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Board sub-committee effectiveness, director attraction and director attrition: Do nomination and remuneration committees matter?

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ABSTRACT

This study examines whether the effectiveness of board subcommittees is associated with director attrition and the attraction of new directors to boards. Using a sample of firms listed on the Australian Securities Exchange, we find that nomination and remuneration committee effectiveness is inversely associated with director attrition and positively related to new external directors joining boards. The results suggest the contribution of these subcommittees to improve corporate governance by strengthening the board's human capital through recruitment and retention of suitable talent. Furthermore, the influence of subcommittee effectiveness on attrition (attraction) is more pronounced in firms experiencing higher levels of information asymmetry, weaker governance quality and poorer performance. The results are robust to tests with alternative variables, entropy balanced matching, and additional controls. Overall, our findings show that improved governance through effective subcommittees helps maintain and enhance the human capital of boards.

1. Introduction

The use of board subcommittees has received the attention of policymakers (Pierce and Waring, 2004) and researchers as a mechanism to enhance corporate governance (Kim et al., 2014; Reeb and Upadhyay, 2010; Ntim, 2009). Subcommittees that directly relate to the recruitment and retention of directors, i.e., nomination and remuneration committees, can contribute to the recruitment and retention of board members with the right talent. However, empirical evidence on the benefits of subcommittees is sparse (Adams et al., 2021; Chen and Wu, 2016), and nomination and remuneration committees have received relatively little research attention (Clune et al., 2014). Thus, we know little regarding whether nomination and remuneration committees are associated with director turnover, namely, attrition (existing directors leaving) or attraction of new external directors to the board (i.e., appointment of new directors). In this study, we aim to empirically examine this relationship using a sample of Australian Securities Exchange (ASX) listed

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firms.

We predict that the effectiveness of nomination and remuneration committees is negatively (positively) associated with director attrition (director attraction). We argue these committees will influence director attraction and attrition through (a) an enhanced information environment (b) governance excellence, and (c) improved firm performance. First, as prior research shows, board subcommittees facilitate the efficiency of decision making in large boards (Reeb and Upadhyay, 2010) and enhance communication in situations where the committees have formal authority (Adams et al., 2021). Improved information from and quicker decision making through subcommittees (Ntim, 2009) signal effective governance practices thereby attracting new directors to join the board and minimising the number of existing directors departing. Second, these two committees' responsibilities relate to governance excellence that reflects well on firm performance (Ntim, 2009), which will reduce director departures and attract qualified directors. Nomination committees contribute to firm performance through the recruitment of skilled, knowledgeable, and experienced directors with the right level of independence (Ntim, 2009). Similarly, effective remuneration committees can help devise remuneration schemes that align director remuneration with performance, and firms with superior performance are, in turn, likely to attract high-quality directors to join the board and retain existing ones.[1]

The motivation for this study originates from three main sources. First, there has been considerable policy emphasis on the use of board subcommittees to reinforce corporate governance (e.g., ASX Corporate Governance Council, 2019). However, there is a limited understanding of the role, benefits, and cost of subcommittees (Adams et al., 2021; Chen and Wu, 2016). Furthermore, nomination and remuneration committees remain under-researched (Clune et al., 2014) as do board subcommittees in general (Adams et al., 2021) while there is a conceptual possibility that these subcommittees enhance director attraction and reduce director attrition. Second, prior research findings on subcommittees' cost-benefit trade-offs are inconclusive. As Adams et al. (2021) argue, the costs of subcommittees may outweigh the benefits in some situations through constrained communication, and thus the cost-benefit trade-off in maintaining subcommittees is an empirical issue. Third, prior studies on director turnover either focused on director departures (e.g., Yermack, 2004) or employed a measure of director turnover that do not distinguish between director attrition and new director joining the board (e.g., Asthana and Balsam, 2007, 2010).

We examine the impact of subcommittee effectiveness on director attrition and attraction for a sample of ASX-listed firms from 2004 to 2018. Our results support our prediction. We find that director attrition is negatively associated with the effectiveness of the two subcommittees, and the attraction of new directors to join the board is positively associated with the effectiveness of the subcommittees. Furthermore, we conducted several additional tests to establish the robustness of the causal relation between subcommittee effectiveness and directors' attrition and attraction. We employ additional tests relating to the alternative variable approach to verify our results. Our proxies include subcommittee existence, the presence of a stand-alone rather than combined subcommittee, and the turnover of independent rather than executive directors. Furthermore, interactions between the standalone existence of nomination and remuneration committees with the effectiveness of the committees show a negative (positive) association with director attrition (joining).

