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Boards of Directors and Firm Leverage: Evidence from Real Estate Investment Trusts

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Abstract

We re-examine the negative association between [leverage](#) and returns while also focusing on the role of [boards of directors](#). To do so, we utilize the unique setting of [real estate investment](#) trusts (REITs), their high leverage, and the volatility that the industry experienced during the recent [financial crisis](#). We find that during the financial crisis REIT board activity increased, especially among firms with high leverage. We also find that board activity helps mitigate the previously reported negative effect of leverage on returns during this time period. Post-crisis, we find evidence suggesting that firms with more active boards reduce their leverage if their pre-crisis leverage was high. Further, firms with more active boards have better post-crisis returns. Our findings are robust to using different measures of activity that take into account director experience in real estate and finance.

Keywords

Corporate boards, Board meeting, Board committee, Director experience, Leverage, Firm performance

1. Introduction

Two areas of [corporate finance](#) that have been studied extensively, both theoretically and empirically, are [capital structure](#) and [corporate governance](#). Additionally, a large number of papers examine how capital structure and corporate governance are linked to each other and to firm performance. For example, [capital structure theory](#) starting with [Modigliani and Miller \(1958\)](#) suggests that increased financial [leverage](#) increases the risk to equity holders and thus, raises their required rate of return. Other work based on either [information asymmetry](#) or on agency costs also predicts a positive association between financial leverage and returns (e.g. [Ross \(1977\)](#), [Hirshleifer and Thakor \(1992\)](#), [Harris and Raviv \(1990\)](#), [Stulz \(1990\)](#), and [Gomes and Schmid \(2010\)](#)). However, the empirical evidence on this issue is mixed. While [Bhandari \(1988\)](#) and [Fama and French \(1992\)](#) find a positive relation between leverage and expected returns, [Penman et al. \(2007\)](#), [Dimitrov and Jain \(2008\)](#), and [George and Hwang \(2010\)](#) find the opposite. Furthermore, [Garlappi et al. \(2006\)](#) and [Korteweg \(2010\)](#) find a non-linear relation between leverage and [abnormal returns](#).

[Agency theory](#) also suggests that debt can act as a self-enforcing mechanism to mitigate conflicts of interest between managers and shareholders (e.g. [Grossman and Hart \(1982\)](#), [Jensen \(1986\)](#), [Stulz \(1990\)](#), [Hart and Moore \(1995\)](#), [Williamson \(1988\)](#), [Rajan and Winton \(1995\)](#), and [Stulz \(2000\)](#)). The intuition is that debt, and particularly short-term debt, can reduce discretionary funds, thus subjecting managers to the scrutiny of the financial market. Such scrutiny, in turn, reduces managers' self-serving behavior. While emphasizing the use of debt as an effective way to mitigate agency problems, agency theory also highlights the importance of board monitoring in constraining managerial behavior ([Jensen and Meckling \(1976\)](#)). However, evidence on the effectiveness of board structure on firm value is also mixed (e.g. [Yermack \(1996\)](#), [Coles et al. \(2008\)](#), and [Adams et al. \(2010\)](#)).

We re-examine the link between [boards of directors](#), leverage, and firm performance by focusing on board activity before and after the 2008 [financial crisis](#). To do so, we use a sample of [real estate investment](#) trusts (REITs). REITs provide a unique setting to study the association between leverage and firm performance for three reasons. First, REITs tend to be highly levered ([Barclay et al., 2013](#); [Harrison et al., 2011](#)). Second, REITs were heavily impacted by the 2008 financial crisis: the aggregate REIT market capitalization of \$438 billion at the end of 2006 had declined to \$192 billion by the end of 2008, and the National Association of Real Estate Investment Trusts (NAREIT) Equity REITs Index fell from 10,256.96 in January 2007 to 3337.41 in February 2009, a cumulative loss of 67.46%.¹

Third, because of the legal structure under which REITs operate, the need for strong internal governance is not obvious. Given that REITs are required to distribute 90% of their taxable income to shareholders, REIT managers have limited scope to expropriate (or waste) free [cash flow](#). This attenuates agency problems and limits the need for board monitoring. At the same time, however, the top five investors in any REITs together cannot hold >50% of the company. This requirement mitigates the effectiveness of external governance by reducing the ability of shareholders to take control of the company and [change management](#). As a result, strong boards might be needed to prevent managerial entrenchment and agency problems. Taken together, the role of internal governance during normal times might not be clear; however, the financial crisis and ensuing volatility for REITs allows us to examine the role of boards at a time when they are arguably needed most.

Empirically, board size and board independence are frequently used as proxies for board monitoring. We contribute to the literature by incorporating a focus on board activity through time. A number of [prior](#) papers focusing on industrial companies have used board meeting frequency to proxy for director effort (e.g. [Menon](#)

[and Williams \(1994\)](#), [Vafaes \(1999\)](#), [Deli and Gillan \(2000\)](#), [Brick and Chidambaran \(2010\)](#), and [Nguyen \(2014\)](#)). Anecdotal evidence suggests that REIT boards changed their meeting frequency in response to the financial crisis. For example, before the financial crisis Redwood Trust Inc.'s board met five times a year and the top three [committees \(Audit, Compensation, and Nomination/Governance\)](#) met a total of 16 times a year. During the financial crisis, the board met 7.5 times a year while the top three committees met 19 times a year. Post-crisis, the board met seven times a year and the top three committees met 15 times. We also note that Redwood Trust Inc.'s pre-crisis leverage of approximately 92% reduced to approximately 71% post-crisis.

Using a sample of 222 REITs from 2003 to 2016, we find that REIT boards and board committees meet more often during the financial crisis, a result that is driven primarily by larger firms. These findings are consistent with director activity changing according to the firm's need for both monitoring and advising from the board. We also find evidence of a negative association between leverage and stock returns during the financial crisis and a positive association post-crisis, consistent with [Sun et al. \(2015\)](#). However, it appears that board activity attenuates the negative association between leverage and returns during the crisis in that returns are not as negative for REITs with active boards. Moreover, we find that increased board activity is associated with reduced post-crisis leverage, a result driven by the sample of highly levered firms. Specifically, post-crisis, on average, firms in the top quartile of leverage reduce their leverage by approximately 8% and a one [standard deviation](#) change in excess board activity is associated with approximately 1% lower leverage. Lastly, post-crisis we find that board activity is positively associated with stock returns. Our results hold after controlling for endogeneity and/or using different measures of board activity where we take into account the financial and real estate experience of directors. Taken together, our findings suggest that REIT boards of directors add to firm value via monitoring and advising with regard to the capital structure decision, especially for highly levered firms during a period of financial crisis.

Our paper contributes to the literature along several dimensions. First, we add to the work examining the effect of financial leverage on firm performance. Although the association between leverage and firm value has been studied extensively, and the theory has provided strong directional predictions as to that relationship, the empirical evidence remains mixed. Second, we provide insights into how boards can add value. As suggested by [Aggarwal et al. \(2016\)](#), while "...studies generally focus on outcomes that relate to board monitoring, ... much less is known about the evolution of boardroom practices after regulation, and no study ... connects such changes to firm value." We attempt to address this gap in the literature by focusing on how board activity changed around the time of the financial crisis - a period during which board input is particularly important. Additionally, we explore the link between these changes and firm value.

Third, we add to the literature on corporate governance in REITs by using board and board committee meetings to proxy for board monitoring and advising. Most prior work has emphasized board size and board independence as proxies for board strength, or monitoring, but has found little evidence of a connection between these proxies and firm performance. Nonetheless, a board that does not meet, or meets rarely, may not be effective. By using board and committee meeting frequency for REITs we capture another dynamic of board monitoring that has shown to be important in other organizational forms. Furthermore, our newly created measure of director activity which incorporates directors' managerial experience in finance and real estate allow us to proxy for both the quantity and quality of director activity.

The remainder of the paper is organized as follows. [Section 2](#) provides a brief review of the current literature and hypothesis development. [Section 3](#) describes our data. [Section 4](#) reports [descriptive statistics](#), while [section 5](#) contains our multivariate analyses. Finally, [section 6](#) concludes.

2. Related literature and hypothesis development

The classic work of [Modigliani and Miller \(1958\)](#) predicts a positive association between [leverage](#) and equity risk and returns. Similarly, models based on agency costs (e.g. [Hirshleifer and Thakor \(1992\)](#), [Harris and Raviv \(1990\)](#), and [Stulz \(1990\)](#)) or [information asymmetry](#) ([Ross, 1977](#)) predict that leverage is positively associated with firm value. However, the empirical evidence is mixed. For example, [Bhandari \(1988\)](#) and [Fama and French \(1992\)](#) report a positive relationship between market leverage and [stock returns](#). However, [Fama and French \(1992\)](#) also find a negative relation between book leverage and stock returns. More recently, [Penman et al. \(2007\)](#) document that when decomposing book-to-market equity into an asset component and a leverage component, the leverage component is negatively related to stock returns, even after controlling for risk factors such as size, estimated beta, [return volatility](#), momentum, and default risk. To explain the negative relation between leverage and stock returns, [George and Hwang \(2010\)](#) develop a theoretical model and provide empirical evidence showing that this relationship could be explained by distress costs. Specifically, they show that since firms with high distress costs choose low leverage, low leverage firms will have the greatest exposure to systematic risk related to distress. In the cross section, expected returns will therefore be negatively related to leverage. Focusing on product markets, [Campello \(2006\)](#) shows both theoretically and empirically that debt could increase or decrease a firm's product market performance: at low debt levels, taking on more debt is associated with higher sales; however, at high level of debt, taking on more debt is associated with lower sales.

