, we include the percentage of women on the board of directors (%WOMEN BOARD) as our independent variable of primary interest. We control for potential endogeneity by including the inverse mills ratio (MILLS), which is not significant in any model. In principle, the regressions do not suffer from sample selection bias.

Table 2.5: Heckman Procedure: 2nd-Stage Analysis for Women on the Board of Directors

	PRICE/NAV	FFO/SHARE
% WOMEN BOARD	0.038 (0.28)	0.070 (0.12)
FIRMSIZE	0.093* (1.67)	0.858*** (5.75)
LEVERAGE	-0.406*** (-3.22)	0.688* (1.76)
VOLATILITY	-0.012*** (-3.06)	-0.038* (-1.96)
LIQUIDITY	-0.368*** (-3.14)	-0.321 (-0.59)
FIRMAGE	-0.088** (-2.01)	0.031 (0.19)
FFO	-0.050 (-1.03)	
PRICE/NAV		0.202 (0.49)
% INDEPENDENT	0.013 (0.56)	-0.009 (-0.08)
CEO DUALITY	0.064** (2.19)	0.013 (0.11)
INSIDERS	0.256** (2.24)	0.664 (1.20)
INSTITUTIONALS	0.015 (0.16)	-0.691** (-2.22)
BMEETING	0.013 (0.57)	-0.170 (-1.32)
CEO TENURE	0.000 (0.08)	0.017 (1.55)
UNEMPLOY RATE	0.005 (0.66)	0.575*** (3.51)
NTBI TR	-0.079 (-0.40)	-0.081 (-0.06)
TERMSTRUCTURE	-0.012 (-1.09)	-0.275 (0.10)
MILLS	0.010 (0.09)	-0.092 (-0.29)
INTERCEPT	0.200 (0.35)	-13.498*** (-5.11)
Observations	524	735
R^2	0.80	0.86
Adj. R^2	0.75	0.83

Table 2.5 shows the results of the second stage Heckman procedure (panel regression with period and cross-section fixed effects). The dependent performance measures are represented by market-based (PRICE/NAV) and accounting-based measures (FFO/SHARE). PRICE/NAV is the natural logarithm of the market valuation divided by the NAV. FFO/SHARE is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. % WOMEN BOARD represents the percentage of women in the board of directors. FIRMSIZE is the natural logarithm of total assets. LEVERAGE is the ratio of total debt to total assets. VOLATILITY is the standard deviation of the share price, based on the weekly values, divided by the mean price and multiplied by 40. LIQUIDITY represents the ratio of traded shares to shares outstanding. FIRMAGE is the natural logarithm of the firm's age, whereby age is measured by the years since listing on the stock exchange. % INDEPENDENT is the percentage of independent directors on the company's board. CEO DUALITY is a binary variable equal to 1 if a firm's CEO is simultaneously chair of the board, 0 otherwise. INSIDERS represents the percentage of outstanding shares currently held by insiders (including relatives). INSTITUTIONALS is the percentage of shares held by all institutional investors. BMEETING represents the natural logarithm of the number of all board meetings during a fiscal year. CEO TENURE is the CEO's time in office. UNEMPLOYRATE is the average unemployment rate in the US. NTBI TR represents the total return of the NCREIF transaction-based index. TERMSTRUCTURE is the difference between 10yr and 3month treasury yield. MILLS is the inverse mills ratio estimated from the probit model to account for sample selection bias. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively. Heteroscedasticity and autocorrelation-corrected t-statistics are shown in parentheses.

We do not find any significant and positive association between female board representation and REIT performance. Therefore, we have to reject our first hypothesis *H1,* that an increased percentage of women on the board of directors has a positive impact on a REIT's financial performance. Consequently, women on the board of directors neither enhance nor reduce market-level performance (PRICE/NAV), and the same applies to operating performance (FFO/SHARE).

However, if we distinguish explicitly between the female proportions in executive and in non-executive positions (Table 2.6), our results show that female executives (% WOMEN EXE) have a significant positive impact on PRICE/NAV (at 5% level). We could not find any significant results for the percentage of female non-executive directors (% WOMEN NON-EXE) on financial performance. Since executives bear the responsibility for strategic corporate decisions and day-to-day business, they are highly visible and thus subject to considerable media attention, leading to coverage by market analysts and attracting investor interest. Consequently, the theory that REIT investors expect higher future earnings through increased corporate social responsibility from firm's with increased female representation, only holds for gender diversity in executive positions. Furthermore, in comparison to women in less visible leadership positions, female executive directors especially qualify as role models. In such a role model function, successful female executives may encourage female employees to strive for higher career levels, therefore increasing the pool of female talents and board candidates (Hillman et al., 2007). With regard to our accounting-based measure FFO/SHARE, board gender diversity, particularly women in non-executive positions, does not influence operating performance, because other financial factors, such as a company's total assets or capital structure, are more suitable for explaining these financial realities.

Table 2.6: Heckman Procedure: 2nd-Stage Analysis for Women in Executive and Non-executive Positions

	Executives		Non-Executives	
	PRICE/NAV	FFO/SHARE	PRICE/NAV	FFO/SHARE
% WOMEN EXE	0.185** (2.22)	1.001 (1.59)		
% WOMEN NONEXE			-0.074 (-0.73)	-0.218 (-0.30)
FIRMSIZE	0.068* (1.94)	0.999*** (4.94)	0.051 (1.37)	1.286*** (4.96)
LEVERAGE	-0.412*** (-4.12)	1.007* (1.76)	-0.402*** (-3.57)	1.670** (2.02)
VOLATILITY	-0.011*** (-4.30)	-0.097 (-1.29)	-0.011*** (-4.19)	-0.091 (-1.27)
LIQUIDITY	-0.290*** (-3.30)	-2.001 (-1.53)	-0.280*** (-2.66)	-2.465* (-1.70)
FIRMAGE	-0.040 (-1.20)	-0.309 (-1.23)	-0.039 (-1.13)	-0.282 (-1.13)
FFO	-0.033 (-1.49)		-0.023 (-1.07)	
PRICE/NAV		-0.339 (-0.45)		0.277 (0.40)
% INDEPENDENT	-0.005 (-0.17)	-0.149 (-0.74)	-0.010 (-0.22)	0.219 (1.24)
CEO DUALITY	0.000 (-0.02)	0.106 (0.58)	0.007 (0.20)	-0.283 (-0.84)
INSIDERS	0.231* (1.94)	0.379 (0.40)	0.201 (1.32)	-1.397 (-1.05)
INSTITUTIONALS	0.118** (1.97)	-0.552 (-1.19)	0.115* (1.85)	-0.617 (-1.24)
BMEETING	0.019 (0.99)	0.026 (0.08)	0.018 (0.90)	0.024 (0.07)
CEO TENURE	0.000 (0.04)	0.015 (0.92)	0.000 (0.10)	0.016 (0.95)
UNEMPLOY RATE	0.009* (1.78)	0.210*** (4.47)	0.011 (1.61)	0.174*** (3.20)
NTBI TR	-0.073 (-0.58)	0.683 (0.45)	-0.122 (-0.87)	-0.195 (-0.12)
TERMSTRUCTURE	-0.016** (-2.37)	-0.130*** (-2.68)	-0.019** (-2.33)	-0.116* (-1.88)
MILLS	-0.017 (-0.52)	0.066 (0.13)	-0.018 (-0.20)	1.181 (1.61)
INTERCEPT	0.144 (0.39)	-12.125*** (-4.17)	0.274 (0.49)	-17.562*** (-4.34)
Observations	928	909	928	909
R^2	0.76	0.77	0.76	0.86
Adj. R^2	0.72	0.73	0.72	0.84

Table 2.6 shows the results of the second-stage Heckman procedure (panel regression with period and cross-section fixed effects) for women in the group of executives and non-executives. PRICE/NAV is the natural logarithm of the market valuation divided by the NAV. FFO/SHARE is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. % WOMEN EXE and % WOMEN NON-EXE represents the percentage of women in the group of executives and non-executives, respectively. FIRMSIZE is the natural logarithm of total assets. LEVERAGE is the ratio of total debt to total assets. VOLATILITY is the standard deviation of the share price, based on the weekly values, divided by the mean price and multiplied by 40. LIQUIDITY represents the ratio of traded shares to shares outstanding. FIRMAGE is the natural logarithm of the firm's age, whereby age is measured by the years since listing on the stock exchange. % INDEPENDENT is the percentage of independent directors on the company's board. CEO DUALITY is a binary variable equal to 1 if a firm's CEO is simultaneously chair of the board, 0 otherwise. INSIDERS represents the percentage of outstanding shares currently held by insiders (including relatives). INSTITUTIONALS is the percentage of shares held by all institutional investors. BMEETING represents the natural logarithm of the number of all board meetings during a fiscal year. CEO TENURE is the CEO's time in office. UNEMPLOYRATE is the average unemployment rate in the US. NTBI TR represents the total return of the NCREIF transaction-based index. TERMSTRUCTURE is the difference between 10yr and 3month treasury yield. MILLS is the inverse mills ratio estimated from the probit model to account for sample selection bias. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively. Heteroscedasticity and autocorrelation-corrected t-statistics are shown in parentheses.

2.4.3 Alternative Tests

Impact of different gender compositions in the group of executives

With regard to the 'tokenism theory' of Kanter (1977a, 1977b), it may be that the gender diversity / performance relationship is non-linear. Therefore, we rerun the Heckman 2-step procedure by including gender diversity in its quadratic term (% WOMEN EXE SQ).

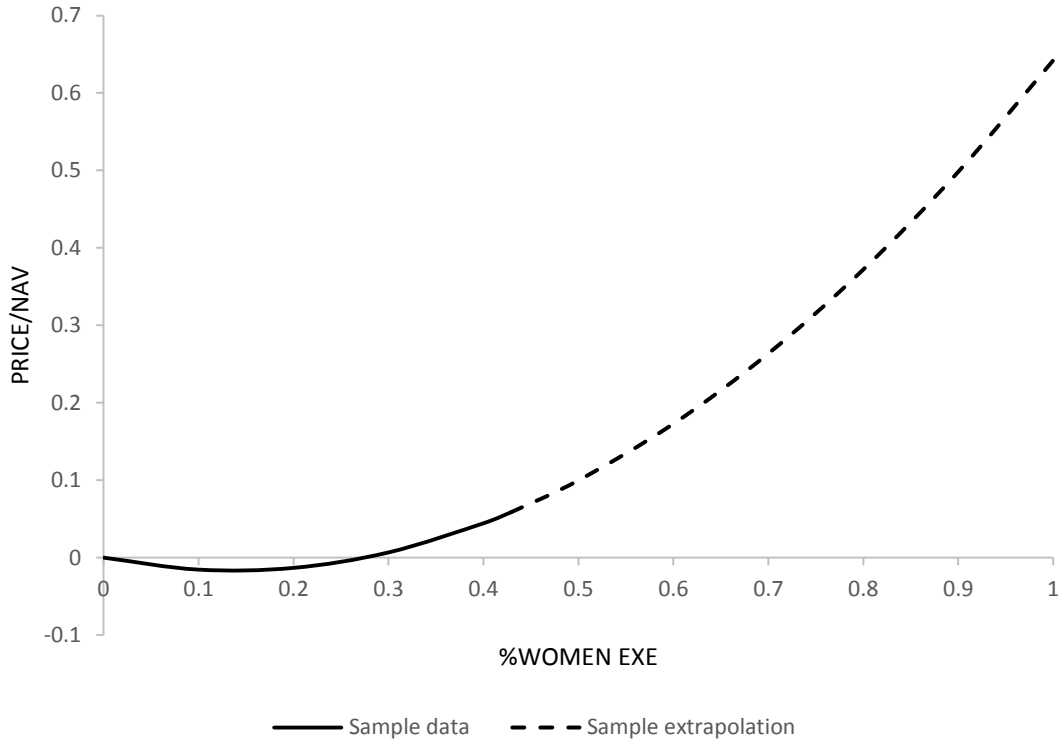
Table 2.7: Heckman Procedure: 2nd-Stage Analysis with % WOMEN EXE in its Linear and Quadratic Form

	PRICE/NAV
% WOMEN EXE	-0.243** (-2.02)
% WOMEN EXE SQ	0.885*** (4.09)
FIRMSIZE	0.042 (1.53)
LEVERAGE	-0.277*** (-3.47)
VOLATILITY	-0.007*** (-2.70)
LIQUIDITY	-0.253*** (-2.82)
FIRMAGE	-0.040* (-1.96)
FFO	-0.032 (-1.44)
% INDEPENDENT	0.000 (-0.02)
CEO DUALITY	-0.002 (-0.15)
INSIDERS	0.189* (1.82)
INSTITUTIONALS	0.102** (2.16)
BMEETING	0.008 (0.64)
CEO TENURE	0.001 (0.47)
UNEMPLOY RATE	0.067*** (3.75)
NTBI TR	-0.571*** (-4.30)
TERMSTRUCTURE	-0.064*** (-5.75)
MILLS	-0.054** (-1.99)
INTERCEPT	0.205 (0.65)
Observations	755
R^2	0.70
Adj. R^2	0.63

Table 2.7 shows the results of the second-stage Heckman procedure (panel regression with period and cross-section fixed effects) for women in the group of executives and the squared percentage of women in the group of executives. PRICE/NAV is the natural logarithm of the market valuation divided by the NAV. % WOMEN EXE and % WOMEN EXE SQ represents the percentage of women in the group of executives and the squared percentage of women, respectively. FIRMSIZE is the natural logarithm of total assets. LEVERAGE is the ratio of total debt to total assets. VOLATILITY is the standard deviation of the share price, based on the weekly values, divided by the mean price and multiplied by 40. LIQUIDITY represents the ratio of traded shares to shares outstanding. FIRMAGE is the natural logarithm of the firm's age, whereby age is measured by the years since listing on the stock exchange. % INDEPENDENT is the percentage of independent directors on the company's board. CEO DUALITY is a binary variable equal to 1 if a firm's CEO is simultaneously chair of the board, 0 otherwise. INSIDERS represents the percentage of outstanding shares currently held by insiders (including relatives). INSTITUTIONALS is the percentage of shares held by all institutional investors. BMEETING represents the natural logarithm of the number of all board meetings during a fiscal year. CEO TENURE is the CEO's time in office. UNEMPLOYRATE is the average unemployment rate in the US. NTBI TR represents the total return of the NCREIF transaction-based index. TERMSTRUCTURE is the difference between 10yr and 3month treasury yield. MILLS is the inverse mills ratio estimated from the probit model to account for sample selection bias. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively. Heteroscedasticity and autocorrelation-corrected t-statistics are shown in parentheses.

The results (Table 2.7) confirm Kanter's tokenism theory, since a low level of female representation has a negative effect on PRICE/NAV. However, once a certain threshold of female representation has been reached, the impact becomes positive, as the coefficient of % WOMEN EXE SQ on PRICE/NAV is significantly positive (1%-Level). Figure 2.1 plots the relationship between gender diversity in executive positions, according to the regression line resulting from the estimation, which includes the quadratic term. The graph displays a U-shaped link with increasing PRICE/NAV levels for REITs at approximately 30% female representation.

Figure 2.1: Link between PRICE/NAV and Gender Diversity in the Group of Executives



In order to determine the outperformance for different gender compositions within the group of executives, we apply the numbers from our quadratic term estimation and categorise according to Kanter's approach, into uniform (0% women), skewed (0% < x < 15% women), tilted (15% ≤ x < 30% women) and balanced (x ≥ 30% women) groups. We rerun both stages of the Heckman (1976) procedure, including these four groups that vary in their gender composition, as well as the usual set of board, firm and macroeconomic controls and the inverse Mill's ratio.

The results of the 'tokenism' analysis are displayed in Table 2.8, with uniform groups representing the reference category. We find that firms with a balanced executive team outperform homogeneous male groups by 5.7%, as measured by PRICE/NAV (at 10% level). The coefficients for the two other executive groups (SKEWED and TILTED) are not statistically different from zero. We verify *H3* that a female 'token' has no impact on the market performance. Even a female minority group does not contribute to higher market performance. Hence, a certain level of female representation is needed to generate an impact. In the case of REITs, a critical mass of female executives is reached in balanced groups (> 30% women)[12].

Table 2.8: Heckman Procedure: 2nd-Stage Analysis for the 'Tokenism' Analysis

	Executives	
	PRICE/NAV	FFO/SHARE
SKEWED	-0.008(-0.31)	0.382(1.57)
TILTED	0.013(0.46)	0.215(1.24)
BALANCED	0.057*(1.73)	0.291(1.22)
Observations	928	909
Controls	included	included
MILLS	included	included
R^2	0.76	0.77
Adj. R^2	0.72	0.73

Table 2.8 shows the results of the second-stage Heckman procedure (panel regression with period and cross-section fixed effects) with a focus on different gender compositions in the group of executives and non-executives. PRICE/NAV is the natural logarithm of the market valuation divided by the NAV. FFO/SHARE is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. UNIFORM is a binary variable equal to 1 for homogeneous male groups, 0 otherwise and represents the reference category in all regressions. SKEWED is a binary variable equal to 1 if the percentage of women varies from 1% to less than 15%, 0 otherwise. TILTED is a binary variable equal to 1 if the percentage of women varies from 15% to less than 30%, 0 otherwise. BALANCED is a binary variable equal to 1 if the percentage of women is at least 30%, 0 otherwise. MILLS is the inverse mills ratio estimated from the probit model to account for sample selection bias. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively. Heteroscedasticity and autocorrelation-corrected t-statistics are shown in parentheses.

[12] The U-shaped relation only holds for gender diversity in the group of executives and for the market-based measure PRICE/NAV. The gender distribution within the group of non-executives does not show any significant effect, and neither does the operating performance measure FFO/SHARE.

Impact of different gender compositions in real estate property sectors

Table 2.9 provides an in-depth analysis of real estate companies' different property sectors. Panel A shows the results of the mean-comparison test for the average percentage of female executives, classified by different property sectors. In our sample, women occupy on average 9.0% of executive positions. With 13.5% and 14.2% of women in the group of executives, the property sectors health care and residential, respectively, show a significantly higher female representation than the sample's average percentage of women in the group of executives. The sectors office, hotel and industrial account for the smallest mean percentage of female executives in comparison with the overall sample average.

Panel B displays the regression results for the performance effects of female executives in different property sectors. The group of executives is subdivided by its gender composition into uniform, skewed, tilted and balanced groups, whereas uniform represents the reference category. As hypothesised in *H4*, it is important for profitable companies to consider customer needs through the management team. In the regressions of the health care and retail subsample, the coefficients for the balanced group of executives show the expected positive signs. A balanced executive team outperforms a homogeneous male group by 12.1% (health care) and 6.1% (retail), as measured by PRICE/NAV. This positive association stresses the importance of a diverse leadership team for real estate sectors which are more consumer-orientated. Furthermore, these findings are also of particular interest for real estate sectors with a diverse workforce, e.g. the health care sector, where women account for the majority of employees. Interestingly, companies with a residential and hotel property focus do not seem to benefit particularly from gender-diverse management. This might be explained by the fact that the consumer base for housing and lodging is relatively equally distributed between women and men. Interestingly, the subsample industrial shows a positive performance effect for skewed and balanced executive teams. With only 92 observations in the industrial subsample, extreme values may bias the results. In conclusion, female leadership connects the firm to its customers and employees, which is then rewarded by investors.

Table 2.9: Different Property Sectors Analysis

Panel A: Mean-comparison for different property sectors concerning the percentage of women in the group of executives (% WOMEN EXE)							
	Health care	Residential	Retail	Industrial	Office	Hotel	Mixed
	13.477*** (-3.85)	14.166*** (-5.33)	9.085 (-0.13)	5.435*** (2.84)	7.115** (2.21)	6.074*** (2.73)	7.718 (1.40)
Panel B: Heckman procedure - 2nd stage analysis for different gender compositions in the group of executives							
	PRICE/NAV						
	Health care	Residential	Retail	Industrial	Office	Hotel	Mixed
SKEWED	-0.083 (-1.40)	-0.013 (-0.37)	-0.006 (-0.34)	0.316*** (3.31)	-0.033 (-0.62)	-0.149 (-1.02)	0.020 (0.16)
TILTED	0.077 (1.58)	0.001 (0.04)	0.020 (0.69)	0.0320 (0.64)	0.019 (0.51)	0.004 (0.14)	0.103 (1.15)
BALANCED	0.121*** (3.05)	-0.026 (-0.56)	0.061* (1.90)	0.305*** (4.53)	-0.046 (-1.18)	0.094 (0.91)	0.223* (1.77)
Observations	92	138	140	80	138	78	119
Controls	included	included	included	included	included	included	included
MILLS	included	included	included	included	included	included	included
R^2	0.73	0.86	0.86	0.90	0.70	0.70	0.70
Adj. R^2	0.60	0.81	0.81	0.85	0.59	0.52	0.58

Table 2.9 provides a mean-comparison test for real estate companies' different property sectors (Panel A) and the results of the second-stage Heckman procedure (panel regression with period and cross-section fixed effects) for different gender compositions in the group of executives with Price/NAV as dependent variable (Panel B). PRICE/NAV is the natural logarithm of the market valuation divided by the NAV. The property sectors are defined by following the SNL classification: 'health care'; 'office'; 'hotel'; 'residential' (multi-family and manufactured homes); 'retail' (shopping centre, regional malls and other retail); 'industrial' (logistics and self-storage); 'mixed' (miscellaneous). UNIFORM is a binary variable equal to 1 for homogeneous male groups, 0 otherwise and represents the reference category in all regressions. SKEWED is a binary variable equal to 1 if the percentage of women varies from 1% to less than 15%, 0 otherwise. TILTED is a binary variable equal to 1 if the percentage of women varies from 15% to less than 30%, 0 otherwise. BALANCED is a binary variable equal to 1 if the percentage of women is at least 30%, 0 otherwise. MILLS is the inverse mills ratio estimated from the probit model to account for sample selection bias. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively. For Panel A, the t-statistics are shown in parentheses. For Panel B heteroscedasticity and autocorrelation-corrected t-statistics are shown in parentheses.

2.5 Conclusion

This study extends the REIT corporate governance literature by demonstrating that investors pay increased attention to gender diversity in their investment decisions. We offer new insights into the relationship between gender diversity in boardrooms and firm financial performance by focusing on the REIT sector.

Using a sample of 112 US Equity REITs from 2005 till 2015, this study is the first to examine the development and status quo of women in real estate leadership roles, and their contribution to performance. Whereas in 2005, the percentage of women on the board of directors accounted for 7.6%, in 2015, female representation in the board reached 11.7%. The real estate sector, although traditionally male-dominated, has shown a gradual increase in the inclusion of women on boards over the last few years.

We test several hypotheses to determine whether real estate companies benefit from a diversified board of directors. To control for endogeneity within this relationship, we first need to investigate the factors that impact on a real estate company's female representation. We find that larger firms with larger boards have a higher female representation on the board of directors. This finding indicates that more leadership positions being available - usually the case in larger REITs, since leadership complexity is higher - increases the likelihood of females occupying those positions. Our results also show that institutional investors and independent board members have a positive impact on female board appointments. In the REIT context, where extensive external monitoring through large blockholders is weaker than in other industry sectors, independent shareholders and institutional investors may expect women to contribute to an enhanced internal monitoring, and thus do support gender-diverse leadership teams.

With regard to our performance analysis, we find that women on the board of directors neither enhance nor reduce market-level performance (PRICE/NAV) as well as operating performance (FFO/SHARE). However, distinguishing explicitly between the female proportions in executive and in non-executive positions, our results show that female executives (% WOMEN EXE) have a significant positive impact on PRICE/NAV. Since executive directors, in comparison to non-executive directors, are the subject of considerable media attention and coverage by analysts, investors expect higher future earnings from REITs with increased female representation in executive positions.

We find evidence of a U-shaped relationship between gender diversity in executive positions and PRICE/NAV. Accordingly, a certain level of female representation is needed to generate

an impact. In the case of REITs, a critical mass of female executives is reached at approximately 30% female representation. Specifically, firms with a balanced executive team outperform homogeneous male groups by 5.7%, as measured by PRICE/NAV. This finding holds especially for real estate sectors with a strong consumer orientation and a high proportion of women in the workforce, such as retail and health care.