Consistent with baseline results, the additional results are stable across all specifications. Furthermore, our research reveals that subcommittee effectiveness significantly decreases (increases) director attrition (attraction), especially in firms with high information asymmetry indicated by Non-Big Audit, lower liquidity, and fewer analysts following. Additionally, we observe that the relationship between subcommittee effectiveness and director attrition (attraction) is stronger for firms with weaker governance structures, exemplified by lower TOP20 ownership and lower board independence. Moreover, we find that this relationship between subcommittee effectiveness and director attrition (attraction) is more pronounced in firms exhibiting poor performance, as evidenced by lower return on assets and stock performance. To address endogeneity concerns, we conduct further tests using the lagged value of subcommittee effectiveness in our analysis and control for time-invariant firm-specific omitted variables using firm fixed effect specifications (Fich and Shivdasani, 2006; Krishnan et al., 2011). Furthermore, we employ an entropy balancing matching technique (Hainmueller, 2012) to address endogeneity due to possible covariate imbalance. Reeb and Upadhyay (2010) suggest that subcommittees are helpful for large boards but may not have the same effect on small or insider-oriented boards. We mitigate this concern by including firm size and board size in the regression estimation. Finally, we test whether firm-level characteristics and governance mechanisms significantly affect the relationship between subcommittee effectiveness and director attrition and attraction. The results in all additional tests suggest that the relation between subcommittee effectiveness and director attrition and attraction continues to hold even after controlling for firm-level information environment and governance mechanisms.

The contributions of this study to the corporate governance literature are two-fold. First, we provide empirical evidence on the role of nomination and remuneration committees on directors' attrition and attraction. We do so by testing the effect of these committees on both minimising director attrition and attracting new directors to join the board. This is an important contribution because while the role of nomination and remuneration committees is directly related to director turnover, the impact of such committees has not been empirically examined by methodologically separating the two components of director turnover, that is, director attrition and director attraction. Such a nuanced understanding of the components of director turnover enables informed emulation of corporate governance policies. Second, the study makes a methodological contribution to the relatively limited literature on stand-alone and combined subcommittees (Hermanson et al., 2012). It provides empirical evidence that the effect of stand-alone subcommittees on director turnover has greater significance than that of combined subcommittees. We employ novel Australian corporate governance

[1] By contrast, other subcommittees are not directly involved in matters relating to director turnover. For instance, another major subcommittee, the audit committee focus on verifiability and integrity of corporate reports and the risk committee ensure that the firms are having a sound risk management framework.

data with data points for several board characteristics that capture attributes relating to board structure and authority of subcommittees, which Adams et al. (2021) argue are important considerations in assessing the benefits of board subcommittees. Our unique dataset contributes empirical evidence on the link between these two subcommittees, which are under-researched due to data access limitation (Clune et al., 2014), and other corporate phenomena thereby contributing insights to a fuller consideration of the ongoing cost-benefit dilemma regarding board-subcommittees.

The remainder of the paper is organised as follows. The following section presents the corporate governance background of the Australian context and the importance of subcommittees. Section 3 provides a review of the literature and develops hypotheses, which is followed by Section 4 which outlines the research design. Results are reported in Section 5, and finally, Section 6 draws conclusions.

2. Importance of subcommittees: background literature and theory

Boards of large firms may find it challenging to discharge their monitoring responsibilities (Coles et al., 2008; Baker and Gompers, 2003), and such boards benefit from using board subcommittees to reduce inefficiencies induced by large board size (Lipton and Lorsch, 1992; Jensen, 1993; Yermack, 1996; Eisenberg et al., 1998). Prior studies show, that using subcommittees provides benefits by enabling knowledge specialisation (Kim et al., 2014), task division efficiency (De Kluyver, 2009) and enhanced accountability (Hermalin and Weisbach, 2003). This line of reasoning suggests the role of board subcommittees in enhancing the information environment of the firm through enhanced communication on boards. Prior studies (Yermack, 1996; Reeb and Upadhyay, 2010) document that larger boards and boards with a high proportion of outside directors employ board subcommittees to mitigate communication, coordination and free-riding problems. We build on this reasoning to argue that the use of nomination and remuneration committees enhances the information environment and thus signalling such an environment attracts new directors to boards and retains existing directors.

On the other hand, the potential advantage of subcommittees to improve the information environment through enhanced communication is not without a challenge. A competing argument highlights the costs of using subcommittees including barriers to communication and limiting effective group decision making (Adams et al., 2021; Li et al., 2001). Adams et al. (2021) argue that the formation of subcommittees may be useful to divide labour; however, it is not clear how these committees affect group information production and decision making. In this respect, Li et al. (2001) argued that board subcommittees may hinder communication by undermining the efficiency of information aggregation when there are incentives for committee members' self-interested actions. This observation can be considered in the light of Aghion and Tirole's (1997) empirical finding that subcommittees may hinder communication when the subcommittees lack formal authority. However, given that nomination and remuneration subcommittees are widely employed in the formal board structures in settings such as Australia (Adams et al., 2021), we argue such committees play an important role in corporate governance best practice at the firm level.