Similarly, in real estate, [Giacomini et al. \(2015\)](#) find a positive correlation between leverage and returns while [Sun et al. \(2015\)](#) find an inverse relationship. Specifically, using sample of [public real estate](#) firms from eight countries between 2003 and 2011, [Giacomini et al. \(2015\)](#) find a positive unconditional relation between leverage and returns. However, they also find that during the [financial crisis](#), higher leverage is associated with larger share price declines. This finding is consistent with [Sun et al. \(2015\)](#) who find that during the years surrounding the financial crisis, share prices of REITs with higher debt-to-asset ratios and shorter maturity debt fell more. In contrast, [Pavlov et al. \(2015\)](#) find no evidence of a significant relationship between leverage and returns for a sample of global real estate securities over the period 1999 to 2011.

Furthermore, [agency theory](#) suggests that debt acts as a self-enforcing mechanism to mitigate agency problems (e.g. [Grossman and Hart \(1982\)](#), [Jensen \(1986\)](#), [Stulz \(1990\)](#), [Hart and Moore \(1995\)](#), [Williamson \(1988\)](#), [Rajan and Winton \(1995\)](#), and [Stulz \(2000\)](#)). More recently, [Morellec et al. \(2012\)](#) develop a dynamic tradeoff model to examine the effect of agency conflicts on [capital structure](#). Among other results, they provide evidence that external and internal governance mechanisms (including board independence) significantly affect the value of control and firms' [financing decisions](#). Empirically, [Harford et al. \(2008\)](#) show that firms with stronger boards use more debt and more short-term debt. Similarly, focusing on REITs, [Ghosh et al. \(2011\)](#) report that more entrenched CEOs use less debt and shorter maturity debt. In contrast, [John and Litov \(2010\)](#) find that firms with entrenched managers use more debt and have higher leverage ratios. Thus, evidence on the link between board structure and firm leverage is also conflicting.

Monitoring managers can also reduce agency problems, and in this regard [boards of directors](#) play a central role in [corporate governance](#) ([Jensen, 1993](#)). Indeed, a rich body of theoretical and empirical literature has examined board structure including board size and independence (as proxies for board monitoring) and board effectiveness ([Hermalin and Weisbach \(2003\)](#), [Bebchuk and Weisbach \(2010\)](#), and [Adams et al. \(2010\)](#)). For example, [Yermack \(1996\)](#) reports an association between board size and firm value, suggesting that small boards are more effective. In contrast, [Coles et al. \(2008\)](#) find that the relation between board size and firm performance is non-linear. Similarly, while independent directors are considered better monitors, inside directors can act as a conduit of information to the rest of the board which enhances their ability to monitor and advise management ([Raheja \(2005\)](#), [Adams and Ferreira \(2007\)](#), and [Harris and Raviv \(2008\)](#)). Empirically, [Hermalin and Weisbach \(1991\)](#) and [Bhagat and Black, 1999](#), [Bhagat and Black, 2002](#) find no evidence

of an association between board independence and firm performance. In contrast, [Coles et al. \(2008\)](#) find that, for complex firms, board independence is positively associated with firm performance, but for R&D-intensive firms, the link is negative. More recently, however, [Wintoki et al. \(2012\)](#) conclude that there is no causal relation between board structure and firm performance after controlling for endogeneity. Again, the evidence on the effectiveness of independent boards is not clear.

In addition to board size and board independence, board activity is another dimension of director monitoring and advising. Among industrial firms, meeting frequency has been used as proxy for board and committee activity ([Menon and Williams, 1994](#); [Vafaes, 1999](#); [Deli and Gillan, 2000](#); [Brick and Chidambaran, 2010](#); [Nguyen, 2014](#)). For example, [Vafaes \(1999\)](#) shows that abnormal board activity improves firm performance, especially among those with poor [prior](#) performance. Focusing on [audit committees](#), [Deli and Gillan \(2000\)](#) report that firms' demand for independent and active audit committee is driven by the demand for accounting certification. [Brick and Chidambaran \(2010\)](#) find that board monitoring activity (as proxied by the number of board and committee meetings and by the independence of Audit, Compensation and Nominating committees) is positively associated with a firm's industry-adjusted Tobin's Q. Thus, we use board and committee meetings as proxies for board activity while taking into account director experience and controlling for board size and independence.

As mentioned earlier, we choose to focus on REITs in testing our hypotheses because REITs are highly levered and leverage amplifies REIT returns in both a positive and negative direction ([Giacomini et al., 2015](#); [Sun et al., 2015](#)). Moreover, because of the dividend payout requirement and the restrictions on ownership concentration, the role of internal governance in REITs is not clear. Nevertheless, the evidence to date suggests that REITs boards do matter. For example, [Friday and Sirmans \(1998\)](#) and [Ghosh and Sirmans \(2003\)](#) show that there is a positive association between board independence and firm value. In addition, [Ghosh and Sirmans \(2005\)](#) show that firms with weak director monitoring (large boards and boards with older and busier directors) pay their CEOs more. [Hartzell et al. \(2008\)](#) find that firms with better [governance structure](#) at the time of IPO not only have higher initial valuations but also better long-term performance than their counterparts. More recently, [Anglin et al. \(2012\)](#) report that good corporate governance is essential for constraining [earnings management](#), especially for a subset of REITs that are more susceptible to such activities. As a result, focusing on REITs between 2003 and 2016, a period spanning the financial crisis, provides an ideal setting to observe both the effect of leverage and the role of the boards in affecting firm performance.

In addition to the impact on market value and volatility, the financial crisis led to many changes in the regulatory environment. As consequence, firms and their boards were under intense scrutiny, and this has continued post-crisis. This is especially true for REITs. Consistent with prior literature, we argue that during the financial crisis, the performance of REITs with high leverage will be more negative. However, this is also the time when internal governance, specifically the board, will act to monitor and advise management. As such, we also anticipate that director activity increases and has the potential to attenuate the negative effect of leverage on performance.

H1a

During the financial crisis, boards at firms with high leverage increase their activity.

H1b

Active boards mitigate the negative effects of leverage on returns during the financial crisis.

In the post crisis period, we would expect boards to learn from their experience during the crisis and potentially adjust the firm's capital structure. Indeed, in related work, [Pavlov et al. \(2018\)](#) report that some REITs mitigated risk *prior* to the crisis by reducing leverage and extending their debt maturity. This, in turn, was associated with

better performance during the crisis. We build on these insights and argue that, conditioned on performance and board activity during the crisis, REITs with high leverage will lower debt levels post-crisis.

H2

Post-crisis, firm with high leverage and more active boards will lower their leverage to reduce leverage risk.

[Sun et al. \(2015\)](#) find that post-crisis, leverage is positively associated with firm performance. The positive association between leverage and returns is consistent with theoretical predictions (e.g. [Modigliani and Miller \(1958\)](#), [Ross \(1977\)](#), [Hirshleifer and Thakor \(1992\)](#), [Harris and Raviv \(1990\)](#), [Stulz \(1990\)](#) and [Gomes and Schmid \(2010\)](#)) and prior empirical evidence (e.g. [Bhandari \(1988\)](#), [Fama and French \(1992\)](#), and [Giacomini et al. \(2015\)](#)). We argue that boards add value not only during the crisis period, but also more generally at other times. Thus, focusing on the post-crisis period, we hypothesize that the positive link between leverage and returns is partly driven by board monitoring and advising (and thus board activity).

H3

Firms with higher leverage and more active boards have higher returns post-crisis.

A potential concern when examining the effect of governance on firm value is endogeneity (e.g. [Hermalin and Weisbach \(2003\)](#) and [Adams et al. \(2010\)](#)). To address the issue of endogeneity between director activity and firm value, following [Nguyen, 2014](#), we use two-stage OLS regression models. In the first stage, we use the lagged median number of board (or committee) meetings of REITs that invest in the same property type as [instrumental variables](#). The rationale is that directors would not want to appear less diligent than directors of peer firms by having fewer meetings, but they do not want to meet too often because meetings are costly for them. Thus, industry norms should dictate how many meetings a firm would have. However, how often the boards and committees of similar firms meet should not affect the performance of a particular firm.