The results also demonstrate that the gender diversity / performance relationship depends on the measure of performance. More specifically, the hypothesis proposed above, that women have a positive impact on financial performance, is not supported by the accounting-based performance measure FFO/SHARE. Other financial factors, such as a company's total assets or capital structure, are more suitable for explaining these financial realities. Concerning the impact of gender-diverse teams on PRICE/NAV, our findings indicate that REIT investors consider a critical mass of female representation in executive positions as a positive investment variable, thereby increasing the demand for those companies' shares and ultimately their prices. Thus, the REIT specific market-based measure PRICE/NAV is probably the more appropriate performance measure in the context of gender diversity, since the positive influence of female directors does relate to investor perceptions, however it does not to operating performance.

Future research could extend the diversity analysis to women participation at the middle management level. It would be interesting to examine how women in middle management positions affect financial performance. It would also be interesting to analyse the relationship between performance, a REIT's corporate social responsibility ranking (e.g. KLD scores) and female representation. Such an investigation would shed further light on the interdependences between these mechanisms. Moreover, the real estate corporate governance literature would also benefit from an investigation of further diversity dimensions, such as race, religion, age and education.

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3 The Determinants of Executive Compensation in US REITs: Performance vs. Corporate Governance Factors

Abstract

The paper examines whether executive compensation packages within the real estate industry are determined merely by performance or also by CEO power mechanisms that have an essential influence on board-level negotiations. We offer original into management compensation arrangements during and after the financial crisis. The relative importance of cash bonuses within CEO compensation contracts has been more than halved after the crisis. Simultaneously, after the financial crisis, equity-based compensation became increasingly important. Concerning the pay-for-performance link our results show no relationship during the financial crisis. However, after the crisis, we show a strong significant link between remuneration packages and corporate success.

3.1 Introduction

The financial crisis of 2007/2008 revealed that managers had been rewarded for excessive short-term risk-taking (Bebchuk, Cohen, & Spamann, 2010; Cheng, Hong, & Scheinkman, 2015; Clementi, Cooley, Richardson, & Walter, 2009). The devastating consequences of the financial crisis have triggered a heated debate on executive compensation, and especially on the effectiveness of performance-based compensation. In 2011, the Securities and Exchange Commission (SEC) adopted amendments to its disclosure rules. The 'Say-on-Pay'[13] rule now provides shareholders with an advisory vote on executive compensation. Hence, through regulation, the SEC is attempting to strengthen shareholder engagement in listed companies, provide a framework for effective pay-for-performance arrangements and finally, increase transparency. However, the practical implementation of pay-for-performance arrangements after the financial crisis has so far not been assessed systematically. This paper aims to fill this void by empirically examining C-level compensation packages in the US real estate industry.

Previous research on compensation has built upon the arguments of agency theory (Bloom & Milkovich, 1998; Jensen & Meckling, 1976) and/or managerial power theory (Bebchuk et al., 2002). Agency theory proclaims that CEO/executive compensation is primarily determined by company performance. Managerial power theory, however, considers the significant influence of CEOs on board member's decisions, and ultimately on the level of their own compensation and pay sensitivity to performance. Moreover, recent studies like Murphy (2013) show that government intervention and political climate have been major drivers of time trends in executive compensation over the last years. The question then is which of these theories apply to real estate companies and whether political shocks like the financial crises or government intervention (Say-on-Pay reform) trigger substantial changes in executive pay.

A large number of studies have examined the pay-for-performance relationship empirically in the context of REITs. The literature, however, provides ambiguous findings, with evidence that agency theory and managerial power theory both play a valuable role in explaining distinct compensation patterns within the real estate industry. For example, Ghosh and Sirmans (2005) find that independent directors - a determinant in monitoring CEO power - are associated with higher remuneration packages, whereas Feng et al. (2010) find an insignificant relationship between independent directors and compensation, while other studies do not even control for this monitoring variable (e.g., Pennathur et al., 2005; Griffith et al., 2011). Hence, a thorough assessment of the compensation determinants within the real estate industry is needed, taking into consideration the explanatory validity of agency

[13] For further information on the 'Say-on-Pay' rule see: https://www.sec.gov/rules/final/2011/33-9178-secg.htm.

theory, managerial power theory and government intervention in the context of compensation levels and its sensitivity to firm performance. We extend the current literature by investigating the pay-performance relationship with respect to the entire group of executive directors, alongside a detailed analysis of CEO compensation.

To analyse the pay-performance relationship from different time-horizon perspectives, we distinguish between short-term total current cash compensation (*TCC:* base salary and cash bonus), long-term compensation (*TDC:* base salary, cash bonus, restricted stock grants, stock options granted, long-term incentive pay-outs (LTIP) and all other total) and incentive-based compensation (*EQUITY:* value of stocks and options granted). Company performance is measured using five different variables: the average shareholder total return over one, three and five years *(TSR1YR, TSR3YR, TSR5YR)* and the real estate specific measures *FFO/SHARE* and *PRICE/NAV.* Using a panel data fixed-effects methodology and lagged performance variables we find: (1) Short-term cash compensation of CEOs and executive directors is primarily driven by the performance ratio of total return to shareholders over one year. (2) Long-term compensation packages for CEOs and executive directors are tied to long-term performance, as the total return to shareholders over five years as well as the real estate specific metrics *FFO/SHARE* and *PRICE/NAV* have a significant positive impact on *TDC*. (3) Incentive-based compensation is positively linked to long-term and value-driven growth performance ratios *(TSR5YR and PRICE/NAV)*.

Additionally, we offer original into management compensation arrangements during and after the financial crisis. The relative importance of cash bonuses within CEO compensation contracts has been more than halved after the crisis. Simultaneously, after the financial crisis, equity-based compensation became increasingly important. Rerunning our regressions for different time sub-samples, we find no relationship between performance and compensation during the financial crisis. However, for the post-crisis period, we show a strong significant link between remuneration packages and corporate success.

Our findings are relevant to REIT investors, since we provide evidence that the U.S. listed real estate sector has learned its lessons from the dramatic disaster of the financial crisis and that government intervention like the 'Say-on-Pay' rule can alleviate managerial entrenchment.

The remainder of the paper is organised as follows. Section two reviews the theoretical reasoning and relevant literature on this topic, followed by the methodology of the panel data analysis in the third Section. The data are described in Section four. The results are displayed in Section five and the conclusion in Section six.

3.2 Literature Review

3.2.1 Theoretical Background

Agency problems arise due to the separation of company ownership (stockholders) and control (managers). Since listed real estate companies commonly have dispersed stockholders, company owners cannot efficiently control the daily operations of the company. Thus, from an agency perspective, the central challenge is to align the manager's objectives of achieving maximum compensation, while simultaneously mitigating personal losses to the owner's interest of maximising performance (Bloom & Milkovich, 1998).

According to Jensen and Meckling (1976), the structure of the compensation contract should provide appropriate incentives for the manager to make decisions that maximise stockholder wealth. Therefore, the board of directors engages in arm's-length negotiations with CEO and executives over compensation policies, in order to mitigate agency problems. Based on agency theory, executive compensation is determined primarily by company performance. More recent studies postulate that risk is also a determining factor in executive pay. Executives at riskier companies experience higher wealth uncertainty, since those companies are characterised by greater volatility in stock prices. Therefore, based on principal-agent theory, riskier companies have to offer a higher total compensation to provide a risk-averse manager the same incentives. (Cheng et al., 2015)

This view is challenged by the managerial power theory of Bebchuk et al. (2002). They argue that boards of directors cannot be expected to bargain at arm's length with managers, because a powerful CEO significantly impacts on board member decisions, especially in circumstances where the board of directors is relatively less independent. Since directors' positions are associated with reputation, networks, and compensation, directors generally prefer to retain their position, and thus may negotiate compensation contracts that are more favourable to executives. CEOs exert a powerful influence on this re-election process and if, in addition, such tendencies as loyalty and collegiality prevail within boards, directors may comply with the CEO and approve substantial pay arrangements. (Main et al., 1995; O'Reilly and Main, 2010) Consequently, executives exert considerable influence on the amount of their own remuneration and the level of sensitivity to performance (fixed vs. variable compensation).

Real estate companies provide a desirable setting for analysing both theories, since REITs are heavily regulated. Particularly the fact that a single shareholder cannot own more than 10

percent of REIT shares results in predominantly dispersed ownership within REITs. Thus, the role of institutional shareholders or independent directors in monitoring the company's management can be accorded more importance than in other industries. Moreover, by focusing on a single industry, we significantly reduce company heterogeneity in terms of variability in performance, risk and board characteristics. In this way, examining real estate companies provides an interesting and valuable setting for examining the relationship between compensation and both performance and board characteristics.

3.2.2 Determinants of CEO and Executive Compensation

There is a growing body of literature on the determinants of REIT CEO and executive compensation. Most work focuses on the pay-for-performance relation, although recent studies also deal with the monitoring role of the board of directors.

Hardin (1998) finds senior executive cash compensation to be determined by REIT firm size, senior management's stock ownership, the amount of dividends paid to the senior executive and the number of years since the initial public offering. Chopin et al. (1995) model executive compensation as a function of size, revenue and unexpected profit, and find a positive relationship between REIT revenue and size, and CEO compensation. Scott et al. (2001) examine the impact of the market-based performance measure total shareholder return on REIT executives' base salary and incentive compensation. Their findings indicate that size, more so than performance, is a significant determinant of the base salary, although incentive-based compensation is highly elastic to performance. In contrast to prior research which applies the OLS method, Pennathur et al. (2005) apply the Tobit method to estimate the determinants of CEO compensation. They find that REIT CEOs who increase FFO and earnings per share receive larger option awards. Moreover, CEOs are rewarded with larger stock-based compensation schemes for riskier investments, measured by variability in returns.

Ghosh and Sirmans (2005) are the first to test the role of board-of-director characteristics on REIT CEO compensation. Applying a simultaneous equation model, they find that CEOs receive higher compensation schemes in REITs where the board monitors only weakly, due to its large size, the presence of older directors and absence of blockholders. Consistent with prior research, firm size and performance, as measured by return on assets, are significant explanatory variables in explaining CEO compensation. Using a REIT sample from 2001, Feng et al. (2007) similarly include board-independence monitoring variables to investigate the determinants of director compensation. Their results show that higher equity-based director compensation is associated with improved performance. Moreover, larger firms with an

independent nomination committee award more equity-based compensation to directors. However, they find no relationship between director compensation and board size, the presence of outside directors, CEO duality, or CEO tenure and ownership. Similarly, Feng et al. (2010) focus on the relationship between the presence of institutional shareholders and CEO compensation. They find evidence that institutional ownership is associated with greater CEO option awards. Thus, institutional shareholders incentivise CEOs by establishing a pay-for-performance link, but they also pay higher CEO cash compensation (salary + bonus).

Using a REIT sample from 2000 till 2006, Griffith et al. (2011) are the first to apply panel fixed-effects regression to study the impact of performance and CEO power on changes in CEO compensation. They find that performance, measured by shareholder total return, Tobin's q and changes in FFO, does not influence CEO salary, while CEO power variables, such as CEO tenure and age, CEO duality, CEO stock ownership, all have significant effects. However, performance in addition to CEO power affects CEO option awards and finally, CEO bonuses are determined predominantly by performance.

This study extends the REIT literature on executive compensation by answering the following research questions: First, current literature does not specify the most appropriate indicator of REIT management performance with regard to C-Level compensation. Do REITs apply contingent payment contracting relying on market-based or specific real estate performance measures? Second, do certain board-of-director characteristics allow CEOs to bargain for higher compensation levels?

This paper adds to the literature by examining both the REIT CEO pay-for-performance relationship, and the validity of managerial power theory in a real estate context. We extend prior research by adding further corporate governance variables, such as the number of compensation committee meetings, a dummy indicating whether the CEO is also the founder of the company or the tenure of the longest-serving board member. These variables consider the power of different participants in the pay-setting process. Furthermore, we not only focus on CEO compensation, but also investigate the determinants of different types of executive director compensation. We are the first to investigate whether cash, long-term and equity compensation is adequately linked to different performance time horizons. Specifically, we extend the literature by using a post-financial-crisis sample, as one could argue that the extent of board monitoring and the pay-for-performance sensitivity changed after the crisis.

3.3 Methodology

3.3.1 Data

As primary inclusion criteria for this study, sample companies had to be listed in the FTSE EPRA / NAREIT United States Index, which ensures a homogeneous real estate sample with regard to the listing criteria of size and income composition. The initial sample consists of 116 US publicly traded real estate companies. The dataset for this study was created by using various sources. The CEO and executive compensation information was provided by ExecuComp. Financial performance data are from Compustat, SNL and Thomson Reuters Datastream. Data on the corporate governance mechanisms were collected primarily from Bloomberg, and secondly from the company's proxy statement (DEF 14A). Our dataset was limited by the availability of corporate governance information. In total, the final sample comprises 83 US listed real estate companies over the sample period 2005 to 2015.

3.3.2 Variables

Compensation Variables

Previous pay-for-performance research commonly focuses on total CEO compensation and its distinct components (see Ghosh and Sirmans, 2005; Feng et al., 2010; Griffith et al., 2011). This study investigates both CEO compensation and that of the entire group of executive directors, as executives are crucial participants in daily company decision-making processes and therefore part of the agency problem. The group of executive directors is defined by the number of directors in the board holding executive positions. We focus on these executive positions, because executive directors are risk takers, they operate the daily business and they are subject of considerable media attention, in contrast to non-executive directors, who are responsible for advisory tasks. To analyse the pay-performance relationship from different time-horizon perspectives, we distinguish between short-term and long-term compensation components. Additionally, we construct a variable for equity compensation to evaluate incentive-based components. This approach yields three sets of estimates each, for CEO and executive directors.

With regard to short-term compensation, this study investigates total current cash compensation (*TCC CEO* and *TCC EXE*), which is the sum of base salary and cash bonus for a fiscal year. The base salary is a fixed component of total compensation, whereas the cash bonus is generally dependent on previous-year performance. The second compensation measure includes long-term compensation components (*TDC CEO* and *TDC EXE*), and is calculated by the sum of base salary, cash bonus, restricted stock grants, stock options

granted, long-term incentive pay-outs (LTIP) and all other total. The LTIP are determined by company's long-term growth plan, which generally sets performance goals for a long-term time horizon of 3 years or more. For each year going forward, potential rewards will be paid out in cash or stock, contingent on achieving the stipulated goals. The 'all other' total represent the most inclusive component in long-term compensation, comprising fringe benefits, other personal benefits such as company car, severance pay or relocation benefits and countervailing benefits. Finally, incentive-based equity compensation (*EQUITY CEO* and *EQUITY EXE*) is defined as the value of stocks and options granted, as reported in the company's financial statements. According to ASC 718 (formerly FAS 123R), companies are required to disclose their equity grants at fair value.

Performance Variables

Company performance is measured using five different variables. First, we apply the accounting-based measure funds from operations per share (*FFO/SHARE*). Following the NAREIT guidelines, FFO is calculated as GAAP net profits excluding gains or losses from sales of properties or debt restructuring, and adding back real estate depreciation and amortisation. In this way, FFO might be the most appropriate performance measure in the real estate industry, since it serves as an improved approximation of cash flows by not deducting depreciation, amortisation, non-recurring revenue and expenses (Ben-Shahar et al., 2011). The second real estate specific measure of performance is price per net asset value (PRICE/NAV), which represents the ratio of the market price to the book value of equity. By comparing the REIT's market valuation to the net asset value, PRICE/NAV is a well-known valuation metric to assess if REITS are traded at a premium or discount. To capture the influence of current and past performance on our compensation measures, we apply total return to shareholders, measured in different time-horizons. Specifically, the average total return to shareholders over one, three or five years (*TSR1YR, TSR3YR, TSR5YR*) might have a mixed relationship with short-term, long-term and equity compensation. Following previous literature on agency theory, the link between CEO/executive compensation and company performance should align management goals, such as maximising compensation, with those of shareholder's, such as creating sustainable company performance. Hence, in pay-for-performance contracts, CEO or executive compensation is a positive increasing function of performance. Based on agency theory, we predict that a better performing company rewards the CEO and executive directors with higher compensation levels, especially equity compensation.

Corporate Governance Variables

In order to control for the distinct power mechanisms within the pay-setting process, we include a broad set of corporate governance variables in our model. Generally, corporate governance variables can be categorised either according to CEO entrenchment mechanisms (CEO/chairman duality, CEO/founder duality, CEO age, CEO tenure, CEO ownership) or board control mechanisms (longest board member tenure, blockholders and institutional investors, independent shareholders, size of the board, number of compensation committee meetings). We predict that these mechanisms influence the ability of CEO's and executives to negotiate higher compensation arrangements. *CEO DUALITY* is a proxy for the CEO being simultaneously chairman of the board. This power clustering in the CEO position may increase the CEO's influence in pay negotiations and the nomination process of new directors (Main et al., 1995; O'Reilly and Main, 2010). A similarly powerful position for enforcing strategic decisions is *CEO FOUNDER,* which captures a dual role as CEO and founder of the company. We predict that *CEO DUALITY* as well as *CEO FOUNDER,* are positively associated with CEO/executive compensation.

The age of the CEO and executive directors, as well as their length of tenure, may also be a determinant of strengthening managerial power. Therefore, we include *CEO AGE*, *EXE AGE, CEO TENURE,* as well as the tenure of the longest serving board member (*BOARD MEMBER TENURE*), in our regression models. The age of the CEO or executive directors can either be a proxy for working experience or an indicator of the length of time to retirement (Linck et al., 2008; Fernandes et al., 2013). Thus, the effect of CEO or executive age on performance can be ambiguous. We use the CEO's time in office *(CEO TENURE)* to control for the CEO's managerial entrenchment. As collaboration and collegiality among board members intensify over time, longer tenured CEOs are expected to have more influence over board members (Bebchuk & Fried, 2003). Thus, we expect a positive impact of CEO tenure on compensation. We also control for the tenure of the longest-serving board member, which can be an underestimated counterpart to the CEO tenure. Hence, a long-serving board member may have seniority status and be capable of convincing other board members to contradict CEO decisions.

Concerning the effects of ownership variables, *CEO OWN*, *EXE OWN*, *MAJORSHARE* and *INSTITUTIONALS* are employed. Increased share ownership empowers CEOs or executives with voting rights and greater control of the company. Thus, higher CEO/executive shareholdings might impede external control and monitoring, which could lead to excessive managerial compensation packages (Ozkan, 2011). Therefore, we include the percentage of

shares owned by the CEO and executives *(CEO OWN* and *EXE OWN)* and expect a positive association with CEO/executive compensation. Ozkan (2011), as well as Griffith *et al.*, (2011), find a significant non-monotonic relation between CEO/executive ownership and compensation. Consequently, we also include the quadratic model of these variables (*CEO OWN*^{2}, *EXE OWN*^{2}*)* to control for a non-linear relationship.

A key structural governance feature in constraining the power of CEOs is blockholder ownership. Therefore, we include *MAJORSHARE* to control for the percentage of substantial shareholders who own more than 5% percent of company's shares. In comparison to dispersed shareholders, large, concentrated owners have considerable wealth at stake. Hence, they are motivated to actively monitor management decisions and exert influence in cases of poor governance. However, the unique regulatory structure of REITs inhibits the formation of large blockholders, since a single shareholder cannot own more than 10 percent of REIT shares. Thus, the role of institutional shareholders in monitoring the company's management is likely to be more important than in other industries. We include *INSTITUTIONALS,* which represents the percentage of shares held by all institutional investors. On the one hand, since institutional investor portfolios are closely tied to the performance of companies they invest in, they may act as active monitors by limiting managerial power through their voting rights and hostile takeover threats. On the other hand, institutional investors may act as momentum traders by 'voting with their feet', instead of imposing disciplinary actions on management (Feng et al., 2010). We predict that higher levels of concentrated, or rather institutional ownership, in the case of REITS, are negatively associated with CEO/executive compensation.

In the real estate sector, the presence of independent directors is also likely to be a critical determinant of monitoring the company's management. By including *%INDEPENDENT,* we control for the share of independent directors on the board. Directors are considered independent if they are not currently employed by the company and have no other affiliations with it. A board composed of independent directors is supposed to ensure effective internal monitoring and enhanced corporate governance, since company outsiders should be less sensitive to the influence of corporate insiders, and free of conflicts of interest (Dalton, Daily, Ellstrand, & Johnson, 1998). However, independent directors may be less willing to challenge the CEO, as tendencies like loyalty and collegiality between board members evolve over time and directors generally prefer to retain their position within the re-election procedure (Main et al., 1995; O'Reilly and Main, 2010). Nevertheless, we hypothesize that independent directors act as efficient monitors in setting market-conform executive compensation arrangements and expect a negative association with CEO/executive compensation.

The number of directors within the board (*BOARDSIZE)* is also likely to raise CEO power. Larger boards might be ineffective in monitoring, due to a lack of mutual interaction, as well as internal coordination and communication problems, which may require more time and effort to build consensus (Bebchuk & Fried, 2004; Yermack, 1996; Zahra & Pearce, 1989). Therefore, we expect these collective-action problems of larger boards to provide CEOs with more power, resulting in higher CEO/executive compensation. The last corporate governance variable is *COMPMEETINGS*, which is measured by the natural logarithm of the total number of compensation committee meetings during a fiscal year. A larger number of compensation-committee meetings might imply disagreements on the level of compensation and a varying level of performance sensitivity among participants within the pay-setting process. Thus, we expect a negative impact of *COMPMEETINGS* on CEO/executive compensation.

Firm control variables

Given the well-documented relationship between the size of a company and compensation (e.g. Jensen & Murphy, 1990; Mehran, 1995; Sapp, 2008), we expect a positive association between FIRMSIZE, measured by the natural logarithm of total company assets value, and the compensation level. We also include the volatility of stock returns (*VOLATILITY*), calculated as the standard deviation of weekly stock returns, in order to control for firm risk. More volatile companies may invest in riskier assets in the hope of higher returns. If CEOs or executive directors are rewarded for taking risks, we expect the impact of volatility on CEO/executive compensation to be positive. Finally, control variables for the company's specific property type are added, since there may not only be returns variability, but also differences in the compensation level between various property types. These binary variables equal 1, if the investment focus of the company is either one of the following: *RESIDENTIAL*, *RETAIL*, *INDUSTRIAL*, *OFFICE*, *HOTEL*, *HEALTH CARE* or *DIVERSIFIED*.

3.3.3 Model Specification

Apart from corporate governance and performance variables, distinct observable and unobservable company, board, industry and country characteristics influence the pay-setting-process and ultimately the C-level compensation contract. As a result, compensation arrangements can be determined endogenously by firm performance, or both dependent and independent variables can be effected by omitted unobservable characteristics at the same time (Frydman & Jenter, 2010). We account for this potential endogeneity problem by applying a panel data fixed-effects methodology with year and property-type dummies and using lagged performance variables in all regressions, which reduces our sample period by one year to 2006-2015.

To investigate the determinants of CEO and executive compensation, the following panel data fixed-effects model is estimated:

$$Compensation_{i,t}$$

$$= \alpha + \beta\ Performance_{i,t-1} + \gamma\ Corporate\ Governance_{i,t} + \vartheta\ Firm\ Controls_{i,t} + \delta_i + \tau_t + \varepsilon_{i,t},$$

where *i* denotes the firm, and *t* the year. The dependent variable *Compensation* refers to the distinct compensation types of CEO's and executives: *TCC CEO*, *TCC EXE*, *TDC CEO*, *TDC EXE*, *EQUITY CEO* and *EQUITY EXE. Performance* denotes either the real-estate-specific measures FFO/SHARE and PRICE/NAV or the average shareholder total return over one, three and five years (*TSR1YR, TSR3YR, TSR5YR*). *Corporate Governance* represents a broad set of CEO power variables (e.g. *CEO DUALITY, CEO TENURE, CEO OWN)* and board control variables (e.g. *MAJORSHARE, INSTITUTIONALS, %INDEPENDENT*). *Firm controls* refers to *FIRMSIZE* and *VOLATILITY*. The models include property type dummies δ to control for differences in compensation level between companies with a distinct property focus. τ refers to the time fixed-effects for the period of 2006 to 2015 and ε is the error term.