ASX Corporate Governance Council (2019) recommends establishing nomination and remuneration committees chaired by independent directors and having a minimum of three directors with independent director majority. The guideline suggests that "a separate remuneration committee can be an efficient and effective mechanism to bring the focus and independent judgement needed on remuneration decisions" (p. 29).[2] Principle 2 of the ASX Corporate Governance Council recommendations (2019) provides best practice guidelines on nomination and Principle 8 on remuneration committees.[3] The role of the nomination committees includes recruiting new directors, which involves evaluating the balance of skills, knowledge, experience, independence and diversity on the board. Remuneration committees consult the board on remuneration policy and plans as well as detailed remuneration packages including those relating to retirement for executives and employees (ASX Corporate Governance Council, 2019).

Another mechanism through which subcommittees signal good corporate governance is through improved firm performance (Calleja, 1999; Ntim, 2009; Reeb and Upadhyay, 2010). Subcommittees assist the board's role in monitoring and controlling by facilitating communication and efficient decision making as well as providing advisory services that contribute to firm value. Apart from the generic contribution of board subcommittees to the effective performance of the board (Ntim, 2009), nomination and remuneration committees can also contribute to firm performance through the recruitment and appropriate remuneration of expert board members.

Prior research (e.g., Asthana and Balsam, 2007, 2010) on director turnover measured this variable with a single proxy of director turnover without separately measuring director attrition and new director appointments to boards. An exception is Yermack's (2004) study that separately examined director departures, which still did not examine new director attraction to boards. In the following section, we develop our hypotheses splitting director turnover into director attrition and attraction of new directors.

3. Hypothesis development

In this section, we develop hypotheses on the role of nomination and remuneration committees on director attraction and attrition.

[2] The corporate governance principles with recommendations and amendments were released in 2010, the third edition in 2014 and fourth edition in 2019.

[3] According to listing rule 4.10.3, listed companies need to provide a statement disclosing the extent to which the entity has followed the recommendations set by the ASX CG Council during the reporting period. The ASX recommends the formation of Audit, Risk, Remuneration and Nomination as well as other subcommittees based on need, e.g., finance, strategy and sustainability committees.

3.1. Nomination committee effectiveness and director turnover

Due to their role in the corporate governance process, nomination committees serve as the foundational committee ultimately responsible for staffing and thus effective functions of other board and subcommittee members. Compared to audit committees and remuneration committees, nomination committees remain under-researched due to the relative difficulty of obtaining data on the latter (Clune et al., 2014). Corporate governance practices serve as monitoring devices to minimise agency problems and to ensure that managers act in the best interest of shareholders, i.e., maximizing firm value (Jensen and Meckling, 1976; Fama and Jensen, 1983). The board also serves as a key link between an organisation and the outside environment (Hillman et al., 2000; Palmer and Barber, 2001) thereby providing the platform for nomination committees' role in the director recruitment process. Nomination committees contribute to the recruitment of directors with the skills and resources needed to monitor the management of the firm (Jensen and Meckling, 1976; Fama and Jensen, 1983).

The use of a nomination committee could also enhance corporate governance quality, for example, by minimising the adverse effect of CEO influence in the selection and appointment of directors (Vafeas, 1999; Carson, 2002). While CEO influence on nomination committees cannot be ruled out (Clune et al., 2014; Shivdasani and Yermack, 1999) the full board's other mechanisms such as the proportion of independent directors can serve as a mechanism to monitor CEO influence. Indeed, according to corporate governance best practice recommendations, nomination committees would be effective if they have independent director majority, a minimum size of three members, and an independent director as the committee chair. Eminet and Guedri (2010) argue that an independent nomination committee reduces the influence of CEOs on the selection of independent directors. This role may in turn bolster the reputation of the existing board to undertake effective monitoring of management.

Pierce and Waring (2004) report that corporate governance practice guidelines of numerous countries constantly recommend the use of board subcommittees, and they find that using subcommittees for key elements of governance such as audit, remuneration, and nomination is regarded as good corporate governance practice (Pierce and Waring, 2004). The role of a nomination committee is two-fold: first, it contributes to the matrix of skills for the replacement or addition of directors; and second, it reassesses the performance of the directors on a consistent and periodic basis (Carson, 2002). In doing so, nomination committees contribute to improved firm performance, which in turn, could send a positive signal to potential new directors and reflect well on the performance of existing directors hence contributing to their retention. Ntim (2009) reports that the nomination committee can make a significant influence on the financial performance of companies. Correspondingly, based on a study of the top 100 firms in Australia, Calleja (1999) finds that firms that use audit, remuneration and nomination subcommittees, achieve improved firm performance.

