UNDERSTANDING HETEROGENEOUS BOARD BUSYNESS: DETERMINANTS AND IMPLICATIONS

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Understanding Heterogeneous Board Busyness: Determinants and Implications

Thesis directed by Professor Yonca Ertimur

I examine the determinants and consequences of board busyness. Regarding determinants, I find that board busyness decreases with firms' monitoring demand and increases with their advising demand. I also find that agency problems and labor market frictions are associated with greater board busyness. Further, firms with high advising and low monitoring demands tend to adopt more lenient policies governing director busyness. To examine implications, I separate board busyness into the demand-based component (explained by firms' combined advising and monitoring demand), the overboarding component (explained by agency problems and labor market frictions), and the remaining unexplained component. I find consistently positive associations between the demand-based component and firm performance. In contrast, the association between the overboarding component and firm performance is negative. Finally, I exploit negative shocks to busyness at director-interlocked firms induced by M&A activity. I find that the effect of these negative shocks on director-interlocked firms' performance decreases with firms' advising demand and increases with firms' monitoring demand. Collectively, the results suggest that the composition of board busyness, not its level per se, has important performance implications. My findings do not support one-size-fits-all limits on board busyness.

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CHAPTER 1

INTRODUCTION

In this thesis, I study the determinants and consequences of board busyness.[1] With respect to determinants, I examine how the expected level of board busyness varies with firms' advising and monitoring demands. I also study how factors associated with agency problems and director labor market frictions can drive board busyness to deviate upward from the level expected based on advising and monitoring demand. In assessing consequences, I separate board busyness into the demand-based component of busyness (i.e., the portion explained by firms' combined monitoring and advising demand), the overboarding component (i.e., the portion explained by agency problems and director labor market frictions), and the unexplained portion, and examine their associations with firm performance.

In the director labor market, board busyness is determined by a matching process in which directors with specific advising and monitoring ability match to firms with specific advising and monitoring needs. I argue that a higher number of board seats per director signals both higher advising quality and lower monitoring quality, and that firms use this signal to trade-off advising and monitoring quality based on their particular needs. If this is the case, firm-specific demand for advising and monitoring services, combined with the competing effects of director busyness on board advising quality and monitoring quality, lead to heterogeneous levels of expected board

[1] Qualified directors in high demand usually serve on several public boards, limiting the time and effort they can devote to each directorship. Prior studies typically classify directors with three or more seats as busy directors (e.g., Core, Holthausen, and Larcker, 1999; Ferris, Jagannathan, and Pritchard, 2003; Perry and Peyer, 2005; Fich and Shivdasani, 2006; Field, Lowry, and Mkrtchyan, 2013; Falato, Kadyrzhanova, and Lel, 2014). Board busyness refers to the busyness level of the entire board of directors. Prior studies either consider boards where the majority of directors are busy as busy boards or use the average number of seats across all directors on the board as a continuous measure of board busyness. I rely on the latter approach as the main measure of board busyness. Throughout the text, I use the terms busyness, multiple directorships, and overboarding interchangeably to refer to the construct of busyness.

busyness. This argument builds on two assumptions implicitly or explicitly suggested in prior research. First, the qualification effect manifests primarily through good advising quality, while the distraction effect manifests mainly through poor monitoring quality. For example, Field et al. (2013) suggest that busy directors' experience and networks enhance their advising quality. Falato et al. (2014) provide evidence that busy directors damage board monitoring effectiveness. Second, both effects manifest simultaneously for any given busy director. In other words, a busy director is likely to be both more capable and more distracted.[2] To provide structure for my predictions, I develop an analytical model (presented in Appendix B), where a firm considers its specific advising and monitoring demands in determining an optimal combination of board advising quality and monitoring quality, which manifests as its optimal level of board busyness. The model predicts that there exist firm-specific optimal levels of board busyness, which are positively related to the firms' advising demand and negatively to their monitoring demand.

Building on the implications of the analytical model, I formulate predictions about the determinants of board busyness. Specifically, I predict that expected board busyness is positively related to factors that capture advising demand and negatively related to factors that capture monitoring demand. Meanwhile, several observable and unobservable factors can cause board busyness to deviate from its expected level. Agency problems such as an entrenched CEO and director labor market frictions resulting from limited supply of qualified directors are examples of such factors. Therefore, I predict that observed levels of board busyness are positively related to agency problems and labor market frictions. With respect to consequences, I predict that the portion of board busyness explained by firms' combined monitoring and advising demand is

[2] Per Adams, Hermalin, and Weisbach (2010): "is the fact that busy directors are likely to be relatively high quality directors more important than the impact of their potential lack of time on their effectiveness?"

positively related to firm performance, while the portion explained by agency problems and director labor market frictions is negatively associated with firm performance.

To empirically test the above predictions, I construct a dataset of directors at S&P 1500 firms between 2000 and 2015. I first estimate a determinants model for board busyness. I rely on proxies for firm complexity and management experience to capture advising demand, and proxies for the efficiency of external monitoring mechanisms to capture monitoring demand. I use proxies for entrenched CEO and board to capture agency problems, and proxies for the difficulty of firms to recruit qualified directors to capture director labor market frictions. Consistent with predictions, the results indicate that board busyness measures decrease with monitoring demand and increase with advising demand, agency problems, and labor market frictions.

To conduct the consequences tests, I first separate board busyness into three components using the estimated coefficients from the determinants regressions: the *demand-based component* (observed busyness explained by firms' combined advising and monitoring demands), the *overboarding component* (observed busyness resulting from agency problems and director labor market frictions), and the *unexplained deviation component* (absolute value of the residual from the determinants model). Next, I examine the relation between these three components and performance as measured by return on assets, Tobin's Q, voting outcomes of director elections, and director attendance at board meetings. I find a positive (negative) association between the demand-based component (overboarding component) and performance, and weak evidence of a negative association between the unexplained deviation component and performance.

The core results document that board busyness varies predictably across firms with advising and monitoring demand and highlight the importance of considering the components of observed board busyness to evaluate its consequences. Next, I conduct two additional analyses regarding determinants and consequences respectively. First, I examine the determinants of firms' overboarding policies. This allows me to assess whether firms take into account their advising and monitoring needs when they set specific limits for number of seats their directors can hold. Using textual analysis, I obtain information about overboarding policies from S&P 500 firms' corporate governance guidelines during 2014-2015. I then examine the association between these firm-specific overboarding policies and factors capturing firms' advising and monitoring demands. The results indicate that firms with high advising and low monitoring demand (e.g., diversified firms, R&D intensive firms, young firms, volatile firms and firms with high institutional ownership) tend to adopt more lenient overboarding policies.

Second, I exploit exogenous shocks to board busyness driven by M&A activity. These are cases where the entire board of a target firm is dissolved because of M&A activity, resulting in a negative shock to board busyness at firms with a director interlocked to the dissolved board. Two prior studies, Hauser (2018) and Brown et al. (forthcoming), show that these negative shocks have a significant effect on the performance of director-interlocked firms. I find that the advising and monitoring demands of the director-interlocked firms moderate the effect documented in these studies. Specifically, the impact of the negative shock on firm value decreases in the firm's advising demand and increases in monitoring demand (i.e., the impact is more negative when the demand components of board busyness is higher). The effect is economically meaningful. The affected director-interlocked firms in the top quintile of high advising demand and low monitoring demand experience a 6.7% decrease in Tobin's Q, pre- versus post-M&A, while those in the bottom quintile of high advising demand and low monitoring experience a 1.1% increase in

Tobin's Q.[3] These results suggest that the cost-benefit tradeoff of the negative shock to multiple directorships varies across firms based on their particular demands.

To shed more light on busyness heterogeneity, I also examine the variation in busyness across different committees within a board. I find that the audit (nominating) committee busyness is positively (negatively) related to performance, suggesting that committee members with more (less) transferable skills and less (more) agency problems are less (more) likely to be over-boarded.

In a related paper, Coles, Daniel, and Naveen (2012) examine how the board's advising quality, as captured by the board's connections, relates to a firm's advising demand and firm value. Coles et al. (2012) find that boards' connections are positively associated with firm complexity, a proxy for advising demand, and that the sensitivity of firm value to boards' connections is positively associated with firm complexity. To the extent that busy boards are better connected in director networks, these findings are consistent with my results. However, my study differs from Coles et al. (2012) in several ways. First, the analytical model and empirical tests integrate both advising demand and monitoring demand in determining the expected levels of board busyness. Second, Coles et al. (2012) focuses on the construction and validation of the measures of board advising quality, while my focus is on how firms' advising and monitoring demand are relevant in determining the expected levels of board busyness.

My study makes several contributions. First, I contribute to the literature on the relation between board busyness and firm performance (e.g., Core et al., 1999; Ferris et al., 2003; Perry and Peyer, 2005; Fich and Shivdasani, 2006; Field et al., 2013; Falato et al., 2014; Hauser, 2018;

[3] To provide context for these changes in Tobin's Q, Hauser (2018) documents changes in Tobin's ranging from 0.95% to 1.62%, Brown et al. (forthcoming) record a 3% difference of changes in Tobin's Q between the top and bottom quintiles of target firm connections.

Brown et al., forthcoming; Masulis and Zhang, forthcoming). My study provides new insights into board busyness by relaxing the implicit assumption underlying these studies that firms have homogenous benchmarks for board busyness. I show analytically and empirically that the expected levels of board busyness vary positively with firms' advising demand and negatively with firms' monitoring demand. I further show that the demand-based component of board busyness is associated with positive firm performance while the overboarding component manifests a negative association. As such, I provide a potential explanation for conflicting results in prior literature. Overall, one key takeaway from my study is that the composition of board busyness, not its level per se, has important firm value implications. Therefore, shareholders, regulators, and proxy advisors should be cautious in setting mandatory one-size-fits-all limits of board busyness.

Second, I complement studies that assess causality using exogenous events as shocks to director busyness (e.g., Falato et al., 2014; Hauser, 2018; Brown et al., forthcoming; Masulis and Zhang, forthcoming). My results emphasize that the causal effect of multiple directorships on performance also depends on firm-specific demand. For practitioners and policymakers, the results suggest that firm and board heterogeneity play important roles in the relation between busyness and performance, and thus do not support the call for setting one-size-fits-all restrictions on director busyness.

Third, this study contributes to the broader board composition, function, and effectiveness literature. While prior studies primarily focus on board independence and monitoring functions, a growing literature investigates the advisory role of directors (e.g. Song and Thakor, 2006; Adams and Ferreira, 2007; Coles, Daniel and Naveen, 2008, 2012; Field et al., 2013; Larcker et al., 2013; Schmidt, 2015, Brown et al., 2018). I add to this stream of literature by providing a framework for measuring firms' advising demand. More importantly, this study complements Field et al. (2013)

by showing that busy directors are overall beneficial as advisors not only to newly public firms and young firms but also to a broader set of firms with high advising and low monitoring demands.

CHAPTER 2

RELATED LITERATURE AND HYPOTHESES DEVELOPMENT

2.1. Related Literature

There is extensive research on the effectiveness of busy directors and busy boards. From a theoretical perspective, if board positions are randomly assigned to the same type of directors, then directors with more seats will commit less time and effort to each directorship, leading to less effective boards and lower firm value. However, if board positions are endogenously determined, in the sense that directors with greater reputation, experience, and network resources are rewarded with more board seats (i.e., a greater number of seats is indicative of higher ability), then director busyness should lead to more effective boards and higher firm value. Therefore, the theoretical predictions of the overall effect of director busyness are ambiguous: whether busy directors hurt or enhance shareholder value depends on the tradeoff between the advantages of better qualifications and the disadvantages of greater distraction (See Adams et al., 2010).

Empirical research could help address this ambiguity but provides mixed evidence. For example, Core et al. (1999), Fich and Shivdasani (2006), Falato et al. (2014), and Hauser (2018) show that busy directors hurt firm value due to weak monitoring quality, consistent with the "distraction effect" hypothesis. Ferris et al. (2003), Perry and Peyer (2005), and Field et al. (2013) show that busy directors do not hurt firm value, and may even enhance firm value by providing better advising services, consistent with the "qualification effect" hypothesis. There are various explanations for the mixed results.

First, the dynamics of board busyness changed significantly after the Sarbanes-Oxley Act (SOX) of 2002. However, the effect of SOX on board busyness is largely ambiguous. On one hand, director responsibilities and workload increased dramatically in the post-SOX period along with a significant increase in the demand for and a decrease in the supply of independent directors, raising concerns about director distraction (Linck, Netter, and Yang, 2009; Bar-Hava, Gu, and Lev, 2013; Chen and Moers, 2014). On the other hand, because of the more stringent regulations, higher shareholder scrutiny, and greater pressure from lawsuits and SEC enforcement post-SOX, directors are more cautious in taking on too many board seats and are thus less likely to overcommit themselves.[4] In addition, SOX focuses primarily on the audit and compensation committees, while the nominating/governance committee and other committees are relatively unregulated.[5] Therefore the impact of SOX on director busyness could be asymmetric across committees.

Second, varying methodologies and specifications could result in different results. While early literature commonly uses the traditional ordinary least squares specification, recent studies employ more sophisticated econometric methods and quasi-natural experiment designs to address endogeneity concerns.[6] However, the results of these recent studies are still mixed even when controlling for endogeneity concerns, indicating that this is unlikely the critical explanation.

Third, previous literature relies on alternative definitions of busyness, but most of these definitions assume that all firms have a homogeneous busyness benchmark. This could be problematic given that firms likely have different expected levels of board busyness due to their specific advising and monitoring demands.

[4] For example, Adams and Ferreira (2012) and Hauser (2018) document that director attendance problems at board meetings decreased significantly post-SOX.

[5] According to Spencer and Stuart U.S. Board Index 2012-2016, nominating committee has a lower presence among public firms, a higher percentage of executive directors, and a higher percentage of directors with multiple seats, compared with the audit and compensation committees.

[6] Field et al. (2013) use a two-stage model with two instruments for busy directors, the number of independent directors who are older than 60 and an indicator variable for whether an IPO firm headquartered in Silicon Valley. Falato et al. (2014) employ a difference-in-differences research design and utilize director death as an exogenous attention shock to directors who sit on the same committee as the deceased directors at an interlocked firm.

2.2. Hypothesis Development

This study examines the implications of firm heterogeneity on the relation between board busyness and firm performance. I argue that, depending on firms' heterogeneous demand for board services, different firms have different expected levels of board busyness to maximize firm value. An analytical model, which is presented in Appendix B, formalizes this argument. The intuition of the model is that a firm chooses an optimal combination of board advising quality and monitoring quality based on its advising and monitoring demands. This optimal combination of board advising quality and monitoring quality is manifested as its optimal level of board busyness, given the conflicting effects of director busyness on advising quality and monitoring quality. The model predicts that there exist heterogeneous optimal levels of board busyness, which are positively related to firms' advising demand and negatively related to monitoring demand. Therefore, the first hypothesis is:

H1: *The level of board busyness increases with firm demand for board advising services and decreases with demand for board monitoring services.*

To the extent that H1 holds, firms with higher expected levels of board busyness tend to: (1) have a relatively higher demand for board advising services and thus can better use busy directors' higher advising ability, and/or (2) have a relatively lower demand for board monitoring services because other monitoring mechanisms efficiently address agency problems, alleviating the concern of busy directors' lower monitoring quality. Therefore, I expect a positive association between firm performance and the demand-based component which captures the magnitude of firms' advising demand relative to monitoring demand.