3.4 Results

3.4.1 Descriptive Statistics

In Table 3.1, we provide the summary statistics of performance measures in Panel A, CEO's and executive's distinct compensation types in Panel B, corporate governance variables in Panel C and firm control variables in Panel D. Comparing the one, three and five-year total shareholder returns, the one-year return yields the highest average *TSR1YR* of 12.1%. The US listed real estate companies in the sample yield an average PRICE/NAV ratio of 1.66 and an FFO per share ratio of 2.46. Average cash compensation is $963.5 thousand for CEOs and $3.1 million for the group of executives. The boards of US listed real estate companies comprise 8.5 members on average, thereof 5.81 in executive positions. Hence, an average executive director is rewarded with a total cash compensation of $536.9 thousand. The CEO's long-term compensation totals on average $4.40 million, which is more than double an average executive director's long-term compensation of $1.90 million. The same pattern is evident within equity compensation arrangements (fair value of stocks and options granted), which values on average $2.50 million for CEOs and $1.07 million for an average executive director. Approximately 16.4% of the CEOs have a dual-role as CEO, and board chair and 26.4% of the CEOs are simultaneously the company founder. The board consists of independent directors to the extent of two-thirds. On average, compensation committees

meet five times per year. The CEO is on average 56 years old. The longest tenured board member serves approximately 18 years, which is more than double the CEO's tenure of 8.3 years. The percentages of shares owned by the CEO and executive directors are negligibly small at 1.5% and 0.9%, respectively. Blockholders who own more than 5% of company's shares, represent one third of all shareholders. Moreover, at approximately 82% share ownership, institutional investors are the largest shareholder group. The average total assets of the sample companies amount to $5.340 billion. The stock price volatility oscillates around 4.9%. Concerning the sample property types, retail companies comprise the largest subsample at 27.7%.

Table 3.1: Summary Statistics

	Obs.	Median	Mean	Std. Dev.
Panel A: Performance variables				
TSR1YR	853	0.128	0.121	0.393
TSR3YR	819	0.117	0.104	0.173
TSR5YR	785	0.114	0.106	0.133
FFO/SHARE	817	2.170	2.457	1.571
PRICE/NAV	850	1.411	1.660	1.186
Panel B: Compensation variables				
TCC CEO (in $000)	804	719.616	963.503	891.176
TCC EXE (in $000)	804	2,351.965	3,119.184	2,563.317
TDC CEO (in $000)	801	3,159.223	4,462.725	6,531.393
TDC EXE (in $000)	801	8,345.042	11,384.211	11,865.399
EQUITYCOMP CEO (in $000)	771	1,500.000	2,585.002	5,586.868
EQUITYCOMP EXE (in $000)	771	3,909.335	6,217.971	8,620.947
Panel C: Corporate governance variables				
CEO DUALITY	860	0.000	0.164	0.499
CEO FOUNDER	759	0.000	0.264	0441
CEO AGE	799	54.000	55.733	8.511
EXE AGE	799	52.000	52.268	4.700
CEO TENURE	718	7.000	8.292	6.143
BOARD MEMBER TENURE	844	16.000	17.760	9.588
CEO OWN	688	0.008	0.015	0.029
EXE OWN	709	0.003	0.009	0.024
MAJORSHARE	853	0.347	0.341	0.141
INSTITUTIONALS	825	0.844	0.817	0.220
BOARD SIZE	860	8.000	8.483	2.044
EXE	860	5.000	5.807	1.233
% INDEPENDENT	858	0.750	0.752	0.103
COMPMEETINGS	850	5.000	5.041	2.552
Panel D: Firm control variables				
FIRMSIZE (in $000)	876	3,220,826	5,340,497	5,953,524
VOLATILITY	855	4.065	4.922	2.723
RETAIL	913	0.000	0.277	0.448
RESIDENTIAL	913	0.000	0.145	0.352
INDUSTRIAL	913	0.000	0.084	0.278
OFFICE	913	0.000	0.169	0.375
HOTEL	913	0.000	0.096	0.295
HEALTH CARE	913	0.000	0.120	0.326
DIVERSIFIED	913	0.000	0.108	0.311

Table 3.1 gives an overview of the descriptive statistics of all variables. Panel A shows our five performance variables: *TSR1YR, TSR3YR, TSR5YR, FFO/SHARE* and *PRICE/NAV. TSR1YR, TSR3YR, TSR5YR* are the average shareholder total return over one, three and five years. *FFO/SHARE* is the funds from operations (as reported by the company) divided by the number of shares outstanding. *PRICE/NAV* is the market valuation divided by the NAV. Panel B displays the compensation variables for CEO and executive directors: *TCC* is the total current cash compensation, which is the sum of base salary and cash bonus for a fiscal year. *TDC* is the long-term compensation, and is calculated by the sum of base salary, cash bonus, restricted stock grants, stock options granted, long-term incentive pay-outs (LTIP) and all other total. *EQUITY* is the value of stocks and options granted, as reported in the company's financial statements. Panel C shows the corporate governance variables: *CEO DUALITY* is a dummy variable where 1 indicates that the CEO is simultaneously chairman of the board; *CEO FOUNDER* is a dummy variable where 1 indicates that the CEO is simultaneously founder of the company; *CEO AGE* is the age of the CEO. *CEO TENURE* is the CEO's time in office; *BOARD MEMBER TENURE* is the tenure of the longest serving board member; *CEO OWN* is the percentage of shares owned by the CEO; *EXE OWN* is the percentage of shares owned by the executive directors; *MAJORHSARE* is the percentage of substantial shareholders who own more than 5% percent of company's shares; *INSTITUTIONALS* is the percentage of shares held by all institutional investors; *BOARD SIZE* is the number of directors within the board; *EXE* is the number of executive directors within the board; *% INDEPENDENT* is the share of independent directors on the board; *COMPMEETINGS* is the total number of compensation committee meetings during a fiscal year. Panel D shows our firm control variables: *FIRMSIZE* is the total company assets value. *VOLATILITY* is the standard deviation of weekly stock returns. The property sectors are defined by following the SNL classification: *RETAIL* (shopping centre, regional malls and other retail); *RESIDENTIAL* (multi-family and manufactured homes); *INDUSTRIAL* (logistics and self-storage); *OFFICE; HOTEL; HEALTH CARE; DIVERSIFIED* (miscellaneous).

Figure 3.1 depicts the development of CEO and executive director long-term compensation (*TDC*) from 2006 to 2015. Over the whole sample period, the mean of a CEO's TDC is far above an average executive director's TDC, which is not surprising, given that the CEO bears more responsibility. From 2008 to 2009, both TDCs decrease as a consequence of the global financial crisis. After 2009 and until 2015, the data show a positive trend for both TDCs. However, there is a huge increase in CEO TDC from 2009 to 2011, whereas the long-term compensation of an executive director remains moderate at roughly the same level. A more detailed breakdown of the different compensation components is given in Figure 3.2.

Figure 3.1: Development of Long-Term CEO and Executive Compensation

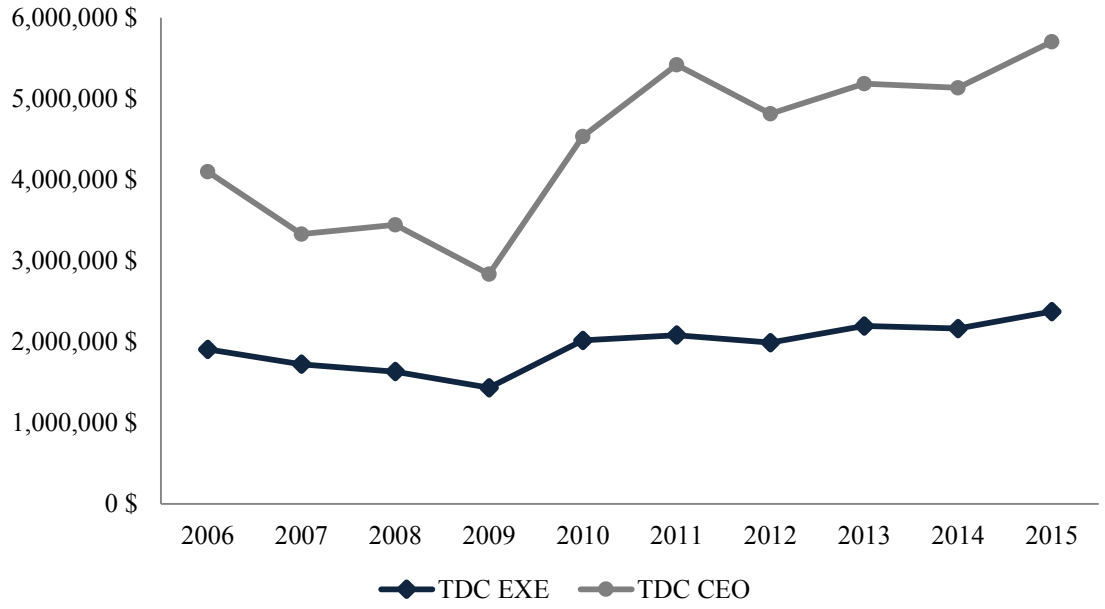

Figure 3.2 represents the main compensation components (salary, cash bonus, all others, stocks grants and option grants) and their relative importance during the sample period. In order to compare the main compensation components of a CEO's and an average executive director, the compensation of the group of executive directors is divided by the average number of executives. The salary proportion of both CEO and an average executive director varies between 12% and 26%, although changes over time are marginal. Thus, this compensation component is not sensitive to changing market conditions or crises. Interestingly, for executive directors, the salary component represents a larger proportion of the whole compensation package than for the CEO, implying that for CEO's, more than for executives, incentive-based compensation is a crucial component for aligning management with shareholder interests. The relative importance of a cash bonus within CEO compensation contracts has been more than halved from 13% in 2006 to 5% in 2015. The same pattern

can be observed within the executive director compensation packages. The cash bonus decrease can be explained by the simultaneously fundamental increase in stock grants within compensation arrangements. Over the whole sample period, stock grants comprise the largest component within compensation contracts. This finding shows that equity compensation is the most influential part in current C-level remuneration packages, suggesting that within the real estate industry, compensation packages align management interests with those of the company shareholders.

Figure 3.2: Main Components of CEO and Executive Compensation

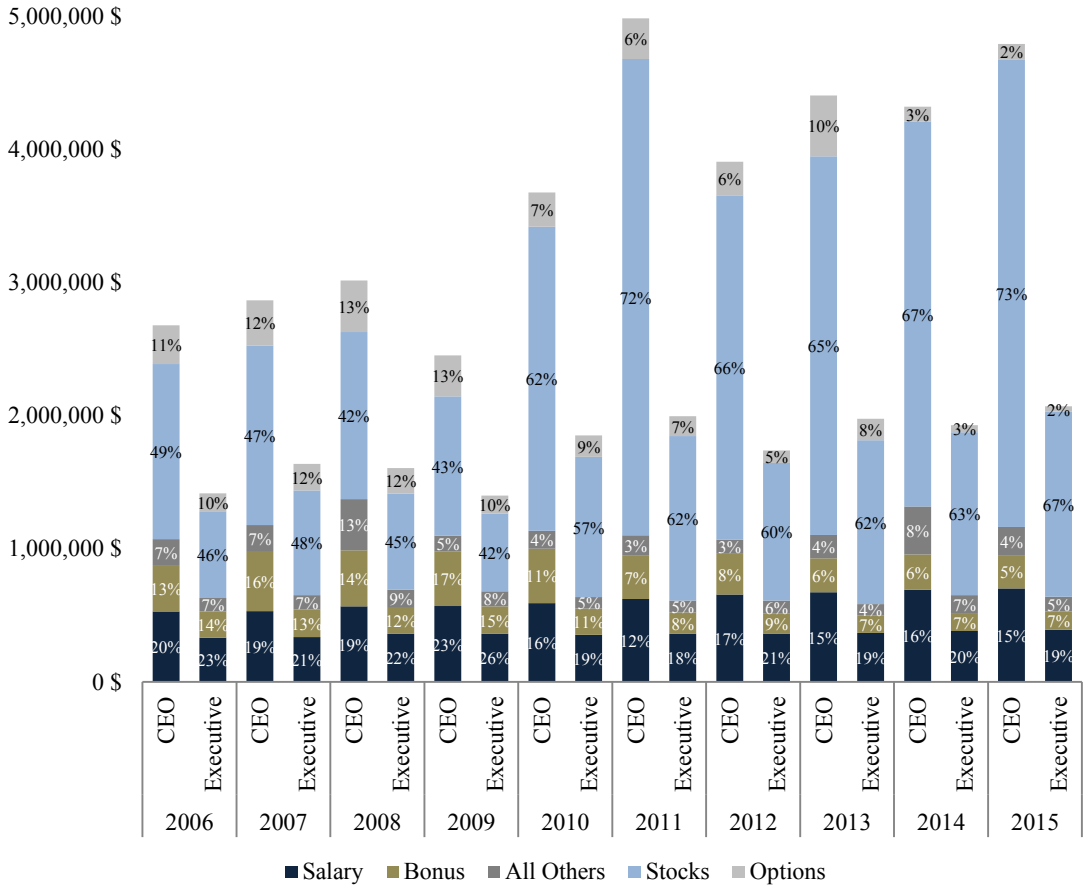

Table 3.2 provides an in-depth analysis of real estate companies' different property sectors by displaying the mean-comparison results for average cash, long-term and equity compensation for CEO's and for an average executive director. In our sample, the largest remuneration packages for CEOs as well as executive directors, are provided by companies with an office focus. The cash, long-term and equity compensation in the office sector is significantly different to the average sample compensation. Hence, in the office sector, a CEO earns on average $1,484,548 cash compensation and an executive director on average $839,742. Over all three compensation categories, CEO remuneration is approximately twice that of an average executive director. This result emphasises the outstanding responsibility position of CEO's for the company. Similar patterns in the compensation level can be found within all other property-type subgroups. The second highest cash compensation, which is significantly different from the sample average, is paid to CEOs and executive directors in industrial real estate companies. Companies in the hotel sector pay the third highest CEO cash compensation and residential real estate companies reward the third largest executive cash compensation packages. CEOs hired by diversified real estate companies earn less, than the other property types.

Table 3.2: Comparison of CEO and Average Executive Director Compensation by Property Types

Property Types	Health care	Residential	Retail	Industrial	Office	Hotel	Diversified
CEO TCC	719,737*** (2.77)	652,909*** (4.14)	1,029,951 (-1.33)	1,162,955** (-1.99)	1,484,548** (-7.86)	726,712** (2.35)	654,960*** (3.42)
CEO TDC	4,116,211 (0.53)	3,517,401* (1.70)	4,930,990 (-1.27)	4,708,294 (-0.33)	6,008,710*** (-3.09)	4,009,745 (0.61)	2,566,954*** (2.86)
CEO EQUITY	2,583,291 (0.00)	2,068,336 (1.05)	2,967,089 (-1.20)	2,236,609 (0.54)	3,337,293* (-1.71)	2,357,275 (0.35)	1,521,474* (1.83)
EXE TCC	328,797*** (4.82)	417,739*** (3.20)	575,941 (-1,57)	629,656* (-1.87)	839,742*** (-9.35)	379,490*** (3.17)	380,186*** (3.51)
EXE TDC	1,528,906** (2.13)	1,688,188 (1.57)	2,018,127 (-0.50)	2,202,081 (-1.05)	2,701,383*** (-4.76)	1,843,963 (0.50)	1,332,395*** (3.03)
EXE EQUITY	891,212 (1.21)	879,728 (1.47)	1,091,979 (-0.25)	1,145,937 (-0.44)	1,472,245*** (-3.45)	1,084,196 (-0.08)	741,228** (2.13)

Table 3.2 provides a compensation comparison by property types for CEOs and an average executive director. *TCC* is the total current cash compensation, which is the sum of base salary and cash bonus for a fiscal year. *TDC* is the long-term compensation, and is calculated by the sum of base salary, cash bonus, restricted stock grants, stock options granted, long-term incentive pay-outs (LTIP) and all other total. *EQUITY* is the value of stocks and options granted, as reported in the company's financial statements. The property sectors are defined by following the SNL classification: *RETAIL* (shopping centre, regional malls and other retail); *RESIDENTIAL* (multi-family and manufactured homes); *INDUSTRIAL* (logistics and self-storage); *OFFICE; HOTEL; HEALTH CARE; DIVERSIFIED* (miscellaneous).Coefficients of statistical significance at: * 10%, ** 5%, *** 1% levels. The t-statistics are reported in parentheses.

3.4.2 Main Regression Model

The results of the panel fixed-effects regression with regard to the distinct compensation types for CEOs and executive directors are displayed in Table 3.3 - Table 3.8. To ensure that our coefficient estimates are not affected by multicollinearity, the variance inflation factor (VIF) is calculated. All VIF are below 10, indicating that multicollinearity is not a problem in our models. To analyse the pay-performance relationship from different time horizon perspectives, we distinguish between short-term and long-term compensation components. Additionally, we construct a variable for equity compensation, in order to evaluate incentive-based compensation components. This approach yields three sets of estimates each for CEO and executive directors. All models show high explanatory power with an adjusted R^2 ranging from 0.46 to 0.72.

Total current cash compensation

Tables 3.3 and 3.4 contain the results for cash compensation regressions *TCC CEO* and *TCC EXE*, respectively. The impact of performance measures shows a similar pattern for CEO's and executives cash compensation. Short-term compensation arrangements are primarily driven by the average total return to shareholders over one year (*TSR1YR*). As expected, the maximisation of shareholder wealth in the short-term is a key determinant in explaining the cash salary and bonus of CEO's and the whole group of executives. The accounting-based performance metric FFO/SHARE has a positive impact on CEO's and executive directors' cash compensation. However, the market-based performance metric PRICE/NAV does not influence the total cash compensation, neither CEO's nor the executives'. Most of the CEO entrenchment mechanisms show high power in explaining CEO and executive cash compensation. Interestingly, *CEO TENURE* reveals no impact on CEO cash compensation, but a positive impact on executive cash compensation. As collegiality among board members may intensify over time, longer tenured CEOs tend to negotiate higher short-term cash compensation for the group of executives than merely for themselves. The tenure of the longest serving board member is only significant within the CEO cash compensation regressions. The negative coefficient of *BOARD MEMBER TENURE* implies that the seniority status of a long serving board member enables directors to fulfil an active monitoring role within the pay-setting process. *CEO DUALITY* displays an unexpected result, since the dual-role as CEO and chairman affects both CEO and executive cash compensation adversely. Thus, CEOs who similarly occupy the chairman position do not exploit their power position in pay negotiations. However, an equally powerful position is *CEO FOUNDER*, which has a positive influence on CEO as well as executive cash compensation. Thus, within the real estate industry, a founder's influence over cash compensation packages is significantly strong. In

line with the findings of Pennathur and Shelor (2002), older CEOs are associated with significantly less cash compensation. Such CEOs are probably wealthier, and thus less dependent on negotiating high cash compensation packages (Ghosh & Sirmans, 2005).

Table 3.3: CEO Total Current Cash Compensation *TCC CEO*

	Model 1	Model 2	Model 3	Model 4	Model 5
INTERCEPT	7.650*** (8.36)	7.631*** (7.81)	7.721*** (7.95)	8.278*** (9.28)	7.690*** (7.69)
TSR1YR	0.172* (1.66)				
TSR3YR		0.131 (0.62)			
TSR5YR			0.002 (0.01)		
FFO/SHARE				0.080** (2.39)	
PRICE/NAV					-0.005 (-0.09)
CEO DUALITY	-0.157*** (-3.18)	-0.159*** (-3.04)	-0.154*** (-3.02)	-0.154*** (-3.31)	-0.147*** (-2.79)
CEO FOUNDER	0.116* (1.93)	0.152** (2.37)	0.174*** (2.73)	0.113** (1.99)	0.163** (2.48)
CEO AGE	-0.338* (-1.90)	-0.449** (-2.34)	-0.427** (-2.26)	-0.349** (-2.1)	-0.520*** (-2.71)
CEO TENURE	0.030 (1.00)	0.042 (1.29)	0.047 (1.49)	0.028 (0.96)	0.012 (0.36)
BOARD MEMBER TENURE	-0.082* (-1.69)	-0.053 (-0.95)	-0.050 (-0.84)	-0.019 (-0.41)	-0.068 (-1.36)
CEO OWN	7.892*** (4.53)	6.407*** (3.41)	4.335** (2.33)	6.746*** (3.98)	8.937*** (4.81)
CEO OWN²	-18.53*** (-3.56)	-13.058** (-2.36)	-8.447 (-1.56)	-15.064*** (-3.05)	-20.106*** (-3.60)
MAJORSHARE	0.449*** (2.64)	0.508*** (2.78)	0.410** (2.28)	0.648*** (3.98)	0.495*** (2.71)
INSTITUTIONALS	0.105 (0.93)	0.18 (1.53)	0.212* (1.78)	-0.030 (-0.28)	0.205* (1.70)
BOARD SIZE	-0.465*** (-4.04)	-0.699*** (-5.56)	-0.825*** (-6.54)	-0.689*** (-6.15)	-0.582*** (-4.76)
% INDEPENDENT	0.086 (0.37)	0.003 (0.01)	-0.142 (-0.57)	-0.234 (-1.04)	0.161 (0.65)
COMPMEETINGS	0.164*** (3.38)	0.216*** (4.12)	0.219*** (4.28)	0.185*** (4.03)	0.162*** (3.19)
FIRMSIZE	0.335*** (12.04)	0.369*** (12.47)	0.382*** (13.02)	0.333*** (11.65)	0.371*** (12.32)
VOLATILITY	0.025** (2.03)	0.025* (1.89)	0.016 (1.19)	0.022** (1.96)	0.023* (1.79)
RETAIL	0.406*** (5.01)	0.439*** (5.04)	0.432*** (4.99)	0.409*** (5.41)	0.419*** (4.71)
RESIDENTIAL	0.018 (0.20)	0.069 (0.74)	0.082 (0.89)	0.073 (0.88)	0.034 (0.35)
INDUSTRIAL	0.338*** (3.57)	0.355*** (3.49)	0.349*** (3.46)	0.338*** (3.85)	0.376*** (3.72)
OFFICE	0.504*** (5.50)	0.51*** (5.24)	0.499*** (5.12)	0.547*** (6.24)	0.517*** (5.26)
HOTEL	0.241** (2.30)	0.242** (2.11)	0.183 (1.55)	-0.039 (-0.36)	0.248** (2.24)
HEALTH CARE	0.377*** (4.09)	0.355*** (3.55)	0.364*** (3.65)	0.419*** (4.89)	0.363*** (3.65)
Period fixed-effects	Yes	Yes	Yes	Yes	Yes
F-statistic	14.09	15.45	16.59	17.67	14.7
R^2	0.50	0.53	0.57	0.57	0.51
Adj. R^2	0.46	0.50	0.53	0.53	0.48

Table 3.3 shows the results for the CEO cash compensation regression. The dependent variable *TCC CEO* is the natural logarithm of the total current cash compensation for CEO_i in year *t*. *Performance* is measured by five variables: *TSR1YR, TSR3YR, TSR5YR, FFO/SHARE* and *PRICE/NAV. TSR1YR, TSR3YR, TSR5YR* are the average shareholder total return over one, three and five years. *FFO/SHARE* is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. *PRICE/NAV* is the natural logarithm of the market valuation divided by the NAV. *Corporate Governance* is measured by: *CEO DUALITY* is a dummy variable where 1 indicates that the CEO is simultaneously chairman of the board; *CEO FOUNDER* is a dummy variable where 1 indicates that the CEO is simultaneously founder of the company; *CEO AGE* is the natural logarithm of the age of the CEO. *CEO TENURE* is the natural logarithm of the CEO's time in office; *BOARD MEMBER TENURE* is the natural logarithm of the tenure of the longest serving board member; *CEO OWN* is the percentage of shares owned by the CEO; *MAJORHSARE* is the percentage of substantial shareholders who own more than 5% percent of company's shares; *INSTITUTIONALS* is the percentage of shares held by all institutional investors; *BOARD SIZE* is the natural logarithm of the number of directors within the board; *% INDEPENDENT* is the share of independent directors on the board; *COMPMEETINGS* is the natural logarithm of the total number of compensation committee meetings during a fiscal year. *FIRMSIZE* and *VOLATILITY* represent our *Firm Controls*. *FIRMSIZE* is the natural logarithm of total company assets value. *VOLATILITY* is the standard deviation of weekly stock returns. Coefficients of statistical significance at: * 10%, ** 5%, *** 1% levels. The t-statistics are reported in parentheses.