An effective nomination committee could lead to improved corporate governance and contribute to the proper functioning of the organisation by making the right appointments to the board. Subcommittees enable large boards to foster efficiency of operations and communications (Reeb and Upadhyay, 2010; Upadhyay et al., 2014) by focusing on specific areas of the boards' responsibilities (Spira and Bender, 2004). Nomination committees contribute to efficiency through the recruitment of directors with the right set of skills and experience, which in turn will positively contribute to firm performance (Ntim, 2009; Calleja, 1999). Apart from the role of nomination committees in signalling a good information environment and thus attracting new directors, these committees can also reduce director attrition, which is, inter alia, driven by poor firm performance (Fahlenbrach et al., 2017). Based on the foregoing arguments, we predict the following hypothesis:

H1. *Director attrition (joining) is negatively (positively) associated with nomination committee effectiveness.*

3.2. Remuneration committee effectiveness and director turnover

ASX Corporate Governance Council Principle 8 (2019) (p. 29) recommends designing "executive remuneration to attract, retain and motivate high quality senior executives and to align their interests with the creation of value for security holders and with the entity's values and risk appetite." Further, it recommends that a majority of remuneration committee members be independent directors, including at least three members and be chaired by an independent director. The presence of non-executive directors on the remuneration committee can serve as a monitoring mechanism that prevents excessive remuneration for executive directors. The benefits claimed for having a remuneration committee are consistent with the agency theory explanation that independent monitoring mechanisms are needed when ownership of firms is separated from control (Fama and Jensen, 1983). By having transparent compensation packages, a remuneration committee with independent director majority can better align the interests of top management and shareholders (Cerbioni and Parbonetti, 2007).

Remuneration committees play a supporting role and make recommendations to the main board on remuneration related issues including performance-based remuneration and disclosure of remuneration information. This role encompasses making periodic recommendations to the board on decisions, actions and disclosures that merit the board's attention regarding director remuneration. Remuneration committees can be more efficient in designing remuneration for firms than the full board while the ultimate responsibility rests with the main board. Subcommittees including remuneration committees help boards to focus on important issues such as improving firm performance by freeing up their time (Reeb and Upadhyay, 2010; Upadhyay et al., 2014).

Moreover, while the overall strength of corporate governance is inversely associated with the level of CEO compensation (Core et al., 1999), remuneration committees play a vital role in devising executive remuneration schemes that align with firm performance. Conyon and Peck (1998) find that firm performance and executive remuneration are aligned for firms that have majority independent directors on boards and use remuneration committees. The alignment of executive remuneration with firm performance will in turn contribute to high firm performance (Carpenter and Sanders, 2002), which will contribute to the retention of existing directors and

attracting new directors to the board. In line with this argument and the findings of prior studies (Yermack, 2004; Fahlenbrach et al., 2017), we argue that firms with high performance have good reputation that helps retain existing directors and attract new ones.

However, it is worth noting that director departures are not a supply side decision alone. That is, directors may be removed involuntarily for several reasons originating from supply side factors (Brochet and Srinivasan, 2014; Core et al., 1999). Shareholders hold low performing independent directors accountable by voting against re-appointment of independent directors when the firm is identified with financial reporting irregularities (Brochet and Srinivasan, 2014; Srinivasan, 2005). Such involuntary removal of directors and pressure for resignation of the directors also occurs when the firm faces litigation in which the directors are named as defendants (Brochet and Srinivasan, 2014). Therefore, demand side factors are important considerations to fully understand the drivers of firms when attrition and attraction.

Overall, drawing on the empirical and theoretical literature, we argue that effective remuneration committees enhance corporate governance quality in fairly remunerating directors. This will in turn send a positive signal to potential directors to join the board. Remuneration committees can also contribute to corporate governance excellence through improved firm performance (Yermack, 2004). Fahlenbrach et al. (2017) find that director departure is associated with worsening of operating and stock performance and increased litigation risk for companies. In addition, their findings show that firm performance deteriorates following director departures because: first, the firm loses the effective monitoring role of the experienced director, and second, deteriorating firm performance explains some directors' decision to withdraw (Fahlenbrach et al., 2017). Sound remuneration and improved firm performance would in turn contribute to the retention of existing directors. Further, a reputation for improved corporate governance will enable the board to attract new directors. Based on this argument, we propose the following hypothesis on the two components of director turnover:

H2. *Director attrition (joining) is negatively (positively) associated with remuneration committee effectiveness.*

4. Research design

4.1. Data, and descriptive statistics

Our sample includes all firms listed on the ASX that have director turnover data in the Boardroom Connect 4 database for the period from 2004 to 2018. We collect data for other variables that we include within our modelling procedures from the SIRCA and DatAnalysis databases. For stock data, we retrieve stock returns and market returns from the Datastream database. We initially identify a sample of firms which have director attrition and director's attraction data from the Boardroom Connect 4 database. We remove firms in the financial service and utility sectors. We then remove firms that do not have financial data in the DatAnalysis database and corporate governance data in the SIRCA database. The final sample comprises 10,640 firm year observations.