In practice, several observable and unobservable factors can result in deviations of board busyness from its expected level. I focus on three observable factors that could cause board busyness to deviate upward from its expected level. First, a CEO-chair may have both the ability and the incentive to cause upward deviation of board busyness from its expected level. For example, Core et al. (1999) show that a busy board provides its CEO with excessive compensation. Fich and Shivdasani (2006) report that a busy board is less likely to fire a CEO when firm performance declines. Coles, Daniel, and Naveen (2014) find that directors co-opted by the CEO decrease monitoring effectiveness.

Second, entrenched directors could cause board busyness to deviate upward from its expected level. The private benefit of increasing visibility and prestige by taking on more board positions primarily go to the individual director, while the potential distraction cost is shared by all stakeholders of the firms the director is serving (i.e., free-riding problem). Therefore, a director may prefer to take on more board positions than the firm's expected level. This preference will cause agency problems between the individual director and other stakeholders. For example, if the management team or the entire board do not counterbalance the individual director, the director may take too many seats.

Third, director labor market frictions can cause deviation when it takes significant time and cost to replace directors or the supply of directors is limited (Coles et al., 2008). Previous studies find that the director labor market has non-trivial frictions (Mortensen and Pissarides, 1999; Rogerson, Shimer, and Wright, 2005; Rajgopal, Shivaram, Taylor, and Venkatachalam, 2012), and that the supply of qualified directors, especially those with financial expertise and CEO experience, are constrained during the post-SOX era (Knyazeva, Knyazeva, and Masulis, 2013; Armstrong, Kepler, and Tsui, 2018).

Because upward deviations from the expected levels of board busyness are detrimental to firm performance, I expect a negative association between firm performance and the overboarding component which is related to forces that cause upward deviations. Further, after conditioning on observable determinants, firms with too many or too few busy directors (unsigned deviations) would be bad for performance. If the absolute values of the regression residuals represent the unsigned deviations induced by unobservable variables, I expect a negative association between the unexplained component and future performance. However, if the unexplained component is induced merely by a misspecified model of the determinants of board busyness (i.e., the unexplained deviation component captures unobserved variables that relate to either the demand-based component or the overboarding component), no association is expected. These arguments lead to the second hypothesis (H2c is stated in the null form):

H2a: *The demand-based component of board busyness is positively related to firm performance.*

H2b: *The overboarding component of board busyness is negatively related to firm performance.*

H2c: *The unexplained component of board busyness is not related to firm performance.*

To shed more light on busyness heterogeneity, I also examine the variation in busyness across different committees within a board. Specifically, I consider the different characteristics of board committees and examine the relation between committee busyness and performance. This investigation provides two merits. First, the committee level measures of multiple directorships can better capture how busy directors are allocated among different jobs, functions, and committees, enabling me to detect potentially differing associations between busyness and performance across committees (Klein, 1998). Second, more and more board functions have been delegated to committees, and "ignoring them leads to an incomplete picture of corporate boards" (Klein, 1998; Adams, et al., 2015; Chen and Wu, 2016).

This analysis focuses on the nominating committee and the audit committee for three reasons. First, SEC and major stock exchanges have mandated public firms to have audit, compensation, and nominating/corporate governance committees since 2002. Therefore, almost every board has nominating, audit, and compensation committees whose duties are usually clearly defined and similar across firms. Second, while these required committees are all monitoring committees, their specific functions differ. Specifically, the nominating committee has the most general governance duties and authorities, such as setting governance guidelines and procedures, nominating candidates for board and executive team, and assigning directors to committees (De Kluyver, 2009). Conversely, the audit committee's responsibilities center on the oversight of financial reporting quality and internal control. Third, the nominating committee and audit committee have been the focus of several studies examining committees (e.g., Klein, 2002; Srinivasan, 2005; Brochet and Srinivasan, 2014; Guo and Masulis, 2015).

Linck et al. (2008) propose that outside directors bring the benefits of valuable skills and expertise, but also incur the costs associated with transforming outside directors' skills and expertise to the specific firm and free-rider problems. They find that the board structure varies across firms and reflect the tradeoff of the above costs and benefits. Murphy and Zabojnik (2004, 2007) argue that general skills which are transferable across firms and industries are more important in managing firms and are priced higher in the managerial labor market, compared with the firm- and industry-specific skills. Similarly, in the director labor market, the benefits of greater qualification from director interlocks should depend on the extent to which the director skills accumulated from one board can be easily transferred to other boards. Next, I rely on these arguments and findings to draw predictions for the implications of committee busyness.

No matter which committee a busy director serves, busyness provides both the benefit of higher qualification (e.g., more experience, better expertise, and more extensive networks) and the cost of greater distraction. However, I argue that the benefit relevance of the higher qualification and the incentives to offset the greater distraction vary across committees, making the costs benefits trade-off of director busyness vary across committees.

First, the benefit relevance of the higher qualification is probably higher for audit committee than the nominating committee. The accounting profession has long been characterized by a high level of standardization and harmonization (identical or similar standards and rules). For instance, all firms need to comply with accounting and auditing standards, regardless of what their accounting and auditing practices are. Madsen (2011) documents that accounting has the highest standardization level out of 22 general professions. Bloomfield, Bruggemann, Christensen, and Leuz (2016) find that substantial regulatory harmonization of accounting and auditing standards increases cross-border labor migration for the accounting profession. Therefore, I propose that the greater standardization and uniformity of accounting profession make it easier for a busy director who serves multiple audit committees to transfer financial expertise and accumulated experiences of monitoring financial among multiple audit committees. If this is the case, both audit committee members and firms benefit more from greater experiences and expertise of network externality induced by audit committee members' busyness.

Conversely, the skills required to serve the nominating committees are relatively firm idiosyncratic because good governance practice varies significantly across firms even within the same industry. For example, Hermalin and Weisbach (2003) and Adams et al. (2009) emphasize that firms adopt governance mechanisms and board structures to address their firm-specific agency problems. Armstrong et al. (2010) propose that endogenously determined governance mechanisms are functions of various firm-specific characteristics. Brickley and Zimmerman (2010) argue that firm-specific heterogeneity within an industry could result in "very different optimal governance structures" of firms within that industry. If this is the case, both nominating committee members and firms benefit less from greater firm-specific experience induced by nominating committee members' busyness.

Second, audit committee members are less subject to free-rider problems and have greater incentives to offset the greater distraction of busyness than nominating committee members. Audit committees have concentrated duties in financial reporting while nominating committees have much more general responsibilities, which cover almost all crucial parts of corporate governance and usually shared by the entire board. Therefore, it is harder to distinguish the nominating committee's contribution from the board's aggregate performance, compared with the audit committee's contribution. Alchian and Demsetz, (1972) suggest that incentive to shirk increases when it is hard to separate individual contribution from team performance. Therefore, the audit committee has less incentive to shirk thank the nominating committee.

Third, while the SOX increases the entire board's responsibilities and scrutiny, the effects are asymmetrically greater on audit committees. On the other hand, nominating committee has more discretion in director recruitment process and tend to be associated with executive director interlocks (Shivdasani and Yermack, 1999; Fich and White, 2005). Therefore, audit committee members are more reluctant to take on too many board seats because excessive directorships impose more risk and workload on them.

Fourth, qualified independent directors are in short supply in the post-SOX period, especially for audit committee members. For example, previous literature documents a significant increase in the demand for and a decrease in the supply of independent directors during my sample period, and shows that these changes concentrate primarily on audit committee members and for financial experts (Linck, et al., 2009; Chen and Moers, 2014; Armstrong, et al., 2018). If eligible candidates for audit committee are more likely in short supply, I expect a positive association between audit committee busyness and firm performance.

These arguments lead to the following hypothesis:

H3a: *Firm performance is negatively associated with the busyness of nominating committee.*

H3b: *Firm performance is positively associated with the busyness of audit committee.*

However, it is possible that the audit committee arguably has more monitoring duties and is more time demanding, compared with the nominating committee. If this is the case, the optimal levels of audit committee busyness should be lower than the nominating committee. Then a given busyness level is more likely higher than optimal level for audit committee and lower than optimal level for nominating committee, and the associations in H3a and H3b may not be found.

CHAPTER 3

MEASUREMENT AND RESEARCH DESIGN

3.1. Measurement

3.1.1. Advising demand, monitoring demand, and deviation

A primary challenge to empirically testing the predictions is measuring firms' advising and monitoring demands, and the forces driving board busyness to deviate upward from expected levels. Drawing on the insights and findings in prior studies, I use the following framework to identify a set of observed variables to measure these constructs.[7]

First, firms' advising demand increases with firm's complexity and decreases with management's experience and ability (Fama and Jensen, 1983; Klein, 1998; Adams and Ferreira, 2007). The underlying logic is that a firm needs advising services from its board to complement its management's experience and ability in dealing with operational and business complexity. I use *Diversification* (+), *R&D intensity* (+), *Return variation* (+), *ROA variation* (+) and *Firm size* (+) as proxies for firm complexity, drawing on previous literature (e.g., Hermalin and Weisbach, 1988; Klein, 1998; Lynall, Golden, and Hillman, 2003; Yermack, 2004; Linck, Netter, and Yang, 2008; Coles et al., 2012; Field et al., 2013).[8] I formally define all variables in Appendix A and present the arguments for predicted associations in Appendix D. CEOs accumulate relevant experience, develop valuable connections, and build critical ability to deal with complexity as they stay long in firm and industry (Field et al., 2013). Thus, I use *CEO age* (-) to proxy for

[7] In Appendix C, I perform a factor analysis to provide further evidence of the relations between these observed variables and the underlying constructs they try to capture.

[8] Firm complexity could be associated with its monitoring demand to the extent that information asymmetry between managers and investors is greater for complex firms. I use firm complexity as a determinant of advising demand because prior studies provide direct evidence of the association between firm complexity and advising demand (e.g., Coles et al., 2008, 2012), while the relation between complexity and monitoring demand is conditional on the existence and extent of agency problems.

management's experience and ability to deal with firm complexity. Collectively, these variables approximate a firm's specific demand for board advising services.

Second, a firm's monitoring demand decreases with the efficiency of other monitoring mechanisms in addressing agency problems that arise from the separation of firm ownership and control (e.g., Jensen and Meckling, 1976; Fama,1980; Jensen, 1993). The underlying logic is that board monitoring can be mitigated if other monitoring mechanisms could efficiently discipline management.[9] Specifically, I use CEO delta as a proxy for agency problems because it captures how well managers' interests align with those of shareholders (e.g., Core et al. [1999], Core, Guay, and Thomas [2005], Armstrong, Larcker, and Su [2010]). *Institutional ownership* (-) and *Blockholder indicator* (-) capture the monitoring function of large shareholders because firms with higher institutional ownership and Blockholder have fewer agency problems (e.g., Morck, Shleifer, and Vishny, 1988; Cronqvist and Fahlenbrach, 2009; Fos and Tsoutsoura, 2014). *Leverage* (-) represents debt contracts and active debtholders which can work as an alternative governance mechanism.[10] Collectively, these proxies capture firm demand for monitoring services from the board.

Third, forces driving board busyness to deviate upwards from its expected level include agency problems and director labor market frictions. The underlying logic is that firms could choose busy directors because either an entrenched CEO-chair prefers busy directors for their weaker monitoring, or because an entrenched director prefers the extra compensation and prestige

[9] Although admittedly whether various governance mechanisms are complements or substitutes is not yet fully understood, prior studies provide some evidence of the substitution effect between other monitoring mechanisms and board monitoring (e.g. Williamson, 1983; Hirshleifer and Thakor, 1994, 1998; Ferreira, Ferreira, and Raposo, 2011).

[10] Debt contract could work as a mechanism for solving agency problems through active creditors because they "combine substantial cash flow rights with the ability to interfere in the major decisions of the firm"(e.g., Grossman and Hart, 1988; Bolton and Scharfstein, 1990; Diamond, 1991; Hart and Moore, 1995; Shleifer, and Vishny, 1997; Roberts and Sufi, 2009; Armstrong, Guay, and Weber, 2010).

benefit of additional seats. These preferences will cause agency problems if they are not counterbalanced. Specifically, *CEO-chair duality* (+), *Management ownership* (-), and *Board ownership* (-) proxy for board entrenchment (Shivdasani and Yermack, 1999; Perry and Peyer, 2005; Fich and Shivdasani, 2006). In addition, the director labor market presents substantial supply constraints in the post-SOX period (e.g., Nguyen and Nielsen, 2010; Knyazeva et al., 2013; Armstrong et al., 2018), in which case firms struggling to recruit independent directors to accommodate the preference of regulators and shareholders for board independence may fall back on hiring less committed busy directors. If this is the case, director labor market frictions induced by the difficulty of firms to recruit qualified directors may cause board busyness to deviate upwards from its expected level. Given that mergers and acquisitions place a substantial threat to the career prospects of directors of target firms (Harford, 2003), and E-index captures primary antitakeover provisions that affect a firm's takeover likelihood (Bebchuk et al., 2009), firms with high E-Index is more attractive to talent directors. Therefore, director labor market frictions decrease with *E-index*. Riskier and non-prestigious firms are particularly susceptible to director labor market frictions because the literature suggests that talented directors prefer less risky and prestigious firms (Masulis and Mobbs, 2014). I use *Firm age* which proxies for firm lifecycle to capture how established a firm is. In addition, *Board independence* (+) proxies for firms' pressure to add independent directors, and *Board compensation* (-) proxies for the possibility that they hire busy directors at the cost of less commitment (Mortensen and Pissarides, 1999; Rogerson et al., 2005; Coles et al., 2008; Nguyen and Nielsen, 2010; Rajgopal et al., 2012).[11]

3.1.2. Measurement of board busyness

[11] Firms could attract qualified directors with higher pay, but prior studies find that firms pay significantly lower if qualified directors are more likely to commit less time and effort (e.g., Linck, Netter, and Yang, 2008; Masulis and Mobbs, 2014).

Prior studies use various definitions of busyness. For example, busy directors are often defined as directors serving on 3 or more boards, and a board is defined as busy if at least half of its directors are busy (Core et al., 1999; Fich and Shivdasani, 2006). However, Ferris et al. (2003) use the average number of seats to measure board busyness. Field et al. (2013) classify directors as busy if retirees or venture capitalist directors serve on at least six boards, following the guidelines of the Council of Institutional Investors.