Table 3.4: Executive Directors' Total Current Cash Compensation *TCC EXE*

	Model 1	Model 2	Model 3	Model 4	Model 5
INTERCEPT	6.908*** (6.37)	6.493*** (5.78)	6.085*** (5.32)	7.027*** (6.48)	7.073*** (6.52)
TSR1YR	0.192** (2.00)				
TSR3YR		0.302 (1.63)			
TSR5YR			0.326 (1.32)		
FFO/SHARE				0.069* (1.87)	
PRICE/NAV					0.050 (1.12)
CEO DUALITY	-0.126*** (-2.79)	-0.130*** (-2.81)	-0.126*** (-2.69)	-0.136*** (-3.02)	-0.121*** (-2.68)
CEO FOUNDER	0.109** (2.00)	0.105* (1.87)	0.116** (1.99)	0.090* (1.66)	0.119** (2.15)
EXE AGE	0.235 (0.85)	0.317 (1.09)	0.414 (1.38)	0.296 (1.11)	0.213 (0.78)
CEO TENURE	0.056** (2.04)	0.064** (2.24)	0.063** (2.19)	0.053* (1.89)	0.044 (1.53)
BOARD MEMBER TENURE	-0.060 (-1.28)	-0.036 (-0.69)	-0.031 (-0.52)	-0.020 (-0.42)	-0.062 (-1.36)
EXE OWN	1.652 (0.63)	0.274 (0.10)	-1.328 (-0.46)	1.453 (0.54)	2.481 (0.94)
EXE OWN²	-5.169 (-0.55)	-0.131 (-0.01)	4.843 (0.49)	-3.593 (-0.38)	-7.329 (-0.78)
MAJORSHARE	0.052 (0.33)	0.085 (0.53)	0.011 (0.07)	0.173 (1.08)	0.062 (0.39)
INSTITUTIONALS	0.067 (0.65)	0.040 (0.39)	0.069 (0.63)	0.009 (0.09)	0.073 (0.70)
BOARD SIZE	-0.094 (-0.90)	-0.141 (-1.28)	-0.202* (-1.76)	-0.246** (-2.31)	-0.099 (-0.96)
% INDEPENDENT	-0.188 (-0.86)	-0.168 (-0.74)	-0.197 (-0.83)	-0.387* (-1.74)	-0.206 (-0.95)
COMPMEETINGS	0.110** (2.47)	0.129*** (2.76)	0.134*** (2.84)	0.144*** (3.21)	0.102** (2.33)
FIRMSIZE	0.306*** (12.41)	0.309*** (12.17)	0.317*** (12.08)	0.304*** (11.14)	0.306*** (12.40)
VOLATILITY	0.031*** (2.77)	0.035*** (2.97)	0.034*** (2.76)	0.024** (2.23)	0.027** (2.52)
RETAIL	0.327*** (4.43)	0.304*** (3.94)	0.289*** (3.64)	0.326*** (4.47)	0.303*** (3.94)
RESIDENTIAL	-0.003 (-0.04)	-0.014 (-0.17)	-0.016 (-0.19)	0.020 (0.25)	-0.020 (-0.25)
INDUSTRIAL	0.095 (1.10)	0.064 (0.71)	0.056 (0.6)	0.089 (1.05)	0.094 (1.09)
OFFICE	0.666*** (8.08)	0.634*** (7.51)	0.632*** (7.22)	0.661*** (7.95)	0.654*** (7.87)
HOTEL	0.107 (1.12)	0.063 (0.62)	0.008 (0.08)	-0.066 (-0.63)	0.120 (1.27)
HEALTH CARE	0.102 (1.20)	0.084 (0.94)	0.087 (0.95)	0.132 (1.58)	0.086 (1.00)
Period fixed-effects	Yes	Yes	Yes	Yes	Yes
F-statistic	16.42	15.76	15.72	17.62	16.33
R^2	0.54	0.54	0.55	0.56	0.53
Adj. R^2	0.50	0.50	0.51	0.53	0.50

Table 3.4 shows the results for the executive directors' cash compensation regression. The dependent variable *TCC EXE* is the natural logarithm of the total current cash compensation for the group of *executive directors*$_i$ in year *t*. *Performance* is measured by five variables: *TSR1YR, TSR3YR, TSR5YR, FFO/SHARE* and *PRICE/NAV. TSR1YR, TSR3YR, TSR5YR* are the average shareholder total return over one, three and five years. *FFO/SHARE* is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. *PRICE/NAV* is the natural logarithm of the market valuation divided by the NAV. *Corporate Governance* is measured by: *CEO DUALITY* is a dummy variable where 1 indicates that the CEO is simultaneously chairman of the board; *CEO FOUNDER* is a dummy variable where 1 indicates that the CEO is simultaneously founder of the company; *CEO AGE* is the natural logarithm of the age of the CEO. *CEO TENURE* is the natural logarithm of the CEO's time in office; *BOARD MEMBER TENURE* is the natural logarithm of the tenure of the longest serving board member; *EXE OWN* is the percentage of shares owned by executive directors; *MAJORHSARE* is the percentage of substantial shareholders who own more than 5% percent of company's shares; *INSTITUTIONALS* is the percentage of shares held by all institutional investors; *BOARD SIZE* is the natural logarithm of the number of directors within the board; *% INDEPENDENT* is the share of independent directors on the board; *COMPMEETINGS* is the natural logarithm of the total number of compensation committee meetings during a fiscal year. *FIRMSIZE* and *VOLATILITY* represent our *Firm Controls*. *FIRMSIZE* is the natural logarithm of total company assets value. *VOLATILITY* is the standard deviation of weekly stock returns. Coefficients of statistical significance at: * 10%, ** 5%, *** 1% levels. The t-statistics are reported in parentheses.

However, the average age of executive directors does not influence executives' cash compensation. In line with Griffith et al. (2011), the positive coefficient on CEO ownership (*CEO OWN*), along with the negative coefficient for the quadratic term *CEO OWN²,* suggest that CEO ownership positively affects cash compensation at a declining rate. In contrast to Hardin (1998), who finds a positive relationship between director stock ownership and compensation, our coefficients on *EXE OWN* and *EXE OWN²* are insignificant. Surprisingly, the increase in the number of board members does not result in ineffective monitoring and higher CEO cash compensation, in contrast to what was demonstrated by Ghosh and Sirmans (2005). Our findings for *BOARDSIZE* show just the opposite - monitoring requires capacity and a less familiar environment. Group cohesion and loyalty are more likely to prevail in smaller boards. Contrary to our expectations, the number of compensation committee meetings has a significant positive impact on CEO/executive compensation, implying that compensation contracts might have been renegotiated upwards. Inconsistent with our expectations, but in line with Feng et al. (2010), independent directors have no impact on CEO or on executive cash compensation, therefore neither enhancing nor impairing monitoring. The impact of blockownership and institutional investors on the executive cash compensation is insignificant. However, contrary to our expectations, but in line with Feng et al. (2010), *MAJORSHARE* and *INSTITUTIONALS* are positively associated with CEO cash compensation. Implying that institutional shareholders are willing to pay higher cash compensation to retain CEOs (Feng et al., 2010). Moreover, the results indicate that our firm controls *FIRMSIZE* and *VOLATILITY* do indeed positively influence CEO's as well as executives' cash compensation. This result confirms past empirical studies that larger companies attract the best talents and reward management for taking risks.

Total long-term compensation

Tables 3.5 and 3.6 present the results for the long-term compensation measures *TDC CEO* and *TDC EXE*. As expected, long-term remuneration packages are linked to the long-term-orientated performance ratio *TSR5YR*. Besides this highly significant (p-value<0.01) long-term relationship between pay and performance, we similarly found a positive impact of the operative company profit *FFO/SHARE* and the market-based performance measure *PRICE/NAV* on long-term payments to CEOs and executive directors. It appears that a CEO's and executive directors' long-term compensation is rather linked to higher market valuations, since *PRICE/NAV* has a strong positive impact on *TDC CEO* and *TDC EXE,* but no impact on short-term cash payments, as measured by *TCC CEO* and *TCC EXE* (see Tables 3.3 and 3.4).

Table 3.5: CEO Total Long-Term Compensation *TDC CEO*

	Model 1	Model 2	Model 3	Model 4	Model 5
INTERCEPT	5.332*** (4.24)	4.971*** (3.83)	4.727*** (3.48)	6.865*** (5.51)	5.714*** (4.38)
TSR1YR	0.224 (1.58)				
TSR3YR		0.348 (1.26)			
TSR5YR			1.120*** (3.01)		
FFO/SHARE				0.117** (2.51)	
PRICE/NAV					0.136** (1.98)
CEO DUALITY	-0.064 (-0.94)	-0.064 (-0.93)	-0.074 (-1.04)	-0.011 (-0.17)	-0.063 (-0.91)
CEO FOUNDER	-0.083 (-1.01)	-0.065 (-0.78)	-0.008 (-0.09)	-0.033 (-0.42)	-0.044 (-0.51)
CEO AGE	-1.341*** (-5.55)	-1.265*** (-5.04)	-1.301*** (-4.98)	-1.375*** (-5.99)	-1.540*** (-6.21)
CEO TENURE	0.091** (2.19)	0.098** (2.28)	0.081* (1.83)	0.064 (1.60)	0.065 (1.50)
BOARD MEMBER TENURE	-0.173*** (-2.59)	-0.141* (-1.91)	-0.135 (-1.61)	-0.155** (-2.46)	-0.170*** (-2.59)
CEO OWN	12.807*** (5.39)	12.028*** (4.87)	11.403*** (4.42)	13.040*** (5.55)	13.256*** (5.51)
CEO OWN²	-19.499*** (-2.73)	-17.284** (-2.35)	-15.062** (-1.99)	-20.542*** (-2.98)	-18.659** (-2.56)
MAJORSHARE	0.619*** (2.65)	0.681*** (2.82)	0.763*** (3.04)	0.807*** (3.56)	0.625*** (2.63)
INSTITUTIONALS	0.526*** (3.50)	0.499*** (3.30)	0.568*** (3.52)	0.370** (2.57)	0.607*** (3.97)
BOARD SIZE	-0.442*** (-2.84)	-0.498*** (-3.05)	-0.431** (-2.50)	-0.550*** (-3.58)	-0.424*** (-2.70)
% INDEPENDENT	0.491 (1.55)	0.505 (1.55)	0.515 (1.49)	0.287 (0.93)	0.437 (1.37)
COMPMEETINGS	0.298*** (4.64)	0.312*** (4.66)	0.317*** (4.60)	0.277*** (4.46)	0.321*** (5.01)
FIRMSIZE	0.650*** (17.08)	0.652*** (16.71)	0.656*** (16.07)	0.605*** (15.26)	0.666*** (17.10)
VOLATILITY	-0.012 (-0.71)	-0.017 (-0.95)	-0.013 (-0.74)	-0.015 (-0.94)	-0.010 (-0.63)
RETAIL	0.612*** (5.50)	0.629*** (5.46)	0.628*** (5.19)	0.588*** (5.58)	0.583*** (5.04)
RESIDENTIAL	0.140 (1.15)	0.167 (1.34)	0.140 (1.08)	0.178 (1.55)	0.092 (0.73)
INDUSTRIAL	0.360*** (2.77)	0.374*** (2.77)	0.391*** (2.77)	0.364*** (2.96)	0.350*** (2.66)
OFFICE	0.370*** (2.94)	0.400*** (3.10)	0.487*** (3.57)	0.421*** (3.44)	0.366*** (2.85)
HOTEL	0.484*** (3.36)	0.563*** (3.70)	0.525*** (3.18)	0.304** (2.00)	0.434*** (3.01)
HEALTH CARE	0.451*** (3.64)	0.392*** (3.01)	0.285** (2.08)	0.471*** (4.02)	0.371*** (2.91)
Period fixed-effects	Yes	Yes	Yes	Yes	Yes
F-statistic	29.99	29.03	29.99	29.64	31.56
R^2	0.68	0.68	0.70	0.68	0.69
Adj. R^2	0.65	0.66	0.67	0.66	0.66

Table 3.5 shows the results for the CEO long-term compensation regression. The dependent variable *TDC CEO* is the natural logarithm of the total long-term compensation for CEO_t in year *t*. *Performance* is measured by five variables: *TSR1YR, TSR3YR, TSR5YR, FFO/SHARE* and *PRICE/NAV. TSR1YR, TSR3YR, TSR5YR* are the average shareholder total return over one, three and five years. *FFO/SHARE* is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. *PRICE/NAV* is the natural logarithm of the market valuation divided by the NAV. *Corporate Governance* is measured by: *CEO DUALITY* is a dummy variable where 1 indicates that the CEO is simultaneously chairman of the board; *CEO FOUNDER* is a dummy variable where 1 indicates that the CEO is simultaneously founder of the company; *CEO AGE* is the natural logarithm of the age of the CEO. *CEO TENURE* is the natural logarithm of the CEO's time in office; *BOARD MEMBER TENURE* is the natural logarithm of the tenure of the longest serving board member; *CEO OWN* is the percentage of shares owned by the CEO; *MAJORHSARE* is the percentage of substantial shareholders who own more than 5% percent of company's shares; *INSTITUTIONALS* is the percentage of shares held by all institutional investors; *BOARD SIZE* is the natural logarithm of the number of directors within the board; *% INDEPENDENT* is the share of independent directors on the board; *COMPMEETINGS* is the natural logarithm of the total number of compensation committee meetings during a fiscal year. *FIRMSIZE* and *VOLATILITY* represent our *Firm Controls*. *FIRMSIZE* is the natural logarithm of total company assets value. *VOLATILITY* is the standard deviation of weekly stock returns. Coefficients of statistical significance at: * 10%, ** 5%, *** 1% levels. The t-statistics are reported in parentheses.

Table 3.6: Executive Directors' Total Long-Term Compensation *TDC EXE*

	Model 1	Model 2	Model 3	Model 4	Model 5
INTERCEPT	5.613*** (5.16)	6.362*** (4.72)	6.406*** (4.68)	6.112*** (5.28)	5.538*** (4.8)
TSR1YR	0.135 (1.41)				
TSR3YR		0.271 (1.22)			
TSR5YR			0.993*** (3.37)		
FFO/SHARE				0.065* (1.87)	
PRICE/NAV					0.152*** (3.21)
CEO DUALITY	-0.019 (-0.41)	-0.039 (-0.69)	-0.044 (-0.77)	0.0003 (0.01)	-0.047 (-0.97)
CEO FOUNDER	-0.104* (-1.92)	-0.034 (-0.50)	0.017 (0.25)	-0.062 (-1.06)	-0.084 (-1.42)
EXE AGE	-0.248 (-0.91)	-1.247*** (-3.65)	-1.286*** (-3.66)	-0.516* (-1.83)	-0.556* (-1.94)
CEO TENURE	0.090*** (3.24)	0.084** (2.44)	0.064* (1.83)	0.073** (2.43)	0.069** (2.26)
BOARD MEMBER TENURE	-0.160*** (-3.38)	-0.116* (-1.82)	-0.089 (-1.23)	-0.154*** (-3.12)	-0.151*** (-3.12)
EXE OWN	5.858** (2.23)	8.256** (2.5)	7.044** (2.07)	6.197** (2.16)	6.257** (2.23)
EXE OWN²	-11.461 (-1.23)	-13.194 (-1.14)	-9.830 (-0.83)	-10.809 (-1.08)	-8.912 (-0.9)
MAJORSHARE	0.354** (2.26)	0.328* (1.69)	0.391** (1.97)	0.483*** (2.85)	0.407** (2.43)
INSTITUTIONALS	0.106 (1.05)	0.518*** (4.26)	0.513*** (4.04)	0.168 (1.56)	0.246** (2.3)
BOARD SIZE	-0.215** (-2.08)	-0.081 (-0.62)	0.002 (0.01)	-0.273** (-2.43)	-0.185* (-1.71)
% INDEPENDENT	-0.112 (-0.52)	-0.404 (-1.49)	-0.263 (-0.94)	-0.472** (-2.01)	-0.315 (-1.39)
COMPMEETINGS	0.101** (2.33)	0.283*** (5.22)	0.258*** (4.7)	0.146*** (3.15)	0.155*** (3.42)
FIRMSIZE	0.523*** (21.34)	0.627*** (20.69)	0.615*** (19.64)	0.557*** (19.56)	0.576*** (22.17)
VOLATILITY	-0.008 (-0.71)	-0.003 (-0.18)	0.002 (0.14)	-0.012 (-1.08)	-0.007 (-0.59)
RETAIL	0.444*** (6.02)	0.618*** (6.70)	0.587*** (6.17)	0.489*** (6.31)	0.431*** (5.32)
RESIDENTIAL	0.145* (1.81)	0.153 (1.55)	0.115 (1.14)	0.177** (2.1)	0.091 (1.05)
INDUSTRIAL	0.257*** (2.96)	0.304*** (2.81)	0.303*** (2.72)	0.29*** (3.2)	0.237** (2.58)
OFFICE	0.453*** (5.47)	0.534*** (5.23)	0.587*** (5.55)	0.543*** (6.11)	0.482*** (5.45)
HOTEL	0.381*** (3.94)	0.461*** (3.77)	0.417*** (3.19)	0.265** (2.35)	0.374*** (3.71)
HEALTH CARE	0.395*** (4.74)	0.138 (1.31)	0.069 (0.63)	0.358*** (4.09)	0.312*** (3.46)
Period fixed-effects	Yes	Yes	Yes	Yes	Yes
F-statistic	31.03	37.39	37.53	34.99	36.34
R^2	0.68	0.73	0.74	0.72	0.72
Adj. R^2	0.66	0.71	0.72	0.70	0.69

Table 3.6 shows the results for the executive directors' long-term compensation regression. The dependent variable *TDC EXE* is the natural logarithm of the total long-term compensation for the group of *executive directors*$_i$ in year *t*. *Performance* is measured by five variables: *TSR1YR, TSR3YR, TSR5YR, FFO/SHARE* and *PRICE/NAV. TSR1YR, TSR3YR, TSR5YR* are the average shareholder total return over one, three and five years. *FFO/SHARE* is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. *PRICE/NAV* is the natural logarithm of the market valuation divided by the NAV. *Corporate Governance* is measured by: *CEO DUALITY* is a dummy variable where 1 indicates that the CEO is simultaneously chairman of the board; *CEO FOUNDER* is a dummy variable where 1 indicates that the CEO is simultaneously founder of the company; *CEO AGE* is the natural logarithm of the age of the CEO. *CEO TENURE* is the natural logarithm of the CEO's time in office; *BOARD MEMBER TENURE* is the natural logarithm of the tenure of the longest serving board member; *EXE OWN* is the percentage of shares owned by executive directors; *MAJORHSARE* is the percentage of substantial shareholders who own more than 5% percent of company's shares; *INSTITUTIONALS* is the percentage of shares held by all institutional investors; *BOARD SIZE* is the natural logarithm of the number of directors within the board; *% INDEPENDENT* is the share of independent directors on the board; *COMPMEETINGS* is the natural logarithm of the total number of compensation committee meetings during a fiscal year. *FIRMSIZE* and *VOLATILITY* represent our *Firm Controls*. *FIRMSIZE* is the natural logarithm of total company assets value. *VOLATILITY* is the standard deviation of weekly stock returns. Coefficients of statistical significance at: * 10%, ** 5%, *** 1% levels. The t-statistics are reported in parentheses.

Some CEO entrenchment mechanisms change their impact with regard to the long-term compensation components *TDC CEO* and *TDC EXE*. The two dual-role variables, *CEO DUALITY* and *CEO FOUNDER* lose their explanatory power when considering CEO and executive director long-term compensation. However, the tenure of the CEO has a positive impact on *TDC CEO* and *TDC EXE*. Hence, in comparison to short-term compensation, it appears that CEOs use their long trajectory in the C-Suite to negotiate higher long-term compensation packages for themselves as well as for fellow executives. We found a consistently negative impact of *BOARD MEMBER TENURE* on *TDC CEO* and *TDC EXE*, suggesting that the longest-serving board member plays an important role in monitoring excessive compensation arrangements. Unlike the results for cash compensation, we found a positive significant link between share ownership by executive directors *(EXE OWN)* and long-term compensation contracts. Through an increased amount of shares, executive directors use their voting rights and strategic power to bargain for higher long-term remuneration packages. Interestingly, there is no significant non-monotonic relationship for executive shareholdings and *TDC EXE*. The positive impact of institutional investors, either as a major blockholder or not, tends to be stronger on *TDC CEO* and *TDC EXE*. This result is in line with Feng et al. (2010), suggesting that institutional investors, rather than constraining generous compensation contracts, motivate management by paying higher long-term compensation alongside higher cash compensation. The explanatory power of *BOARDSIZE*, *FIRMSIZE* and *VOLATILITY* remains unchanged, compared to *TCC CEO* and *TCC EXE.*

Total equity compensation

Finally, the results for incentive-based equity compensation (*EQUITY CEO* and *EQUITY EXE*) are displayed in Tables 3.7 and 3.8. Generally, incentive-based compensation should motivate CEOs and executive directors to create value over a long time horizon. Consequently, we expect stock and option grants to be positively linked to long-term and value-driven growth. Our findings confirm this expectation by demonstrating that the market-based performance measures *TSR5YR* and *PRICE/NAV* are positively related to *EQUITY CEO* and *EQUITY EXE*. Additionally, medium-term performance, measured by *TSR3YR,* has a similarly positive impact on *EQUITY EXE*, however, the influence is marginal. Consequently, equity compensation is a reward for creating long-term company value. Interestingly, the proxy for CEO entrenchment *(CEO FOUNDER)* shows a negative impact on *EQUITY CEO.* If a CEO is simultaneously the company founder, it might be likely that he/she already owns a sufficient amount of company shares. Therefore, a *CEO FOUNDER* may not bargain for higher equity compensation for himself/herself. The impact of *CEO TENURE, BOARD MEMBER TENURE, CEO OWN, CEO OWN², EXE OWN* and *EXE OWN²* remains unchanged compared to *TDC CEO* and *TDC EXE.* Contrary

to Feng et al. (2010), who find that institutional investors use greater pay-performance sensitivity to align their interests with those of shareholders, we find no impact of *MAJORSHARE* and *INSTITUTIONALS* on equity compensation.