3. Data

We start with a sample of 275 unique REITs operating between 2003 and 2016 from the Ziman REIT database on the Center for Research on Security Prices (CRSP). We merge the REIT sample with CRSP and Compustat databases to obtain [stock returns](#) and financial information. The number of board and committee meetings and board characteristics are obtained from MyLogIQ and Morningstar. We hand-collect any missing board data from proxy statements. The final sample includes 1701 observations (222 unique REITs) from 2003 to 2016. Moreover, to make our findings more comparable to those from [prior](#) work, we use a sub-sample similar to that of [Sun et al. \(2015\)](#). This sub-sample includes 137 REITs that operate between 2006 and 2011. See [Appendix 1](#) for more details about sample construction.

Following the prior literature (e.g. [Menon and Williams \(1994\)](#) and [Vafaes \(1999\)](#)), we use meeting frequency as a proxy for director activity. It is argued that board and committees that meet more often are better monitors (and advisors) as they put more effort into performing their duties. We focus on the board as a whole and the three committees whose main function is to monitor management: the Audit, the Compensation and the Nominating/Governance committees. Specifically, *Board Meetings* is the number of board meetings during a fiscal year while *Committee Meetings* is the number of meeting held by all three monitoring committees during a fiscal year ([Nguyen, 2014](#)). In addition, we measure *Abnormal Board (Committee) Meetings* as the difference between the number of board (committee) meetings and the average board (committee) meetings during the pre-crisis period (i.e. from 2003 to 2006), similar in spirit to the approach of [Vafaes \(1999\)](#). Meeting frequency per se does not necessarily reflect the quality of director monitoring and/or advising and therefore, may not help the REIT's performance. Thus, we control for director experience in real estate and finance as this type of experience could be valuable for the firms, especially during the [financial crisis](#). Specifically, we hand-collect

director biographic information from the company proxy statements, Bloomberg and LinkedIn to estimate the number of years a particular director has managerial experience in finance and/or real estate as a proxy for his and/or her finance or real estate experience, respectively. We then average the finance or real estate experience across the whole board to construct three variables *FIN Experience*, *RE Experience*, and *FIN & RE Experience* respectively. Finally, we create “experience weighted” measures of director activity as the product of the number of meetings and director experience as it is plausible that both the experience of the directors and the time they spend on monitoring and advising are important.² We also include other more commonly-used proxies for the quality of board monitoring: *Board Size* (the total number of directors on the board) and *Board Independence* (the proportion of independent directors on the board).

We measure returns during financial crisis as the cumulative monthly return for each REIT from January 2007 to February 2009 (*Cumulative Return 2007–2009*). Post-crisis return is measured as the cumulative monthly return from March 2009 to December 2016 (*Cumulative Return 2009–2016*). As proxies for [leverage](#), we use *Market Leverage*, the ratio of total debt to market value of the firm. Total debt is calculated as the book value of debt due in one year and long-term debt while market value of the firm is calculated as total debt plus book value of preferred stock plus equity market capitalization. We also use an indicator, *High Leverage*, that equals one if the firm's leverage is on the top quartile of the sample and zero otherwise.

We control for other firm characteristics that have been shown by prior literature to affect firm's governance, leverage, and returns. For example, we include *Firm Size*, *Tobin's Q*, *FFO per Share*, *Variable Rate Debt/Total Debt*, *Debt Due in 1 year/Total Debt* and *Debt Due in 2 or 3 years/Total Debt* ([Sun et al., 2015](#)). In addition, we control for different property types.³ See [Appendix 2](#) for a more detailed description of the variables included in the study.

[Table 1](#), Panel A, provides summary statistics for the full sample. The average board has eight members with approximately 73% classified as independent directors. These numbers are similar to those reported in other studies (e.g. [Ghosh and Sirmans \(2005\)](#), [Anglin et al. \(2012\)](#), and [Hartzell et al. \(2014\)](#)). On average, boards meet eight times per year and the Audit, Compensation, and Nomination/Governance committees meet 14 times. The number of board meetings is similar to that of other studies for both REIT and non-REIT firms (e.g. [Anglin et al. \(2012\)](#) and [Nguyen \(2014\)](#)).⁴ On average, directors have nine (ten) years of managerial experience in finance (real estate). With respect to firm characteristics, the average firm has total assets of \$5.4B, a Tobin's Q of 1.31, and a leverage of 43%.

Table 1. [Descriptive statistics](#).

Variable	N	Mean	Median	Std Dev
Board size	1701	8.09	8.00	2.21
Board independence	1701	72.70	71.43	11.75
Board meetings	1701	8.30	7.00	4.56
Committee meetings	1701	14.34	14.00	5.60
FIN experience	1698	9.11	8.14	6.24
RE experience	1698	10.07	9.55	6.79
Total assets (B\$)	1701	5.43	2.55	10.32
Firm Q	1665	1.31	1.22	0.43
Firm age	1701	26.00	20.00	19.66
Leverage	1697	43.48	45.97	21.35

UPREIT				1694	0.65	1.00	0.48	
Maryland				1701	0.76	1.00	0.43	
Panel B: 2006 sub-sample.								
This table reports the summary statistics for the sub-sample of 137 REITs that were traded in 2006. See Appendix 2 for variable definitions.								
Variable	N	Mean	Std Dev	5th Pctl	25th Pctl	50th Pctl	75th Pctl	95th Pctl
Cumulative return 1/2007–12/2011	137	-0.119	0.551	-0.892	-0.559	-0.207	0.273	0.924
Cumulative return 1/2007–2/2009	137	-0.602	0.288	-0.964	-0.822	-0.659	-0.466	-0.070
Cumulative return 3/2009–12/2011	137	1.894	1.837	-0.148	0.732	1.356	2.603	5.757
Cumulative return 3/2009–12/2016	137	4.486	4.014	-0.216	1.734	3.635	5.560	13.998
Total assets	137	3916.920	5113.330	115.740	955.317	2016.130	4632.230	15,062.220
Firm size	137	14.380	1.522	11.659	13.770	14.517	15.349	16.528
Firm Q	137	1.466	0.476	0.991	1.153	1.379	1.647	2.221
Cash/total assets	137	0.044	0.074	0.001	0.008	0.022	0.045	0.173
FFO per share	98	2.924	4.220	0.887	1.540	2.375	3.580	5.130
Market leverage	137	0.406	0.194	0.054	0.298	0.405	0.526	0.746
Preferred stock	137	0.031	0.066	0.000	0.000	0.000	0.039	0.144
Variable rate debt/total debt	137	0.121	0.195	0.000	0.000	0.019	0.184	0.515
Debt due in 1 year/total debt	134	0.125	0.237	0.000	0.005	0.036	0.101	0.841
Debt due in 2–3 year/total debt	134	0.204	0.242	0.000	0.042	0.131	0.239	0.859
Board meetings	132	8.076	3.775	4.000	5.000	7.000	10.000	16.000
Audit meetings	132	7.227	3.005	4.000	5.000	7.000	9.000	12.000
Comp. meeting	132	4.417	2.815	1.000	3.000	4.000	6.000	10.000
Gov. & nom meetings	132	2.492	1.763	0.000	1.000	2.000	4.000	6.000
FIN experience	134	7.454	5.459	0.000	3.900	6.690	9.889	18.333
RE experience	134	9.418	6.113	0.000	4.778	9.091	12.333	21.857

For comparison purposes, Panel B, [Table 1](#), provides summary statistics for the sub-sample similar to the one in [Sun et al. \(2015\)](#). The average return during the financial crisis is -60% and post-crisis is 189%. On average, the market leverage is 40%, 12% of the total debt is due in one year, and another 20% of total debt is due in the next two years. Except for the number of meetings and director experience, which are not included in [Sun et al. \(2015\)](#), the other variables are comparable.

[Table 2](#) reports the correlations between our main variables of the subsample. Firm size is negatively associated with returns during the crisis but positively associated with post-crisis returns. In contrast, Tobin's Q is positively

associated with returns during the crisis, but post-crisis that relationship is reversed. In addition, during the crisis, market leverage is negatively associated with returns; post-crisis, market leverage is positively associated with returns. This finding is consistent with leverage amplifying REIT returns in both a positive and negative direction ([Giacomini et al. \(2015\)](#) and [Sun et al. \(2015\)](#)).

Table 2. Correlation matrix.

	Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
[1]	Cumulative return 1/2007–2/2009														
[2]	Cumulative return 3/2009–12/2016	-0.50													
		<i><0.0001</i>													
[3]	Size	-0.23	0.29												
		<i>0.01</i>	<i>0.00</i>												
[4]	Firm Q	0.14	-0.16	-0.11											
		<i>0.09</i>	<i>0.07</i>	<i>0.22</i>											
[5]	Cash/total assets	-0.05	-0.07	-0.22	0.26										
		<i>0.55</i>	<i>0.41</i>	<i>0.01</i>	<i>0.00</i>										
[6]	FFO per share	-0.02	-0.10	0.45	0.32	0.05									
		<i>0.84</i>	<i>0.31</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.63</i>									
[7]	Market leverage	-0.38	0.31	0.20	-0.54	-0.10	-0.03								
		<i><0.0001</i>	<i>0.00</i>	<i>0.02</i>	<i><0.0001</i>	<i>0.25</i>	<i>0.76</i>								
[8]	Preferred stock	0.12	0.01	0.06	0.12	-0.08	-0.05	-0.26							
		<i>0.17</i>	<i>0.92</i>	<i>0.48</i>	<i>0.16</i>	<i>0.35</i>	<i>0.62</i>	<i>0.00</i>							
[9]	Variable rate debt/total debt	-0.11	0.02	-0.07	0.17	-0.18	0.08	-0.14	0.03						
		<i>0.18</i>	<i>0.79</i>	<i>0.40</i>	<i>0.04</i>	<i>0.03</i>	<i>0.45</i>	<i>0.11</i>	<i>0.74</i>						
[10]	Debt due in 1 year/total debt	0.15	-0.05	0.04	-0.34	0.19	-0.01	-0.03	-0.10	-0.22					
		<i>0.09</i>	<i>0.60</i>	<i>0.67</i>	<i><0.0001</i>	<i>0.02</i>	<i>0.89</i>	<i>0.73</i>	<i>0.23</i>	<i>0.01</i>					
[11]	Debt due in 2– 3 year/total debt	0.20	-0.12	-0.04	-0.29	0.16	-0.09	-0.07	0.00	-0.16	0.90				
		<i>0.02</i>	<i>0.15</i>	<i>0.68</i>	<i>0.00</i>	<i>0.07</i>	<i>0.38</i>	<i>0.39</i>	<i>0.97</i>	<i>0.07</i>	<i><0.0001</i>				
[12]	Board meetings	-0.02	0.06	0.18	-0.09	-0.03	0.01	0.01	0.02	-0.10	-0.08	-0.13			
		<i>0.82</i>	<i>0.47</i>	<i>0.04</i>	<i>0.31</i>	<i>0.73</i>	<i>0.89</i>	<i>0.91</i>	<i>0.85</i>	<i>0.25</i>	<i>0.36</i>	<i>0.14</i>			
[13]	Committee meetings	-0.08	0.12	0.34	0.11	-0.05	-0.15	0.08	0.04	-0.10	-0.21	-0.22	0.28		
		<i>0.37</i>	<i>0.16</i>	<i>0.00</i>	<i>0.21</i>	<i>0.57</i>	<i>0.14</i>	<i>0.36</i>	<i>0.64</i>	<i>0.27</i>	<i>0.02</i>	<i>0.01</i>	<i><0.0001</i>		
[14]	FIN experience	0.05	0.04	0.20	-0.15	0.16	0.08	0.24	0.02	-0.22	0.24	0.22	0.04	-0.08	
		<i>0.55</i>	<i>0.62</i>	<i>0.02</i>	<i>0.08</i>	<i>0.06</i>	<i>0.46</i>	<i>0.00</i>	<i>0.83</i>	<i>0.01</i>	<i>0.01</i>	<i>0.01</i>	<i>0.63</i>	<i>0.39</i>	
[15]	RE experience	-0.10	0.02	-0.07	0.35	0.05	-0.05	-0.17	-0.06	0.30	-0.22	-0.17	-0.17	0.06	-0.54
		<i>0.27</i>	<i>0.83</i>	<i>0.43</i>	<i><0.0001</i>	<i>0.56</i>	<i>0.61</i>	<i>0.05</i>	<i>0.49</i>	<i><0.0001</i>	<i>0.01</i>	<i>0.05</i>	<i>0.06</i>	<i>0.48</i>	<i><0.0001</i>

4. Univariate results

[Prior](#) literature has shown that director monitoring and advising changes depending on a firm's need for board oversight ([Linck et al. \(2009\)](#) and [Linn and Park \(2005\)](#)). As firm size is often used to capture firm complexity and, thus the demand for director monitoring and advising, we partition our sample firms into three groups based on their total assets. Specifically, large firms are those in the top tercile while small firms are those in the bottom tercile. In addition, we argue that the demand for board monitoring will change through time. Thus, we divide our sample period into three sub-periods: Pre-crisis, Crisis, and Post-crisis. Pre-crisis is defined to be before 2007 while Post-crisis is from 2009 forward. In [Table 3](#), we report the distribution of the main variables across firm size and time periods for the full sample.

Table 3. Board characteristics, board and committee activity, [leverage](#) and firm performance based on firm size and periods.

This table reports board structure, board and committee activity, leverage and firm performance. Firms are partitioned into terciles based on their total assets. Firms in each tercile are partitioned into three periods: the pre-crisis period is from 2003 to 2006, the crisis period is from 2007 to 2008, and the post-crisis period is from 2009 to 2016. For each size-period group, we report the average value of each variable in the corresponding column. We report P-values from F-tests for differences in the values across periods within each size tercile. See [Appendix 2](#) for variable definitions.

Firm size	Period	N	Board size	Board independence	Board meetings	Audit meetings	Comp. meeting	Nom & gov. meetings	Market leverage	Annual return (%)
Large	Pre-crisis	163	9.20	70.87	8.06	7.88	5.07	3.36	0.46	26.04
	Crisis	91	8.88	71.25	10.11	7.80	5.85	3.14	0.60	-34.03
	Post-crisis	449	8.56	74.96	9.06	6.77	5.33	3.39	0.40	18.01
	P-value		0.01	0.00	0.00	0.00	0.15	0.57	0.00	0.00
Medium	Pre-crisis	225	8.47	71.17	8.54	7.65	4.34	2.84	0.43	25.24
	Crisis	105	8.50	71.10	8.70	6.94	5.09	3.13	0.55	-28.96
	Post-crisis	409	7.93	76.67	8.19	6.35	5.22	3.26	0.41	22.01
	P-value		0.00	0.00	0.34	0.00	0.00	0.05	0.00	0.00
Small	Pre-crisis	268	7.08	67.50	7.31	6.15	2.82	1.59	0.40	22.74
	Crisis	100	6.93	67.97	8.10	6.50	3.05	2.20	0.53	-30.34
	Post-crisis	278	7.36	69.06	6.69	5.85	2.76	1.94	0.39	16.36
	P-value		0.14	0.25	0.01	0.11	0.55	0.00	0.00	0.00

Across all firm size categories, we find that there are changes in board structure pre- and post-crisis. While large- and medium-sized firms seem to reduce their board size post-crisis, small firms increase their board size slightly. In addition, all firms increase board independence after 2008. This is consistent with the focus on board independence by regulators and proponents of [good governance](#) around this time. Focusing on board and committee activity, we find that boards of larger firms met more often during the crisis. For example, during the crisis, on average, boards of large firms had two more meetings than the pre-crisis average (a 25% increase). Post-crisis, the number of board meetings decreased compared to the crisis period, but remained higher than the number of pre-crisis meetings (12.5% more than pre-crisis period). For small firms, meeting frequency increased for both the board and committees during the [financial crisis](#), but the pattern post-crisis is not clear. In addition, for medium firms and the audit and nominating/governance committees of larger firms, meeting frequency did not seem to change significantly during crisis, but tends to decline post-crisis. A potential explanation for the differences in director activity patterns for large versus small and medium firms is that large firms are more complex and more difficult to monitor which requires more director effort, especially during difficult times. In addition, larger firms are exposed to more external pressures than other firms (e.g., institutional shareholders, media, regulators, etc.) thus directors might want to demonstrate that they are doing their job by meeting more often.

With regard to [leverage](#), across all periods, firm size is positively associated with leverage. This is consistent with larger firms having higher debt capacity and borrowing more (e.g. [Harrison et al. \(2011\)](#)). In addition, across all firm size groups, leverage increases during the financial crisis (primarily because of a [declining market](#) value of equity) but decreases again in the post-crisis period. We also observe that post-crisis leverage is lower than pre-crisis leverage, especially for larger firms. A similar pattern is observed with annual [stock returns](#): Across all firm size groups, returns decrease during the financial crisis but bounce back post-crisis, albeit remaining at a lower level post-crisis relative to the pre-crisis period.

Overall, the univariate results indicate that board structure and activity vary with firm characteristics. Moreover, board independence increases through time, and boards are more active during the financial crisis, especially at large firms. These findings are consistent with director activity changing depending on firms' demand for monitoring and advising. In the next section, we examine the association between director activity, leverage, and firm performance in the multivariate setting.

5. Multivariate results

5.1. Director activity, leverage and firm performance during the financial crisis

As mentioned earlier, to facilitate the comparison of our findings with those from [prior](#) work we focus our analysis on the subsample that is comparable to [Sun et al. \(2015\)](#). We first examine board and committee meeting frequency during the [financial crisis](#). We argue that during this period, the stock price is more volatile, [leverage](#) has a more negative effect on returns, and therefore firms have a higher demand for director monitoring and advising. As a result, boards at firms with high leverage will increase their activity ([H1a](#)).

[Table 4](#) Panel A reports the results for board activity, while Panel B reports the results for committee activity. To proxy for increased board and committee activity during the financial crisis, we use the sum of the abnormal board (or committee) meetings during 2007 and 2008. The abnormal meetings are measured in a manner similar to [Vafaes \(1999\)](#) as the number of meetings above the normal level (where the normal level is measured as the average number of meetings from 2003 to 2006). The explanatory variables we use in the base specification, Model 1, are similar to those in [Sun et al. \(2015\)](#) and are measured at the end of 2006. In Model 2, we add several board characteristics including $\ln(\text{Board Size})$, *Board Independence*, *FIN Experience*, and *RE Experience*.