Because my primary argument is that firms have heterogeneous expected levels of board busyness, I use the average number of directorships as the main measure, rather than an indicator. Specifically, a director's number of directorships (*MD_director*) refers to the number of public boards on which the director serves, a board's average number of directorships *(MD_board*) is calculated by averaging *MD_director* for all members, and a particular committee's measure (*MD_audit, MD_compensation, MD_nominating, and MD_other*) is calculated by averaging *MD_director* across the committee members. In robustness tests, I also use alternative definitions of busyness. *Busy director_3* is set to 1 if a director serves on at least three boards, and 0 otherwise. *Busy director_6* is set to 1 if a director has a full-time job and serves on at least three boards, or if a director has no full-time job and serves on at least six boards, and 0 otherwise.

3.1.3. Measurement of consequences

The costs and benefits of busy directors and busy boards likely have multiple consequences. Extant studies use various performance measures and governance outcomes to gauge the overall effect of board busyness on firms. Specifically, firm-level measures include Tobin's Q, return on assets (ROA), return on sales, likelihood of litigation, cumulative abnormal returns (CAR), abnormal accruals, CEO turnover sensitivity to performance, and excessive CEO pay (Core et al., 1999; Ferris et al., 2003; Fich and Shivdasani, 2006; Field et al., 2013; Falato et al., 2014). Director-level consequences measures include committee membership and meeting attendance (Ferris et al., 2003; Adams and Ferreira, 2008). I use the two most commonly used future performance proxies, the market-based *Tobin's Q* and the accounting-based *ROA*, in addition to the director attendance problems at board meetings (*Attendance problems*) in this study.

Although the above consequence measures are widely used in the governance literature, they have several limitations in the board busyness setting. The firm-level performance measures are comprehensive, but they could be or too indirect and general to capture the value added by boards. It is uncertain whether the magnitude of the multiple directorships effect is significant enough to be captured by these measures (Adams et al., 2010). Low attendance at board meetings, disclosed in proxy statements, provides a direct measure of director distraction, but the indicator variable is coarse. It only captures low attendance at the board meeting, and does not speak to the quality of a director's services, or the effort and time committed by the director outside of board meetings. Because of these concerns, Adams et al. (2010) call for "the development of more direct effort measures" to facilitate a better understanding of multiple directorships.

Responding to this call, this study uses voting outcomes of director elections as an alternative consequence measure of board busyness. Prior studies find that director election outcomes provide important information regarding investor perceptions of board performance and responsiveness (Fischer, Gramlich, Miller, and White, 2009; Ertimur, Ferri, and Oesch, 2015). In this paper, I use *Director votes withheld* which is the percentage of director votes withheld from directors up for election to proxy for shareholder dissatisfaction.[12] I calculate *Board votes withheld* by averaging *Director votes withheld* across a board.

[12] Under plurality voting rules, shareholders express dissatisfaction with a director candidate up for election by voting "withhold", rather than voting "against" (Cai et al., 2009; Ertimur et al., 2013).

This measure has several advantages in the board busyness setting. First, reputational concerns from the director labor market and the prevalence of "vote no" campaigns make votes withheld from director elections a good proxy for shareholder's evaluation of director, committee, and board performance (Del Guercio, Seery, and Woidtke, 2008). Second, while shareholder voting rarely removes particular directors, empirical studies show that the voting outcomes are strongly associated with subsequent board conduct, governance changes, and firm performance (Cai et al., 2009; Ertimur et al., 2013). Third, voting outcomes data is available at the director level and can be aggregated at the committee level and board level. However, proxy advisors' one-size-fit-all overboarding policies and the important impact of proxy advisors' recommendations on shareholder voting (Cai et al., 2009; Ertimur et al., 2013), could potentially bring measurement noise in the board busyness setting as well. A concurrent working paper by Chen and Guay uses shareholder voting outcomes to examine how shareholders perceive the tradeoffs of director busyness. They find that shareholder voting provides a nuanced measure for director performance. They also find that shareholder voting dissatisfaction with a busy director is relatively lower for firms with high advising needs, consistent with my results.[13]

3.2. Research design

To empirically test how board busyness is associated with firm advising and monitoring demands, I regress observable board busyness on proxies for firms' advising and monitoring demands, and potential deviation driving forces by estimating the following pooled regression:

[13] Although their findings are complementary to my study, our papers differ in several important ways. First, my paper focuses on how firm heterogeneity plays a role in the determinants and implications of board busyness while they focus on director heterogeneity. Second, my research design allows me to separate board busyness into different components and explicitly test how these components of board busyness are associated with firm performance, which cannot be answered with their research designs. Third, my determinant model incorporates a list of proxies for firms' advising demand, monitoring demand, and deviation driving forces for all firm-year observations. Their within-firm-year variation tests only examine several firm characteristics.

$$MD\_board_i = \beta_0 + \sum_a \beta_a\, AdvisingDemand_i + \sum_m \beta_m\, MonitoringDemand_i + \sum_d \beta_d\, Deviationfactors_i + \varepsilon_i \quad (1)$$

I then use the estimated coefficients from the above regression in conjunction with the underlying variables to separate observed board busyness into the components resulting from firm demand (*Demand-based component*), deviation driving forces (*Overboarding component*) and unobservable factors (*Unexplained component*).

To test how board busyness is related to consequences, I first run the following test as a benchmark regression:

$$Performance_{i,t+1} = \alpha_0 + \alpha_1 MD\_board_{i,t} + Controls_{i,t} + Firm\ FE + Year\ FE + \varepsilon_{i,t} \quad (2)$$

I subsequently replace the *MD_boardi,t* in Equation (2) with the three components of board busyness, and estimate the following regression:

$$Performance_{i,t+1} = \alpha_0 + \alpha_1\, DemandbasedComponent_{i,t} + \alpha_2\, OverboardingComponent_{i,t} + \alpha_3\, UnexplainedDeviationComponent_{i,t} + Controls_{i,t} + Firm\ FE + Year\ FE + \varepsilon_{i,t} \quad (3)$$

I also run the following regression to test whether board busyness is consistently associated with performance after controlling for the deviation driving forces:

$$Performance_{i,t+1} = \alpha_0 + \alpha_1 MD\_board_{i,t} + \alpha_2\, OverboardingComponent_{i,t} + \alpha_3 UnexplainedDeviationComponent_{i,t} + Controls_{i,t} + Firm\ FE + Year\ FE + \varepsilon_{i,t} \quad (4)$$

Following previous literature, the control variables for all regressions include *Firm size, Sales growth, Return on sales, Return variation, Leverage,* and *R&D intensity.* Further, I control for certain additional variables because prior studies find they affect dependent variables significantly. When using *Board votes withheld* as the dependent variable, I control for *ISS "Withhold" Recommendation*, *Institutional ownership,* and *Return Variation.* When using *Attendance Problem* as the performance measure, I control for *Attendance Problem* $_{t-1}$, *Board size*, and *Director age*. I also include year fixed effects to control for aggregate time-series trends and firm fixed effects to control for time-invariant firm characteristics.

To empirically test H3a and H3b, I run the following regression, and compare its results with those of the benchmark regression in Equation (2).[14]

$$Performance_{i,t+1} = \alpha_0 + \alpha_1 \, MD_{audit_{i,t}} + \alpha_2 MD_{nominating_{i,t}} + \alpha_3 MD\_compensation_{i,t} + \alpha_4 MD\_other_{i,t} + Controls_{i,t} + Year\ FE + Firm\ FE + \varepsilon_{i,t} \quad (5)$$

The variables of interests include the multiple directorships of the audit, nominating, compensation, and other committees because prior studies find that the majority of directors sit on multiple committees. The control variables are *Firm size, Firm age, Leverage, Sales growth, Return on sales, Return variation, ROA variation, R&D intensity, Diversification, Management ownership, Board ownership,* and *Board independence*. I also include firm fixed effects and year fixed effects.

[14] My primary committee analysis focuses on the required committees because non-required committees are relatively less common. In additional analysis, I also investigate the busyness of advising committee using an alternative dataset.

CHAPTER 4

SAMPLE AND EMPIRICAL RESULTS

4.1. Sample

The dataset used in this study includes all directors covered by Institutional Shareholder Services Directors Database (formerly MSI, IRRC, and RiskMetrics) between 2000 and 2015. The ISS Directors Database provides a range of detailed director level information such as directorships from other major company boards, director attendance problems at board meetings ("Attended < 75% of Meetings"), and other characteristics, which are collected from company proxy statements, annual reports or company websites.

The initial dataset consists of 197,207 director-firm-year observations for a sample of 27,046 directors from 2,604 firms during 2000-2015. I merge this dataset with the ISS Governance database to obtain corporate governance provisions data, with the ISS Voting Analytics (VA) database to get director elections voting data, with ExecuComp to get compensation and ownership information for executives and directors, and with Thomson Reuters to get institutional ownership data.[15] The accounting data is from Compustat and stock returns data is from CRSP. The final dataset for board level analysis consists of 13,313 firm-year observations for a sample of 1,778 firms during 2000-2015. The dataset for committee level analysis consists of 12,864 firm-year observations for a sample of 1,691 firms during 2000-2015. Table 1 presents more details about how these observations are distributed across years and industries. Although the industries

[15] Director name information is retrieved from the "ItemDesc" variable of ISS VA database. The database span 2003-2013, so when the voting outcome is used as the performance measure, the sample size shrinks.

Consumer durables and Money and finance have the highest proportions, the observations are distributed over all Fama and French 12- industries, and almost evenly across the sample period.

Table 1: Sample distribution

Panel A: Number of observations by year

Year	# observations
2000	15,071
2001	15,227
2002	12,326
2003	12,436
2004	11,769
2005	11,125
2006	10,222
2007	12,156
2008	12,343
2009	12,581
2010	12,649
2011	12,335
2012	12,431
2013	12,742
2014	12,181
2015	9,613
Total	197,207

Panel B: Industry composition of sample firms

Industry Description	% observations
Consumer durables	20%
Money and finance	17%
Business equipment	11%
Shops	11%
Other	8%
Telephone and television transmission	7%
Utilities	7%
Manufacturing	5%
Consumer nondurables	4%
Energy	4%
Chemicals and allied products	3%
Healthcare	3%
Total	100%

Table 1 shows the distribution of sample observations. Panel A presents the distribution of observations over 2000-2015, and Panel B presents the distribution of observations across industries based on the Fama and French 12-industry classification. All variables are defined in Appendix A.

4.2. Empirical results

4.2.1. Descriptive statistics

Table 2, Panel A shows the mean multiple directorships per committee and board between 2000-2015, indicating a trend towards lower levels of busyness. Panel B provides information on board independence, director attendance problems at board meetings, and the size of committee and board. It shows that both committee size and board size shrink, board independence increases, and director attendance problems at board meetings decrease over time. Given the background of higher shareholder scrutiny, more stringent regulations, and greater pressure from SEC enforcement, the descriptive statistics in Table 2 indicates that the qualified independent directors may be in short supply and fewer directors have attendance problems post-SOX, consistent with previous literature (Linck et al., 2009; Adams and Ferreira, 2012; Chen and Moers, 2014; Hauser, 2018).

Table 2: Descriptive statistics

Panel A: Average directorship across committee and board by year

Year	*Average directorship across*			
	Audit committee	*Compensation committee*	*Nominating committee*	*Board*
2000	2.082	2.241	2.176	2.034
2001	2.029	2.149	2.136	1.972
2002	1.988	2.118	2.100	1.943
2003	1.949	2.034	2.043	1.880
2004	1.967	2.024	2.042	1.902
2005	1.932	1.925	1.957	1.855
2006	1.934	1.960	1.962	1.895
2007	2.006	2.041	2.032	1.908
2008	1.984	2.013	1.988	1.888
2009	1.947	1.967	1.970	1.857
2010	1.920	1.944	1.940	1.829

Year	Average directorship across			
	Audit committee	Compensation committee	Nominating committee	Board
2011	1.902	1.926	1.907	1.820
2012	1.861	1.888	1.880	1.794
2013	1.875	1.899	1.887	1.808
2014	1.879	1.896	1.878	1.806
2015	1.875	1.913	1.882	1.821

Panel B: Other committee and boards characteristics

Year	Attendance problems	Board Independence	Size of			
			Audit committee	Compensation committee	Nominating committee	Board
2000	0.024	0.671	4.145	4.012	4.200	11.172
2001	0.023	0.679	4.099	4.015	4.102	10.931
2002	0.022	0.692	4.064	3.905	4.007	10.662
2003	0.016	0.703	3.980	3.783	3.914	10.294
2004	0.013	0.710	3.769	3.651	3.786	9.685
2005	0.005	0.721	2.684	2.648	3.658	9.165
2006	0.011	0.732	2.456	2.482	2.690	8.911
2007	0.009	0.781	3.908	3.789	3.955	9.972
2008	0.008	0.786	3.959	3.875	4.047	10.069
2009	0.008	0.783	3.984	3.924	4.072	10.021
2010	0.005	0.795	3.990	3.923	4.054	10.028
2011	0.006	0.800	3.984	3.919	4.031	9.955
2012	0.005	0.802	3.975	3.876	4.000	9.986
2013	0.007	0.806	3.971	3.853	3.968	9.981
2014	0.004	0.811	3.927	3.887	4.002	9.865
2015	0.004	0.813	3.764	3.767	3.845	9.265

Panel C: Firm characteristics

	N	Mean	Standard deviation	25%	Median	75%
MD_board	13,313	1.85	.48	1.44	1.80	2.20
Demand-based component	13,313	1.29	.22	1.12	1.27	1.44
Overboarding component	13,313	.56	.12	.48	.58	.67
Unexplained component	13,313	.32	.23	.14	.28	.46
Diversification	13,313	2.01	1.25	1	2	3
R&D intensity	13,313	0.02	0.04	0.00	0.00	0.03
Return variation	13,313	0.10	0.04	0.07	0.09	0.12
ROA variation	13,313	0.04	0.03	0.02	0.03	0.05
Firm size	13,313	7.79	1.39	6.73	7.68	8.77
CEO age	13,313	56.06	6.82	51	56	60
CEO Delta (scaled by 1000)	13,313	1.14	8.37	0.10	0.27	0.70
Institutional ownership	13,313	0.79	0.15	0.68	0.81	0.90
Blockholder indicator	13,313	0.86	0.35	1	1	1
Leverage	13,313	0.21	0.16	0.07	0.20	0.33
CEO-chair duality	13,313	0.64	0.48	0	1	1
Management ownership	13,313	1.44	2.42	0.00	0.26	1.75
Board ownership	13,313	0.01	0.03	0.00	0.00	0.01
E-index	13,313	3.36	1.36	2.00	4.00	4.00
Firm age	13,313	14.12	4.11	11	14	18
Board independence	13,313	0.76	0.13	0.67	0.78	0.88
Board compensation (scaled by 1000)	13,313	5.80	11.12	0.00	0.00	4.35
Tobin's Q	13,313	1.82	0.84	1.18	1.53	2.17
Return on assets	13,313	0.14	0.07	0.09	0.13	0.18
% Voting withheld _ board	8,232	0.05	0.05	0.02	0.03	0.06

Table 2 shows descriptive statistics. Panel A presents the average directorship across committee and board by year. Panel B presents the mean board independence, attendance problems, board size, and committee size by year. Panel C presents the mean, median and standard deviation of main variables used in the paper. All variables are defined in Appendix A.