Table 3.7: CEO Total Equity Compensation *EQUITY CEO*

	Model 1	Model 2	Model 3	Model 4	Model 5
INTERCEPT	2.977* (1.72)	2.521 (1.42)	2.752 (1.47)	3.327* (1.80)	3.672** (2.08)
TSR1YR	0.257 (1.32)				
TSR3YR		0.462 (1.16)			
TSR5YR			1.423*** (2.69)		
FFO/SHARE				0.035 (0.47)	
PRICE/NAV					0.216** (2.36)
CEO DUALITY	0.022 (0.24)	0.044 (0.46)	0.014 (0.14)	0.058 (0.6)	0.031 (0.33)
CEO FOUNDER	-0.348*** (-3.04)	-0.335*** (-2.87)	-0.317** (-2.58)	-0.325*** (-2.79)	-0.297** (-2.55)
CEO AGE	-1.023*** (-3.00)	-0.889** (-2.53)	-0.887** (-2.41)	-1.144*** (-3.27)	-1.178*** (-3.42)
CEO TENURE	0.160*** (2.79)	0.164*** (2.78)	0.147** (2.44)	0.151** (2.56)	0.135** (2.31)
BOARD MEMBER TENURE	-0.421*** (-4.47)	-0.382*** (-3.69)	-0.366*** (-3.07)	-0.389*** (-4.09)	-0.395*** (-4.34)
CEO OWN	16.505*** (4.90)	15.699*** (4.52)	15.423*** (4.23)	18.137*** (5.11)	16.478*** (4.89)
CEO OWN²	-26.472*** (-2.72)	-24.287** (-2.44)	-23.603** (-2.29)	-30.182*** (-3.00)	-24.938** (-2.55)
MAJORSHARE	0.080 (0.25)	0.234 (0.71)	0.388 (1.13)	0.193 (0.57)	0.160 (0.50)
INSTITUTIONALS	0.151 (0.71)	0.100 (0.47)	0.001 (0.00)	0.109 (0.49)	0.177 (0.83)
BOARD SIZE	-0.061 (-0.28)	-0.144 (-0.62)	0.035 (0.14)	-0.160 (-0.67)	-0.044 (-0.20)
% INDEPENDENT	-0.167 (-0.39)	-0.137 (-0.31)	-0.031 (-0.07)	-0.170 (-0.38)	-0.201 (-0.47)
COMPMEETINGS	0.156* (1.69)	0.178* (1.87)	0.172* (1.75)	0.168* (1.76)	0.165* (1.80)
FIRMSIZE	0.723*** (13.98)	0.720*** (13.6)	0.687*** (12.28)	0.734*** (12.5)	0.715*** (13.68)
VOLATILITY	-0.017 (-0.74)	-0.022 (-0.93)	-0.016 (-0.66)	-0.024 (-1.03)	-0.017 (-0.75)
RETAIL	0.528*** (3.56)	0.506*** (3.31)	0.429*** (2.66)	0.519*** (3.43)	0.442*** (2.92)
RESIDENTIAL	-0.001 (-0.01)	-0.003 (-0.02)	-0.090 (-0.52)	0.016 (0.10)	-0.085 (-0.52)
INDUSTRIAL	0.151 (0.85)	0.139 (0.76)	0.136 (0.71)	0.163 (0.90)	0.117 (0.67)
OFFICE	0.488*** (2.83)	0.503*** (2.87)	0.527*** (2.86)	0.424**(2.38)	0.456*** (2.65)
HOTEL	0.483** (2.55)	0.608*** (3.06)	0.593*** (2.74)	0.385* (1.76)	0.43** (2.31)
HEALTH CARE	0.145 (0.87)	0.014 (0.08)	-0.083 (-0.45)	0.145 (0.85)	0.067 (0.4)
Period fixed-effects	Yes	Yes	Yes	Yes	Yes
F-statistic	18.11	17.89	17.17	17.29	18.36
R^2	0.59	0.59	0.60	0.58	0.59
Adj. R^2	0.55	0.56	0.56	0.55	0.56

Table 3.7 shows the results for the CEO equity compensation regression. The dependent variable *EQUITY CEO* is the natural logarithm of the total equity compensation for CEO_i in year *t*. *Performance* is measured by five variables: *TSR1YR, TSR3YR, TSR5YR, FFO/SHARE* and *PRICE/NAV. TSR1YR, TSR3YR, TSR5YR* are the average shareholder total return over one, three and five years. *FFO/SHARE* is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. *PRICE/NAV* is the natural logarithm of the market valuation divided by the NAV. *Corporate Governance* is measured by: *CEO DUALITY* is a dummy variable where 1 indicates that the CEO is simultaneously chairman of the board; *CEO FOUNDER* is a dummy variable where 1 indicates that the CEO is simultaneously founder of the company; *CEO AGE* is the natural logarithm of the age of the CEO. *CEO TENURE* is the natural logarithm of the CEO's time in office; *BOARD MEMBER TENURE* is the natural logarithm of the tenure of the longest serving board member; *CEO OWN* is the percentage of shares owned by the CEO; *MAJORHSARE* is the percentage of substantial shareholders who own more than 5% percent of company's shares; *INSTITUTIONALS* is the percentage of shares held by all institutional investors; *BOARD SIZE* is the natural logarithm of the number of directors within the board; *% INDEPENDENT* is the share of independent directors on the board; *COMPMEETINGS* is the natural logarithm of the total number of compensation committee meetings during a fiscal year. *FIRMSIZE* and *VOLATILITY* represent our *Firm Controls*. *FIRMSIZE* is the natural logarithm of total company assets value. *VOLATILITY* is the standard deviation of weekly stock returns. Coefficients of statistical significance at: * 10%, ** 5%, *** 1% levels. The t-statistics are reported in parentheses.

Table 3.8: Executive Directors' Total Equity Compensation *EQUITY EXE*

	Model 1	Model 2	Model 3	Model 4	Model 5
INTERCEPT	5.387*** (2.89)	5.566*** (2.65)	5.912*** (2.71)	5.968*** (3.12)	6.031*** (2.9)
TSR1YR	0.266 (1.61)				
TSR3YR		0.658* (1.89)			
TSR5YR			1.258*** (2.66)		
FFO/SHARE				0.014 (0.22)	
PRICE/NAV					0.238*** (2.77)
CEO DUALITY	0.087 (1.12)	0.082 (0.93)	0.075 (0.83)	0.129 (1.61)	0.068 (0.78)
CEO FOUNDER	-0.147 (-1.55)	-0.14 (-1.32)	-0.097 (-0.86)	-0.125 (-1.29)	-0.134 (-1.25)
EXE AGE	-1.196** (-2.57)	-1.412*** (-2.65)	-1.465*** (-2.63)	-1.268*** (-2.72)	-1.395*** (-2.7)
CEO TENURE	0.124*** (2.61)	0.131** (2.45)	0.115** (2.07)	0.108** (2.19)	0.102* (1.86)
BOARD MEMBER TENURE	-0.244*** (-2.96)	-0.197** (-1.98)	-0.168 (-1.46)	-0.228*** (-2.77)	-0.289*** (-3.27)
EXE OWN	14.857*** (3.2)	15.81*** (3.01)	15.019*** (2.72)	16.32*** (3.35)	17.186*** (3.29)
EXE OWN²	-31.116* (-1.92)	-30.892* (-1.70)	-29.052 (-1.53)	-35.797** (-2.13)	-31.743* (-1.75)
MAJORSHARE	0.170 (0.63)	0.345 (1.14)	0.410 (1.30)	0.279 (0.99)	0.399 (1.31)
INSTITUTIONALS	0.029 (0.17)	-0.064 (-0.34)	-0.117 (-0.58)	-0.026 (-0.15)	-0.035 (-0.19)
BOARD SIZE	-0.288 (-1.61)	-0.265 (-1.29)	-0.139 (-0.64)	-0.399** (-2.12)	-0.276 (-1.39)
% INDEPENDENT	-0.275 (-0.74)	-0.270 (-0.64)	-0.175 (-0.39)	-0.385 (-0.99)	-0.499 (-1.21)
COMPMEETINGS	0.147* (1.92)	0.203** (2.34)	0.201** (2.24)	0.151* (1.93)	0.267*** (3.17)
FIRMSIZE	0.696*** (16.61)	0.711*** (15.06)	0.688*** (13.76)	0.698*** (14.75)	0.702*** (14.94)
VOLATILITY	-0.023 (-1.21)	-0.012 (-0.55)	-0.012 (-0.53)	-0.033* (-1.73)	-0.007 (-0.34)
RETAIL	0.346*** (2.71)	0.337** (2.32)	0.272* (1.77)	0.343*** (2.66)	0.291** (1.98)
RESIDENTIAL	0.005 (0.04)	-0.021 (-0.14)	-0.089 (-0.55)	0.043 (0.31)	-0.062 (-0.39)
INDUSTRIAL	0.062 (0.42)	0.036 (0.21)	0.001 (0.01)	0.082 (0.55)	0.049 (0.3)
OFFICE	0.547*** (3.74)	0.599*** (3.66)	0.624*** (3.62)	0.526*** (3.50)	0.531*** (3.24)
HOTEL	0.388** (2.39)	0.452** (2.40)	0.457** (2.22)	0.251 (1.35)	0.342* (1.91)
HEALTH CARE	0.182 (1.28)	-0.003 (-0.02)	-0.1 (-0.58)	0.173 (1.2)	0.054 (0.33)
Period fixed-effects	Yes	Yes	Yes	Yes	Yes
F-statistic	19.6	18.66	17.80	18.51	18.40
R^2	0.59	0.59	0.59	0.59	0.57
Adj. R^2	0.56	0.55	0.55	0.55	0.54

Table 3.8 shows the results for the executive directors' equity compensation regression. The dependent variable *EQUITY EXE* is the natural logarithm of the total equity compensation for the group of *executive directors*$_t$ in year *t*. *Performance* is measured by five variables: *TSR1YR, TSR3YR, TSR5YR, FFO/SHARE* and *PRICE/NAV. TSR1YR, TSR3YR, TSR5YR* are the average shareholder total return over one, three and five years. *FFO/SHARE* is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. *PRICE/NAV* is the natural logarithm of the market valuation divided by the NAV. *Corporate Governance* is measured by: *CEO DUALITY* is a dummy variable where 1 indicates that the CEO is simultaneously chairman of the board; *CEO FOUNDER* is a dummy variable where 1 indicates that the CEO is simultaneously founder of the company; *CEO AGE* is the natural logarithm of the age of the CEO. *CEO TENURE* is the natural logarithm of the CEO's time in office; *BOARD MEMBER TENURE* is the natural logarithm of the tenure of the longest serving board member; *EXE OWN* is the percentage of shares owned by executive directors; *MAJORHSARE* is the percentage of substantial shareholders who own more than 5% percent of company's shares; *INSTITUTIONALS* is the percentage of shares held by all institutional investors; *BOARD SIZE* is the natural logarithm of the number of directors within the board; *% INDEPENDENT* is the share of independent directors on the board; *COMPMEETINGS* is the natural logarithm of the total number of compensation committee meetings during a fiscal year. *FIRMSIZE* and *VOLATILITY* represent our *Firm Controls*. *FIRMSIZE* is the natural logarithm of total company assets value. *VOLATILITY* is the standard deviation of weekly stock returns. Coefficients of statistical significance at: * 10%, ** 5%, *** 1% levels. The t-statistics are reported in parentheses.

3.4.3 Alternative Tests

The global financial crisis began in late 2007 and revealed severe shortcomings in corporate governance mechanisms, especially the rewarding of managers for excessive short-term risk taking. The listed real estate sector provides an optimal setting for comparing time-varying pay-performance sensitivities, given that particularly the bursting of the real estate bubble was the crucial trigger for the crisis, which led to the most disastrous price falls in history. The timeframes are subdivided into one period displaying the core effects of the crisis from 2007-2010 and another period from 2012-2015, which covers the recovery years after the crisis. The year 2011 is not included, because, as of this year, new laws induced by the crisis became effective, e.g. the SEC 'Say-on-Pay' rule. Hence, we follow Murphy (2013) by accounting for political factors or rather government intervention.

Tables 3.9 and 3.10 show the results of pay-performance sensitivity during and after the financial crisis for long-term and equity compensation components of executive directors.[14] Consistent with the main model, we apply a fixed-effects panel approach and control for potential endogeneity by using lagged performance ratios. During the financial crisis, the results show no significant relationship between compensation and performance. For the post-crisis period, we find a positive significant impact for the performance metrics *FFO/SHARE* and *PRICE/NAV* on both executive remuneration types, either long-term or equity compensation. Compared to a non-significant pay-performance link for the crisis period 2007-2010, the post-crisis results demonstrate an intensified pay-for-performance relationship. Hence, contemporary long-term and equity remuneration packages are more closely linked to corporate success, either cash (*FFO/SHARE*) or value-driven *(PRICE/NAV)* ratio, than during the crisis.

The results for corporate governance variables and firm controls are predominately stable for the sub-periods. However, for equity compensation (see Table 3.10) the differential impact of certain variables during and after the crisis is clearly observable. Apparently, *CEO FOUNDER* as well as *EXE AGE* only have a significant impact during the crisis, whereas *CEO TENURE* gains explanatory power in the post-crisis period. The central monitoring role, either during or after the crisis, is assumed by the longest-serving board member. *BOARDSIZE* exclusively displays a negative sign in the post-crisis sub-period; hence a CEO-friendly atmosphere tended to prevail in small boards during the crisis. The significant coefficient of COMPMEETINGS during the

[14] The results are the same for CEO's long-term and equity compensation.

crisis period suggests that there was certainly a sufficient need for discussion concerning the negotiation and arrangement of compensation contracts.

Table 3.9: Comparison of Executive Directors' Total Long-Term Compensation *TDC EXE* During and After the Crisis

	Model 1		Model 2	
	During 2007-2010	After 2012-2015	During 2007-2010	After 2012-2015
INTERCEPT	8.605*** (3.38)	4.450** (2.39)	6.836*** (2.93)	3.963** (2.19)
FFO/SHARE	0.083 (1.17)	0.134** (2.11)		
PRICE/NAV			0.019 (0.20)	0.273*** (3.70)
CEO DUALITY	-0.082 (-0.83)	0.066 (0.81)	-0.127 (-1.43)	0.022 (0.28)
CEO FOUNDER	-0.174 (-1.47)	0.138 (1.38)	-0.169 (-1.49)	0.097 (1.03)
EXE AGE	-1.324** (-2.2)	-0.712 (-1.55)	-1.053* (-1.86)	-0.705 (-1.54)
CEO TENURE	-0.081 (-0.99)	0.076* (1.74)	0.005 (0.07)	0.055 (1.24)
BOARD MEMBER TENURE	-0.30*** (-2.70)	-0.196** (-2.55)	-0.277*** (-2.77)	-0.209*** (-2.76)
EXE OWN	15.515*** (3.11)	25.459 (1.59)	12.656*** (2.79)	9.643 (0.66)
EXE OWN²	-32.239** (-1.99)	-185.837 (-0.43)	-24.799* (-1.68)	322.096 (0.77)
MAJORSHARE	0.662* (1.87)	0.350 (1.30)	0.502 (1.58)	0.357 (1.35)
INSTITUTIONALS	0.533** (2.35)	0.633*** (3.90)	0.45** (2.26)	0.659*** (4.11)
BOARD SIZE	-0.026 (-0.12)	-0.181 (-0.95)	0.020 (0.10)	-0.152 (-0.84)
% INDEPENDENT	-0.255 (-0.55)	-0.386 (-0.94)	-0.032 (-0.08)	-0.301 (-0.77)
COMPMEETINGS	0.24*** (2.78)	0.282*** (3.35)	0.199** (2.50)	0.319*** (4.12)
FIRMSIZE	0.535*** (8.93)	0.644*** (13.32)	0.561*** (10.98)	0.661*** (15.32)
VOLATILITY	0.024 (1.36)	-0.058* (-1.69)	0.026 (1.51)	-0.056* (-1.67)
RETAIL	0.908*** (5.43)	0.473*** (3.90)	0.786*** (4.69)	0.445*** (3.69)
RESIDENTIAL	0.383** (2.24)	-0.066 (-0.50)	0.306* (1.85)	-0.097 (-0.73)
INDUSTRIAL	0.333 (1.63)	0.329** (2.44)	0.296 (1.59)	0.293** (2.16)
OFFICE	0.781*** (4.42)	0.349** (2.36)	0.756*** (4.50)	0.315** (2.25)
HOTEL	0.220 (0.76)	0.399** (2.51)	0.381 (1.56)	0.448*** (3.15)
HEALTH CARE	0.567*** (3.07)	0.022 (0.16)	0.559*** (3.18)	-0.008 (-0.06)
Period fixed-effects	Yes	Yes	Yes	Yes
F-statistic	18.10	21.18	18.75	23.80
R^2	0.76	0.74	0.75	0.74
Adj. R^2	0.72	0.70	0.71	0.71

Table 3.9 reports the regression results for the two sub-periods during (2007-2010) and after (2012-2015) the financial crisis with regard to the long-term compensation components of executive directors. The dependent variable *TDC EXE* is the natural logarithm of the total long-term compensation for the group of *executive directors*$_i$ in year *t*. *Performance* is measured by five variables: *TSR1YR, TSR3YR, TSR5YR, FFO/SHARE* and *PRICE/NAV. TSR1YR, TSR3YR, TSR5YR* are the average shareholder total return over one, three and five years. *FFO/SHARE* is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. *PRICE/NAV* is the natural logarithm of the market valuation divided by the NAV. *Corporate Governance* is measured by: *CEO DUALITY* is a dummy variable where 1 indicates that the CEO is simultaneously chairman of the board; *CEO FOUNDER* is a dummy variable where 1 indicates that the CEO is simultaneously founder of the company; *CEO AGE* is the natural logarithm of the age of the CEO. *CEO TENURE* is the natural logarithm of the CEO's time in office; *BOARD MEMBER TENURE* is the natural logarithm of the tenure of the longest serving board member; *EXE OWN* is the percentage of shares owned by executive directors; *MAJORHSARE* is the percentage of substantial shareholders who own more than 5% percent of company's shares; *INSTITUTIONALS* is the percentage of shares held by all institutional investors; *BOARD SIZE* is the natural logarithm of the number of directors within the board; *% INDEPENDENT* is the share of independent directors on the board; *COMPMEETINGS* is the natural logarithm of the total number of compensation committee meetings during a fiscal year. *FIRMSIZE* and *VOLATILITY* represent our *Firm Controls*. *FIRMSIZE* is the natural logarithm of total company assets value. *VOLATILITY* is the standard deviation of weekly stock returns. Coefficients of statistical significance at: * 10%, ** 5%, *** 1% levels. The t-statistics are reported in parentheses.

Table 3.10: Comparison of Executive Directors' Equity Compensation *EQUITY EXE* During and After the Crisis

	Model 1		Model 2	
	During 2007-2010	After 2012-2015	During 2007-2010	After 2012-2015
INTERCEPT	14.905*** (3.99)	0.784 (0.31)	15.271*** (3.38)	-0.330 (-0.13)
FFO/SHARE	-0.133 (-1.07)	0.218** (2.5)		
PRICE/NAV			0.075 (0.40)	0.392*** (3.82)
CEO DUALITY	0.119 (0.82)	0.175 (1.58)	0.090 (0.51)	0.107 (1.00)
CEO FOUNDER	-0.425** (-2.43)	0.117 (0.87)	-0.524** (-2.37)	0.126 (0.95)
EXE AGE	-2.969*** (-3.33)	-0.518 (-0.82)	-3.041*** (-2.76)	-0.304 (-0.47)
CEO TENURE	-0.008 (-0.07)	0.148** (2.5)	0.015 (0.11)	0.124** (2.04)
BOARD MEMBER TENURE	-0.368** (-2.20)	-0.347*** (-3.3)	-0.534*** (-2.68)	-0.368*** (-3.51)
EXE OWN	23.412*** (3.06)	62.407*** (2.78)	30.79*** (3.42)	27.666 (1.32)
EXE OWN^2	-55.126** (-2.27)	-677.976 (-1.13)	-70.934** (-2.46)	172.413 (0.3)
MAJORSHARE	0.612 (1.13)	0.248 (0.68)	0.748 (1.16)	0.260 (0.71)
INSTITUTIONALS	-0.317 (-0.93)	0.253 (1.14)	-0.458 (-1.19)	0.335 (1.52)
BOARD SIZE	0.165 (0.48)	-0.589** (-2.26)	0.204 (0.51)	-0.559** (-2.24)
% INDEPENDENT	0.110 (0.16)	0.153 (0.26)	-0.025 (-0.03)	-0.111 (-0.2)
COMPMEETINGS	0.238* (1.78)	0.110 (0.96)	0.435*** (2.71)	0.129 (1.17)
FIRMSIZE	0.527*** (5.97)	0.802*** (12.11)	0.517*** (5.19)	0.828*** (13.78)
VOLATILITY	-0.004 (-0.15)	-0.058 (-1.23)	0.020 (0.58)	-0.066 (-1.40)
RETAIL	0.876*** (3.59)	0.187 (1.12)	0.895*** (2.80)	0.149 (0.89)
RESIDENTIAL	0.253 (1.00)	-0.239 (-1.31)	0.110 (0.35)	-0.268 (-1.45)
INDUSTRIAL	0.069 (0.23)	0.154 (0.83)	0.065 (0.19)	0.097 (0.52)
OFFICE	1.045*** (3.88)	0.162 (0.79)	0.914*** (2.78)	0.330 (1.63)
HOTEL	0.408 (0.97)	0.200 (0.92)	0.656 (1.44)	0.250 (1.27)
HEALTH CARE	0.486* (1.78)	-0.039 (-0.21)	0.361 (1.06)	-0.116 (-0.61)
Period fixed-effects	Yes	Yes	Yes	Yes
F-statistic	8.40	14.25	7.13	15.82
R^2	0.62	0.66	0.56	0.67
Adj. R^2	0.54	0.61	0.48	0.63

Table 3.10 reports the regression results for the two sub-periods during (2007-2010) and after (2012-2015) the financial crisis with regard to the equity compensation components of executive directors. The dependent variable *EQUITY EXE* is the natural logarithm of the total equity compensation for the group of *executive directors*$_i$ in year *t*. *Performance* is measured by five variables: *TSR1YR, TSR3YR, TSR5YR, FFO/SHARE* and *PRICE/NAV. TSR1YR, TSR3YR, TSR5YR* are the average shareholder total return over one, three and five years. *FFO/SHARE* is the natural logarithm of the funds from operations (as reported by the company) divided by the number of shares outstanding. *PRICE/NAV* is the natural logarithm of the market valuation divided by the NAV. *Corporate Governance* is measured by: *CEO DUALITY* is a dummy variable where 1 indicates that the CEO is simultaneously chairman of the board; *CEO FOUNDER* is a dummy variable where 1 indicates that the CEO is simultaneously founder of the company; *CEO AGE* is the natural logarithm of the age of the CEO. *CEO TENURE* is the natural logarithm of the CEO's time in office; *BOARD MEMBER TENURE* is the natural logarithm of the tenure of the longest serving board member; *EXE OWN* is the percentage of shares owned by executive directors; *MAJORHSARE* is the percentage of substantial shareholders who own more than 5% percent of company's shares; *INSTITUTIONALS* is the percentage of shares held by all institutional investors; *BOARD SIZE* is the natural logarithm of the number of directors within the board; *% INDEPENDENT* is the share of independent directors on the board; *COMPMEETINGS* is the natural logarithm of the total number of compensation committee meetings during a fiscal year. *FIRMSIZE* and *VOLATILITY* represent our *Firm Controls*. *FIRMSIZE* is the natural logarithm of total company assets value. *VOLATILITY* is the standard deviation of weekly stock returns. Coefficients of statistical significance at: * 10%, ** 5%, *** 1% levels. The t-statistics are reported in parentheses.

3.5 Conclusion

This paper examines whether compensation packages within the real estate industry are determined merely by performance or also by CEO power mechanisms that have an essential influence on board-level negotiations about executive compensation. Especially the arrangement of compensation contracts after the financial crisis has so far not been assessed systematically. This paper aims to fill this void by analysing a comprehensive set of performance, CEO entrenchment as well as board-control variables, some of which have never been covered for the US real estate industry. Compensation arrangements were analysed for a sample of 83 US listed real estate companies between 2006 and 2015, the most comprehensive US sample to date. After controlling for a possible endogenous determination of compensation arrangements by applying a panel data fixed-effects methodology and using lagged performance variables, our findings can be summarised as follows:

Total cash compensation of CEOs and executive directors is primarily driven by the performance ratio of total return to shareholders over one year (*TSR1YR*). Furthermore, several CEO-entrenchment and board-control proxies such as *CEO DUALITY*, *CEO OWN*, *CEO OWN²*, *MAJORSHARE*, *BOARD SIZE*, *COMPMEETINGS* give explanatory power to *TCC CEO* and *TCC EXE*. Total cash compensation is similarly driven by *FIRMSIZE* and *VOLATILITY,* which confirms past empirical studies that larger companies attract the best talents and reward the C-Suite for taking risks.

Principally, the performance ratios of total return to shareholders over five years (*TSR5YR*), operative company profit *(FFO/SHARE)* and the market-based performance measure *PRICE/NAV* have a significant positive impact on *TDC CEO* and *TDC EXE*. Hence, long-term compensation packages for CEOs and executive directors are tied to long-term company performance. With regard to our CEO entrenchment mechanisms, we find that CEOs exploit their long experience within the firm *(CEO TENURE)* to negotiate higher long-term pay for themselves, as well as for fellow executive directors. In contrast to institutional investors or major blockholders, the longest-serving board member assumes a leading role in monitoring excessive pay arrangements. In line with Feng et al. (2010), we find that institutional investors motivate and retain management by paying higher long-term compensation together with higher cash compensation.

We also show that incentive-based compensation, such as stock and option grants, is positively linked to long-term and value-driven growth performance ratios (*TSR5YR* and *PRICE/NAV)*. Consequently, equity compensation is a reward for creating long-term company

value. Results concerning the CEO entrenchment mechanisms remain the same as for *TDC CEO* and *TDC EXE,* except for the variable *CEO FOUNDER,* which yields a negative impact on *EQUITY CEO.* A CEO who is simultaneously the company founder, may not bargain for higher equity compensation for himself/herself, since he/she might already own a sufficient amount of company shares. Contrary to Feng et al. (2010), who find that institutional investors use incentive-based compensation to align management interests to those of shareholders, we find no impact of *MAJORSHARE* and *INSTITUTIONALS* on equity compensation.

The analysis of two different time sub-samples subdivided into 'during financial crisis' (2007-2010) and 'after financial crisis' (2012-2015) demonstrates impressively that the implementation of pay-for-performance contracts is an essential consequence of the crisis.

In conclusion, our results reveal that the U.S. listed real estate sector has learned its lessons from the dramatic disaster of the financial crisis, a period of exaggerated remuneration packages with regard to economic incentives and short-term risk taking. CEO's and executive directors' compensation contracts should be closely linked to both short- and long-term performance measures, in order to align management interests with those of company owners.