Table 4. Board and committee activity during the [financial crisis](#).

This table models board activity (Panel A) and committee activity (Panel B) during the financial crisis. The dependent variable, *Abnormal Board (Committee) Meetings* during the financial crisis is measured as the difference between the number of board (committee) meetings during 2007 and 2008 and the average number of board (committee) meetings from 2003 to 2006 (i.e. the pre-crisis period). Market *Leverage* is defined as the ratio of total debt (the book value of debt due in one year plus long-term debt) to the market value of the firm (total debt plus book value of preferred stock plus market capitalization). *High Leverage* is an indicator variable that equals one if the firm's leverage is in the top quartile and zero otherwise (see [Appendix 2](#) for other variable definitions). Explanatory variables are measured at the end of 2006 and are standardized at the mean and have unit variance. P-values are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively, in two-tailed tests.

Variable	Panel A: abnormal board meetings				Panel B: abnormal committee meetings	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	5.2759** [0.025]	5.4452** [0.022]	3.2681 [0.198]	3.8799 [0.127]	11.4658*** [0.001]	10.8086*** [0.004]
Market leverage	1.9018* [0.09]	1.9199* [0.090]			2.2516 [0.171]	
High leverage			3.2341** [0.04]	2.6090 [0.111]		1.0077 [0.673]
Ln(total assets)	1.1469 [0.205]	1.4366 [0.154]	1.4052 [0.119]	1.7359* [0.084]	2.5984* [0.078]	2.8956* [0.051]
Firm Q	0.5689 [0.638]	0.9139 [0.460]	0.2697 [0.790]	0.3698 [0.724]	1.6982 [0.34]	0.2775 [0.857]
FFO per share	0.2439 [0.671]	0.2893 [0.610]	0.3181 [0.579]	0.3635 [0.524]	-0.2383 [0.773]	-0.2096 [0.803]
Cash/total assets	0.8965 [0.50]	-0.0229 [0.986]	0.5576 [0.676]	-0.2558 [0.853]	1.6814 [0.40]	1.3401 [0.510]
Variable rate debt/total debt	0.2684 [0.65]	0.0518 [0.933]	0.0704 [0.907]	-0.1109 [0.859]	0.7051 [0.440]	0.5666 [0.538]
Debt due in 1 year/total debt	1.5950 [0.667]	3.6357 [0.331]	1.2660 [0.732]	3.4036 [0.364]	6.7801 [0.214]	6.8406 [0.217]
Debt due in 2–3 year/total debt	-0.5246 [0.716]	-1.4703 [0.30]	-0.7020 [0.623]	-1.5327 [0.287]	-0.1578 [0.939]	-0.2640 [0.900]
Ln(board size)		-1.2249* [0.077]		-1.2473* [0.072]	-1.8174* [0.071]	-1.9900* [0.051]
Board independence		-1.4782** [0.031]		-1.3826** [0.044]	-2.1545** [0.031]	-2.0899** [0.039]
FIN experience		0.9491 [0.32]		0.7496 [0.442]	-2.0579 [0.147]	-2.1744 [0.132]
RE experience		-0.2084 [0.792]		-0.2773 [0.729]	-0.5846 [0.613]	-0.4741 [0.688]
REIT types	Yes	Yes	Yes	Yes	Yes	Yes
Num of obs	92	91	92	91	91	91
R-square	0.1877	0.2939	0.2000	0.2906	0.2201	0.2012

Models 3 and 4 are similar to Models 1 and 2 except that in place of *Market Leverage*, we use an indicator variable (*High Leverage*) to capture highly levered firms, specifically, those whose market leverage is in the top quartile. The rationale is that firms with higher leverage will be affected more during the financial crisis than other firms, and thus the demand for board monitoring and advising will be higher. Models 5 and 6 are similar to Models 2 and 4, respectively, except that the dependent variable is *Abnormal Committee Meetings*. All models include indicator variables for different REIT types. For this and subsequent tests, we standardize all continuous variables so that they have zero mean and unit variance. Thus, the coefficient estimates reported correspond to a one [standard deviation](#) change in the continuous explanatory variables, or a change from zero to one for indicator variables.

In [Table 4](#) Models 1 and 2 we find that, consistent with our hypothesis, *Market Leverage* is positively associated with board activity during the financial crisis. In terms of economic magnitude, a one-standard-deviation increase in leverage is associated with approximately two additional board meetings. This is not only statistically significant, but also economically meaningful given the unconditional number of board meetings is eight. In addition, in Model 2, *Board Size* and *Board Independence* are both negatively associated with abnormal board meetings. This finding is consistent with the argument that it is harder to coordinate larger boards and those with more non-employee directors thus these firms have fewer excess meetings. However, neither experience variables (*FIN Experience* and *RE Experience*) are significantly associated with excess director activity. When we use the indicator variable *High Leverage*, we see that firms with leverage in the top quartile have three additional meetings compared to other firms. This is statistically significant at 4% and 11% levels (Models 3 and 4, respectively). These findings are consistent with the univariate results and with our hypothesis that during the crisis, boards of highly levered firms increase their activity to meet the increased demand for monitoring and advising.

In an attempt to separate the monitoring and advising functions, in Panel B (Models 5 and 6) we focus on the activity of the three monitoring committees. Neither *Market Leverage* nor *High Leverage* is significantly associated with abnormal monitoring committee meetings, suggesting that these key committees of highly levered firms did not increase their monitoring activity during the financial crisis more than other firms. Taken together with the results from Panel A, it would seem that during the financial crisis directors of high levered firms increased their activity via board meetings as a whole rather than via committee meetings.

Next, we examine the effect of leverage on [stock returns](#) from January 2007 to February 2009 (*Cumulative Return 2007–2009*). This captures the heart of the financial crisis period. Panel A report the results from OLS regression, of which Models 1 and 2 we use *Market Leverage* while in Models 3 and 4 we use the *High Leverage*. In Panel B, we include FIN & RE experience-weighted abnormal board activity during the financial crisis, board size, and board independence. As noted in the previous section, a potential concern we face when examining the effect of governance on firm value is endogeneity (e.g. [Hermalin and Weisbach \(2003\)](#) and [Adams et al. \(2010\)](#)). Thus, we use two-stage OLS regression models to address the potential endogeneity between director activity and firm value. Following [Nguyen \(2014\)](#), our [instrumental variable](#) in the first stage is the lagged median number of board (or committee) meetings by REIT property type. We report the coefficients from the second stage regressions (Models 5 to 8) in [Table 5](#).

Table 5. Director activities, [leverage](#) and firm performance during the [financial crisis](#).

This table reports the association between board activity, leverage, and firm performance during the financial crisis. The dependent variable is cumulative monthly [stock returns](#) between January 2007 and February 2009 (*Cumulative Return 2007–2009*). *Market Leverage* is defined as the ratio of total debt (the book value of debt due in one year plus long-term debt) to the market value of the firm (total debt plus book value of preferred stock plus market capitalization). *High Leverage* is an indicator variable that equals one if the firm's leverage is in the top quartile and zero otherwise. *Exp. Weighted Abnormal Board Meetings* during the financial crisis is measured as the product of *FIN& RE Experience* and *Abnormal Board Meetings* during the financial crisis where *FIN& RE Experience* is measured as the average across the whole board number of years of managerial experience in finance or real estate (see [Appendix 2](#) for other variable definitions). Explanatory variables are measured at the end of 2006 and are standardized at the mean and have unit variance. Panel A reports the results from OLS regressions. Panel B reports the results from the second stage regressions. The [instrumental variable](#) used in the first stage is the lagged median property type number of board meetings. P-values are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively, in two-tailed tests.