4.2.2. Determinants of board busyness

Table 3 presents the results from the estimation of Equation (1). Table 3 shows that most coefficients are significant with predicted signs. Specifically, board busyness measures are positively associated with firms' advising demand as proxied by high *Diversification,* high *R&D intensity,* high *Return variation,* high *ROA variation*, low *Firm age* and low *CEO age*. Board busyness is negatively related to monitoring demand as proxied by low *Institutional ownership*, *Blockholder Indicator*, and low *Leverage*. Ex-ante, the association between *Firm size* and board busyness is ambiguous because *Firm size* could proxy for advising demand (+), or monitoring demand (-), or director labor market conditions (-). The significant and positive coefficients of *Firm size* on board busyness in Table 3 indicate that the advising demand explanation dominates. In addition, board busyness is positively associated with board entrenchment (as proxied by *CEO-chair duality* and low *Management ownership*) and director labor market frictions (as proxied by high *Board independence* and low *Board compensation*).

Table 3: Board busyness determinants

	Pred. sign	*Board busyness variable*				
		MD_board	*Busy director percentage_3*	*Busy director percentage_6*	*Busy board Indicator_3*	*Busy board Indicator_6*
Demand related factors						
Advising demand						
Diversification	+	0.014*** (4.79)	0.007*** (5.65)	0.004*** (3.72)	0.012*** (5.21)	0.003** (2.17)
R&D intensity	+	2.312*** (22.59)	0.827*** (19.97)	0.528*** (15.28)	0.962*** (12.36)	0.309*** (6.81)
Return variation	+	0.057 (0.62)	-0.004 (-0.10)	0.061* (1.96)	-0.102 (-1.46)	0.027 (0.66)
ROA variation	+	0.279** (2.25)	0.112** (2.24)	0.096** (2.29)	0.044 (0.46)	-0.03 (-0.63)
Firm size	?	0.150*** (43.90)	0.055*** (39.54)	0.037*** (31.78)	0.065*** (25.06)	0.021*** (14.06)
CEO age	-	-0.002*** (-3.92)	-0.001*** (-2.66)	-0.000 (-0.08)	-0.000 (-0.18)	0.000 (1.34)

	Pred. sign	*Board busyness variable*				
		MD_board	*Busy director percentage_3*	*Busy director percentage_6*	*Busy board Indicator_3*	*Busy board Indicator_6*
Monitoring demand						
CEO delta	+	0.000*** (2.71)	0.000 (1.18)	0.000*** (4.14)	0.000 (-0.72)	0.000** (2.29)
Institutional ownership	+	0.108*** (4.26)	0.025** (2.39)	-0.011 (-1.29)	-0.035* (-1.79)	-0.037*** (-3.29)
Blockholder indicator	+	0.024** (2.20)	0.011*** (2.58)	0.012*** (3.16)	0.006 (0.71)	0.006 (1.16)
Leverage	+	0.164*** (6.87)	0.047*** (4.87)	0.039*** (4.83)	0.028 (1.53)	0.010 (0.99)
Overboarding related factors						
Agency problems						
CEO-chair duality	+	0.037*** (4.78)	0.014*** (4.30)	0.014*** (5.30)	0.025*** (4.19)	0.007** (2.13)
Management ownership	-	-0.006*** (-3.53)	-0.001* (-1.96)	0.001 (1.00)	0.001 (0.77)	0.001 (1.23)
Board ownership	-	0.113 (0.79)	0.001 (0.02)	0.018 (0.37)	0.055 (0.51)	-0.023 (-0.37)
Labor market frictions						
E-index	-	-0.001 (-0.22)	-0.002 (-1.30)	-0.004*** (-3.96)	-0.005** (-2.24)	-0.003** (-2.05)
Firm age	-	-0.015*** (-13.53)	-0.006*** (-12.15)	-0.007*** (-17.40)	-0.007*** (-7.82)	-0.005*** (-10.07)
Board independence	+	0.886*** (27.70)	0.314*** (24.28)	0.160*** (14.84)	0.294*** (12.07)	0.077*** (5.42)
Board compensation	-	-0.001*** (-3.41)	-0.000*** (-3.04)	0.000 (0.55)	-0.000 (-0.61)	0.000*** (2.82)
N		13,313	13,313	13,313	13,313	13,313
Adj-R^2		32.01%	26.97%	18.63%	10.22%	4.29%

Table 3 presents results from the pooled regressions of the five board multiple directorships measures on a set of factors driving a firm's expected level of board busyness and the deviation from the expected level. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level respectively, and two-tailed t-statistics are in parentheses. All variables are defined in Appendix A. Continuous variables are winsorized at 5% and 95%.

Collectively, Table 3 shows that the observed board busyness reflects firms' advising demand, monitoring demand, and deviation driving forces as predicted. To the extent that the observed board busyness, after controlling for observable deviation driving forces, captures the expected level of board busyness, these results provide evidence that the expected levels of board busyness increase with firm advising demand and decrease with monitoring demand. Table 3 also indicates that these variables explain a significant amount of cross-sectional variation in board busyness, with the adjusted R^2 as 32.15% and 27.16% for column (1) and (2), respectively.

4.2.3. Board busyness and consequences

Panel A of Table 4 presents results of regressions of board busyness on operating performance, proxied by year-ahead *ROA*, without and with firm and year fixed effects. I start by regressing year-ahead *ROA* on board busyness and a set of control variables as a benchmark regression in Model 1. The estimation results suggest that board busyness per se is not significantly related to operating performance, consistent with the mixed results in the previous literature. However, Model 2 of Panel A shows the demand-based component of board busyness is positively associated with operating performance ($p < 0.01$) while the overboarding component is negatively associated ($p < 0.01$) with operating performance. In Model 3, the coefficient on the overboarding component is negative and significant ($p < 0.01$), and the coefficient on board busyness is positive and significant ($p < 0.10$), indicating that board busyness is positively associated with operating performance after controlling for deviation driving forces. Model 4 to 6 replicate these tests with firm and year fixed effects. Results show similar patterns but with greater adjusted R^2.

Table 4: Regressions of performance on board busyness

Panel A: Board busyness and year-ahead operating performance

	Pred. sign	*ROA$_{t+1}$*					
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
MD board	?	-0.001		0.003*	0.000		0.003*
		(-0.42)		(1.74)	(0.16)		(1.82)
Demand-based component	+		0.030***			0.036***	
			(9.99)			(13.34)	
Overboarding component	-		-0.035***	-0.036***		-0.030***	-0.027***
			(-7.19)	(-7.18)		(-6.44)	(-5.55)
Unexplained component	?		-0.000	-0.002		0.000	-0.000
			(-0.17)	(-0.63)		(0.19)	(-0.01)
Control Variables		Yes	Yes	Yes	Yes	Yes	Yes
Firm and year fixed effects		No	No	No	Yes	Yes	Yes
N		13,313	13,313	13,313	13,313	13,313	13,313
Adj-R^2		12.15%	12.68%	12.47%	81.66%	81.78%	81.70%

Panel B: Board busyness and year-ahead Tobin's Q

	Pred. sign	*Tobin's Q $_{t+1}$*					
		(1)	(2)	(3)	(4)	(5)	(6)
MD_board	?	0.008		0.053***	0.035**		0.057***
		(0.53)		(3.27)	(2.26)		(3.43)
Demand-based component	+		0.152***			0.410***	
			(4.44)			(13.47)	
Overboarding component	-		-0.414***	-0.490***		-0.192***	-0.233***
			(-7.56)	(-8.60)		(-3.59)	(-4.23)
Unexplained component	?		-0.031	-0.050*		0.011	-0.008
			(-1.14)	(-1.77)		(0.40)	(-0.28)
Control Variables		Yes	Yes	Yes	Yes	Yes	Yes
Firm and year fixed effects		No	No	No	Yes	Yes	Yes
N		13,313	13,313	13,313	13,313	13,313	13,313
Adj-R^2		19.12%	19.43%	19.57%	86.08%	86.08%	86.10%

Panel C: Board busyness and year-ahead voting outcomes

	Pred. sign	*Board votes withheld* $_{t+1}$					
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
MD_board	?	-0.001 (-1.11)		-0.000 (-1.25)	-0.000 (-0.40)		-0.001 (-0.92)
Demand-based component	-		-0.008*** (-2.77)			-0.004* (-1.71)	
Overboarding component	+		0.002 (0.46)	0.001 (0.15)		0.005 (1.11)	0.003 (0.73)
Unexplained component	?		0.002 (0.87)	0.003 (1.14)		0.003 (1.14)	0.003 (1.24)
ISS "Withhold" recommendation	+	0.348*** (104.51)	0.348*** (103.81)	0.348*** (103.79)	0.348*** (104.72)	0.349*** (104.31)	0.349*** (104.31)
Institutional ownership	+	0.024*** (6.84)	0.024*** (6.69)	0.024*** (6.82)	0.027*** (8.47)	0.027*** (8.19)	0.027*** (8.07)
Return variation	+	0.100*** (7.05)	0.093*** (6.43)	0.100*** (7.06)	0.106*** (7.75)	0.105*** (7.63)	0.106*** (7.73)
Control Variables		Yes	Yes	Yes	Yes	Yes	Yes
Firm and year fixed effects		No	No	No	Yes	Yes	Yes
N		8,232	8,232	8,232	8,232	8,232	8,232
Adj-R^2		57.89%	57.92%	57.88%	73.75%	73.77%	73.76%

Panel D: Board busyness and director attendance problems

	Pred. sign	*Attendance Problem $_t$*					
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
MD_board	?	0.000 (0.05)		0.000 (0.30)	0.001 (0.78)		0.000 (0.43)
Demand-based component	-		-0.008*** (-3.90)			-0.006*** (-3.08)	
Overboarding component	+		-0.002 (-0.83)	-0.005 (-1.57)		0.002 (0.59)	-0.000 (-0.01)
Unexplained component	?		0.002 (1.25)	0.002 (1.18)		0.002 (1.57)	0.002 (1.41)
Attendance Problem $_{t-1}$	+	0.023*** (20.19)	0.023*** (20.03)	0.023*** (20.16)	0.024*** (20.70)	0.024*** (20.62)	0.024*** (20.67)
Board size	+	0.001*** (3.86)	0.001*** (5.22)	0.001*** (4.23)	0.001*** (5.14)	0.001*** (5.98)	0.001*** (4.96)
Director age	-	-0.001*** (-8.34)	-0.001*** (-8.20)	-0.001*** (-8.47)	-0.000*** (-3.60)	-0.000** (-2.49)	-0.000*** (-3.47)
Control Variables		Yes	Yes	Yes	Yes	Yes	Yes
Firm and year fixed effects		No	No	No	Yes	Yes	Yes
N		13,313	13,313	13,313	13,313	13,313	13,313
Adj-R^2		4.06%	4.19%	4.07%	9.27%	9.35%	9.28%

Table 4 presents results from the regressions of performance metrics on various board busyness variables. Panel A shows results using operating performance proxied by year-ahead ROA, Panel B presents results using year-ahead Tobin's Q. Panel C displays results using year-ahead voting outcomes from director election. Panel D shows results using director attendance problems at board meetings. For brevity, the control variables are not tabulated in Table 4 onward. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level respectively, and two-tailed t-statistics are in parentheses. All variables are defined in Appendix A. Continuous variables are winsorized at 5% and 95%.

Panel B reports results on the relation between board busyness and the firm value proxied by year-ahead *Tobin's Q* without and with firm and year fixed effects. Again, Model 1 suggests that board busyness is not significantly related to the firm value. But Model 2 shows that the overboarding component is negatively associated with the firm value ($p < 0.01$). Model 3 shows that as predicted, the coefficient on the overboarding component is negative and significant ($p < 0.01$), and the coefficient on the demand-based component is positively associated with the firm value ($p < 0.01$). Model 4 to 6 replicate these tests with firm and year fixed effects. Model 4 suggests that year-ahead *Tobin's Q* increases with board busyness after controlling for time-invariant firm characteristics and aggregate time-series trends. Results in Model 5 and 6 show similar patterns as in Panel A.

Panel C reports results on the relation between board busyness and the shareholder dissatisfaction proxied by year-ahead *Board votes withheld* without and with firm and year fixed effects. Model 1 suggests that board busyness is not significantly related to shareholder dissatisfaction. Model 2, however, shows that the coefficient on the demand-based component is negative and significant ($p < 0.05$), while the coefficient on the unexplained component is positive and significant ($p < 0.10$). Model 3 also shows a positive relation ($p < 0.10$) between the unexplained component of board busyness and *Board votes withheld*. Model 4 to Model 6 replicate these tests with firm and year fixed effects. Model 4 suggests that board busyness is not significantly related to the shareholder dissatisfaction. Model 5 and Model 6 show positive coefficients ($p < 0.05$) on the unexplained component. The coefficients on the *ISS "Withhold" recommendation*, *Institutional ownership*, and *Return variation* are positive and significant ($p < 0.01$), consistent with the findings of prior studies that proxy advisors' recommendations have a substantial influence on shareholder voting (Cai et al., 2009; Ertimur et al., 2013). These results suggest that shareholders are supportive when board busyness relates to firms' advising and monitoring demands, but more concerned if board busyness relates to overboarding or unobservable factors. The results are also consistent with Ertimur et al. (2013) and Chen and Guay (2018), who find that shareholder voting provides a nuanced measure for director performance beyond ISS recommendations.

Panel D presents results of the relation between board busyness and the attendance problems proxied by the number of directors who attended fewer than 75% of the meetings expected to attend divided by board size without and with firm and year fixed effects. Model 1 and Model 4 suggest that overall board busyness is positively related to the attendance problems ($p < 0.01$). However, Model 2 and Model 4 show that the coefficients on the demand-based component of board busyness are negative ($p < 0.01$) while on the overboarding component are positive ($p < 0.01$) with the attendance problem. Model 3 and Model 6 also show positive coefficients ($p < 0.01$) on the overboarding component. These results suggest that busy directors are generally more likely to present attendance problems at board meetings and that the overboarding component of board busyness drives the association.

Summarizing, Table 4 provides evidence that performance measures are positively associated with the demand-based component but negatively related to the overboarding component of board busyness. The results also suggest a negative association between the unexplained component of board busyness and shareholder satisfaction. Collectively, the results indicate that considering firm heterogeneity enables a better understanding of the association between board busyness and performance.