Table 1 provides details of the distribution of firm-years across years and industries, respectively. The lowest number of firm-year observations is ($n = 441$) in 2018, with 4.14% of sample firms, and the largest number of firms is ($n = 884$) in 2006, representing 8.31% of sample firms. The distribution is fairly even with no apparent evidence of clustering in any year. We classify firms according to the Global Industries Classification Standard (GICS) codes. A large proportion (33.57%) of firms is concentrated in the Materials sector followed by Industrial (16.22%), Consumer discretionary (14.26%) and Energy (13.07%). These are the most widely represented industry sectors in the sample and, thus, the distribution indicates that the firms operate in a broad array of industries.

4.2. Subcommittee effectiveness and other firm-level characteristics

We developed a composite index to measure subcommittee effectiveness based on ASX CG best practice recommendations (2019) and extant literature (Sun and Cahan, 2009; Kanapathippillai et al., 2016). ASX Recommendations for good corporate governance suggest each committee should consist minimum of three members, the majority of the members should be independent, and an independent director should chair the committee. If these conditions are satisfied, we give a value of 1 and otherwise 0. The extant literature has used a number of subcommittee meetings and the financial expertise of the committee members in developing a composite index (Sun and Cahan, 2009; Kanapathippillai et al., 2016; Zaman et al., 2011). There is no recommendation regarding the number of meetings and financial expertise of subcommittee members. Therefore, we coded 1 if the number of meetings held in a year is greater than the median and 0 otherwise. The financial expertise of subcommittee members is coded as 1 if at least one member has financial expertise and 0 otherwise. We constructed an index for subcommittee effectiveness by aggregating the scores of these five dimensions of governance with a maximum value of 5 and a minimum value of 0.

In line with prior studies (see for example, Asthana and Balsam, 2007; Gao et al., 2017), we use a number of control variables to ensure the validity of our results and conclusions: total assets (*SIZE*), leverage (*LEVRG*), return on assets (*ROA*), loss (*LOSS*), market return (*RETURN*), earnings quality (*EARNQLT*), fractions of shares held by institutional investors (*TOP20*), board size (*BS*), number of board meeting (*BMEET*), proportion of independent directors on the board (*INDBS*), new CEO (*CEONW*), directors compensation (*REMUN*), audit quality (*BIG4*), going concern (*GOINGCON*), fraction of financial experts on the audit committee (*FINEX_AC*), CEO in

Table 1
Year-wise classification and industry classifications.

Panel A: Year-wise classification		
Year	*Observations*	*%*
2004	711	6.68
2005	839	7.89
2006	884	8.31
2007	842	7.91
2008	842	7.91
2009	831	7.81
2010	824	7.74
2011	748	7.03
2012	712	6.69
2013	740	6.96
2014	687	6.46
2015	430	4.04
2016	520	4.89
2017	589	5.54
2018	441	4.14
Total	10,640	100
Panel B: Industry-wise classifications		
Industry	***Observations***	***%***
Energy	1391	13.07
Materials	3572	33.57
Industrials	1726	16.22
Consumer Discretionary	1517	14.26
Consumer Staples	425	3.99
Health Care	928	8.72
Information Technology	790	7.43
Communication Service	291	2.74
Total	10,640	100

This table shows the year wise classification and industry classification for our final sample for the period from 2004 to 2018.

nomination committee (*CEO_NC*), and CEO in remuneration committee (*CEO_RC*). We make several predictions as to the directional impacts of the various control variables cited above deriving from the extant literature and theory-based reasoning. That is, we anticipate larger director turnover for smaller, riskier and more complex firms. We use industry dummy variables based on GICS and year dummy variables, to control for the impacts arising from changes in financial reporting regulations. Table 2 reports descriptive statistics of firm-level financial characteristics.[4]

The two-subcommittee existence measures are "*NCX*", and "*RCX*" and the two subcommittee effectiveness measures are "*NCE*" and "*RCE*". The mean and median of *NCX* (*RCX*) are 0.41 (0.61) and 0 (1). Similarly, the mean and median of *NCE* (*RCE*) are 2.18 (1.76) and 3 (1). Table 2 also shows that the mean (median) value of directors' attrition is 0.34 (0); the mean (median) value for directors joining the firm is 0.22 (0); the mean and median value of profitability (*ROA*) is 0.017% and 0.011%. The mean and median value of total assets (*SIZE*) is $ 4709.98 million and $908.01 million, respectively; the mean value of the total debt ratio (*LEVRG*), is 26.54%. For other variables, the mean value of board size (*BS*), is 8.64; the mean value of independent directors to board size (*INDBS*), is 0.36; and the mean value of *TOP20* ownership, is 54.63%. The descriptive statistics of other variables are consistent with those of prior studies in the area.