Variable	Panel A: OLS				Panel B: 2SLS			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	-0.6365***	-0.6912***	-0.5697***	-0.6208***	-0.6863***	-0.7012***	-0.6509***	-0.6516***
	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]
Market leverage	-0.0986**	-0.0924**			-0.0482	-0.0766		
	[0.014]	[0.018]			[0.371]	[0.11]		
High leverage			-0.1217**	-0.1155**			-0.0292	-0.0601
			[0.035]	[0.041]			[0.741]	[0.453]
Exp. weighted ab. board meetings during crisis					-0.0155	-0.0136	-0.0173	-0.0168
					[0.233]	[0.356]	[0.192]	[0.288]
Ln(total assets)	-0.0823**	-0.0746**	-0.094***	-0.085***	-0.0565	-0.0236	-0.0588	-0.0239
	[0.010]	[0.017]	[0.004]	[0.007]	[0.146]	[0.704]	[0.167]	[0.724]
Firm Q	0.0142*	0.0218	0.047	0.0516	0.0293	0.0103	0.0524	0.0442
	[0.737]	[0.597]	[0.195]	[0.146]	[0.528]	[0.822]	[0.198]	[0.278]
FFO per share	-0.0074	-0.0014	-0.0096	-0.0035	0.0054	0.0124	0.0072	0.0142
	[0.714]	[0.942]	[0.63]	[0.859]	[0.808]	[0.603]	[0.759]	[0.586]
Cash/total assets	0.0076	0.0084	0.0256	0.0242	0.0096	-0.0039	0.0158	0.0035
	[0.87]	[0.855]	[0.590]	[0.60]	[0.858]	[0.940]	[0.774]	[0.949]
Variable rate debt/total debt	-0.0374*	-0.0429**	-0.0304	-0.0355*	-0.0263	-0.0401*	-0.0231	-0.0342
	[0.078]	[0.04]	[0.157]	[0.096]	[0.321]	[0.088]	[0.363]	[0.160]
Debt due in 1 year/total debt		-0.3177**		-0.3104**	-0.2828*	-0.2478	-0.2893**	-0.2413
		[0.014]		[0.017]	[0.050]	[0.101]	[0.049]	[0.121]
Debt due in 2–3 year/total debt		0.1106**		0.1187**	0.0904	0.0852	0.0954	0.0858
		[0.027]		[0.018]	[0.124]	[0.205]	[0.117]	[0.229]

Ln(board size)						-0.0598		-0.0638
						[0.267]		[0.253]
Board independence						-0.0057		-0.0134
						[0.886]		[0.752]
REIT types	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Num of obs	93	93	93	93	88	88	88	88
R-square	0.412	0.4625	0.4002	0.4527	0.43768	0.47108	0.41998	0.43858

We find that in Panel A, leverage is negatively associated with stock returns during the financial crisis. Specifically, a one-standard-deviation increase in *Market Leverage* is associated with a decrease in cumulative stock return of about 10% during the financial crisis (Model 1), which is consistent with [Sun et al. \(2015\)](#). In addition, the proportion of variable interest rate debt and debt due in one year is negatively associated with crisis period returns. For example, a one-standard-deviation increase in the proportion of variable interest rate debt is associated with a decrease in *Cumulative Return 2007–2009* of approximately 5% (Model 2). Similarly, in Models 3 and 4, the coefficient of *High Leverage* is negative and significant, suggesting that highly levered firms perform worse than other firms during the financial crisis. In particular, during the crisis, highly levered firms underperform other firms by approximately 12%, significant at the 5% level (Model 3).

However, in Panel B, after controlling for board structure and activity and potential endogeneity, the coefficients on *Market Leverage* (Models 5 and 6) and *High Leverage* (Models 7 and 8) are no longer significantly associated with stock returns during the crisis. Additionally, the significance of variables proxying for debt structure and maturity also decreases. While a “non-result,” this finding is consistent with our hypothesis that board and committee activities during the financial crisis help attenuate the negative effects of leverage on returns.⁵ Overall, the findings in [Table 4](#), [Table 5](#) are consistent with the hypothesis that boards and committees increase their activity during the financial crisis in response to the increased monitoring and advising needs of the firm. In addition, board activity appears to attenuate the negative effects of leverage on returns during the financial crisis.

5.2. Director monitoring, leverage and firm performance post financial crisis

In this section, we first examine the effect of board activity on leverage in the post-crisis period. We anticipate that boards learn from their experience and, conditioned on performance during the crisis, REITs with high leverage will lower debt levels post-crisis ([H2](#)). To test this hypothesis, we start with our full sample of REITs and focus on those that are traded in 2006. We do this for two reasons. First, to have measures of leverage and accounting variables at the end of 2006, prior to the crisis level. Second, this approach closely mirrors that of [Sun et al. \(2015\)](#) and thus allows us to compare our findings with theirs. We then track these firms up to 2016. We rank REITs into quartiles based on their leverage as of the end of 2006. We then calculate the average of leverage, change in leverage, board activity, and change in board activity post-crisis. The results are report in [Table 6](#). The last two rows report the difference between the highest and lowest quartiles based on 2006 leverage along with P-values as to whether the difference is different from zero.

Table 6. Board activity and [leverage](#) post-crisis.

This table reports the change in leverage and board activity from 2009 to 2016. Firms are partitioned into quartiles based on their leverage at the end of 2006. *Market Leverage* is defined as the ratio of total debt (the book value of debt due in one year and long-term debt) to market value of the firm (total debt plus book value of preferred stock plus market capitalization). *Board Meetings* is the number of board meetings in a particular year. *Change in Market Leverage (Change in Board Meetings)* is calculated as the difference between *Market Leverage (Board Meetings)* in a particular year post-crisis and the 2006 *Market Leverage (Board Meetings)*. P-values for tests of the difference between high- and low-leverage firms are reported in brackets.

Leverage rank in 2006	N	Market leverage Post-crisis	Change in market leverage	Board meetings in 2006	Board meetings Post-crisis	Change in board meetings
[1]	[2]	[3]	[4]	[5]	[6]	[7]
4 high	277	0.5861	-0.0809	8.7040	9.5885	0.8845
3	289	0.4912	0.0342	8.0138	8.4706	0.4568
2	311	0.3729	0.0189	8.2251	7.3794	-0.8457
1 low	281	0.2620	0.1000	8.6121	7.9182	-0.6940

High - low		0.3240	-0.1808	0.0919	1.6703	1.5784
P-value		[<0.0001]	[<0.0001]	[0.7965]	[<0.0001]	[0.0003]

[Table 6](#), column 3 shows that after the financial crisis, on average, firms with high pre-crisis leverage are still more levered than those with low pre-crisis leverage; however, the gap between high- and low-levered groups is smaller. Specifically, column 4 suggests that while firms with high pre-crisis leverage reduce their leverage post-crisis, other firms increase their leverage. Specifically, firms in the top quartile of leverage reduce their leverage by approximately 8% post-crisis, while firms in the bottom quartile of leverage increase their leverage by 10% post-crisis. The [difference-in-difference](#) change in leverage between firms in the top and bottom quartiles is 18% and significant at the 1% level.

In terms of board meetings, column 5 shows that pre-crisis, there is no significant difference in board meetings between the lowest and highest leverage quartiles. However, after the financial crisis, we observe a significant change in board meetings: boards of the higher leverage firms increase their activity whereas boards of the lower leverage firms decrease their activity (column 6). In particular, boards of the highest leverage group had an average of 0.88 additional meetings per year, while there is a decline of 0.69 meetings per year for boards in the lowest leverage group. The difference-in-difference of 1.68 meetings is significant at the 1% level. In summary, the results in [Table 6](#) indicate that boards change their activity and firm leverage after the financial crisis conditioned on the pre-crisis leverage. Moreover, it seems that highly levered firms reduce their leverage significantly after the financial crisis.

To further explore the findings in [Table 6](#) we turn to a [multivariate analysis](#). Our dependent variable is *Change in Leverage* which, again, is measured as the difference between the current leverage and pre-crisis leverage (i.e. leverage as of 2006). The explanatory variables include *Abnormal Board Meetings*, *Experience-weighted Abnormal Board Meetings*, *RE Experience-weighted Abnormal Board Meetings*, *FIN Experience-weighted Abnormal Board Meetings*, cumulative stock return during the financial crisis (*Cumulative Return 2007–2009*), and other accounting variables as before. In addition, in Models 6–8, we include an indicator variable *Negative Leverage* which takes a value of one if in 2006 the firm's return (EBITDA / (Equity Market Capitalization + Book Value of Debt)) is less than its average cost of debt, and zero otherwise. Except for *Cumulative Return 2007–2009* and *Negative Leverage*, other variables are lagged one year. The results are reported in [Table 7](#). Models 1–6 are for the full sample. Model 7 is for REITs in the highest pre-crisis leverage quartile, and Model 8 for REITs in the lowest pre-crisis leverage quartile.

Table 7. Board activity and [leverage](#) post-crisis.