4.2.4. Committee busyness and consequences

Panel A of Table 5 present the results on the relation between committee busyness and operating performance proxied by year-ahead *ROA* with and without firm fixed effects and year fixed effects. Again, I start by regressing year-ahead *ROA* on board busyness and a set of control variables as a benchmark regression, and the results presented in the column (1) is similar with those in board level analysis. Then I replace board busyness with the four committee busyness defined in Appendix A. In column (2), the coefficient on *MD_audit* is positive and significant at the 1% level, while the coefficient on *MD_nominating* is negative and significant at the 1% level. The coefficient on the board busyness in column (3) is significant and positive at the 10% level, after controlling for firm fixed effects and year fixed effects. Column (4) shows that after controlling for firm fixed effects and year fixed effects, the coefficient on *MD_audit* is positive and significant ($p < 0.01$), and the coefficient on *MD_nominating* is significant and negative ($p < 0.01$). In Panel B of Table 5, I perform same tests but with the year-ahead *Market-to-book ratio* as the performance proxy. Results show that the coefficient on *MD_audit* is consistently positive and significant ($p < 0.01$) for all specifications, while the coefficient on *MD_nominating* is negative at the 1% after controlling for firm fixed effects and year fixed effects. The coefficients on *MD_other* are insignificant for all specifications.

Table 5: Regressions of performance on committee busyness

Panel A: Committee busyness and year-ahead operating performance

	ROA_{t+1}			
	(1)	(2)	(3)	(4)
MD_board	-0.001 (-0.49)		0.000 (0.07)	
MD_audit		0.003*** (2.93)		0.004*** (3.11)
MD_compensation		0.001 (0.49)		0.001 (0.64)
MD_nominating		-0.003*** (-2.78)		-0.003*** (-2.72)
MD_other		-0.001 (-0.63)		-0.000 (-0.36)
Control Variables	Yes	Yes	Yes	Yes
Year and firm fixed effects	No	No	Yes	Yes
N	13,452	13,452	13,452	13,452
Adj-R^2	11.68%	11.74%	81.40%	81.42%

Panel B: Committee busyness and year-ahead Market-to-book ratio

	Market-to-Book$_{t+1}$			
	(1)	(2)	(3)	(4)
MD_board	0.006 (0.34)		0.034** (2.11)	
MD_audit		0.025* (1.88)		0.033** (2.44)
MD_compensation		0.010 (0.73)		0.017 (1.20)
MD_nominating		-0.010 (-0.74)		-0.008 (-0.55)
MD_other		-0.000 (-0.30)		0.007 (0.58)
Control Variables	Yes	Yes	Yes	Yes
Firm and year fixed effects	No	No	Yes	Yes
N	13,452	13,452	13,452	13,452
Adj-R^2	18.14%	18.15%	85.71%	85.72%

Panel C: Committee busyness and attendance concern

	Attendance concern			
	Audit Committee		*Nominating Committee*	
MD_audit	0.001 (1.57)	0.001* (1.66)		
MD_nominating			0.002*** (2.69)	0.002*** (2.75)
Committeesize_audit	0.002*** (3.32)	0.002*** (3.52)		
Committeesize_nominating			0.002*** (3.92)	0.002*** (4.13)
Control Variables	Yes	Yes	Yes	Yes
Firm and year fixed effects	No	Yes	No	Yes
N	13,452	13,452	13,452	13,452
Adj-R^2	0.85%	3.14%	0.92%	3.67%

Panel D: Committee busyness and voting outcomes

	Committee votes withheld			
	Audit Committee		*Nominating Committee*	
MD_audit	0.010 (1.43)	0.011 (1.56)		
MD_nominating			0.020** (2.48)	0.021*** (2.63)
Committeesize_audit	0.019*** (4.38)	0.020*** (4.54)		
Committeesize_nominating			0.017*** (3.89)	0.018*** (4.25)
Control Variables	Yes	Yes	Yes	Yes
Firm and year fixed effects	No	Yes	No	Yes
N	4,755	4,755	4,755	4,755
Adj-R^2	1.42%	9.64%	1.69%	13.05%

Table 5 presents results from the regressions of performance metrics on committee busyness variables. Panel A shows results using operating performance proxied by year-ahead ROA, Panel B presents results using year-ahead Market-to-Book ratio, Panel C displays results using committee attendance concerns, and Panel D presents results using voting outcomes from director election. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level respectively, and t-statistics are in parentheses. All variables are defined in Appendix A. Continuous variables are winsorized at 5% and 95%.

To provide more direct evidence for H3a and H3b, I regress committee attendance concern on committee busyness and a set of control variables, respectively for audit committee and nominating committee. Results presented in Panel C of Table 5 show that the coefficient on *MD_nominating* is consistently positive and significant ($p < 0.01$) for all specifications, while the coefficient on *MD_audit* is only significant ($p < 0.10$) after controlling for fixed effects, largely consistent with H3a and H3b.

I also regress committee voting shareholder dissatisfaction on committee busyness and a set of control variables, respectively for audit committee and nominating committee. Results presented in Panel D of Table 5 show that the coefficient on *MD_nominating* is consistently positive and significant ($p < 0.01$) for all specifications, while the coefficient on *MD_audit* is insignificant for all specifications, consistent with H3a and H3b.

Collectively, results in Table 5 provide evidence of a negative (positive) relation between nominating (audit) committee busyness and firm performance, consistent with the H3a and H3b. The additional analyses further confirm this finding by showing that only the busy nominating committee members are more likely to demonstrate attendance concern and suffer higher voting shareholder dissatisfaction while the busy audit members are not.[16]

In addition to the required committees, firms could also form other committees such as the executive, finance, strategy, technology committees, etc., to assign specific tasks. In contrast to the required committees, the non-required committees are under less scrutiny, and more likely to be over-committed.

To test the above predictions, I construct a new dataset by adding more detailed committee information from BoardEx to my initial dataset.[17] As these additional committees are not as commonly used as required committees, and their names vary across all firms, I select all advising committees and group them into advising committee in this dataset.[18] Specifically, I first classify committee names in BoardEx into five categories: audit committee, compensation committee, nominating committee, advising committee, and other committees.[19] Then I generate committee indicator variables and populate them for all year-firm-director-committee observations in my new

[16] I plan to expand the committee analysis using more specific committee effectiveness measures in the future.

[17] The Institutional Shareholder Services Directors database only provides data on audit, compensation, governance, and nominating committees, while the BoardEx data include more detailed information on all committees.

[18] I obtain similar but less significant results (untabulated) when I use executive committee, the most common non-required committee, as a proxy for the advising committees.

[19] I classify committees by the key words in committee names, committee charters, and executive director percentages of committees. The percentage of observations related to committee names of the other committee category is trivial.

dataset. Lastly, I aggregate *MD_director* along each firm-year-committee indicator to get committee busyness measures. I replicate my committee analysis with the committee busyness of audit committee, compensation committee, nominating committee, and advising committee.

The results in Table 6 generally confirm previous findings in Table 5, and provide insights regarding the busyness of advising committee. Consistent with expectation, the coefficient on *MD_advising* is negative and significant in columns (2), (3), and (6) of Panel A, and (2), (5) and (6) of Panel B. While the coefficient of *MD_audit* on audit committee attendance is positive in the column (1) and (2) of Panel C, it ceases to be statistically significant after controlling for *MD_nominating*, indicating that the effect might be due to directors who sit on both audit committee and nominating committee (Chen and Wu, 2016).[20]

Table 6: Regressions of performance on committee busyness using BoardEx database

Panel A: Committee busyness and year-ahead operating performance

	ROA_{t+1}					
	(1)	(2)	(3)	(4)	(5)	(6)
MD_board	-0.001 (-0.49)		0.004 (1.45)	0.001 (1.01)		0.005* (1.96)
MD_audit		0.004*** (3.41)			0.005*** (3.69)	
MD_compensation		0.002 (1.52)			0.002* (1.71)	
MD_nominating		-0.003** (-2.46)			-0.003** (-2.38)	
MD_advising		-0.003* (-1.73)	-0.004* (-1.65)		-0.003 (-1.50)	-0.004* (-1.68)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year and firm fixed effects	No	No	No	Yes	Yes	Yes
N	12,504	12,504	12,504	12,504	12,504	12,504
Adj-R^2	14.29%	14.40%	14.30%	82.00%	82.03%	82.00%

[20] Using executive-job-adjusted committee busyness measures, I find similar but less significant results (untabulated).

Panel B: Committee busyness and year-ahead Market-to-book ratio

	Market-to-Book$_{t+1}$					
	(1)	(2)	(3)	(4)	(5)	(6)
MD_board	0.067***		0.138***	0.091***		0.164***
	(4.58)		(4.90)	(6.18)		(5.74)
MD_audit		0.054***			0.062***	
		(3.76)			(4.22)	
MD_compensation		0.042***			0.048***	
		(2.88)			(3.18)	
MD_nominating		0.005			0.007	
		(0.37)			(0.49)	
MD_advising		-0.041**	-0.071***		-0.033*	-0.073***
		(-2.18)	(-2.95)		(-1.75)	(-2.97)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year and firm fixed effects	No	No	No	Yes	Yes	Yes
N	12,504	12,504	12,504	12,504	12,504	12,504
Adj-R^2	21. 09%	21.17%	21.15%	86.01%	86.03%	86.02%

Panel C: Committee busyness and attendance concern

	Attendance concern					
	Audit Committee		*Nominating Committee*		*Both Committees*	
MD_audit	0.003***	0.003***			0.001	0.001
	(3.76)	(3.98)			(0.75)	(0.84)
MD_nominating			0.003***	0.003***	0.003***	0.003***
			(3.87)	(4.00)	(2.94)	(3.00)
Committeesize_audit	0.002***	0.002***			0.001	0.001
	(3.26)	(3.45)			(1.24)	(1.29)
Committeesize_nominating			0.002***	0.002***	0.002***	0.002***
			(3.87)	(4.07)	(2.94)	(3.08)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm and year fixed effects	No	Yes	No	Yes	No	Yes
N	12,504	12,504	12,504	12,504	12,504	12,504
Adj-R^2	1.00%	3.31%	1.03%	3.81%	1.04%	3.83%

Panel D: Committee busyness and voting outcomes

	Committee votes withheld					
	Audit Committee		Nominating Committee		Both Committees	
MD audit	0.005	0.007			-0.011	-0.009
	(0.66)	(0.97)			(-1.20)	(-0.93)
MD nominating			0.015*	0.017**	0.020**	0.022**
			(1.93)	(2.23)	(2.27)	(2.39)
Committeesize_audit	0.020***	0.021***			0.008	0.009
	(4.43)	(4.60)			(1.42)	(1.48)
Committeesize_ nominating			0.018***	0.020***	0.015***	0.017***
			(4.10)	(4.46)	(3.15)	(3.45)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm and year fixed effects	No	Yes	No	Yes	No	Yes
N	4,589	4,589	4,589	4,589	4,589	4,589
Adj-R^2	1.38%	9.50%	1.71%	13.09%	1.74%	13.16%

Table 6 presents results from the regressions of performance metrics on committee busyness variables using data from BoardEx database. Panel A shows results using operating performance proxied by year-ahead ROA, Panel B presents results using year-ahead Market-to-Book ratio, Panel C displays results using committee attendance concerns, and Panel D presents results using voting outcomes from director election. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level respectively, and t-statistics are in parentheses. All variables are defined in Appendix A. Continuous variables are winsorized at 5% and 95%.

CHAPTER 5

ADDITIONAL ANALYSIS

5.1. Evidence from firm overboarding policies

The primary analyses of board busyness determinants provide large sample evidence consistent with H1 that board busyness increases with firm advising demand and decreases with monitoring demand. However, drawing inference about the expected level of board busyness from these analyses needs to assume that the observed board busyness, after controlling for deviation factors, can measure the unobservable expected levels well. To mitigate the concern for this maintained assumption and provide further evidence for the expected board busyness levels, I next use the numeric limits specified in firm overboarding policies to proxy for the relative levels of expected board busyness and test how they relate to firms' advising and monitoring demands.

Post-2004, many firms adopt and disclose their overboarding policies as one of the "key areas of universal importance" in their governance guidelines.[21] There are several reasons why overboarding policies could credibly reveal firms' perception of their expected levels of board busyness. First, a corporate governance guideline is approved by the entire board, annually reviewed and updated, and disclosed to the public either on the firm website or in the proxy statement. Second, the corporate disclosure literature indicates that effective reputation incentives lead to truthful disclosures when agents and principals interact over multiple periods (Stocken, 2000). Third, the corporate governance literature finds that reputation incentives in the director

[21] Section 303A.09 of the Listed Company Manual of NYSE, approved on November 4, 2003 by the SEC, requires the adoption and disclosure of corporate governance guidelines for its listed companies. Many NASDAQ companies voluntarily adopt and disclose their corporate governance guidelines.

labor market serve as a primary motivation of directors (Fama, 1980; Fama and Jensen, 1983; Yermack, 2004; Adams and Ferreira, 2008).

Using textual analysis, I first extract the numeric limits set in the overboarding policies from a sample of S&P 500 firms' corporate governance guidelines hand collected during 2014-2015. I construct four overboarding policy measures (*OB_policy*), which are the numeric limits for all directors, for audit committee members, for executive directors, and the average of these three numeric limits. In case of no numeric limit specified, I set the value as the sample maximum of that measure. I then estimate the following pooled OLS regression of *OB_policy* on proxies of firms' advising and monitoring demands:

$$OB_{policy_i} = \beta_0 + \sum_a \beta_a \, AdvisingDemand_i + \sum_m \beta_m \; MonitoringDemand_i \; + \varepsilon_i \qquad (6)$$

Table 7, Panel A shows that S&P 500 firms often adopt nuanced firm-specific numeric limits in their overboarding policies, providing the direct evidence that firms consider overboarding concerns in their governance practice and the consideration varies across firms. Specifically, numeric limits are lower for executive directors (mean=3.45) and for audit committee members (mean=3.78) compared to for all directors (mean=5.21), indicating that firms have more concern about these directors being too busy. The results also show that the rate of policy violations is nontrivial although overboarding policies are often set flexibly. For example, 16% of the 576 board year observations in the sample show at least one type of violation, implying that overboarding policies are not simply "window dressing."