Further research may extend this study by investigating a sample which comprises a longer timeframe after the global financial crisis in order to validate whether the pay-performance link is sustainable. Additionally, it would be interesting to examine whether the pay-performance link can also be found in the compensation arrangement of the middle management within real estate companies.

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4 SEC Comment Letters and Information Asymmetries in REITs

Abstract

The SEC reviews REIT financial statements at least every three years, by adopting the perspective of an investor in evaluating the disclosure of REITs and asking questions an investor would ask. If any disclosure deficiencies are identified, the SEC sends a comment letter to the REIT requesting clarification, more discussion or corrections and/or improvements in future filings. We investigate whether SEC comment letters improve the information environment for REIT investors. Using a sample of 452 comment letters on annual financial statements (10-K) received by REITs over the period of 2006 to 2016, we show that SEC comments for REITs most frequently relate to assets and business transactions, operational results and liquidity, as well as REIT-specific non-GAAP measures such as FFO and AFFO. We find that SEC comment letters reduce information asymmetries, as proxied by the bid-ask spread, albeit with a two-quarter lag. These results are driven by SEC comments on accounting disclosure issues (e.g. leases and joint ventures), MD&A issues (e.g. business operations and liquidity) and non-GAAP metrics (e.g. FFO) issues. We also find that the complexity of SEC comment letters in terms of the number of comments and length of the comment letter correspondence between SEC and REIT have a negative impact on information asymmetry. Our findings show that SEC comment letters indeed enhance the information environment for REIT investors by forcing REITs to reveal decision-relevant information to the investment community.

4.1 Introduction

The mission of the Securities and Exchange Commission (SEC) is to maintain fair and efficient markets based on the concept that all types of investors, regardless of whether they are private individuals or large institutions, should have access to fundamental information about a firm in which they invest. The SEC aims to achieve this goal by requiring public companies to disclose decision-useful information to the public.[15] In line with this mission and in its regulatory oversight function, the SEC reviews registration statements (e.g. IPO or merger filings) and periodic reports (e.g. annual and quarterly financial statements) of publicly listed firms. Such reviews can be considered a form of external, involuntary and independent auditing of firms. As a result of the Sarbanes Oxley Act of 2002, periodic reports of SEC registered firms have to be reviewed by the SEC at least every three years (Bozanic, Dietrich, & Johnson, 2017). The SEC states that the comment letter process "involves evaluating the disclosure from a potential investor's perspective and asking questions that an investor might ask when reading the document."[16]

If the SEC identifies deficiencies in accounting standards and disclosure requirements in periodic reports, a comment letter is sent to the firm seeking clarification, requesting additional information and/or revisions to a firm's disclosure in the targeted or a future filing. For REITs, comment letters may, for example, relate to the accounting and/or discussion of FFO and other non-US GAAP measures, results of operations, leases or forward-looking information on liquidity or business conditions in the management discussion and analysis (MD&A). Upon receipt of a comment letter, firms are required to submit a response to the SEC addressing the issues raised within a certain amount of time. This correspondence between SEC and firm can continue for several rounds, depending on the SEC's satisfaction with the firm's response and the severity of the comment letter issues. Generally, each follow up comment letter from the SEC contains fewer comments, since the targeted firm resolves issues over time. The SEC ends the review by filing a "no further comment" letter.[17] The SEC comment letters and firm's response letters are then made publicly available to the investment community through the SEC's EDGAR website[18].

As a consequence, the question arises as to whether SEC comment letters help in improving the information environment for REIT investors and reduce information asymmetries, in line

[15] Further information on the mission, purpose and organisational structure, see SEC website on "What We Do": https://www.sec.gov/Article/whatwedo.html.
[16] See: SEC website on "Filing Review Process": https://www.sec.gov/edgar/searchedgar/companysearch.html.
[17] Further information on the comment letter review process see SEC website on "Filing Review Process": https://www.sec.gov/edgar/searchedgar/companysearch.html.
[18] Once uploaded, investors gain access to the 10-K comment letter correspondences via the EDGAR website, see: https://www.sec.gov/edgar/searchedgar/companysearch.html.

with the SEC mission. If the SEC requires REITs, for example, to provide more information on operations, performance metrics, commercial real estate market conditions, liquidity or business transactions, new decision-relevant information about a REIT is revealed to investors that is highly valuable for investment and pricing decisions.

The purpose of this study is to investigate the impact of SEC comment letters on information asymmetries, as proxied by the bid-ask spread, in the REIT market. We focus particularly on SEC comments that are important from a REIT investor perspective. In our empirical analysis, we focus on comment letters relating to annual financial statements of REITs (10-Ks), as they represent the type of filing on which the SEC most frequently comments. Additionally, 10-K filings represent an important source of information for investor decision-making, considering that they contain information about a firm's financial position and past performance (Griffin, 2003), risk factors as well as forward-looking information.

In our empirical analysis, we use a dataset of 85 REITs that received 452 comment letters with 2,846 comment letter issues over the period of the first quarter from 2006 to the fourth quarter of 2016. In the first part of our analysis, we employ content analysis to provide insights into the types of comment that are most frequently received by REITs. The largest share of SEC comments in our dataset relate to the disclosure of operational, asset-specific (e.g. leasing), business transaction-specific (e.g. joint ventures), liquidity and performance measurement (e.g. FFO and AFFO) issues.

In the second part of our analysis, we assess the impact of SEC comment letters on the information environment of REIT investors. In particular, we use the bid-ask spread to measure information asymmetries following the public release of a comment letter correspondence between the SEC and a REIT. We find that bid-ask spreads are reduced within two quarters of the dissemination of 10-K comment letter conversations to the investment community, which suggests that SEC comments letters indeed improve the information environment of REIT investors. Our analysis of individual SEC comment letter categories suggests that these overall results are driven by comments that are most relevant to REIT investors such as accounting issues (e.g. leases), MD&A issues or non-GAAP (e.g. FFO) issues. Interestingly, a higher complexity of SEC comment letter correspondences in terms of number of comments and length results in an even stronger reduction in information asymmetry.

To the best of our knowledge, SEC comment letters have received little attention in the REIT literature. Adams, Hayunga, & Rasmussen (2017) touch on SEC comment letters in the context of REITs, as they find that investors respond negatively to restatements by REITs as a result of SEC comment letters and/or other interventions by regulators. Our study aims at filling this

gap and contributes to two streams of literature in particular. The first is the REIT information asymmetry literature (e.g. Anglin, Edelstein, Gao, & Tsang, 2011; Danielsen, Harrison, Van Ness, & Warr, 2014; Devos, Devos, Ong, & Spieler, 2018; Downs, Güner, & Patterson, 2000; Glascock, Hughes, & Varshney, 1998; McDonald, Nixon, & Slawson, 2000). We complement previous studies, which show that voluntary disclosure transparency and corporate governance enhance the REIT information environment (Anglin et al., 2011; Danielsen et al., 2014), by providing evidence that the SEC comment letter review as a form of external involuntary auditing also improves the information environment for REIT investors. Second, our approach adds to the accounting and finance literature on SEC comment letters (Bozanic et al., 2017; Cassell, Dreher, & Myers, 2013; Johnston & Petacchi, 2017) by emphasising the importance of a REIT industry-specific analysis of comment letters and showing that SEC comment letters with regard to REIT-specific metrics (e.g. FFO and AFFO), real estate-specific issues (e.g. leases) and qualitative information about operations and liquidity in the MD&A section are most important with regard to enhancing the information environment for REIT investors.

Our findings also have relevance for REIT investors, since we show that SEC comment letters contain valuable information about a REIT. Comment letter correspondences are a source of information that was created relatively recent, considering that the SEC only started to publicly release comment and response letters in August 2004[19]. However, with its reviews of REIT filings, the SEC provides an external, free of charge auditing of REIT disclosures revealing deficiencies in REIT disclosure, especially on non-GAAP measures, various accounting topics and MD&A items. Investors may incorporate the type of information revealed in SEC comment letters correspondences or signals about the credibility of a REIT management revealed by the type and amount of SEC comments, into their decision-making process to develop investment strategies and price their investment risk more appropriately.

The remainder of this study is structured as follows. Next, we discuss the relevant literature and develop our hypotheses. This is followed by a description of our data, variables and methodology. We then present our results, which is followed by a conclusion.

[19] For more information, please visit: https://www.sec.gov/answers/edgarletters.htm.

4.2 Literature Review

Previous studies on corporate disclosure for non-REIT firms find that an increased level of disclosure improves the information environment between a firm and its investors (Amihud & Mendelson, 1986; Diamond & Verrecchia, 1991). Few studies use analyst forecast[20] error to measure information asymmetries (e.g. Devos, Ong, & Spieler, 2007; Juergens, 2000). Instead, the majority of REIT studies applies bid-ask spreads on the basis of the following argumentation: The bid-ask spread reflects all costs of a stock exchange trade including an adverse selection component. The adverse selection component is related to information flows in capital markets and therefore compensates market makers for the risk of information asymmetry. Dealers set the bid-ask spread so that the expected gains from uninformed traders cover the expected losses to informed traders. (Callahan, Lee, & Yohn, 1997) Hence, the bid-ask spread is an appropriate measure to capture information asymmetries between informed and uninformed investors. In this vein, Welker (1995) postulate that disclosure policy affects market liquidity, proxied by bid-ask spreads, since uninformed traders "price protect" against adverse selection. Hence, bid-ask spreads are inversely related to well-regarded disclosure policy. Similarly, Leuz and Verrecchia (2000) demonstrate declining bid-ask spreads for German firms that voluntarily commit to higher levels of disclosure by switching from German to international reporting standards such as IAS or US GAAP.

Over the last decade, a growing stream of accounting and audit literature has emerged that examines the information content of SEC comment letters on corporate filings such as IPO registration statements (Ertimur & Nondorf, 2006), compensation disclosures (Robinson, Xue, & Yu, 2011) or auditor changes (Ettredge, Johnstone, Stone, & Wang, 2011). A particular focus of this literature has been on periodic reports such as annual financial statements (10-K), considering that the SEC is required to review these reports for each firm at least every three years in line with the Sarbanes Oxley Act of 2002 (Bozanic et al., 2017).

Cassell et al. (2013) analyse the determinants of receiving a 10-K comment letter. They find that firms with low profitability, high volatility and complexity are more likely to obtain a 10-K comment letter. On the contrary, strong corporate governance and engagement of a Big-Four audit firm decreases the probability. Grove, Johnsen, & Lung (2016) construct a "red flag" metric to analyse the information content in 10-K comment letters and market performance surrounding the dissemination. The metric consists of five models, for example, the Altman Z-Score as bankruptcy prediction model that identifies financial problems. They find that firms with high red-flag metrics underperform the market and that SEC comment

[20] Unfortunately, we had no access to analyst forecast data on e.g. FFO.

letters anticipate the performance for firms that exhibit such a substantial financial distress. The findings of Brown, Tian, & Wu Tucker (2018) suggest that SEC comment letters do not only impact the targeted firms disclosure quality but also that of industry peers. They examine spillover effects of the 10-K comment letter review by explicitly focusing on SEC comments with regard to risk factor disclosure. They find that firms not receiving any comment letter considerably modify their next year's annual report if the SEC has commented on the risk factor disclosure of the industry leader, a close competitor, or various industry peers.

Another stream of literature suggests that investors consider SEC comment letters as useful information for buy vs. hold decisions. Dechow, Lawrence, & Ryans (2016) and Gietzmann & Isidro (2013) find evidence of strategic trades of firm's insiders and institutional investors surrounding the public release of SEC comment letters. Dechow et al. (2016) examine insider sales prior to the dissemination of comment letters concerning revenue recognition disclosure. They find evidence that insider trading is significantly higher than normal preceding the public disclosure of SEC comment letters. This negative abnormal insider trading volume is highest for firms with high short positions. Gietzmann and Isidro (2013) focus on trades by institutional investors, especially trades by low turnover or rather long-term institutional investors, who are assumed to monitor their investments more closely. They find that institutional shareholders reduce their stakes upon receipt of a SEC comment letter, and that these changes in holdings are especially pronounced for low turnover (better informed) institutional investors.

Johnston and Petacchi (2017) as well as Bozanic et al. (2017) are two recent studies explicitly focusing on the impact of the SEC comment letter review on information asymmetry. Johnston and Petacchi (2017) analyse the impact of 10-K and 10-Q comment letters on a firms' information environment proxied by the adverse selection component of the bid-ask spread in the quarter immediately following the public release and over a prolonged time-frame. They find that the public release of SEC comment letters is associated with reduced information asymmetry in the period after the comment letter release and in the subsequent eight quarters. Similarly, Bozanic et al. (2017) show that firms enhance their disclosure upon receiving a SEC comment letter. Improvements to firms' disclosures subsequent to a comment letter review are linked to a decline in information asymmetry, an increase in analyst following and a reduction in litigation risk. Both studies' evidence suggests that an SEC comment letter review enhances the targeted firms' information environment for investors.

A number of studies investigate information asymmetries in the context of REITs, for example with regard to IPOs (Devos et al., 2018; Glascock et al., 1998) or capital distribution policies

(Downs et al., 2000; McDonald et al., 2000). Two recent REIT studies focus on accounting quality and transparency by measuring the relationship between information asymmetry and the quality of a REIT's audit committee (Anglin et al., 2011) and abnormal audit fees (Danielsen et al., 2014). Anglin et al. (2011) show that enhanced REIT corporate governance diminishes the percentage bid-ask spread. Specifically, a combination of experienced board members and an independent audit committee with financial experts reduces the level of asymmetric information. Danielsen et al. (2014) employ abnormal audit fees as a measure of accounting disclosure transparency and find that this over-investment in audit services is rewarded with lower bid-ask spreads. Their evidence suggests that accounting transparency is most valuable to riskier REITs with greater growth options.

4.2.1 Hypotheses

While these earlier studies focus on internal audits (Anglin et al., 2011; Danielsen et al., 2014), the SEC comment letter review represents a form of external, involuntary and independent auditing. Considering that comment letter reviews are an independent external audit of financial statements by the SEC that is able to identify deficiencies in the disclosure and accounting practices, we assume that SEC comment letters provide additional information for REIT investors. In particular, we expect the dissemination of 10-K comment letter correspondences between the SEC and a REIT to lead to a lower level of information asymmetry, as measured by declining bid-ask spreads, in subsequent quarters. Therefore, we construct the following hypothesis:

H1: Information asymmetry decreases subsequent to a SEC 10-K comment letter public release.

Furthermore, the complexity of comment letter correspondences may have an impact on information asymmetry. While Johnston and Petacchi (2017) measure the informational consequences following the receipt of a comment letter, Bozanic et al. (2017) additionally analyse changes in qualitative disclosure such as length, readability, tone, numerical intensity or forward-looking statement intensity in the annual report filing subsequent to the comment letter review. Moreover, they examine the impact of negotiations, i.e. length of the correspondence with the SEC as measured by the number of comment letters filed by the SEC, on disclosure improvements in the following annual report. However, both studies focus on the informational consequences of the comment letter review but not on the content and complexity of the 10-K comment letter review itself. Contrary, studies like Cassell et al. (2013) and Grove et al. (2016) focus on the informational content of 10-K comment letters. Cassell et al. (2013) explicitly analyses the extent of comments received and the cost of remediation

as measured by the number of rounds and days to finalise a comment letter review. They show that the extent of comments received is higher for larger firms that report losses, engage in a small audit firm (not Big-Four) and for firms with less independent directors. Concerning the cost of remediation, they find that market capitalisation is positively associated with the number of rounds and that stock volatility, market capitalisation and restating financial statements are positively associated with response time.

We combine the approach of Cassell et al. (2013) with those of Johnston and Petacchi (2017) and Bozanic et al. (2017) by explicitly analysing the complexity of the comment letter reviews, as proxied by either the number of comments, the response time or the number of rounds, and its association with information asymmetries. We expect that more complex comment letter correspondences between the SEC and the REITs management cause a stronger impact on information asymmetries of REIT investors. Based on the combined approach of the aforementioned studies we present the following hypothesis:

H2: Information asymmetry decreases more strongly subsequent to a complex SEC comment letter public release.

Lastly, we focus on comment categories specific to REITs and determine whether the decline in information asymmetry subsequent to a comment letter correspondence release is dependent on the type of comment letter issues. Prior literature shows that the effects of a comment letter depend on its content. Cassell et al. (2013) find evidence that accounting topics are more costly than non-accounting topics to remediate with regard to response time and the number of rounds within a SEC correspondence. Concerning comment letters on compensation issues, Robinson et al. (2011) categorise SEC critiques into three distinct categories: pay-performance, governance and readability. They find that excess compensation is significantly associated with comments on pay-performance and corporate governance but not with comments on the readability of the disclosures. Considering that REIT investors are most interested in decision-relevant information with regard to the past and future performance and financial situation of REITs as well as conditions in underlying commercial real estate markets, we expect comment letter categories concerning performance metrics for REITs (e.g. FFO or AFFO), REIT operations in the commercial real estate market (e.g. leases) as well as the discussion of past performance and future business conditions, uncertainties, trends and financial conditions in the MD&A section to be most important for reducing information asymmetries following the public dissemination of REIT comment letter correspondences.

Hence, we propose the final hypothesis:

H3: Information asymmetry decreases more strongly subsequent to a SEC comment letter public release that contains crucial information for REIT investor decision-making.

4.3 Methodology

4.3.1 Data

We use Audit Analytics, which is linked to the EDGAR database, to identify all REITs that received at least one SEC comment letter relating to a 10-K annual report over the period of 2004 and 2016. Since we focus on the annual report review process, we exclude all other comment letter filings, e.g. periodic filings 8-K and 10-Q or event filings like IPO Filing S-1 or Merger Filings S-4 from our dataset. The starting year of 2004 was chosen since the SEC began to publicly release comment letters correspondence on their filing reviews on its EDGAR website in June 2004. However, 10-K comment letters are only available for REITs starting in 2006. Table 4.1 presents an overview of our sample. Our final sample includes 85 REITs with 452 SEC comment letters. Retail REITs represent the largest share in our sample (29%) and received the most comment letters (30%). They are followed by REITs specialising in office and industrial (17 REITs and 88 comment letters) and healthcare (11 REITs and 70 comments).

Table 4.1: Sample Overview

	No. of comment letters	REITs
Audit Analytics comment letters dataset (all file types) from **2004-2016**	941	156
Sample after matching with WRDS, CRPS, IBES, Ziman datasets	503	89
10-K review sample after excluding all other filings (e.g. 8-K, 10-Q, S-1 or S-4) from **2006-2016**	452	85
REITs classified by property type		
Diversified	47	9
Retail	136	25
Residential	53	10
Office / Industrial	88	17
Health	70	11
Lodging / Resort	41	10
Other	17	3

Table 4.1 shows our sample selection process and classifies the number of comment letter reviews received by REITs into different property types.

4.3.2 Variables

We derive a binary variable *10KCL*, which denotes the quarter of the public release of the respective 10-K comment letter correspondence between the REIT and the SEC. To assess whether the effect of SEC comment letters on information asymmetries is longer than one quarter, we also include indicator variables for the subsequent one (*10KCL_Lag1*), two (*10KCL_Lag2*), three (*10KCL_Lag3*), and four (*10KCL_Lag4*) quarters following the comment letter public release.

To assess whether comment letter correspondence complexity affects information asymmetry, we derive three distinct variables: First, the number of comments (*NoComments*), which sums up all comments in the first 10-K comment letter filed by the SEC. Second, the response time (*RespTime*), which measures the response time in days from the receipt of the first comment letter by the REIT to the dissemination date of the whole conversation on the SEC's EDGAR website. Third, the number of rounds (*Rounds*), which counts the number of 10-K comment letters within a correspondence from the SEC, that is, the number of rounds from the first letter to the "no further comment" 10-K letter. We calculate three indicator variables set equal to one if the number of comments (*Complex_NoComments*), the response time (*Complex_RespTime*) and the number of rounds (*Complex_Rounds*) is above median. For our sample, the median for number of comments is 5, for response time 78 days and for rounds 2. We also include the one to four quarter lags of the respective complexity variable to account for changes in information asymmetry over time.

To explore comment letter categories, we classify comment letter issues in six distinct categories, based on the taxonomy of Audit Analytics. First, the category *Accounting disclosure* comprises deficiencies in accounting topics with regard to recurring items (e.g. revenues and expenses) as well as non-recurring events (e.g. mergers & acquisitions, dividend distributions). Second, *Regulation S-K* contains regulatory issues referring to standard guidelines and reporting requirements for various SEC filings. For example, Regulation S-K, Item 10(e) issues postulates that whenever one or more non-GAAP financial measures are included in a filing, the registrant must include various other statements in the filing. Third, the *Management Discussion and Analysis (MD&A)* category contains comments on the description and analysis of a firm's operational and financial condition. Specifically, the SEC comments on the discussion of earnings, results of operation, liquidity or future trends. Fourth, the *Risk factors disclosure* category provides information on the most significant risks that apply to the company and its securities. Fifth, the category *Diverse GAAP standards and regulations* contains diverse other regulatory filing issues based on, for example, Regulation S-X disclosure requirements, Statements of Financial Accounting Standards (SFAS) or issues raised by the Emerging Issues Task Force (EITF). Lastly, Audit Analytics summarises remaining comments in the category *Other disclosure* issues. This category includes, for example, comments on the application of non-GAAP measures.

In addition to the Audit Analytics categories, we build a new category named *NonGAAP* which includes the non-GAAP issues assigned to the *Other disclosure* category and the issues on Regulation S-K Item 10(e) assigned to *Regulation S-K* in order to account for the importance of non-GAAP measures such as FFO and AFFO for REITs. To create a parsimonious model for our empirical analysis, we reduce the dimension of the comment letter categories by defining seven indicator variables (*Account, SKRef, MD&A, Risk, DivGAAP, OtherDIS, NonGAAP*) that are equal to 1 if the SEC's first 10-K comment letter contains comments in the accounting category, regulation S-K category, management discussion and analysis (MD&A) category, risk factors category, diverse GAAP standards and regulations category, other disclosure issues category and non-GAAP measures, respectively. Again, we also measure the long-term effects of the distinct comment letter issue variables and include the one to four quarter lags of the respective comment letter issue variable.

We measure information asymmetry in line with previous studies (Anglin et al., 2011; Danielsen et al., 2014; Elizabeth Devos et al., 2018) by using the percentage bid-ask spread. *Spread* is the quarterly percentage bid-ask spread, which is calculated by the difference between closing bid and ask prices divided by the midpoint of the closing bid and ask prices. To obtain robust spread metrics, we follow Danielsen et al. (2014) in deleting observations

where the percentage bid-ask spread takes on negative values. Some previous studies on information asymmetries in the context of REITs further decompose the spread into its three parts (Downs et al., 2000; Glascock et al., 1998; McDonald et al., 2000), whereby the adverse selection component is one of them. We decided against this approach and measure the overall changes in the percentage bid-ask spread, considering that McDonald et al. (2000) point out that estimating spread components requires a large number of observations and thereby limits the sample to merely the most frequently traded REITs. Since our focus is on REITs receiving at least one 10-K comment letter, we cannot delete low-volume REITs from our sample.

We control for a number of firm-level variables affecting bid-ask spreads in line with the literature. Bhasin et al. (1997) as well as Cannon and Cole (2011) find that bid-ask spreads are negatively associated with trading volume and market capitalisation and positively with stock return volatility. Hence, we account for volatility by calculating the standard deviation of daily stock returns during the quarter. We control for the logarithm of market capitalisation as a proxy for size, since Wang et al. (1995) show that larger REITs undergo significantly less information asymmetry. Following Devos et al. (2018), we apply the liquidity measure turnover, which is defined as the logarithm of quarterly averages of daily trading volume divided by the quarterly average of the market capitalisation. We add the number of analysts following the REIT, since Danielsen et al. (2014) as well as Anglin et al. (2011) prove that the attention of stock market analysts reduces the bid-ask spread through enhanced information dissemination to investors. Finally, we include leverage, which is measured as a REITs debt divided by total assets. We obtain data for the control variables from CRSP, Compustat, IBES and ZIMAN.