5. Empirical results

5.1. Baseline results – subcommittees and director turnover

We use the following probit baseline model to examine the impact of subcommittee effectiveness on director turnover, with the variable symbols and definitions described below and in Appendix A.

$$DA(DJ)i,t = \alpha + \beta SubComEffi,t-1 + CONTROLi,t-1 + \varepsilon i,t \quad (1)$$

where, *DA(DJ)i,t* is components of director turnover[5] of firm *i* in year *t*, namely, director attrition (*DA*) and director joining the board

[4] In Appendix B, we present Pearson correlations among our key variables. Most of the correlations are significant at 1% level. More interestingly, three of the subcommittee variables are significantly negatively correlated with the turnover variable. Furthermore, our subcommittee measures are associated with performance, and market return measure.

[5] Unlike in U.S., there is no regulatory requirement in Australia to disclose the reasons for director's turnover in the annual report to any regulatory bodies.

Table 2
Descriptive statistics of firm characteristics.

	Obs	Mean	Median	25%	75%	Std.Dev
NCX	10,640	0.414	0.000	0.000	1.000	0.434
RCX	10,640	0.615	1.000	0.000	1.000	0.480
NCE	10,640	2.178	3.000	0.000	5.000	1.429
RCE	10,640	1.763	1.000	0.000	5.000	1.362
DA	10,640	0.339	0.000	0.000	1.000	0.624
DJ	10,640	0.224	0.000	0.000	1.000	0.546
SIZE($m)	10,640	4709.976	908.015	207.830	5610.777	13.572
LEVRG(%)	10,640	26.537	22.314	2.461	47.108	2.222
ROA (%)	10,640	0.017	0.011	0.003	0.144	1.769
LOSS	10,640	0.042	0.000	0.000	1.000	0.463
RETURN	10,640	0.263	0.000	−0.317	0.596	0.812
EARNQLT	10,640	0.156	0.063	0.021	0.208	0.194
SEGMENT	10,640	1.682	1.000	0.000	3.000	0.484
BS	10,640	8.638	7.351	5.225	11.366	4.224
TOP20	10,640	54.626	46.811	23.199	84.748	11.626
BMEET	10,640	11.077	10.459	7.315	13.586	5.451
INDBS	10,640	0.359	0.355	0.177	0.527	0.253
CEONW	10,640	0.046	0.000	0.000	0.000	0.215
REMUN ($m)	10,640	1.184	0.578	0.293	1.212	1.841
BIG4	10,640	0.883	1.000	1.000	1.000	0.083
AMIHUD	10,640	−0.211	−0.001	0.000	−0.026	−1.053
ANALYST	10,640	11.577	8.768	0.938	32.424	2.611
GOINGCON	10,640	0.120	0.000	0.000	0.000	0.338
FINEX_AC	10,640	0.725	1.000	0.000	1.000	0.480
CEO_NC	10,640	0.098	0.000	0.000	0.000	0.309
CEO_RC	10,640	0.128	0.000	0.000	0.000	0.340

This table reports the descriptive statistics for our sample for the period from 2004 to 2018. The Appendix A presents a detailed description of the variables.

(*DJ*). *DA* is a dummy variable that takes a value of 1 if a director leaves the firm, and 0 otherwise. *DJ* is a dummy variable, which takes a value of 1 if a director joins into the firm, and 0 otherwise. *SubComEffi,t-1* is a measure for subcommittee effectiveness of entity *i* in year *t*. *CONTROLSi,t-1* is the set of control variables defined in Section 4.2. All control variables are incorporated in the regression models with a year lag. We also include industry and year fixed effects to control for cross-sectional and time-series dependence. We estimated our models with robust standard errors to correct for heteroscedasticity, and we clustered standard errors at the firm-level. We present the results regarding the impact of subcommittee effectiveness on director attrition (columns 1 through 3) and director joining (columns 4 through 6) in Table 3.

Accordingly, Table 3 shows a significantly negative (positive) relation between subcommittee effectiveness and directors' attrition (joining) in all models, irrespective of the sub-committee measures used, controlling for the various variables that determine director turnover referred to above, as well as industry and year fixed effects.