This table models the change in leverage from 2009 to 2016. The dependent variable is *Change in Leverage* which is measured as the difference between market leverage at the end of a fiscal year between 2009 and 2016 and the 2006 market leverage. *Abnormal Board Meetings* is measured as the difference between the number of board meetings in a particular year and the average number of board meetings from 2003 to 2006 (i.e. the pre-crisis period). *Exp. Weighted Abnormal Board Meetings*, *RE Exp. Weighted Abnormal Board Meetings*, and *FIN Exp. Weighted Abnormal Board Meetings* are calculated as the product of *Abnormal Board Meetings* and *FIN&RE Experience*, *RE Experience*, and *FIN Experience*, respectively. *Negative Leverage* is an indicator variable that takes a value of one if the firm's return calculated as EBITA / (Equity Market Capitalization + Book Value of Debt) is less than its weighted average cost of debt (see [Appendix 2](#) for other variable definitions). Explanatory variables are measured at the end of the previous year and are standardized at the mean and have unit variance. Models 1–6 report the results from the full sample while Models 7 (Model 8) report the results from sub-samples of firms for which the 2006 leverage is in the top (bottom) quartile. P-values are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively, in two-tailed tests.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	0.0332*	0.0477**	0.0477**	0.0473**	0.0473**	0.0487**	0.0023	0.1765***
	[0.071]	[0.015]	[0.015]	[0.016]	[0.015]	[0.024]	[0.977]	[<0.0001]
Ab. board meetings		-0.0073*						
		[0.094]						
Exp. weighted ab. board meetings			-0.0010**					
			[0.018]					
RE exp. weighted ab. board meetings				-0.0002				
				[0.437]				
FIN exp. weighted ab. board meetings					-0.0017***	-0.0019***	-0.0054**	-0.0014**
					[0.000]	[0.000]	[0.014]	[0.043]
Negative leverage						-0.0238**	0.0750	-0.0914***
						[0.028]	[0.101]	[0.009]
Cumulative return 1/2007–2/2009	0.0050	0.0097	0.0095	0.0092	0.0092	0.0131	-0.0011	0.0454**
	[0.53]	[0.292]	[0.301]	[0.31]	[0.309]	[0.171]	[0.95]	[0.03]
Ln(total assets)	-0.0323***	-0.0189**	-0.0190**	-0.0195**	-0.0175**	-0.0011	0.1601**	0.0233
	[<0.0001]	[0.032]	[0.0]	[0.027]	[0.044]	[0.921]	[0.018]	[0.242]
Firm Q	-0.0137**	-0.0161**	-0.0157**	-0.0163**	-0.0143**	-0.0153*	0.1226*	-0.0051
	[0.035]	[0.022]	[0.025]	[0.02]	[0.040]	[0.062]	[0.080]	[0.595]
Cash/total assets	-0.0258*	-0.0336*	-0.0343*	-0.0337*	-0.0330*	-0.0327	-0.1144	-0.0362*
	[0.076]	[0.081]	[0.07]	[0.080]	[0.082]	[0.129]	[0.160]	[0.083]
Market leverage	0.0606***	0.0540***	0.0547***	0.0527***	0.0563***	0.0515***	0.2191***	0.1231***
	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]
FFO per share	0.0242***	0.0145***	0.0145***	0.0145***	0.0143***	0.0044	-0.0681*	-0.0247

	[<0.0001]	[0.000]	[0.00]	[0.000]	[0.000]	[0.693]	[0.080]	[0.32]
Preferred stock	0.0100***	0.0090**	0.0089**	0.0084**	0.0096**	0.0104**	-0.0467*	0.0032
	[0.009]	[0.033]	[0.03]	[0.045]	[0.021]	[0.02]	[0.094]	[0.568]
Variable rate debt/total debt	0.0215***	0.0211***	0.0213***	0.0207***	0.0225***	0.0232***	0.0030	0.0043
	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[0.89]	[0.589]
Debt due in 1 year/total debt	0.0032	-0.0056	-0.0059	-0.0054	-0.0076	-0.0103	-0.0214	-0.0015
	[0.801]	[0.687]	[0.671]	[0.696]	[0.579]	[0.470]	[0.723]	[0.884]
Debt due in 2–3 year/total debt	0.0136	0.0190*	0.0190*	0.0187*	0.0197*	0.0172	0.0361	0.0016
	[0.159]	[0.064]	[0.064]	[0.069]	[0.052]	[0.105]	[0.447]	[0.8]
Ln(board size)		-0.0031	-0.0024	-0.0025	-0.0038	-0.0039	0.0318	-0.0282**
		[0.608]	[0.686]	[0.675]	[0.519]	[0.549]	[0.197]	[0.014]
Board independence		-0.0266***	-0.0263***	-0.0264***	-0.0256***	-0.0231***	0.0014	-0.0370***
		[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[0.000]	[0.959]	[0.000]
REIT types	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Num of obs	674	500	500	500	500	434	63	106
Adj R-Sq	0.3434	0.3870	0.3906	0.3842	0.4022	0.3653	0.8110	0.8307

The results in [Table 7](#) suggest that, absent any conditioning on the pre-crisis leverage, different measures of excess board activity are negatively associated with *Change in Leverage* post-crisis. In terms of economic significance, for example, a one-standard-deviation change in *Abnormal Board Meetings* is associated with 0.7% change in post-crisis leverage (Model 2) while a one-standard-deviation change in *Experience-weighted Abnormal Board Meetings* is associated with 0.1% change in post-crisis leverage (Model 3). When we separate director experience into real estate and finance experience, we find that *FIN Experience-weighted Abnormal Board Meetings* is negatively associated with *Change in Leverage* post-crisis (Model 5). However, there is no significant association between *RE Experience-weighted Abnormal Board Meetings* and *Change in Leverage* post-crisis (Model 4). These findings are consistent with the argument that financial experience (rather than the real estate experience) is more relevant in making [capital structure](#) decisions during our sample period. We also find that firms whose return is less than cost of debt (i.e. negative leverage in 2006) lower their leverage post-crisis (Model 6).

In terms of control variables, we find that larger firms, firms with higher Tobin's Q and higher Cash/Total Assets tends to lower their leverage post-crisis (Models 1–5). For example, one standard deviation increase in $\ln(\text{Total Assets})$, *Firm Q*, or *Cash/Total Assets* is associated with 1–3% decrease in leverage after the financial crisis (Model 1). In addition, prior year's leverage is positively associated with the change in leverage. A one-standard-deviation change in the prior year's leverage is associated with 5–6% increase in the change in post-crisis leverage (Models 1–5).

When we divide our sample into firms with high and low pre-crisis leverage, we find that excess board activity as measured by *FIN Experience-weighted Abnormal Board Meetings* is negatively associated with the change in leverage post-crisis for both samples but more so among high levered firms. In particular, a one-standard-deviation change in *FIN Experience-weighted Abnormal Board Meetings* is associated with a 0.5% change in post-crisis leverage for high levered firms (Model 6) and 0.1% for low levered firms (Model 7). Interestingly, negative leverage is still negatively associated with decreasing leverage, but only for the sample of low levered firms. Overall, the results in [Table 7](#) are consistent with the findings in [Table 6](#) and with the hypothesis that post-crisis, firms with high pre-crisis leverage and more active boards lower their leverage. The potential explanation is that active boards learn from their experience during the crisis and adjust to a more conservative capital structure.

Finally, we examine the association between board activity, leverage, and firm performance after the financial crisis. Our dependent variable is the cumulative stock return from March 2009 to December 2016 (*Cumulative Return 2009–2016*). In [Table 8](#), Model 1 is similar to [Sun et al.'s \(2015\)](#) in order to facilitate a comparison of results (although their sample ends in 2011). In Models 2 and 3, we add *Abnormal Board Meetings* and *Experience-weighted Abnormal Board Meetings* during the financial crisis, respectively. In Model 4 we incorporate board size and board independence and in Model 5 we include an indicator (*S&L Crisis Exp.*) that takes a value of one if the board has at least on director whose managerial experience include the Savings and Loans crisis in the early 1980s. Lastly, we include an indicator variable *High Leverage* and the interaction of *High Leverage* with *Experience-weighted Abnormal Board Meetings* during the financial crisis (Model 6). Again, except for board activity which is measured during the financial crisis, all other explanatory variables are measured at the end of 2006, the pre-crisis level.

Table 8. Board activity, [leverage](#) and firm performance post-crisis.

This table reports the association between board activity, leverage and firm performance after the [financial crisis](#). The dependent variable is cumulative monthly [stock returns](#) between March 2009 and December 2016 (*Cumulative Return 2009–2016*). *Market Leverage* is defined as the ratio of total debt (the book value of debt due in one year plus long-term debt) to market value of the firm (total debt plus book value of preferred stock plus market capitalization). *Abnormal Board Meetings* during the financial crisis is measured as the difference between the number of board meetings during 2007 and 2008 and the average number of board meetings from 2003 to 2006 (i.e. the pre-crisis period). *Exp. Weighted Abnormal Board Meetings* is calculated as the product of *FIN&RE Experience* and *Abnormal Board Meetings*. *S&L Crisis Exp.* is an indicator variable that takes the value of one if at least one director has managerial experience in real estate or finance in the 1980s. *High Leverage* is an indicator variable that takes the value of one if the firm's market leverage is in the top quartile, and zero otherwise (see [Appendix 2](#) for other variable definitions). Explanatory variables are measured at the end of 2006 and are standardized at the mean and have unit variance. P-values are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively, in two-tailed tests.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	4.8297***	4.3256***	4.3955***	4.3890***	4.7959***	4.7711***
	[0.001]	[0.003]	[0.002]	[0.003]	[0.003]	[0.005]
Market leverage	0.9897	0.6887	0.6686	0.7998	0.8260	
	[0.158]	[0.328]	[0.344]	[0.268]	[0.255]	
Ab. board meetings during crisis		0.7935*				
		[0.054]				
Exp. weighted ab. board Meetings during crisis			0.0885*	0.1015**	0.1067**	0.1777***
			[0.057]	[0.04]	[0.034]	[0.009]
S&L crisis exp.					-0.7033	-0.8007
					[0.422]	[0.371]
High leverage						0.9696
						[0.363]
High leverage* exp. Weighted ab. board meetings						-0.1480
						[0.130]
Ln(total assets)	0.5298	0.3779	0.3385	0.0065	0.1306	0.2824
	[0.344]	[0.497]	[0.546]	[0.991]	[0.836]	[0.656]
Firm Q	-0.404	-0.521	-0.5826	-0.4821	-0.3259	-0.6688
	[0.590]	[0.482]	[0.434]	[0.530]	[0.681]	[0.334]
FFO per share	-0.935**	-0.974***	-0.9785***	-1.0703***	-0.9975***	-1.0296***
	[0.01]	[0.006]	[0.006]	[0.003]	[0.008]	[0.007]
Cash/total assets	0.4974	0.3189	0.3859	0.5618	0.5926	0.2885
	[0.552]	[0.701]	[0.642]	[0.512]	[0.491]	[0.73]
Variable rate debt/total debt	0.4318	0.3857	0.3843	0.5166	0.5012	0.5311
	[0.253]	[0.301]	[0.303]	[0.18]	[0.19]	[0.179]