Our descriptive statistics are presented in Table 4.2. Approximately 12.51% of our firm-quarter observations represent a quarter in which SEC comment letter correspondences were publicly released. A SEC 10-K comment letter identifies, on average, 6 disclosure deficiencies (*NoComments*) with a range of 1 to 22 comment topics. The mean number of comment letter rounds is 2.55 with a range of 2 to 10 comment letter correspondences. The response time (*RespTime*) is approximately 100 days, with a range of 2 to 1,052 days. The mean percentage bid-ask spread is 0.13%, which is lower than the estimates reported by Anglin et al. (2011) and Danielsen et al. (2014), who report an average bid-ask spread of 0.28% from 2003 through 2006 and 0.63% from 2000 through 2011, respectively. Devos et al. (2018) show declining percentage bid-ask spreads of 0.51% to 0.33% from 2004 to 2013. If those REITs are traded at the NYSE, percentage bid-ask spreads even declined from 0.23% to 0.09% during that period. Our sample confirms this trend of declining bid-ask spreads in REITs.

Turning to our control variables, REITs in our sample have, on average, a market capitalisation of roughly $4,582 million, which varies considerably for individual REITs from $35 million to $68,157 million. The average number of analysts following is three, whereby the minimum number of analysts is 1 and the maximum number 9. The average volatility of stock return is about 0.02, turnover about 0.92% and leverage about 56%.

Table 4.2: Summary Statistics

	Mean	Median	Max	Min	Std. Dev.
Panel A: Comment letter variables					
10KCL (%)	12.51	0.00	1.00	0.00	0.33
NoComments	6.30	5.00	22.00	1.00	4.42
Rounds	2.55	2.00	10.00	2.00	0.84
RespTime	100.58	78.00	1,052.00	2.00	88.12
Panel B: Information asymmetry variable					
Spread (%)	0.13	0.07	3.72	0.01	0.23
Panel C: Control variables					
MarketCap ($ million)	4,582	2,157	68,157	34.91	6,762
Volatility	0.02	0.01	0.30	0.01	0.02
Turnover (%)	0.92	0.74	10.58	0.05	0.74
Analyst	3.04	2.87	9.67	1.00	1.32
Leverage (%)	56.09	57.22	121.39	2.43	16.65

Table 4.2 reports the mean, median, minimum, maximum and standard deviation for comment letter (Panel A), information asymmetry (Panel B) and control variables (Panel C). *10KCL* is an indicator variable equal to 1 if the firm-quarter observation is a 10-K comment letter public release event. *NoComments* is the sum of all comments in the first 10-K comment letter filed by the SEC. *RespTime* is the response time (days) from the receipt of the first comment letter by the REIT to the dissemination date of the whole conversation on the EDGAR website. *Rounds* is the number of 10-K comment letters within a correspondence from the SEC, that is, the number of rounds from the first letter to the "no further comment" 10-K letter. *Spread* is the quarterly percentage bid-ask spread, which is calculated by the difference between closing bid and ask prices divided by the midpoint of the closing bid and ask prices. *MarketCap* is the quarterly average of the equity value of the REIT. *Volatility* is the standard deviation of daily stock returns during the quarter. *Turnover* is the quarterly average of daily trading volume divided by the quarterly average of market capitalization. *Analyst* is the number of analysts following the REIT. *Leverage* is the REITs total debt divided by total assets. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively.

Table 4.3 presents the correlations between bid-ask spreads, our comment letter and control variables. The release of a SEC comment letter correspondence has a negative correlation with the bid-ask spread in the quarter of its public release (*10KCL*) and in the first (*10KCL_Lag1*), second (*10KCL_Lag2*) and fourth (*10KCL_Lag4*) quarter after the dissemination. These correlations are in line with our expectations and provide initial evidence that the release of comment letters has a relationship with information asymmetries. Larger firms (*LogMarketCap*) with higher liquidity (*LogTurnover*) and an increased number of analysts following (*Analyst*) exhibit reduced bid-ask spreads. Moreover, highly levered and volatile REITs show increased bid-ask spreads and hence a higher level of information asymmetry. The highest correlation coefficient of 0.59 is reported between analyst coverage and market capitalisation and the second largest of 0.58 between the liquidity variable turnover and stock return volatiliy.

Table 4.3: Correlation Matrix

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Spread	1.000										
2. 10KCL	-0.032**	1.000									
3. 10KCL_Lag1	-0.030*	-0.153***	1.000								
4. 10KCL_Lag2	-0.045**	-0.119***	-0.153***	1.000							
5. 10KCL_Lag3	-0.025	-0.010	-0.120***	-0.150***	1.000						
6. 10KCL_Lag4	-0.032*	0.041*	-0.009	-0.118***	-0.149***	1.000					
7. LogMarketCap	-0.283***	0.063***	0.058***	0.065***	0.060***	0.064***	1.000				
8. Volatility	0.503***	-0.040**	-0.047***	-0.029	-0.012	-0.019	-0.292***	1.000			
9. LogTurnover	-0.132***	0.004	-0.006	0.003	0.008	-0.008	0.055***	0.578***	1.000		
10. Analyst	-0.254***	0.025	0.017	0.038**	0.052***	0.044**	0.585***	-0.193***	0.111***	1.000	
11. Leverage	0.137***	0.013	0.018	0.016	0.008	0.009	-0.046**	0.135***	0.146***	-0.066***	1.000

Table 4.3 provides the correlation coefficients. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively. The variable definitions as previously provided.

4.3.3 Model Specification

Our empirical analysis has two components. Considering that this is the first investigation into SEC comment letters in the context of the REIT industry, we first conduct a comment letter content analysis to provide insights into the amount and types of comments received by REITs from 2006 to 2016. Then, we assess the change in information asymmetry surrounding the dissemination of a 10-K comment letter correspondence in a multivariate regression framework. In particular, we define the event window as the quarter in which a 10-K comment letter was publicly released and the subsequent four quarters to measure long-term effects. We employ fixed-effects regression with robust standard errors, which are valid in the presence of heteroscedasticity and serial correlation of arbitrary forms to estimate our model in Equation 1. Furthermore, a diagnostic test for multicollinearity is performed. All explanatory variables have variance inflation factors (VIF) below 10, suggesting that multicollinearity is not a problem in this regression analysis.

$$Spread_{i,t} = \alpha + \beta\ comment\ letter\ measure_{i,t} + \gamma\ controls_{i,t} + \delta_i + \tau_t + \varphi_t + \varepsilon_{i,t} \qquad \textbf{(1)}$$

Where *i* denotes the firm, t the year (2006-2016), δ refers to *firm* fixed-effects, τ to *time* fixed-effects for the years 2006 to 2016, φ to *seasonal* fixed-effects for the respective quarters within a fiscal year and $\boldsymbol{\varepsilon}$ represents the error term. *Comment letter measure* is a proxy for (1) the public release quarter of the 10-K comment letter correspondence (*10KCL*), (2) the public release quarter for each of our comment letter complexity variables (*Complex_NoComments, Complex_RespTime, Complex_Rounds*) and (3) the public release quarter for each of our comment letter content categories variables (*Account, SKRef, MD&A, Risk, DivGAAP, OtherDIS, NonGAAP*).

4.4 Results

4.4.1 Content Analysis

The comment letter issues identified by the SEC can be assigned to six distinct categories based on their content: accounting disclosure issues, other disclosure issues, regulation S-K issues, management discussion and analysis (MD&A) issues, risk factors disclosure issues and diverse GAAP standards and regulations issues. Table 4.4 presents an overview of SEC comments received by REITs for each of the categories from 2006 to 2016. The overall number of comments increased from 161 in 2006 to 544 in 2010 before declining to 112 in 2016. It seems that the SEC started reviewing REIT financial statements more thoroughly

during the financial crisis, i.e. in 2008, and that after 2010 REITs might have learned from SEC comment letter reviews in prior years and improved their disclosure and accounting practices, which resulted in fewer SEC comments. All comment letter categories show this trend except for "diverse GAAP standards and regulation", which already includes 57 comment letter issues in year 2006. This category summarises remaining standards and especially includes SFAS GAAP comments, which provide guidance on a specific accounting topic only up to 2009.

For the entire period, REITs received the most comments for accounting disclosures issues (962), followed by other disclosure issues (599), diverse GAAP standards (555), regulation S-K references (363), MD&A disclosure issues (341) and risk factors (26). Comments in the accounting disclosure category relate to the accounting of, for example, leases, property and business transactions. The "other disclosure issues" category includes non-GAAP measures and director compensation. Considering that REIT-specific performance metrics such as FFO, AFFO and Funds Available for Distribution (FAD) are non-GAAP measures, the large amount of SEC comments in this category suggests that the disclosure for these measures is not satisfactory from a SEC point of view. Interestingly, the low number of comments on risk factors discussed in REIT financial statements suggests that, from an SEC point of view, REITs sufficiently and comprehensively present their risk factors. As a consequence, we ignore risk factor-related comments in the remainder of our investigation.

Table 4.4: Overview of SEC Comments Received by REITs

Year	Accounting disclosure issues	Other disclosure issues	Regulation S-K references	MD&A disclosure issues	Risk factors disclosure issues	Diverse GAAP standards	N
2006	56	28	14	6	0	57	161
2007	68	35	15	9	0	76	203
2008	96	63	48	27	3	75	312
2009	94	44	35	30	3	82	288
2010	142	112	125	59	9	97	544
2011	113	59	26	58	3	49	308
2012	114	89	25	76	4	40	348
2013	126	56	22	42	3	27	276
2014	64	28	23	21	0	25	161
2015	47	44	16	11	1	14	133
2016	42	41	14	2	0	13	112
Total	962	599	363	341	26	555	2,846

Table 4.4 shows the number of comments in the six distinct comment letter categories as defined by Audit Analytics during our sample period.

Table 4.5 provides a detailed content analysis of SEC comment letters received by REITs. We present the top five comment letter issues for the categories accounting disclosure issues, other disclosure issues, regulation S-K issues and MD&A issues. We do not display the categories risk factors disclosure as well as diverse GAAP standards and regulations, as the former is negligible for REITs (see Table 4.4) and the latter contains diverse other regulatory filing issues, which relate to the formal structure rather than the content of an annual report. Column 2 displays the Audit Analytics (AA) issue identifier, column 3 the description of the comment letter issue, column 4 shows the absolute number of comment issues in each category, column 5 the percentage share of each issue within its respective category and finally column 6 the percentage share of each issue with regard to the overall number of comments (2,846 sample total).

In the category for which REITs received the most comments, accounting disclosure issues (Panel A), 140 comments related to leases and leasehold including sale-and-lease-back transactions for real estate. The SEC may, for example, request clarification or more discussion with regard to the disclosure of how leasing, development or construction costs were capitalised or how capital expenditures were treated (Deloitte, 2015). Fair value accounting issues are the second most frequent type of comments with 69 comments. Another frequent comment relates to consolidation, i.e. the accounting of off-balance sheet arrangements, structure investment vehicles and special purpose entities (65 comments). The SEC may, for example, request clarification on how a REIT determined whether they have a controlling interest in a joint venture or additional disclosure of joint venture information (Deloitte, 2015). REITs received 60 comments relating to the accounting of investments in subsidiaries and 54 relating to mergers, acquisitions and other business combinations.

In Panel B (other disclosure issues), 188 comments relate to non-GAAP measure issues. FFO, AFFO and EBITDA are common examples for non-GAAP measures scrutinised by the SEC. For REITs, the application of FFO is common practice as it is standardised by the National Association of REITs (NAREIT). The SEC accepts FFO as a real estate industry-wide non-GAAP standard measure for the operating performance[21], however, some SEC comments focus on clarifying any inconsistencies between the FFO disclosed by a REIT and the NAREIT definition (Usvyatsky, 2015). Considering that REITs commonly adjust FFO in various ways to, for example, normalised FFO, core FFO or the adjusted FFO (AFFO), SEC comments may request more clarifications on whether an adjustment is non-recurring or request changes to the label of metrics in future filings (Usvyatsky, 2015). The SEC also comments on inconsistencies

[21] See SEC compliance and disclosure interpretations on non-GAAP financial measures: https://www.sec.gov/divisions/corpfin/guidance/nongaapinterp.htm.

between performance measures reported in other disclosures such as press releases or earnings calls and the respective measure in the financial report (Deloitte, 2015).

The most common issues with regard to Regulation S-K are presented in Panel C. Regulation S-K specifies reporting requirements for publicly listed companies. In this category, the SEC may, for example, request financial statements with regard to property acquisitions or clarification on the policy to determine whether an acquisition is an asset purchase or business acquisition (Deloitte, 2015). Regulation S-K, Item 10(e) issues relate to non-GAAP measures by requiring a thorough discussion on why displaying a non-GAAP financial measure provides useful information to investors. This S-K item also requires firms to reconcile the difference between the applied non-GAAP measure and the most comparable GAAP measure. For our sample, REITs received 68 comments on this issue. Moreover, SEC comments on the report (34 comments) and discussion (23 comments) of executive compensation in the Regulation S-K category.

Lastly, Panel D presents the most frequently received SEC comments with regard to the qualitative MD&A section. With 88 comments, the discussion of operational results by management received the most frequent comment. It is followed by comments regarding liquidity issues (68 comments), executive compensation (56), critical accounting policies and estimates (39) and business overview issues (36). Comments by the SEC with regard to the MD&A section may, for example, request more information on lease rollover trends, differences between existing rents and current market rents to better understand the future and current performance of REITs, leasing statistics or lease renewal information such as square footage leased, average rents or leasing costs. With regard to liquidity and capital resources, the SEC may require a REIT to disclose information that allows investors to evaluate future distributions by a REIT with regard to cash resources, borrowings or other sources of financing as well as associated risks. (Deloitte, 2015)

Overall, Table 4.5 shows that the SEC indeed takes on the perspective of a REIT investor and most frequently comments on commercial real estate asset-related issues (e.g. leases), real estate business transactions (e.g. joint ventures), REIT-specific performance measures (e.g. FFO), business operations and liquidity issues with regard to the distributions. The SEC requesting more clarification, discussion and/or disclosure of quantitative and qualitative information in REIT financial statements enhances the information environment of REIT investors by providing them with more decision-useful information, some of it previously being private information, to understand the current and future performance of a REIT.

Table 4.5: Comment Letter Content Analysis Results Part 1

Rank in category	AA issue ID	Description of comment letter issue	No. of comments in category	% of category	% of all comments
Panel A: Accounting disclosure issues					
1	204	Lease, leasehold (SFAS 13, SFAS 98 and IAS 17)	140	15%	5%
2	935	Fair value measurement, estimates, use (incl. vendor-specific objective evidence)	69	7%	2%
3	183	Consolidation (FIN 46, variable interest, structured investment vehicles, special purpose entities, and off-balance sheet arrangements)	65	7%	2%
4	200	Investment in subsidiary/affiliate issues	60	6%	2%
5	177	Acquisitions, mergers, and business combinations	54	6%	2%
Subtotal		**44 Issues**	**962**	**100%**	**34%**
Panel B: Other disclosure issues					
1	1403	Future Comment	270	45%	9%
2	813	Non-GAAP measures (incl. FFO, NOI, EBIT, EBITDA issues)	188	31%	7%
3	997	Signatures/exhibits/agreements	72	12%	3%
4	927	Director compensation and options incentives (Benchmark issues)	17	3%	1%
5	924	Family/related party transaction disclosure issues	15	3%	1%
Subtotal		**23 Issues**	**599**	**100%**	**21%**

Table 4.5: Comment Letter Content Analysis Results Part 2

Rank in category	AA issue ID	Description of comment letter issue	No. of comments in category	% of category	% of all comments
Panel C: Regulation S-K					
1	761	Regulation S-K, Item 512 issues: formal pledges that are applicable to 12 types of offering	70	19%	2%
2	762	Regulation S-K, Item 10(e) issues: Discussion of non-GAAP financial measures in commission filings	68	19%	2%
3	810	Regulation S-K, Item 601 issues: Exhibits	45	12%	2%
4	791	Regulation S-K, Item 402 issues: Report about compensation of executives	34	9%	1%
5	792	Regulation S-K, Item 402(b) issues: Discussion of compensation of executives	23	6%	1%
Subtotal		**60 Issues**	**363**	**100%**	**13%**
Panel D: Management discussion & analysis					
1	1736	Results of operations (MD&A)	88	26%	3%
2	1734	Liquidity issues (MD&A)	68	20%	2%
3	907	Executive compensation plan disclosure issues (MD&A)	56	16%	2%
4	1021	Critical accounting policies and estimates (MD&A)	39	11%	1%
5	235	Business overview issues (MD&A)	36	11%	1%
Subtotal		**13 Issues**	**341**	**100%**	**12%**

Table 4.5 presents the top five comment letter issues for the categories Accounting disclosure issues, Other disclosure issues, Regulation S-K issues and MD&A issues. Column 2 displays the Audit Analytics (AA) issue identifier, column 3 the description of the comment letter issue, column 4 the absolute number of comment issues in each category, column 5 the percentage share of each issue within its respective category and column 6 the percentage share of each issue with regard to the overall number of comments. The sample consists of 2,846 comments in 452 comment letter reviews of 85 REITs from Q1 2006 to Q4 2016.

4.4.2 Main Regression Model

Next, we present the results of our fixed-effects regression for the binary variable 10KCL, indicating the public dissemination of a comment letter correspondence, and the bid-ask spread in Table 4.6. In Model 1, we control for firm-fixed effects while in Model 2, 3 and 4 we also control for seasonal and/or year fixed-effects. Irrespective of the model specification, 10KCL_Lag2 has a significant negative coefficient. Thus, we can confirm our first hypothesis that SEC comment letters reduce information asymmetry for REIT investors. More specific, two quarters after a REIT-SEC comment letter correspondence was publicly released, the bid-ask spread is reduced. One explanation for this lag is that, following SEC comment letters, REITs improve their disclosure practices and release additional information or file restatements. Thus, the reduction of the bid-ask spread may be a result of this additional information being released to the REIT investor community. Another explanation is that, compared to shorter corporate disclosures such as earnings press releases, SEC comment correspondences are relatively lengthy and complex. Investors may need a certain amount of time to process the information contained in it, which explains the two-quarter lag. We conduct several robustness checks regarding the two-quarter lag. First, we examine different timeframes before, during and after the financial crisis of 2007/2008 and find a robust two-quarter lag for all subsamples. Moreover, analysing subsamples for our distinct property types, namely residential, retail, office, health, lodging and diverse also yields a robust two-quarter lag for each sub-sample.

Concerning our control variables, the key determinants of the bid-ask spread show the anticipated sign. As expected, volatility increases information asymmetry and bid-ask spreads through increased uncertainty. Larger REITs as measured by their market capitalisation have fewer information asymmetries and are associated with reduced bid-ask spreads. Increased liquidity, as measured by the variable turnover, decreases information asymmetry. Increased analyst coverage reduces bid-ask spreads and therefore appears to enhance information environment for investors. However, this impact is not robust when controlling for year effects (model 3 and 4). Leverage has no impact on the spread. The two opposing effects of leverage on the bid-ask spread may explain the insignificant relationship. Anglin et al. (2011) points out that highly leveraged firms are scrutinised more thoroughly by the capital markets (negative effect) and in contrast, higher leverage and subsequently less equity financing reduce the incentive to disseminate information to investors (positive effect).

Overall, our results in Table 4.6 suggest that SEC comment letters indeed improve the information environment for REIT investors and reduce information asymmetry between informed and uninformed investors, albeit with a two-quarter lag. Thus, we provide evidence that SEC comment letters are effective in providing REIT investors with a higher quality and quantity of information, in line with the SEC mission.

Table 4.6: Fixed-Effects Regression Results for Comment Letters Overall

	Model 1	Model 2	Model 3	Model 4
Intercept	0.0024 (1.49)	0.0022 (1.35)	0.0045** (2.36)	0.0042** (2.21)
10KCL	-0.0001 (-1.31)	-0.0001 (-1.01)	-0.00005 (-0.46)	-0.00002 (-0.18)
10KCL_Lag1	-0.0001 (-1.38)	-0.0001 (-0.97)	-0.00002 (-0.22)	0.000002 (0.02)
10KCL_Lag2	-0.0002*** (-3.18)	-0.0003*** (-3.32)	-0.0002** (-2.08)	-0.0002** (-2.29)
10KCL_Lag3	-0.0001 (-1.31)	-0.0002 (-1.51)	-0.0001 (-0.54)	-0.0001 (-0.67)
10KCL_Lag4	-0.0002* (-1.73)	-0.0001 (-1.46)	-0.0001 (-0.61)	-0.00003 (-0.36)
LogMarketCap	-0.0005*** (-3.32)	-0.0004*** (-3.24)	-0.0007*** (-3.50)	-0.0007*** (-3.43)
Volatility	0.0523*** (6.25)	0.0532*** (6.36)	0.0481*** (5.64)	0.0488*** (5.74)
LogTurnover	-0.0003** (-2.28)	-0.0004** (-2.45)	-0.0003** (-2.13)	-0.0004** (-2.25)
Analyst	-0.0002*** (-4.64)	-0.0002*** (-4.87)	-0.00004 (-0.96)	-0.00005 (-1.09)
Leverage	0.0006 (1.18)	0.0007 (1.23)	-0.0004 (-0.86)	-0.0004 (-0.79)
Firm effects	Yes	Yes	Yes	Yes
Seasonal effects		Yes		Yes
Year effects			Yes	Yes
F-statistic	22.27	21.63	22.62	22.02
R^2	0.40	0.40	0.42	0.43
Adj. R^2	0.38	0.38	0.41	0.41

Table 4.6 presents the results of the fixed effects regressions. Column 1 includes firm effects, column 2 firm and seasonal effects, column 3 firm and year effects and column 4 all three effects. The dependent variable is the quarterly percentage bid-ask *Spread* (calculated by the difference between closing bid and ask prices divided by the midpoint of the closing bid and ask prices). The independent variables of special interest are *10KCL* (indicator variable equal to 1 if the firm-quarter observation is a 10-K comment letter public release event) as well as *10KCL_Lag1, 10KCL_Lag2, 10KCL_Lag3* and *10KCL_Lag4* (indicator variables for the subsequent one, two, three and four quarters following the comment letter public release). We include the following controls: *LogMarketCap* is the logarithm of the quarterly average of the equity value of the REIT. *Volatility* is the standard deviation of daily stock returns during the quarter. *LogTurnover* is the logarithm of the quarterly average of daily trading volume divided by the quarterly average of market capitalization. *Analyst* is the number of analysts following the REIT. *Leverage* is the REITs total debt divided by total assets. The sample consists of 3,261 quarterly REIT spreads from Q1 2006 to Q4 2016. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively. Heteroscedasticity and autocorrelation-corrected t-statistics are shown in parentheses.

4.4.3 Alternative Tests

In Table 4.7, we present our results with regard to the effect of the complexity of a SEC comment letter correspondence on information asymmetry. Column 1 displays the regression results (firm, seasonal and year fixed-effects) for comment letters with an above median number of comments (*Complex_NoComments*), Column 2 for above median response time (*Complex_RespTime*) and Column 3 for an above median number of rounds (*Complex_Rounds*). The results for our complexity variables are in line with the results in Table 4.6. In particular, for REITs with an above median number of comments, an above median response time to SEC comments and an above median-amount of SEC-REIT-correspondence rounds, bid-ask spreads experience a significant reduction two quarters after the public release of the SEC comment letter correspondence. For REITs with an above median-amount of rounds, the release of the SEC comment letter correspondence also has an immediate effect on bid-ask spreads in the release quarter. Hence, our second hypothesis, stating that complex SEC comment letters exert a stronger impact on the information environment of REIT investors, holds especially true for (*Complex_Rounds*). One explanation for this immediate effect may be that it signals information about a REIT and its management to investors before they even had the opportunity to review the SEC comment letter correspondence in detail. Future studies may use our result as a starting point to further investigate a potential signalling effect, for example from the number of pages of a correspondence, or other explanations.

Our results in Table 4.7 suggest that the effects of SEC comment letters on information asymmetries are largest for REITs that have a higher number of disclosure issues, as indicated by the number of SEC comments, and take longer, in terms of time and rounds, to resolve the issues. This indicates that the information environment around these REITs, prior to SEC comments, was characterised by a lower quantity and/or quality of information and higher information asymmetries, which makes the SEC comment letters so useful to investors.