Table 7: Firm overboarding policies analysis

Panel A: Descriptive statistics

	N	*Mean*	*Standard deviation*	*1%*	*25%*	*Median*	*75%*	*99%*
Overboarding policies for all directors	576	5.21	0.93	3	4	6	6	6
Overboarding policies for audit committee members	576	3.78	0.42	3	4	4	4	4
Overboarding policies for executive directors	576	3.45	0.79	1	3	4	4	4
Indicator of policy violation for all directors	576	0.02	0.12	0	0	0	0	1
Indicator of policy violation for audit committee members	576	0.04	0.2	0	0	0	0	1
Indicator of policy violation for executive directors	576	0.14	0.34	0	0	0	0	1
Indicator of violations of any policy limit	576	0.16	0.37	0	0	0	0	1

Panel B: Correlation matrix

	1.	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*	*8.*	*9.*	*10.*
1. Overboarding policies for all directors	1.00	**0.15**	**0.39**	0.06	-0.01	-0.05	**0.12**	**-0.09**	-0.07	**0.11**
2. Overboarding policies for audit committee members	**0.12**	1.00	**0.16**	-0.04	-0.05	**0.12**	-0.01	-0.04	-0.03	0.01
3. Overboarding policies for executive directors	**0.34**	**0.13**	1.00	-0.07	0.04	0.00	-0.02	-0.04	**-0.16**	0.04
4. MD_board	**0.07**	-0.04	-0.06	1.00	**0.07**	**0.19**	0.05	-0.01	**0.16**	**-0.08**
5. Diversification	0.03	0.00	0.06	0.06	1.00	**-0.11**	**-0.25**	**0.16**	**0.17**	**-0.25**
6. R&D intensity	-0.07	**0.10**	-0.01	**0.14**	**-0.21**	1.00	**0.09**	**0.09**	**-0.12**	0.00
7. Return variation	**0.13**	-0.04	-0.01	0.04	**-0.14**	**0.12**	1.00	**-0.30**	**-0.29**	**0.44**
8. Firm age	0.00	-0.01	0.00	**-0.09**	**0.14**	0.04	**-0.25**	1.00	**0.22**	**-0.43**
9. Firm size	-0.05	-0.04	**-0.14**	**0.18**	**0.20**	**-0.19**	**-0.29**	**0.18**	1.00	**-0.34**
10. Institutional ownership	**0.11**	0.03	0.07	**-0.08**	**-0.26**	**0.08**	**0.38**	**-0.36**	**-0.35**	1.00

Panel C: Regression results

Advising demand	Pred. sign	*Overboarding policies for*		
		All directors	*Audit committee members*	*Executive directors*
Diversification	+	0.031 (0.91)	0.011 (0.73)	0.051* (1.78)
R&D intensity	+	-2.072 (-1.52)	1.312** (2.12)	-0.485 (-0.42)
Return variation	+	4.400*** (2.78)	-0.672 (-0.93)	-1.302 (-0.96)
ROA variation	+	-2.750 (-1.59)	-0.329 (-0.42)	0.169 (0.11)
Firm size	?	-0.024 (-0.47)	-0.022 (-0.92)	-0.141*** (-3.15)
CEO age	-	0.007 (0.96)	-0.000 (-0.02)	0.008 (1.22)
Monitoring demand				
CEO delta	+	-0.000 (-1.54)	0.000* (1.77)	-0.000 (-1.25)
Institutional ownership	+	0.794** (2.00)	0.186 (1.03)	0.515 (1.51)
Blockholder indicator	+	-0.077 (-0.50)	-0.117* (-1.69)	-0.200 (-1.54)
Leverage	+	0.061 (0.22)	0.023 (0.18)	0.075 (0.31)
N		576	576	576
Adj-R^2		2.14%	3.21%	2.44%

Table 7 presents results of firm overboarding policies. Panel A presents the mean, median, standard deviation and other descriptive statistics of four firm overboarding policy measures. Panel B presents the Pearson (Spearman) correlation coefficients below (above) the diagonal. Correlations in bold are significant at the 10% confidence level (two-tailed). For brevity, I only report and discuss variables that are significantly correlated with the overboarding policy measures. Panel C presents results from the pooled OLS regression of overboarding policy measures on proxies for firms' advising and monitoring demands. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level respectively, and two-tailed t-statistics are in parentheses. All variables are defined in Appendix A. Continuous variables are winsorized at 5% and 95%.

Panel B shows that the overboarding policy measures are strongly correlated with each other, but only weakly correlated with boards' actual board busyness, suggesting that overboarding policies provide additional information beyond actual board busyness. Panel C presents the results of regressions of overboarding policy measures on proxies of firms' advising and monitoring demands. Notwithstanding the lower explanatory power associated with the smaller sample size and the regression coefficients are not consistently significant, many of the regression coefficients and correlation coefficients suggest that the expected levels of board busyness increase with firm advising demand and decrease with monitoring demand. For example, coefficients are significant positive for *Diversification* ($p < 0.10$), *R&D intensity* ($p < 0.05$), *Return variation* ($p < 0.01$), *Institutional ownership* ($p < 0.05$), and negative for *Firm age* ($p < 0.10$), and *Firm size* ($p < 0.01$) in some specifications. They suggest that firms with high advising and low monitoring demand (e.g., diversified firms, R&D intensive firms, young firms, volatile firms and firms with high institutional ownership) are more likely to adopt more lenient overboarding policies, probably because these firms expect to benefit more from the high advising ability of busy directors and suffer less from their time constraints.

5.2. Evidence from M&A shocks

In the primary analyses, I examine how board busyness varies with firm characteristics and separate board busyness into different components. This approach allows me to explicitly test the performance implications of the various components of board busyness. However, as Adams et al. (2010) argue, some firm characteristics (e.g., a powerful CEO) could confound the relation between board busyness and firm performance, making it difficult to draw a causal inference. Although using firm and year fixed effects and lagged values of busyness helps to mitigate the concern of omitted variables and reverse causality, it is difficult to infer the causal effect of busyness from these tests. As such, I exploit exogenous shocks to board busyness induced by M&A activity to further assess causality.

Harford (2003) finds that directors of target firms are often dissolved (hereafter, dissolved director) following mergers and acquisitions (hereafter, M&A). Hauser (2018) shows that such M&A activity generates exogenous variation in board busyness for other firms from which a dissolved director still holds a seat (hereafter, director-interlocked firms), to the extent that the M&A is independent of the performance of director-interlocked firms. Brown et al. (forthcoming) also exploit the M&A shock in board busyness in their difference-in-differences (DID) analysis.[22]

Theoretically, when a director loses the board seat at the target firm, her workload decreases and her extra time will be allocated to her remaining activities. Consequently, the distraction reduction will benefit the performance of her director-interlocked firms (Adams et al., 2010; Hauser, 2018). Meanwhile, the director will lose access to the valuable information and resources at the target firm after the M&A, decreasing her advising quality to the extent that the lost boardroom connection with the target firm matters. This decrease in advising quality will consequently hurt the performance of her director-interlocked firms (Larcker, So, and Wang, 2013; Brown et al., 2018). The overall effect of the M&A shock on director-interlocked firms depends on whether the benefit of reduced distraction or the cost of decreased ability dominates.

Similar in spirit to H1 and H2, I propose that the cost-benefit tradeoff of M&A shock varies across firms based on their specific advising and monitoring demands. In particular, for firms with high advising demand and low monitoring demand (hereafter, high-advising-demand firms), the cost of decreased qualification dominates because directors' boardroom connection and qualifications are more important for them. Conversely, for firms with high monitoring

[22] I thank Emanuel Zur and Jing Dai for sharing M&A shock data.

demand and low advising demand (hereafter, high-monitoring-demand firms), the benefit of reduced distraction dominates because directors' time and attention matter more for them. Therefore, I predict that the overall effect of M&A shock on director-interlocked firms is significantly different between high-advising-demand firms and high-monitoring-demand firms.

To empirically test this prediction, I first sort director-interlocked firms into groups based on their advising and monitoring demands. By construction, firms with a higher demand-based component of board busyness from the prediction model have both higher demand for board advising services and lower demand for board monitoring services. Therefore, firms are sorted into ranked quintiles based on their demand-based component of board busyness, where quintile 5(1) represents firms with the highest (lowest) level of advising demand and lowest (highest) monitoring demand. Then I modify the main regression tests in Hauser (2018) and Brown et al. (forthcoming) and estimate the following regression:

$$
\begin{aligned}
\Delta Performance = \beta_0 + \beta_1 DirectorInterlockedFirm \\
+\beta_2 FirmDemandQuintile \\
+\beta_3\ DirectorInterlockedFirm * FirmDemandQuintile \\
+\Delta Controls + Year\ FE + Firm\ FE + \gamma \qquad (7)
\end{aligned}
$$

where *DirectorInterlockedFirm* is a dummy variable for the director-interlocked firm, which has a director whose multiple directorships decrease because M&A terminate her board seat in other firm, and *FirmDemandQuintile* is the quintile ranking of firms' advising and monitoring demands. Similar to Hauser (2018) and Brown et al. (forthcoming), the regression is in change form to control for time-invariant characteristics of both firms and incumbent directors. *ΔPerformance* measures the change in *ROA* and *LogQ* for director-interlocked firms and control firms pre- versus post- M&A (i.e., from year t-1 to t+1).

I expect β3, the coefficient on the interaction term, to be negative. Panel A of Table 8 presents the regression results. In column (1), the coefficient on the *DirectorInterlockedFirm* is negative and significant at the 1% level, indicating that the M&A shock negatively impacts director-interlocked firms on average for my sample. In column (4), consistent with the prediction, the coefficient on the interaction term is negative and significant at the 5% level, suggesting that the cost of decreased qualification dominates the benefit of reduced distraction for high-advising-demand firms (i.e., in the higher quintiles). Results in Panel B further confirm that the overall effect of M&A shock on director-interlocked firms significantly differs between high-advising-demand firms and high-monitoring-demand firms. Results in column (4) show that while high-monitoring-demand firms experience a 1.1% increase in *LogQ*, high-advising-demand firms actually experience a 6.7% decrease in *LogQ*. The difference is significant ($p < 0.01$) for both two-tailed t-statistics and Z-statistics. In sum, the results indicate that firms' particular demands play an important moderating role in the effect of M&A shock on director-interlocked firms documented in prior studies.

Table 8: Effect of M&A shock on Director-Interlocked Firm performance

Panel A: Regressions of changes in performance on M&A shock and firm demand quintile

	Pred. sign	ΔROA (1)	ΔROE (2)	ΔLogQ (3)	ΔROA (4)	ΔROE (5)	ΔLogQ (6)
Director-Interlocked Firm	?	-0.005*** (-2.85)	0.006 (0.12)	-0.010 (-1.27)	0.008 (1.37)	0.103 (0.40)	0.004 (0.16)
FirmDemandQuintile	?				0.004** (2.39)	0.063 (0.82)	-0.008 (-0.97)
*Director-Interlocked Firm * FirmDemandQuintile*	-				-0.004** (-2.22)	-0.056 (-0.66)	-0.006 (-0.75)
Change in Control Variables		Yes	Yes	Yes	Yes	Yes	Yes
Industry and year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
N		2,130	2,130	2,130	1,008	1,008	1,008
Adj-R2		45.06%	17.59%	45.29%	60.08%	24.60%	62.73%

Panel B: Changes in performance and firm demand extreme quintiles

	Pred. sign	N (1)	ΔROA (2)	ΔROE (3)	ΔLogQ (4)
FirmDemandQuintile 1		100	-0.008 [-0.004]	-0.026 [-0.008]	0.011 [0.044]
FirmDemandQuintile 5		100	-0.012 [-0.011]	-0.022 [-0.002]	-0.067 [-0.023]
t-stat	+		0.75	-0.24	2.62***
[Z-stat]	+		0.70	-0.95	2.98***

Table 8 presents results from the regressions of changes in performance on M&A shock and firm demand quintiles. Panel A shows the effect of M&A shocks on the change of ROA, ROE, and LogQ, without and with FirmDemandQuintile as the interaction term. FirmDemandQuintile1 (5) represents firms with high monitoring (advising) demand and low advising (monitoring) demand. Panel B reports the change of ROA, ROE, and LogQ for the top and bottom quintiles of the shocked firms' advising and monitoring demands. The two-tailed t-statistics and Z-statistics represent the differences between the top and bottom quintile groups. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level respectively, and two-tailed t-statistics are in parentheses. All variables are defined in Appendix A. Continuous variables are winsorized at 5% and 95%.

5.3. Alternative busyness measures

In addition to directorships, a director's primary full-time job also significantly affects the director's busyness level, distraction, and ability. Executive jobs are particularly important because executive experiences make executive directors more desirable on directors' market, but executive jobs are arguably the most time demanding (Perry and Peyer, 2005; Fahlenbrach, Low, and Stulz, 2010; Faleye, 2011; Knyazeva et al., 2013; Stein and Zhao, 2016; Chen and Guay, 2018). In this section, I construct an alternative busyness measure by giving credit to directors who currently hold an executive job to account for the effect of the full-time executive job on busyness and replicate the board level analysis with these busyness measures. In particular, I first define a director as holding an executive job if the director has the title of CEO, CFO, COO, CIO, or President, or if the director is identified as an Executive Director by the database, similar to Knyazeva et al. (2013).[23] Next, I add 2 to the multiple directorships (*MD_director*) of those directors who hold an executive job to define an alternative measure: executive-job-adjusted multiple directorships (*MD_director_s*).[24] Board's executive-job-adjusted multiple directorships *(MD_board_s*) is calculated by averaging *MD_director_s* across the board. The results presented in Table 9 confirm the previous findings in Table 4 and are consistent with H2. Hence, the board level analysis results remain unchanged after controlling for whether a director currently holds an executive job or not.

Table 9: Regressions of performance metrics on executive-job-adjusted busyness measures

Panel A: Board busyness and year-ahead operating performance

	Pred. sign	ROA_{t+1}					
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
MD_board_s	?	0.002 (1.40)		0.002* (1.93)	0.003*** (3.11)		0.004*** (3.63)
Demand-based component	+		0.024*** (7.57)			0.028*** (11.14)	
Overboarding component	-		-0.003 (-0.68)	-0.009* (-1.94)		-0.004 (-0.82)	-0.012*** (-2.69)
Unexplained component	?		-0.001 (-0.60)	-0.001 (-0.65)		-0.001 (-0.33)	-0.001 (-0.34)
Control Variables		Yes	Yes	Yes	Yes	Yes	Yes
Firm and year fixed effects		No	No	No	Yes	Yes	Yes
N		13,313	13,313	13,313	13,313	13,313	13,313
Adj-R^2		12.16%	12.27%	12.17%	81.67%	81.71%	81.68%

[23] I use the Employment_CEO, Employment_CFO, Employment_COO, Classification, Empl_Category, Primary_Employer, and Type_of_Services variables in the ISS Directors database, and the Executive Director/Non-Executive Director/Senior Manager indicator variable in the BoardEx database to identify executive jobs.

[24] Many firms have set overboarding policies and disclosed them in their corporate governance guidelines. Based on a hand collected sample of S&P 500 firms, the mean (median) limit for executive directors are 3.45 (4), compared to 5.21 (6) for other directors. Therefore, I use adding the difference rounded to the nearest integer, which is 2, as a parsimonious way to adjust for the impact of an executive job on director busyness. The results are qualitatively similar when using 1 or 3 as the difference.