Debt due in 1 year/total debt	1.18	0.9713	1.1920	0.7583	0.7285	1.1198
	[0.608]	[0.669]	[0.600]	[0.74]	[0.752]	[0.630]
Debt due in 2–3 year/total debt	-1.167	-1.146	-1.1628	-1.0912	-0.9474	-0.7746
	[0.192]	[0.197]	[0.1]	[0.226]	[0.303]	[0.400]
Ln(board size)				0.5588	0.6383	0.6040
				[0.20]	[0.161]	[0.186]
Board independence				0.2048	0.2366	0.4458
				[0.645]	[0.597]	[0.326]
REIT types	Yes	Yes	Yes	Yes	Yes	Yes
Num of obs	93	93	93	92	91	91
R-square	0.3527	0.3854	0.3848	0.4055	0.4109	0.4278

Across all models, we find that post-crisis, leverage is no longer negatively associated with stock returns.⁶ More importantly, we find that excess board activity during the financial crisis is positively associated with stock returns post-crisis. For example, in Model 2, a one-standard-deviation increase in abnormal board meetings during the financial crisis is associated with an increase in cumulative stock return of approximately 80% post-crisis (or 8.7% annually), comparable to [Sun et al. \(2015\)](#).² However, neither the coefficient of the indicator capturing experience during the 1980s crisis, high leverage, nor the interaction term with abnormal meetings is significantly associated with post-crisis returns. Overall, the results in [Table 8](#) provide some support for the hypothesis that firms with more active boards have higher returns post-crisis. This finding is also consistent with the finding of [Vafaes \(1999\)](#) that firm performance improves following years of abnormal board activity.

6. Conclusion

[Capital structure](#), [corporate governance](#), and how they are linked to each other and to firm performance have been studied extensively. While [capital structure theory](#) predicts a positive association between [leverage](#) and firm performance, the empirical evidence on this issue is mixed. Similarly, there is conflicting evidence on the link between corporate boards, arguably the most important component of corporate governance, and firm performance. In this paper, we re-examine the negative association between leverage and [stock returns](#) reported in the more recent literature. In doing so we also consider the potential for board activity to influence this link. Specifically, we focus on a sample of REITs from 2003 to 2016. REITs provide an ideal setting because of their high leverage and the volatility that the industry experienced during the [financial crisis](#).

We find that, during the financial crisis, board activity at REITs increased, especially among firms with high leverage. This finding is consistent with directors increasing their monitoring and advising according to the firm's demand for such input from the board. Further, we show that after controlling for potential endogeneity concerns, board activity helps mitigate the previously reported negative effect of leverage on returns during the financial crisis. Post-crisis, we find evidence that firms with more active boards adjust their leverage. REITs with high pre-crisis leverage firms reduce their leverage, while those with low pre-crisis leverage increase their debt. This finding is consistent with boards learning from their experience during the financial crisis and adjusting the firm's capital structure. Finally, we find some evidence suggesting that post-crisis, firms with more active boards have better returns. This is consistent with [prior](#) evidence suggesting that firm performance improves following years of abnormal board activity. Our findings are robust to using different measures of activity that take into account director experience in real estate and finance.

Our paper contributes to the capital structure literature by providing insights to the “puzzling” negative association between leverage and firm performance. In addition, we add to the literature on corporate boards by providing evidence on how boards can add value. Finally, we add to the literature on corporate governance in REITs by examining a different dimension of corporate boards, board activity, which has been shown to be informative for non-REITs firms.

Appendix 1. Data construction

Dataset	Firms	Firm-year obs
Ziman REIT database between 2003 and 2016	275	
Merge with Compustat	246	1811
Merge with CRSP	243	1755
Merge with MyLogIQ, MorningStar, and hand-collected data from proxy statements, Bloomberg and LinkedIn	222	1701
2006 sub-sample	137	

Appendix 2. Variable definitions

Variable	Definition
Board characteristics	
Board meetings	The number of board meetings during the fiscal year.
Committee meetings	The aggregate number of Audit, Compensation and Nominating/Governance committee meetings during the fiscal year.
Abnormal board meetings	The difference between the number of board meetings in a particular year during or post-crisis periods and the average number of board meetings pre-crisis period (from 2003 to 2006).
Abnormal committee meetings	The difference between the number of committee meetings in a particular year during or post-crisis periods and the corresponding average number of committee meetings pre-crisis period (from 2003 to 2006).
FIN experience	The average across the whole board of the number of years of managerial experience in finance.
RE experience	The average across the whole board of the number of years of managerial experience in real estate.
FIN & RE experience	The average across the whole board of the number of years of managerial experience in finance or real estate.
Exp. weighted ab. board meetings	The product of Abnormal Board Meetings and FIN & RE Experience.
FIN exp. weighted ab. board meetings	The product of Abnormal Board Meetings and FIN Experience.
RE exp. weighted ab. board meetings	The product of Abnormal Board Meetings and RE Experience.
S&L crisis exp.	An indicator variable that takes a value of one if at least one director has managerial experience in real estate or finance in the 1980s.
Board size	The total number of directors on the board.
Board independence	The proportion of independent directors on the board.
Firm characteristics	
Cumulative return 2007–2009	Cumulative monthly rates of return from January 2007 to February 2009.
Cumulative return 2009–2016	Cumulative monthly rates of return from March 2009 to December 2016.
Market leverage	The ratio of total debt (the book value of debt due in one year plus long-term debt) to the market value of the firm (total debt plus book value of preferred stock plus market capitalization).
High leverage	An indicator variable that takes the value of one if the firm's market leverage is in the top quartile, and zero otherwise.
Firm Q	The firm's Tobin's Q, calculated as the market value of equity plus total assets minus the book value of common equity, divided by the book value of assets.
Firm size	The natural logarithm of total assets.
FFO per share	Funds from operations per share.
Cash/total assets	The ratio of cash and cash equivalents to total assets.
Preferred stock	The ratio of book value of preferred stock to the market value of the firm (total debt plus book value of preferred stock plus market capitalization).
Variable rate debt/total debt	The ratio of variable interest rate debt to total debt.

Debt due in 1 year/total debt	The ratio of debt due in one year to total debt.
Debt due in 2–3 year/total debt	The ratio of debt due in two or three years to total debt.
Negative leverage	An indicator variable that takes a value of one if the firm's return calculated as EBITA/ (Equity Market Capitalization + Book Value of Debt) is less than its weighted average cost of debt.
REIT types	The set of indicator variables that take value of one if the REIT is classified as Lodging/Resorts, Residential, Industrial/Office, Retail, Diversified, Healthcare, Self-Storage, Mortgage, and Mortgage Back Securities, respectively. Others is the base category.

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¹<https://www.reit.com/data-research/reit-indexes/monthly-index-values-returns>.

²Our weighted measures of director activity are similar in spirit to those in [Brick and Chidambaran \(2010\)](#) except that they weight meetings by the proportion of independent directors on the board. Explanations for the difference are threefold (i) their focus is on board monitoring which is arguably is affected by the

level of director independence while our focus is on director functions more generally (i.e. both monitoring and advising), (ii) we include board independence as a control variable, and (iii) they do not consider measures of director expertise.

³The Ziman REIT database on CRSP includes the following property types: Lodging/Resorts, Residential, Industrial/Office, Retail, Diversified, Healthcare, Self-Storage, Mortgage, Mortgage Back Securities, and Others.

⁴The number of monitoring committee meetings is lower than reported in [Nguyen \(2014\)](#) as her sample comprises S&P 1500 firms and meetings for the Audit, Compensation, Nomination/Governance, and all other monitoring committees.

⁵

As robustness tests, we also use the FIN Exp weighted-, RE Exp weighted-, and non-weighted abnormal board activity during the financial crisis (one at a time) and the results (not tabulated) are similar.

⁶[Sun et al. \(2015\)](#) only find a marginally significant positive association between leverage and returns in two out of seven specifications.

⁷Note that from January 2007 to February 2009, NAREIT All REIT index had dropped >70% and from February 2009 to December 2016, it had bounced up by approximately 220% (<https://www.reit.com/data-research/reit-indexes/monthly-index-values-returns>).