Table 4.7: Fixed-Effects Regression Results for Comment Letter Complexity

	NoComments	RespTime	Rounds
Intercept	0.0046** (2.32)	0.0046** (2.32)	0.0046** (2.33)
Complex_NoComments	-0.000001 (-0.01)		
Complex_NoComments_Lag1	-0.00004 (-0.35)		
Complex_NoComments_Lag2	-0.0002** (-2.52)		
Complex_NoComments_Lag3	0.0001 (0.35)		
Complex_NoComments_Lag4	0.00003 (0.22)		
Complex_RespTime		0.00003 (0.15)	
Complex_RespTime_Lag1		-0.0001 (-0.86)	
Complex_RespTime_Lag2		-0.0002*** (-2.73)	
Complex_RespTime_Lag3		-0.0001 (-0.33)	
Complex_RespTime_Lag4		0.0001 (0.48)	
Complex_Rounds			-0.0002** (-1.99)
Complex_Rounds_Lag1			-0.0001 (-1.10)
Complex_Rounds_Lag2			-0.0002** (-2.03)
Complex_Rounds_Lag3			0.0001 (0.29)
Complex_Rounds_Lag4			0.0001 (0.85)
LogMarketCap	-0.0007*** (-3.49)	-0.0007*** (-3.5)	-0.0007*** (-3.49)
Volatility	0.0483*** (5.64)	0.0482*** (5.63)	0.0481*** (5.69)
LogTurnover	-0.0003** (-2.17)	-0.0003** (-2.20)	-0.0003** (-2.2)
Analyst	-0.0001 (-1.24)	-0.0001 (-1.23)	-0.0001 (-1.28)
Leverage	-0.0005 (-0.94)	-0.0005 (-0.94)	-0.0005 (-0.92)
Firm effects	Yes	Yes	Yes
Seasonal effects	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
F-statistic	21.62	21.63	21.65
R^2	0.42	0.42	0.42
Adj. R^2	0.40	0.40	0.40

Table 4.7 presents the results of the fixed effects regressions for complex comment letters. The dependent variable is the quarterly percentage bid-ask *Spread* (calculated by the difference between closing bid and ask prices divided by the midpoint of the closing bid and ask prices). The independent variables of special interest are in column 1 *Complex_NoComments* (comment letters with an above median number of comments, Median = 5 comments) as well as *Complex_NoComments_Lag1, Complex_NoComments_Lag2, Complex_NoComments_Lag3, Complex_NoComments_Lag4* (indicator variables for the subsequent one, two, three and four quarters following the complex comment letter public release as measured by the number of comments). In Column 2 *Complex_RespTime* (comment letters with an above median number of response time, Median = 78 days) as well as *Complex_RespTime_Lag1*, *Complex_RespTime_Lag2, Complex_RespTime_Lag3, Complex_RespTime_Lag4* (indicator variables for the subsequent one, two, three and four quarters following the complex comment letter public release as measured by the response time). In Column 3 *Complex_Rounds* (comment letters with an above median number of rounds, Median = 2 rounds) as well as *Complex_Rounds_Lag1, Complex_Rounds_Lag2, Complex_Rounds_Lag3, Complex_Rounds_Lag4* (indicator variables for the subsequent one, two, three and four quarters following the complex comment letter public release as measured by the number of rounds). We include the following controls: *LogMarketCap* is the logarithm of the quarterly average of the equity value of the REIT. *Volatility* is the standard deviation of daily stock returns during the quarter. *LogTurnover* is the logarithm of the quarterly average of daily trading volume divided by the quarterly average of market capitalization. *Analyst* is the number of analysts following the REIT. *Leverage* is the REITs total debt divided by total assets. The sample consists of 3,261 quarterly REIT spreads from Q1 2006 to Q4 2016. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively. Heteroscedasticity and autocorrelation-corrected t-statistics are shown in parentheses.

Lastly, we present the results of our fixed-effects regression for individual comment letter categories in Table 4.8. While we estimated our model in Equation 1 for all comment letter categories, we only present the results for categories with significant coefficients. In particular, we find a significantly negative impact on the bid-ask spread of the second quarter (*Account_Lag2*) after the comment letter public release containing accounting disclosure issues, which predominantly relates to leases, fair value accounting, consolidation and investments in subsidiary businesses (Table 4.5). Our results are in line with Cassell et al. (2013), who find that accounting topics in 10-K comment letters have a special informational value and are more costly to remediate.

Interestingly, comment letters relating to MD&A issues not only enhance the information environment in the second quarter after the public release (*MD&A_Lag2*), but also in the third (*MD&A_Lag3).* Hence, the negative effect of MD&A-related SEC comments on the bid-ask spread prevails over a longer period. Within our sample, 46% of comments in the MD&A category focus on result of operations and liquidity issues (Table 4.5). Considering that these key investment criteria are important for the decision-making of REIT investors, SEC comments requesting more clarification, discussion or additional information enhance the information environment for REIT investors.

Lastly, we present the results for non-GAAP issues in comment letters. The variable *NonGAAP* combines the issues raised in the category *Other disclosure issues* (AA ID 813: Non-GAAP Measures) and in the category *Regulation S-K* (AA 762: Regulation S-K Item 10(e)). The third lag of *NonGAAP* (*NonGAAP_Lag3*) has a significantly negative coefficient suggesting that bid-ask spreads are reduced three quarters after a SEC comment letter correspondence with non-GAAP comments was publicly released. One explanation for the three-quarter lag is that REITs improve on their non-GAAP metrics in the next quarterly financial statement (10-Q), which then provides investors with improved performance-related information and reduces information asymmetry among investors. With regard to our last hypothesis, the findings of the detailed comment letter type analysis (Table 4.8) confirm that the improvement of investor information quality depends on the disclosure deficiencies found, as represented by the type of comment in the SEC comment letter review. Specifically, SEC comment letters on accounting disclosure issues, MD&A issues and non-GAAP metrics issues present crucial information to investors. Considering that comments in these categories relate most frequently to assets and business transactions, operational results and liquidity as well as REIT-specific non-GAAP measures such as FFO and AFFO, our results show that the SEC comment letter review process is highly valuable to investors, as REITs are forced to provide more detailed information that is valuable for their investment and pricing-decisions.

Table 4.8: Fixed-Effects Regression Results for Individual Comment Letter Categories

	Account	MD&A	NonGAAP
Intercept	0.0042** (2.21)	0.0042** (2.20)	0.0042** (2.21)
Account	-0.000004 (-0.04)		
Account_Lag1	-0.00002 (-0.21)		
Account_Lag2	-0.0002** (-2.34)		
Account_Lag3	-0.00003 (-0.27)		
Account_Lag4	-0.00001 (-0.06)		
MD&A		0.00002 (0.10)	
MD&A_Lag1		0.0001 (0.73)	
MD&A_Lag2		-0.0002** (-2.30)	
MD&A_Lag3		-0.0001** (-2.10)	
MD&A_Lag4		-0.00004 (-0.37)	
NonGAAP			-0.0001 (-1.36)
NonGAAP_Lag1			0.0001 (0.75)
NonGAAP_Lag2			-0.00004 (-0.44)
NonGAAP_Lag3			-0.0002* (-1.93)
NonGAAP_Lag4			0.0001 (0.55)
LogMarketCap	-0.0007*** (-3.43)	-0.0007*** (-3.44)	-0.0007*** (-3.45)
Volatility	0.0487*** (5.72)	0.0488*** (5.72)	0.0488*** (5.76)
LogTurnover	-0.0004** (-2.24)	-0.0004** (-2.23)	-0.0004** (-2.27)
Analyst	-0.00005 (-1.07)	-0.00005 (-1.07)	-0.00005 (-1.09)
Leverage	-0.0004 (-0.79)	-0.0004 (-0.78)	-0.0004 (-0.83)
Firm effects	Yes	Yes	Yes
Seasonal effects	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
F-statistic	22.02	22.03	22.01
R^2	0.43	0.43	0.43
Adj. R^2	0.41	0.41	0.41

Table 4.8 presents the results of the fixed-effects regressions for the comment letter content variables. The dependent variable is the quarterly percentage bid-ask *Spread* (calculated by the difference between closing bid and ask prices divided by the midpoint of the closing bid and ask prices). The independent variables of special interest are in column 1 *Account* (indicator variable equal to 1 if the SEC's first 10-K comment letter contains comments in the accounting category) as well as *Account_Lag1, Account_Lag2, Account_Lag3, Account_Lag4* (indicator variables for the subsequent one, two, three and four quarters following the accounting category comment letter public release). In Column 2 *MD&A* (indicator variable equal to 1 if the SEC's first 10-K comment letter contains comments in the MD&A category) as well as *MD&A_Lag1, MD&A_Lag2, MD&A_Lag3, MD&A_Lag4* (indicator variables for the subsequent one, two, three and four quarters following the MD&A category comment letter public release). In Column 3 *NonGAAP* (indicator variable equal to 1 if the SEC's first 10-K comment letter contains comments on non-GAAP measures) as well as *NonGAAP_Lag1, NonGAAP_Lag2, NonGAAP_Lag3, NonGAAP_Lag4* (indicator variables for the subsequent one, two, three and four quarters following the non-GAAP comment letter public release). We include the following controls: *LogMarketCap* is the logarithm of the quarterly average of the equity value of the REIT. *Volatility* is the standard deviation of daily stock returns during the quarter. *LogTurnover* is the logarithm of the quarterly average of daily trading volume divided by the quarterly average of market capitalization. *Analyst* is the number of analysts following the REIT. *Leverage* is the REITs total debt divided by total assets. The sample consists of 3,261 quarterly REIT spreads from Q1 2006 to Q4 2016. ***, ** and * denote statistical significance at p-value<0.01, p-value<0.05 and p-value<0.1, respectively. Heteroscedasticity and autocorrelation-corrected t-statistics are shown in parentheses.

4.5 Conclusion

As part of its mission to improve the information environment for stock market investors, the SEC regularly reviews REIT financial statements and, if disclosure deficiencies are found, requires REITs to address them, by providing more discussion, clarification or corrections and/or improvements in future filings. REITs have to submit a response letter within a certain timeframe, outlining how they have addressed the SEC comment(s). The comment letter correspondence between the SEC and a REIT is publicly released once the REIT has satisfactorily addressed the SEC comments. We investigate whether SEC comment letters enhance the information environment for REIT investors. In particular, we focus on annual financial statements (10-K) and investigate whether information asymmetries, proxied by the bid-ask spread, are reduced following the public release of SEC comment letter correspondences. Considering that the SEC adopts an investor perspective when reviewing and commenting on REIT filings, we particularly investigate the effect of comments that are the most relevant to REIT investors with regard to REIT operations, assets and performance metrics.

Using a sample of SEC comment letters for REITs over the period of 2006 to 2016, we find that bid-ask spreads are reduced two quarters after the public release of a 10-K comment letter correspondence between a REIT and the SEC. These results are driven by SEC comment letters on accounting disclosure issues (e.g. leases, joint ventures), MD&A issues (e.g. business operations, liquidity) and non-GAAP metrics (e.g. FFO) issues. Furthermore, we find that the reduction in information asymmetry is largest for REITs with an above median number of comments, above median response time (days to finalise the 10-K comment letter review) and above median number of rounds (number of letters within a particular correspondence from the SEC). Our results suggest that SEC comment letters indeed enhance the information environment of REIT investors as they force REITs to disclose more information regarding assets and business transactions, operational results and liquidity as well as REIT-specific non-GAAP measures such as FFO and AFFO.

One shortcoming of our study is that we do not investigate the actual mechanisms by which comment letters reduce information asymmetries following the public release of SEC comment letter correspondences. The effect we identify could be explained with REITs improving their disclosure quality in subsequent financial statements and/or releasing a restatement following the release of an SEC comment letter correspondence. Another explanation may be that investors review SEC comment letter correspondences and derive information about an individual REIT from them, which then impacts on trading and pricing

decisions. While an analysis of these mechanisms is beyond the scope of our study, we encourage future investigations to use our findings as a starting point for such investigations. These studies may, for example, investigate REIT characteristics that make a REIT more or less likely to receive comment letters. In this context, one could apply topic modelling (e.g. LDA: latent dirichlet allocation algorithm) to identify topics covered in 10-Ks and match them with SEC comment letters in order to predict the probability of a comment letter receipt in future fiscal years. Moreover, it would be interesting to analyse how SEC comment letters, as a form of external auditing, interact with corporate governance, institutional investor ownership and other forms of external monitoring. These studies may also investigate the reaction of REIT investors to SEC comment letters and what information they signal about the credibility of REIT management.

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5 Conclusion

The financial crisis of 2007/2008 showed that incentive misalignment, short-term risk taking and corporate behaviour incompliant with U.S. policy makers' regulations or good corporate governance practises, discredited the financial industry as a whole. However, the crisis triggered a rethinking process and paradigm change in investor decision-making and hence intensified sensitivity towards corporate governance and transparency problems. Accordingly, an increasing number of investors now not only focuses on financial returns, but also considers environmental, social and governance (ESG) factors as important investment criteria. The aim of this study is to evaluate current corporate governance topics, namely gender diversity, pay-for-performance contracts and enhanced disclosure by adopting an investor's perspective. In this way, the present thesis adds to the real estate literature on corporate governance (e.g. Bauer, Eichholtz, & Kok, 2010; Feng, Ghosh, & Sirmans, 2005; Ghosh & Sirmans, 2003; Kohl & Schaefers, 2012) by first analysing whether women in leadership can be considered a corporate governance factor and second by examining managerial entrenchment in the context of compensation arrangements. Additionally, an analysis of SEC comment letters and their impact on the information environment of REIT investors is conducted, thereby extending the literature on corporate disclosure and transparency with regard to the US REIT industry (e.g. Amihud & Mendelson, 1986; Diamond & Verrecchia, 1991; Kohl & Schaefers, 2012; Leuz & Verrecchia, 2000; Welker, 1995).

The following section provides a summary of the respective articles in this dissertation, addressing the motivation, research design and key findings of each paper. The thesis concludes with general remarks and an outlook for further research on the managerial aspects of listed real estate companies.

5.1 Executive Summary

Paper 1: Gender Diversity and Financial Performance: Evidence from US REITs

The article on gender diversity in US REITs is the first to identify the determinants explaining the presence of women on the board of directors, and to study the relationship between gender diversity and financial performance in a US REIT context. Considering the unique legal setting of the REIT sector, the effectiveness of both corporate governance and the impact of gender-diverse boards is expected to differ from that of companies from other industries. Since no five or fewer shareholders are entitled to own 50% of the company, extensive external monitoring through large blockholders is impaired with respect to REITs (Feng et al., 2005), and internal monitoring structures gain importance. If diverse boards enhance internal monitoring (Adams & Ferreira, 2009), gender diversity in senior leadership positions may be a decisive corporate governance factor within REITs, for which extensive external monitoring through large blockholders is weakened. Moreover, the absence of quota legislation in the US market constitutes the US REIT sector as an unbiased setting for analysing the link between gender diversity and REIT performance. In this way, this article extends the corporate governance literature on listed real estate companies (e.g. Bauer, Eichholtz, & Kok, 2010; Feng, Ghosh, & Sirmans, 2005; Ghosh & Sirmans, 2005; Kohl & Schaefers, 2012) by analysing potential benefits of female leadership.

A two-stage Heckman (1976) approach is applied to a unique panel dataset of 112 US Equity REITs over the period from 2005 to 2015. To control for endogeneity within the gender diversity / performance relationship, the first step involves determining the factors that impact on a real estate company's female representation. The results show that institutional investors and independent board members have a positive impact on female board appointments. In the REIT context, where extensive external monitoring through large blockholders is weaker than in other industry sectors, independent shareholders and institutional investors may expect women to enhance internal monitoring, and thus they do support gender-diverse leadership teams.

The second step of the Heckman (1976) procedure includes a performance analysis, which provides evidence of a U-shaped relationship between gender diversity in executive positions and price per net asset value (PRICE/NAV). In the case of REITs, a critical mass of female

executives is reached at approximately 30% representation. This finding holds especially for real estate sectors with a strong consumer orientation and a high proportion of women in the workforce, such as retail and health care. When differentiating between types of performance, the results provide evidence that gender diversity has a positive effect on market performance (PRICE/NAV), but not on accounting-based performance (FFO/SHARE). Hence, investor perceptions drive the positive effect of female directors on performance. However, gender diversity evidently has no impact on operating performance. In sum, the findings constitute a strong case for gender diversity by demonstrating that investors currently pay increased attention to gender diversity in their investment decisions.

Paper 2: The Determinants of Executive Compensation in US REITs: Performance vs. Corporate Governance Factors

This study is the first to systematically assess REIT CEO and executive director compensation contracts after the financial crisis, while considering government interventions like the 'Say-on-Pay' reform of 2011. In detail, the article investigates whether REIT CEO and executive director compensation packages are determined by performance and/or by managerial entrenchment. A large number of studies have examined the pay-for-performance relationship in the context of REITs using pre-crisis data (e.g. Feng, Ghosh, He, & Sirmans, 2010; Ghosh & Sirmans, 2005; Griffith, Najand, & Weeks, 2011; Pennathur, Gilley, & Shelor, 2005). Moreover, a comprehensive set of CEO entrenchment (e.g. CEO tenure, CEO ownership) and board-control mechanisms (e.g. longest board member tenure, institutional investors) is applied, some of which have never been covered for the US real estate industry.

To control for a possible endogenous determination of compensation arrangements, a panel data fixed-effects methodology with lagged performance variables is applied to a sample of 83 US REITs between 2006 and 2015. By explicitly distinguishing between different time-horizon perspectives on compensation, the results are threefold: First, the short-term total current cash compensation (base salary and cash bonus) of CEOs and executive directors is driven primarily by the performance ratio of total shareholder return over one year. Second, long-term compensation packages (base salary, cash bonus, restricted stock grants, stock options granted, long-term incentive pay-outs and all other total) for CEOs and executive directors are tied to long-term performance, as the total return to shareholders over five years,

as well as the real estate specific metrics FFO/SHARE and PRICE/NAV, have a significant positive impact. Third, incentive-based compensation (value of stocks and options granted) is positively linked to long-term and value-driven growth performance ratios. These results are driven by the period after the financial crisis (2012-2015). However, during the financial crisis (2007-2010), no pay-performance link can be found.

With regard to the board-control variables, the findings suggest that institutional investors, rather than cutting back on generous compensation contracts, attempt to motivate management appropriately by paying higher long-term compensation alongside higher cash compensation. Moreover, the longest-serving board member plays an important role in monitoring excessive compensation arrangements. Additionally, ineffective monitoring is likely in smaller boards, where a familiar environment and loyalty rather result in higher compensation packages.

In conclusion, this study provides evidence that the U.S. listed real estate sector has learned its lesson from the disasters of the financial crisis. As a consequence of the crisis, CEO and executive director compensation contracts are now linked to both short- and long-term REIT performance to align management interests with those of REIT investors.

Paper 3: SEC Comment Letters and Information Asymmetries in REITs

The purpose of the third article is to analyse the impact of SEC comment letters on information asymmetries in the REIT market. Such letters can be considered a form of external audit, since the SEC regularly reviews REIT financial statements and, if disclosure deficiencies are found, requires REITs to address them, and finally, these comment letter reviews are released to the public. Considering that the SEC adopts an investor perspective when reviewing REIT filings, this study focuses particularly on the effects of comments that are most relevant to REIT investors. This is the first paper that analyses whether SEC comment letters contain valuable information for REIT investor decision-making. On the one hand, the findings add to the REIT information asymmetry literature (e.g. Anglin, Edelstein, Gao, & Tsang, 2011; Danielsen, Harrison, Van Ness, & Warr, 2014; Devos, Devos, Ong, & Spieler, 2018; Downs, Güner, & Patterson, 2000; Glascock, Hughes, & Varshney, 1998; McDonald, Nixon, & Slawson, 2000)

by investigating the impact of SEC comment letter reviews on the information environment of REIT investors. On the other hand, the study extends the accounting and finance literature on SEC comment letters (e.g. Bozanic, Dietrich, & Johnson, 2017; Cassell, Dreher, & Myers, 2013; Johnston & Petacchi, 2017) by emphasising the importance of REIT industry-specific metrics.

The dataset for the empirical analysis comprises 85 REITs that received 452 comment letters with 2,846 comment letter issues on their annual financial statements (10-K Form) over the period of 2006 to 2016. In the first part of the analysis, content analysis is employed to provide insights into the types of comments that are most frequently received by REITs. The largest share of SEC comments relate to the disclosure of operational, asset-specific (e.g. leasing), business-transaction-specific (e.g. joint ventures), liquidity and performance measurement (e.g. FFO and AFFO) issues.

In the second part of the analysis, a panel data fixed-effects approach is applied to assess the impact of SEC comment letters on the information environment of REIT investors, proxied by the bid-ask spread. The results show that bid-ask spreads are reduced within two quarters of the dissemination of 10-K comment letter conversations to the investment community. The analysis of individual SEC comment letter categories suggests that overall results are driven by comments that are most relevant to REIT investors such as non-GAAP (e.g. FFO) issues. Furthermore, the findings show that a higher complexity of SEC comment letter correspondences, in terms of length and number of comments, results in an even stronger reduction in information asymmetry.

To sum up, the results suggest that SEC comment letters indeed enhance the information environment of REIT investors, as they force REITs to disclose more information regarding asset and business transactions, operational results and liquidity, as well as REIT-specific non-GAAP measures such as FFO and AFFO.

5.2 Final Remarks and Further Research

In recent years, there has been a growing demand for transparency and disclosure by both U.S. policy makers and investors. Hence, ensuring compliance with regulatory provisions and sustaining investor confidence poses a major challenge for REIT management. This dissertation provides guidance on how REIT management can implement well-regarded and appropriate corporate governance mechanisms with regard to gender diversity in executive positions and adequate compensation regimes. Moreover, the deficiencies identified in REIT periodic reports by the SEC comment letter reviews may help REIT management to improve REIT disclosures over time.

The first article of this dissertation on gender diversity in US REITs shows that REIT management can increase the likelihood of a female board appointment by featuring certain board characteristics, namely an increased presence of institutional investors and independent board members. Moreover, REITs can enhance their market performance (PRICE/NAV) by increasing the percentage of women in executive positions. Hence, investors consider female leadership as a signal of enhanced corporate governance and thus develop a higher demand for REITs which promote gender diversity. Future research could extend the diversity analysis to female participation at the middle-management level. It would also be useful to analyse the relationship between a REIT's performance, corporate social responsibility ranking and female representation. Such an investigation would further shed light on the interdependences between these mechanisms. Moreover, the REIT corporate governance literature would benefit from an investigation of further diversity dimensions, such as race, religion and age. As proposed by Schrand & Just (2018), who analyse diversity in educational real estate project groups, an investigation of work-related diversity characteristics such as work experience, professional background and ability would contribute to a comprehensive understanding of diversity.

The article on executive compensation in US REITs - paper two - finds evidence that the U.S. policy makers' 'Say-on-Pay' reform was effective. As a consequence of the crisis, and the resulting 'Say-on-Pay' rule, the REIT management implemented pay-for-performance contracts by linking compensation packages to both short- and long-term performance, as well as value-driven growth. Additionally, this article shows that certain board-control mechanisms can alleviate managerial entrenchment. Specifically, a small board with a long-serving board member (long tenure) is effective in monitoring excessive compensation arrangements. Future research could extend this study by investigating a sample which comprises a longer timeframe after the financial crisis, in order to validate whether the pay-

performance link is sustainable. Furthermore, a deeper analysis of the compensation components with regard to, for example, the distinct structure of long-term incentives or deferred pay-outs might be of considerable interest. However, the availability of such detailed data, which also limited the scope of this study, will remain a challenge for future research.

The last article of this dissertation yields evidence that SEC comment letters indeed enhance the information environment of REIT investors, as they reveal deficiencies in REIT disclosure, especially on operational, asset-specific (e.g. leasing), business transaction-specific (e.g. joint ventures), liquidity and performance measurement (e.g. FFO and AFFO) issues. Hence, REIT management must be aware of the fact that these external audits by the SEC are read by investors and might be utilised in future investment and pricing decisions. This study constitutes a starting point for future investigations into SEC comment letters in the context of the REIT industry. Future studies may, for example, investigate REIT characteristics that make a REIT more or less likely to receive comment letters. In this context, one could apply topic modelling (e.g. LDA: latent dirichlet allocation algorithm) to identify topics covered in 10-Ks and match them with SEC comment letters in order to predict the probability of a comment letter receipt in future fiscal years. Moreover, it would be interesting to analyse how SEC comment letters, as a form of external auditing, interact with corporate governance, institutional investor ownership and other forms of external monitoring. These studies could also investigate the reaction of REIT investors to SEC comment letters and derive trade strategies based on the information content of comment letters.

This dissertation underscores the importance of well-regarded and widely accepted corporate governance and disclosure policies. In this way, the work sheds light on how a REIT's management should position and best prepare itself with regard to gender diversity in executive positions, incentive alignment in compensation packages and external audits of disclosure by the SEC.

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