Panel B: Board busyness and year-ahead Tobin's Q

	Pred. sign	Tobin's Q $_{t+1}$					
		(1)	(2)	(3)	(4)	(5)	(6)
MD_board_s	?	0.030** (2.32)		0.045*** (3.29)	0.092*** (7.62)		0.108*** (8.62)
Demand-based component	+		0.056 (1.57)			0.367*** (12.85)	
Overboarding component	-		-0.147*** (-3.01)	-0.189*** (-3.73)		-0.191*** (-3.88)	-0.306*** (-6.16)
Unexplained component	?		-0.003 (-0.13)	-0.008 (-0.34)		0.038 (1.64)	0.016 (0.69)
Control Variables		Yes	Yes	Yes	Yes	Yes	Yes
Firm and year fixed effects		No	No	No	Yes	Yes	Yes
N		13,313	13,313	13,313	13,313	13,313	13,313
Adj-R^2		19.15%	19.10%	19.22%	86.14%	86.07%	86.18%

Panel C: Board busyness and year-ahead voting outcomes

	Pred. sign	Board votes withheld $_{t+1}$					
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
MD_board_s	?	-0.001 (-1.27)		-0.001 (-0.93)	-0.000 (-0.21)		-0.000 (-0.07)
Demand-based component	-		-0.008** (-2.54)			-0.003 (-1.26)	
Overboarding component	+		-0.006 (-1.30)	-0.007 (-1.36)		-0.008 (-1.57)	-0.008 (-1.63)
Unexplained component	?		0.003* (1.75)	0.004* (1.85)		0.004** (2.05)	0.004** (1.99)
ISS "Withhold" Recommendation	+	0.348*** (104.62)	0.348*** (104.47)	0.348*** (104.59)	0.348*** (104.74)	0.348*** (104.71)	0.348*** (104.69)
Institutional ownership	+	0.024*** (6.83)	0.023*** (6.42)	0.024*** (6.80)	0.027*** (8.30)	0.027*** (8.44)	0.026*** (8.02)
Return Variation	+	0.100*** (7.08)	0.095*** (6.70)	0.099*** (6.98)	0.106*** (7.75)	0.104*** (7.55)	0.103*** (7.49)
Control Variables		Yes	Yes	Yes	Yes	Yes	Yes
Firm and year fixed effects		No	No	No	Yes	Yes	Yes
N		8,232	8,232	8,232	8,232	8,232	8,232
Adj-R^2		57.89%	57.93%	57.91%	73.75%	73.78%	73.77%

Panel D: Board busyness and director attendance problems

	Pred. sign	*Attendance Problem $_t$*					
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
MD_board_s	?	0.002***		0.002**	0.004***		0.003***
		(3.89)		(2.54)	(6.54)		(4.53)
Demand-based component	-		-0.008***			-0.005***	
			(-3.75)			(-2.72)	
Overboarding component	+		0.016***	0.014***		0.019***	0.016***
			(6.12)	(5.35)		(7.58)	(5.93)
Unexplained component	?		0.001	0.001		0.002	0.001
			(1.27)	(1.05)		(1.45)	(1.05)
Attendance Problem $_{t-1}$	+	0.023***	0.022***	0.022***	0.023***	0.023***	0.023***
		(20.05)	(19.52)	(19.57)	(20.32)	(19.86)	(19.76)
Board size	+	0.001***	0.001***	0.000***	0.001***	0.001***	0.001***
		(3.12)	(4.57)	(2.58)	(3.65)	(4.95)	(2.98)
Director age	-	-0.001***	-0.001***	-0.001***	-0.000***	-0.000	-0.000***
		(-7.52)	(-5.99)	(-5.79)	(-5.59)	(-0.55)	(-3.25)
Control Variables		Yes	Yes	Yes	Yes	Yes	Yes
Firm and year fixed effects		No	No	No	Yes	Yes	Yes
N		13,313	13,313	13,313	13,313	13,313	13,313
Adj-R^2		4.17%	4.44%	4.38%	9.56%	9.73%	9.82%

Table 9 presents results from the regressions of performance metrics on executive-job-adjusted board busyness. Panel A shows results using operating performance proxied by year-ahead ROA, Panel B presents results using year-ahead Tobin's Q. Panel C displays results using year-ahead voting outcomes from director election. Panel D shows results using director attendance problems at board meetings. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level respectively, and two-tailed t-statistics are in parentheses. All variables are defined in Appendix A. Continuous variables are winsorized at 5% and 95%.

CHAPTER 6
CONCLUSION

This study investigates the implications of the firm and board heterogeneity on the relation between board busyness and firm performance. At the firm level, the analytical model predicts, and the empirical results support that the optimal/expected levels of board busyness increase with firms' advising demand and decrease with their monitoring demand, and thus are heterogeneous across firms. I also find evidence that firms with high advising and low monitoring demand tend to adopt more lenient overboarding policies. Using the estimated coefficients from a pooled OLS regression of board busyness on a series of determinants, I separate a firm's board busyness into its demand-based component, overboarding component, and unexplained component, and examine the association between these components and firm performance. I find that firm performance is positively (negatively) related to the demand-based component (overboarding component) of board busyness. I find no evidence of a significant association between firm performance and the unexplained component. Exploiting M&A shocks to board busyness, I find that the impact of the negative shock to the multiple directorships of a director-interlocked firm induced by an M&A on the firm's performance decreases with its advising demand and increases with monitoring demand. The additional test confirms that the main findings hold for the executive-job-adjusted busyness measure. Overall, the results suggest that the composition of board busyness, not its level per se, has important firm value implications. Therefore, regulators should be cautious in setting mandatory one-size-fits-all limits of board busyness.

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APPENDIX A

VARIABLE DEFINITIONS AND PRIMARY SOURCE

Variable name	Definition
Advising demand related variables	
Diversification	Number of Segments. (Compustat)
R&D intensity	R&D expenditure / Total assets. (Compustat)
Return variation	Standard deviation of previous five-year daily stock returns. (CRSP)
ROA variation	Standard deviation of previous five-year Return on Assets which equals Income before extraordinary items divided by total assets. (Compustat)
Firm size	Ln (Sales). (Compustat)
CEO age	Ln (*CEO age*). (ExecuComp)
Monitoring demand related variables	
CEO delta	Dollar change in the CEO's stock and option portfolio for a 1% change in firm share price, measured following Core et al. (2005).
Institutional ownership	Shares owned by Institutions divided by total shares outstanding. (Thomson Reuters)
Blockholder Indicator	1 if at least one institutional investor own 5% or more of the firm, 0 otherwise. (Thomson Reuters)
Leverage	(Short-term debt + Long-term debt) / Total assets. (Compustat)
Overboarding related variables	
CEO-Chair duality	1 if the CEO is also the Chair of the board, 0 otherwise. (ISS Directors Database)
Management ownership	Shares owned by top five executives divided by total shares outstanding (ExecuComp)
Board ownership	Aggregate *Director ownership* at the board level. (ExecuComp)
E-index	Sum of six antitakeover provisions specified in Bebchuk et al. (2009). (ISS Governance Database)
Firm age	Ln (Firm age). (Compustat)
Board independence	Number of independent directors divided by board size. (ISS Directors Database)

Board compensation	Averaged director compensation across a board. (ExecuComp)
<u>Busyness measures</u>	
Busy director_3	1 if a director serves on at least three boards, 0 otherwise;
Busy director_6	1 if a director has a full-time job and serves on at least three boards, or if a director has no full-time job and serves on at least six boards, 0 otherwise. (for robustness check)
Fulltime indicator	1 if a director has a full-time job in addition to directorships, 0 otherwise. (ISS Directors Database)
MD_director	Number of public boards a director serves. The primary analysis uses this measure. (ISS Directors Database)
MD_director_s	An alternative measure of multiple directorships calculated as adding 2 to MD_director for those directors who hold an executive job.
MD_board	Number of *MD_director* averaged across a board.
MD_board_s	Number of *MD_director_s* averaged across a board.
MD_committee	Number of *MD_director* averaged across Audit/Compensation/Nominating/Other Committees.
Busy board Indicator_3	1 if at least 50% directors of the board are busy directors, 0 otherwise, a busy director is defined as *Busy director_3.*
Busy board Indicator_6	1 if at least 50% directors of the board are busy directors, 0 otherwise, a busy director is defined as *Busy director_6.*
Busy director percentage_3	Number of busy directors divided by the total number of directors of the board, a busy director is defined as *Busy director_3.*
Busy director percentage_6	Number of busy directors divided by the total number of directors of the board, a busy director is defined as *Busy director_6.*
<u>Performance measures</u>	
Tobin's Q	Total assets market value divided by total assets book value, calculated as AT / (AT-CEQ + prcc_f * CSHE). (Compustat)
Return on Assets (ROA)	Income before extraordinary items divided by total assets. (Compustat)
Director votes withheld	A director's "withhold" votes divided by the sum of "withhold "and "for" votes. (ISS Voting Analytics database)
Committee votes withheld	*Director votes withheld* averaged across Audit/Compensation/Nominating /Other Committees.

Board votes withheld	*Director votes withheld* averaged across a board.
ISS withhold recommendation	Percentage of directors who receive "withhold" recommendation from ISS (ISS Voting Analytics database)
Attendance problems	Number of directors who attended fewer than 75% of the meetings expected to attend divided by board size. (ISS Directors Database)
Return on sales (ROS)	Income before extraordinary items divided by Sales. (Compustat)
Other variables	
Board size	Total number of directors of a board. (ISS Directors Database)
Director age	Ln(director age). (ISS Directors Database)
Director ownership	Shares owned by a director divided by total shares outstanding. (ExecuComp)
Director interlocked firm	1 if a firm has a director whose multiple directorships decrease because M&A activities terminate her board seat in another firm, 0 otherwise. (SDC Mergers and Acquisitions Database)
Firm demand quintile	Quintile ranking of demand-based component of board busyness, where quintile 5(1) represents firms with the highest (lowest) level of advising demand and lowest (highest) monitoring demand.
OB_policy	Numeric limits for all directors, for audit committee members, for executive directors, and the average of these three numeric limits. (Corporate governance guidelines)

APPENDIX B

ANALYTICAL MODEL

The motivation for this analytical model is threefold. First, multiple directorships are common, and the effect of multiple directorships has attracted extensive research interest (Adams et al., 2010). Second, the existing multiple directorships studies find contradictory evidence, and our knowledge of multiple directorships is still incomplete (Adams et al., 2010). Third, there is no analytical model addressing the existence and determinants of the optimal levels of board busyness from a firm's optimization perspective. While Adams et al. (2010) provide a theory to model the effect of busy directors on firm performance, my model significantly differs in two ways. First, the optimization problems are different. In my model, a firm maximizes the value added by its board by selecting its board busyness level, while in their model an individual director maximizes her utility by selecting her multiple directorships. Second, the determinants of the optimal solutions are different. In my model, a firm's optimal multiple directorships depend on the firm's specific demand for advising services and monitoring services, while the effect of a busy director in their model depends on the director's type (high type or low type).

1. Model setup

In the model, a firm faces an optimization problem in which it maximizes the value added by its board V by optimizing its board's multiple directorships d:[25]

[25] While frequently used in academic research, "firm" is not an immediately clear concept. According to Fama (1980), the firm could be "viewed as a set of contracts among factors of production, with each factor motivated by its self-interest", but agency problems are resolved in case that the "wage revision process imposed by the managerial labor market amounts to full ex post settling up," This model assumes that these assumptions are satisfied such that the same rational decision will be made no matter whether shareholders, or the entire board, or the nominating committee, or a specific director is making the decision.

$$\max_{d} V\left(A(d, \boldsymbol{a}), M(d, \boldsymbol{m})\right)$$

where A denotes the contribution of the board's advising services, M denotes the contribution of the board's monitoring services, and $\boldsymbol{a}$, $\boldsymbol{m}$ are vectors of firm-specific factors affecting the firm's demand for and the value of advising services and monitoring services, respectively.

Drawing on findings of previous literature and some fundamental economic laws, I make the following assumptions.

1.1 Assumptions for the value added by its board

V, the value added by its board, increases with the contribution of the board's advising services and the contribution of the board's monitoring services. Thus, $\partial V/\partial A > 0$, and $\partial V/\partial M > 0$ (Fama and Jensen, 1983; Hermalin and Weisbach, 1988). Assume that V is twice differentiable. If V is a linear combination of A and M, then $\partial V/\partial A$ and $\partial V/\partial M$ are both constant, and thus $\partial(\partial V/\partial A)/\partial \boldsymbol{a} = \partial(\partial V/\partial A)/\partial \boldsymbol{m} = \partial(\partial V/\partial A)/\partial d = \partial(\partial V/\partial M)/\partial \boldsymbol{a} = \partial(\partial V/\partial M)/\partial \boldsymbol{m} = \partial(\partial V/\partial M)/\partial d = 0$. Alternatively, if V is a non-linear function of A and M, then by definition, as a increases, the firm's demand for and thus the value of the board's advising services increase, then the sensitivity of value added by its boards to the contribution of the board's advising services, $\partial V/\partial A$, increases, and the sensitivity of value added by its boards to the contribution of the board's monitoring services, $\partial V/\partial M$, decreases. Thus, we have $\partial(\partial V/\partial A)/\partial \boldsymbol{a} > 0$ and $\partial(\partial V/\partial M)/\partial \boldsymbol{a} < 0$. Similarly, we have $\partial(\partial V/\partial M)/\partial \boldsymbol{m} > 0$ and $\partial (\partial V/\partial A)/\partial \boldsymbol{m} < 0$. Also, To the extent that the board's advising services and monitoring services are complementary, Law of Diminishing Marginal Utility implies that $\partial(\partial V/\partial A)/\partial d < 0$ and $\partial(\partial V/\partial M)/\partial d > 0$.[26] The logic is as following. When board's

[26] There is evidence that the board's advising services and monitoring services are complementary (Adams and Ferreira, 2007; Coles et al., 2008; Adams et al., 2010). For example, Adams and Ferreira (2007) suggest that "information generated during the advisory process enhances the monitoring process".

multiple directorships increases, the advising qualification of the board increases, and the firm's demand for the board's advising services is more likely to be satisfied, and therefore the marginal contribution of the board's advising services to the value added by its boards, $\partial V/\partial A$, decreases (Mas-Collel, Whinston, and Green, 1995). Thus we have $\partial(\partial V/\partial A)/\partial d < 0$. Similarly, we have $\partial(\partial V/\partial M)/\partial d > 0$. Collectively, we have $\partial(\partial V/\partial A)/\partial \boldsymbol{a} \geq 0$, $\partial(\partial V/\partial M)/\partial \boldsymbol{a} \leq 0$, $\partial(\partial V/\partial A)/\partial \boldsymbol{m} \leq 0$, $\partial(\partial V/\partial M)/\partial \boldsymbol{m} \geq 0$, $\partial(\partial V/\partial A)/\partial d \leq 0$, and $\partial(\partial V/\partial M)/\partial d \geq 0$.