These findings indicate that subcommittee effectiveness enhances corporate governance quality through properly nominating and remunerating directors, and therefore reduces (increases) director attrition (joining) for such firms. Subcommittee effectiveness also reduces information asymmetry and thus it leads to lower (higher) director attrition (joining).[6] Specifically, the estimated coefficient of *NCE* (for instance, column 1) is −0.2000. That is, given that the standard deviation of *NCE* is 1.429 (as reported in Table 2), a one standard deviation increase in *NCE* is related to the decrease of −0.3904 (−0.2732 × 1.429) in director attrition. On the other hand, the estimated coefficient of *NCE* (for instance, column 4) is 0.1917, indicating that a one standard deviation increase in *NCE* is related to a rise of 0.2739 (0.1917 × 1.429) in director joining. Thus, our hypothesis ***H1*** is supported.

For remuneration committee effectiveness (*RCE*), the results reported in columns 2 and 5 indicate that estimated coefficients on *RCE* are negative (positive) and statistically significant at the conventional levels in all estimations for director attrition (joining). These results support the prediction from hypothesis ***2*** and indicate that directors are less (more) likely to leave (join) firms with better remuneration committee effectiveness. The results are consistent across all specifications. For the full model regression (columns 3 and 6), the results remain unchanged when we combine the *NCE* and *RCE* variables in the model. Overall, these results support the conclusion that subcommittee effectiveness provides an important signal to existing directors who decide to stay on the board and new directors who consider joining the board.[7] In terms of the control variables, in line with Asthana and Balsam (2007), the estimated coefficients on the *SIZE* variable have the expected negative sign and are statistically significant at the 1% level, indicating that larger

[6] We argue that subcommittee effectiveness could enhance confidence of potential external directors in the firm's corporate governance quality and thus increases the likelihood of new director joining the board.

[7] We also employed alternative continuous dependent variables, indicating the number of directors leaving the board (*DA*), and the number of directors joining the board (*DJ*). Unreported results remain qualitatively unchanged. In untabulated results, we find that our results hold when we regress values at subcommittee level of our main dependent variable, director attrition and director joining of both our subcommittee effectiveness measure and control variables."

Table 3
The impact of Subcommittee effectiveness on director attrition and director joining.

	Director Attrition (DA)			Director Joining (DJ)		
	(1)	(2)	(3)	(4)	(5)	(6)
NCE	−0.2000		−0.1970	0.1917		0.1497
	(−7.44)***		(−7.28)***	(3.79)***		(2.24)**
RCE		−0.2856	−0.2758		0.0569	0.0518
		(−6.64)***	(−6.48)***		(3.59)***	(3.33)***
SIZE	−0.1961	−0.1845	−0.1832	0.1204	0.1100	0.1165
	(−8.43)***	(−7.92)***	(−7.65)***	(2.89)***	(2.43)**	(3.46)***
LEVRG	0.1675	0.0158	0.0275	−0.3064	−0.2786	−0.2806
	(2.08)**	(0.18)	(0.32)	(−2.34)**	(−2.11)**	(−2.39)**
ROA	−0.4312	−0.4369	−0.4273	0.6033	0.5829	0.5855
	(−3.60)***	(−3.57)***	(−3.42)***	(3.06)***	(2.93)***	(2.94)***
LOSS	0.2604	0.2106	0.2139	−0.2491	−0.2317	−0.2320
	(7.19)***	(5.70)***	(5.79)***	(−4.09)***	(−3.74)***	(−3.79)***
RETURN	−0.0241	−0.0310	−0.0275	0.0880	0.0906	0.0904
	(−1.46)	(−1.85)*	(−1.63)	(2.75)***	(2.81)***	(2.80)***
EARNQLT	0.3613	0.2405	0.2439	−0.1800	−0.1338	−0.1341
	(4.37)***	(2.85)***	(2.80)***	(−1.00)	(−0.80)	(−0.78)
lnSEGMENT	−0.1196	−0.1130	−0.1339	0.5860	0.5821	0.5843
	(−4.10)***	(−3.82)***	(−4.47)***	(13.77)***	(13.37)***	(13.76)***
CEONW	0.1250	0.1348	0.1390	−0.5315	−0.5290	−0.5295
	(1.89)*	(2.02)**	(2.08)**	(−6.56)***	(−6.18)***	(−6.60)***
CEO_NC	0.0052	0.1460	0.0679	−0.0881	−0.0672	−0.0692
	(0.49)	(2.69)***	(1.24)	(−1.06)	(−0.81)	(−0.87)
CEO_RC	0.2121	0.0113	0.0418	−0.0515	−0.1185	−0.1195
	(4.38)***	(0.40)	(0.85)	(−0.67)	(−1.48)	(−1.50)
lnBS	−0.4063	−0.1742	−0.1776	0.5413	0.4930	0.4979
	(−7.53)***	(−3.11)***	(−3.12)***	(5.62)***	(5.06)***	(5.11)***
lnMEET	−0.1586	−0.0589	−0.0627	0.1570	0.1291	0.1215
	(−5.64)***	(−2.015)**	(−2.09)**	(2.69)**	(2.15)**	(2.00)**
INDBS	−0.1180	−0.0635	−0.0787	0.0754	0.0647	0.0832
	(−12.34)***	(−6.38)***	(−7.82)***	(2.69)**	(2.26)**	(2.84)***
lnREMUN	−0.0221	−0.0160	−0.0238	0.1643	0.1755	0.1747
	(−2.24)**	(−1.94)*	(−2.27)**	(1.72)*	(1.99)**	(1.90)*
GOINGCON	0.1866	0.1242	0.1186	−0.5432	−0.5349	−0.5368
	(3.61)***	(2.33)**	(2.18)**	(−4.35)***	(−4.28)***	(−4.39)***
FINEX_AC	−0.0272	−0.0261	−0.0231	0.0056	0.0016	0.0047
	(−2.36)**	(−2.63)**	(−2.30)**	(1.08)	(0.50)	(0.87)
Constant	3.6247	2.3921	3.5054	−8.1955	−8.1081	−8.1610
	(13.12)***	(9.04)***	(12.39)***	(−20.18)***	(−21.91)***	(−19.80)***
Fixed Effects	YI	YI	YI	YI	YI	YI
Pseudo R2	0.258	0.252	0.285	0.209	0.198	0.244
Obs	10,640	10,640	10,640	10,640	10,640	10,640