1.2 Assumptions for the contribution of the board's advising services

A, the contribution of the board's advising services depends on both the board's advising qualification, which increases with d, and the firm's demand for the board's advising services, which increases with $\boldsymbol{a}$. The board's advising qualification increases with multiple directorships.[27] Thus, we have $\partial A/\partial d > 0$ and $\partial A/\partial \boldsymbol{a} > 0$. Assume that A is twice differentiable. In the spirit of Law of Diminishing Marginal Utility, as board’s multiple directorships increases, the marginal contribution of board’s multiple directorships to the advising qualification of the boards, $\partial A/\partial d$, decreases. Thus, we have $\partial^2 A/\partial d^2 < 0$. To the extent that the advising skill of the boards and the firm's demand for the board's advising services are complementary, Law of Diminishing Marginal Utility implies that $\partial^2 A/(\partial \boldsymbol{a} \partial d) > 0$. The logic is as following. When a board's multiple directorships increases, the advising qualification of the board also increases, and the firm's advising demand for the board's advising services is more likely to be satisfied. Then, the sensitivity of the contribution of the board's advising services to the firm's advising demand, $\partial A/\partial \boldsymbol{a}$, increases. Thus we have $\partial^2 A/(\partial \boldsymbol{a} \partial d) > 0$.

1.3 Assumptions for the contribution of the board's monitoring services

[27] Previous literature document positive association between multiple directorships and firm performance due to higher advising quality (Ferris et al., 2003; Perry and Peyer, 2005; Cai and Sevilir, 2012; Field et al., 2013; Larcker et al., 2013; Falato et al., 2014; Omer, Shelley, and Tice, 2014).

M, the contribution of the board's monitoring services depends on both the quality of the board's monitoring services, which decreases with *d*, and the firm's demand for the monitoring services, which increases with **m**.[28] Thus, we have $\partial M/\partial d < 0$ and $\partial M/\partial \boldsymbol{m} > 0$ (Fich and Shivdasani, 2006; Adams and Ferreira, 2008; Jiraporn, Singh, and Lee, 2009; Adams et al., 2010; Falato et al., 2014). Assume that *M* is twice differentiable. Assume that director's leisure is subject to the Law of Diminishing Marginal Utility, then as board's multiple directorships increases, the sensitivity of the board's monitoring quality to *d*, $\partial M/\partial d$, decreases. Thus, we have $\partial^2 M/\partial d^2 < 0$. Similar to the argument for *A*, to the extent that the monitoring quality of the board and the firm's demand for the board's advising services are complementary, Law of Diminishing Marginal Utility implies that $\partial^2 M/(\partial \boldsymbol{m} \partial d) < 0$. The logic is as following. When board's multiple directorships increase, monitoring quality decreases and the firm's demand for the board's monitoring services is less likely to be satisfied. Then, the sensitivity of the contribution of the board's monitoring services to the firm's demand for the board's monitoring services, $\partial M/\partial \boldsymbol{m}$, decreases. Thus we have $\partial^2 M/(\partial \boldsymbol{m} \partial d) < 0$.

2. Model analysis

With the above assumptions, I now examine the optimal levels of board multiple directorships.

2.1 The existence of optimal solutions

Given that *V*, *A*, and *M* are twice differentiable, the solution is characterized by First Order Condition

[28] While it is plausible that the quality of the board's monitoring services could first increase and then decreases with d, relaxing this assumption has no impact on my primary results to the extent that the labor market effectively adjust so that equilibrium could be reached ultimately.

$$\frac{\partial V}{\partial A}\frac{\partial A}{\partial d}+\frac{\partial V}{\partial M}\frac{\partial M}{\partial d}=0. \tag{8}$$

The existence of solution is thus guaranteed by the assumptions that

$$\frac{\partial V}{\partial A}>0, \quad \frac{\partial V}{\partial M}>0, \quad \frac{\partial A}{\partial d}>0, \quad \frac{\partial^2 A}{\partial d^2}<0, \quad \frac{\partial M}{\partial d}<0, \quad \frac{\partial^2 M}{\partial d^2}<0$$

The existence of a unique global optimal is provided by the Second Order Condition

$$\frac{\partial\left(\frac{\partial V}{\partial A}\right)}{\partial d}\frac{\partial A}{\partial d}+\frac{\partial V}{\partial A}\frac{\partial^2 \mathrm{A}}{\partial \mathrm{d}^2}+\frac{\partial^2 \mathrm{V}}{\partial M \partial d}\frac{\partial M}{\partial d}+\frac{\partial V}{\partial M}\frac{\partial^2 \mathrm{M}}{\partial \mathrm{d}^2}<0. \tag{9}$$

Which will be true given the assumptions that

$$\frac{\partial\left(\frac{\partial V}{\partial A}\right)}{\partial d}\leq 0, \quad \frac{\partial^2 A}{\partial d^2}<0, \quad \frac{\partial\left(\frac{\partial V}{\partial M}\right)}{\partial d}\geq 0, \quad \frac{\partial^2 M}{\partial d^2}<0.$$

2.2 The determinants of optimal solution

By the Implicit Function Theorem, the effect of a factor in ***a***, say a_i, on the optimal choice $d^*(\boldsymbol{a},\boldsymbol{m})$ is

$$\frac{\partial d^*(\boldsymbol{a},\boldsymbol{m})}{\partial a_i}=-\frac{\frac{\partial\left(\frac{\partial V}{\partial A}\right)}{\partial a_i}\frac{\partial A}{\partial d}+\frac{\partial V}{\partial A}\frac{\partial^2 A}{\partial d \partial a_i}+\frac{\partial\left(\frac{\partial V}{\partial M}\right)}{\partial a_i}\frac{\partial M}{\partial d}}{\frac{\partial\left(\frac{\partial V}{\partial A}\right)}{\partial d}\frac{\partial A}{\partial d}+\frac{\partial V}{\partial A}\frac{\partial^2 A}{\partial d^2}+\frac{\partial\left(\frac{\partial V}{\partial M}\right)}{\partial d}\frac{\partial M}{\partial d}+\frac{\partial V}{\partial M}\frac{\partial^2 M}{\partial d^2}}>0 \tag{10}$$

Given that

$$\frac{\partial\left(\frac{\partial V}{\partial A}\right)}{\partial a_i}\geq 0, \quad \frac{\partial^2 A}{\partial d \partial a_i}>0, \quad \frac{\partial\left(\frac{\partial V}{\partial M}\right)}{\partial a_i}\leq 0.$$

Similarly, the effect of a factor in ***m***, say m_i, on the optimal choice $d^*(\boldsymbol{a},\boldsymbol{m})$ is

$$\frac{\partial d^*(\boldsymbol{a},\boldsymbol{m})}{\partial m_i} = -\frac{\frac{\partial\left(\frac{\partial V}{\partial A}\right)}{\partial m_i}\frac{\partial A}{\partial d}+\frac{\partial V}{\partial M}\frac{\partial^2 M}{\partial d\partial m_i}+\frac{\partial\left(\frac{\partial V}{\partial M}\right)}{\partial m_i}\frac{\partial M}{\partial d}}{\frac{\partial\left(\frac{\partial V}{\partial A}\right)}{\partial d}\frac{\partial A}{\partial d}+\frac{\partial V}{\partial A}\frac{\partial^2 A}{\partial d^2}+\frac{\partial\left(\frac{\partial V}{\partial M}\right)}{\partial d}\frac{\partial M}{\partial d}+\frac{\partial V}{\partial M}\frac{\partial^2 M}{\partial d^2}} < 0 \tag{11}$$

Given that

$$\frac{\partial\left(\frac{\partial V}{\partial A}\right)}{\partial m_i} \leq 0, \qquad \frac{\partial^2 M}{\partial d\partial m_i} < 0, \qquad \frac{\partial\left(\frac{\partial V}{\partial M}\right)}{\partial m_i} \geq 0.$$

3. Model implications and limitations

The above analysis leads to the following propositions.

3.1 Implications

Proposition 1 (Existence of optimal level of multiple directorships) There exists a unique optimal level of multiple directorships for the firm, if (1) the board's advising services and monitoring services are complementary in contributing to the firm value; (2) the board's advising services quality increases with the board's multiple directorships, but the marginal contribution of board's multiple directorships to the advising qualification of the boards decreases(concave); and (3) the quality of the board's monitoring services is concave in its multiple directorships.

Proposition 2 (Determinants of optimal level of multiple directorships): The firm's optimal level of multiple directorships is positively associated with the firm's demand for its board's advising services, and is negatively associated with the firm's demand for its board's monitoring services, if (1) a unique optimal level of multiple directorships exists for the firm; (2) the advising qualification of the board and the firm's demand for the board's advising services are complementary in contributing to the firm value, and (3) the board's monitoring qualification *of the board and the firm's demand for the board's monitoring services are complementary in contributing to the firm value.*

3.2 Limitations

While the model explicitly specifies the firm's decision process of its board multiple directorships conditional on other firm-specific factors, it has limitations. For example, in the real world, firms may face a more complex and dynamic optimization problem, in which the firm-specific factors could be jointly determined with governance mechanisms (Coles, et. al., 2008). However, the impact of this limitation on my study is non-significant for two reasons. First, when selecting directors, most other factors have already been set or known to the firm. Second, it is reasonable to treat other firm-specific factors as exogenous in the short run (Adams et al., 2010). Also, this analysis assumes ‘‘second-best’’ conditions based on a partial equilibrium model, i.e., it specifies the firm's decision process of its board multiple directorships given the director labor market is complete. Therefore, given the possibility that director labor market is not complete, caution should be taken in applying theoretical predictions to empirical tests.

APPENDIX C

PRINCIPAL COMPONENT ANALYSIS

Based on findings in prior studies and economic intuition, I identify seventeen observed determinant variables for board busyness in section 3. To provide some assurance that these variables are not arbitrarily selected, but instead capture the underlying constructs of firms' advising and monitoring demands, and the forces driving board busyness to deviate upward from expected levels, I next perform a principal component analysis on these variables.

Requiring eigenvalues greater than one, I retain five factors that capture 52.66% of the total variance of the data. Then a varimax rotation is performed for better interpretation. The results in Table 10 indicate that *Component 1* is loaded by *Firm age*, *E-index*, *Board independence*, and *Board compensation, Component 2* is loaded by *R&D intensity*, *ROA variation*, and *Leverage, Component 3* is loaded by *Management ownership* and *Board ownership, Component 4* is loaded by *Blockholder indicator* and *Institutional ownership, Component 5* is loaded by *CEO-chair duality* and *CEO age*. Therefore, *Component 1*, *Component 2*, and *Component 4* reflect director labor market frictions, advising demand, and monitoring demand, respectively. *Component 3* and *Component 5* collectively capture the agency problems.

Table 10: Principal component analysis

	Principal Component				
	Compt1	***Compt2***	***Comp3***	***Comp4***	***Comp5***
	Labor market	***Advising***	***Agency***	***Monitoring***	***Agency***
Demand related factors					
Advising demand					
Diversification	0.039	-0.242	-0.061	-0.223	0.143
R&D intensity	0.098	**0.593**	-0.113	-0.141	-0.027
Return variation	-0.206	0.296	0.031	0.206	0.074
ROA variation	-0.062	**0.450**	-0.037	0.086	0.089
Firm size	0.143	-0.283	-0.195	-0.279	0.066
Monitoring demand					
CEO delta	0.025	0.116	0.177	-0.309	0.144
Institutional ownership	0.072	-0.004	-0.057	**0.540**	-0.017
Blockholder indicator	0.016	-0.106	0.056	**0.606**	0.071
Leverage	-0.026	**-0.416**	-0.138	0.150	0.042
Overboarding related factors					
Agency problems					
CEO-chair duality	-0.083	0.009	-0.141	0.027	**0.670**
CEO age	0.067	-0.015	0.156	-0.001	**0.673**
Management ownership	0.156	0.043	**0.579**	0.049	0.118
Board ownership	-0.079	-0.096	**0.591**	-0.027	-0.069
Labor market frictions					
E-index	**0.442**	0.053	-0.078	0.141	-0.009
Firm age	**0.516**	-0.011	0.146	-0.031	-0.063
Board independence	**0.447**	0.085	-0.320	0.032	0.093
Board compensation	**-0.460**	-0.002	-0.167	-0.012	0.027
Eigenvalue	2.666	2.404	1.559	1.187	1.136

Table 10 presents the results of a principal component analysis with all 17 determinants variables. The principal components are presented in the order of eigenvalue. Factor loadings in bold are greater than 0.40, the generally accepted cutoff for a meaningful factor loading (Hatcher [1994]).

APPENDIX D

DETERMINANTS OF BOARD BUSYNESS AND PREDICTED ASSOCIATION

Table 11: Predicted association between board busyness and determinants

Factor	Predicted sign	Explanation
<u>Demand related factors</u>		
<u>Advising demand related factors</u>		
Diversification	+	A firm's advising demand increases with the firm's complexity, which is proxied by *Diversification, R&D intensity, Return variation, ROA variation,* and *Firm size* (Fama and Jensen, 1983; Klein, 1998; Adams and Ferreira, 2007; Coles et al., 2008). A firm's advising demand decreases with its internal manager's ability, which is proxied by *CEO age* (Fama and Jensen, 1983; Field et al., 2013).
R&D intensity	+	
Return variation	+	
ROA variation	+	
Firm size	?	
CEO age	-	
<u>Monitoring demand related factors</u>		
CEO delta	+	A firm's monitoring demand increases with the agency problems between shareholders and managers, which I use *CEO delta* to proxy (e.g., Core, Guay, and Thomas [2005], Murphy [2012]).
Institutional ownership	+	A firm's monitoring demand decreases with existing governance mechanisms which can substitute for board monitoring functions, which are proxied by *Blockholder indicator, Institutional ownership,* and *Leverage* (e.g., Fos and Tsoutsoura, 2014; Cremers and Ferrell, 2014; Armstrong, Guay, and Weber, 2010).
Blockholder indicator	+	
Leverage	+	
<u>Overboarding related factors</u>		
CEO-chair duality	+	Agency problems increase with the director and board entrenchment, which is proxied by *CEO-chair duality*, and decrease with insiders' ownership, which is proxied by *Board ownership* and *Management ownership* (Shivdasani and Yermack, 1999; Perry and Peyer, 2005; Fich and Shivdasani, 2006). Director labor market frictions increase with the demand-supply imbalance in director labor market, which is proxied by *Board independence* and *Board compensation* (Mortensen and Pissarides, 1999; Rogerson et al., 2005; Coles et al., 2008; Rajgopal et al., 2012).
Management ownership	-	
Board ownership	-	
E-index	-	
Firm age	-	
Board independence	+	
Board compensation	-	