This table reports the results regarding the impact of subcommittee effectiveness on directors' attrition and joining. We use the following probit baseline model to examine the impact of subcommittee effectiveness on director turnover, with the variable symbols and definitions described below and in the Appendix.

$$\mathrm{DA(DJ)i,t} = \alpha + \beta \mathrm{SubComEffi,t-1} + \mathrm{CONTROLi,t-1} + \varepsilon \mathrm{i,t} \quad (1)$$

where, $DA(DJ)_{i,t}$ is components of director turnover of firm *i* in year *t*, namely, director attrition *(DA)* and Director joining the board *(DJ)*. DA is a dummy variable which equals one if a director leaves the firm, and zero otherwise. *DJ* is a dummy variable, which equals one if a director joins into the firm, and zero otherwise. $SubComEffi_{t-1}$ is a proxy for subcommittee effectiveness of firm i in year t. $CONTROLS_{i,t-1}$ is the set of control variables defined in Section 4.2. All control variables are included in the regressions with a one-year lag. We include industry-fixed, and year-fixed effects to control for cross-sectional and time-series dependence. All models are estimated with robust standard errors to correct for heteroscedasticity and are clustered at the firm level (Peterson, 2009). We present the results regarding the impact of subcommittee effectiveness on director attrition (columns 1 through 3) and director joining (columns 4 through 6). The construction of the related variables is detailed in the Appendix A. The symbols ***, **, and * denote significance levels at the 1%, 5%, and 10% levels, respectively.

firms experience lower director attrition, consistent with prior studies. By contrast, the coefficient estimates on the *SIZE* variable for the director joining sample are positively statistically significant, suggesting that larger firms attract new directors. The coefficients on *LOSS* are positive and statistically significant across all specifications of the director attrition sample, and negative for the director joining sample, consistent with the argument that riskier firms experience higher director attrition and lower director joining. The estimated coefficients on *INDBS* and *lnBS* have a statistically significant negative sign for the director attrition sample and have a positive sign for the director joining, that is, director attrition will be lower for those firms with higher independent directors, while

director attraction will be higher for those firms with higher independent directors.

These results are consistent with prior studies' findings that independent directors in well diversified boards are somewhat more effective (see for example, Gao et al., 2017). The estimated coefficients on the new CEO (*CEONW*) variable are significantly positive (negative) for the director attrition (joining) sample, indicating that director attrition (attraction) will be higher (lower) for those firms with a new CEO. The estimated coefficients on directors' compensation (*lnREMUN*) are significantly negative for the director attrition and positive for the director attraction sample, indicating that director attrition (joining) will be lower (higher) for firms with higher directors' compensation. Further, we find that director attrition is higher for those firms with going concern problems and lower financial expertise in audit committees (*FINEX_AC*); whereas the effect of *FINEX_AC* on director attraction is statistically insignificant.

5.2. Cross-sectional analysis

In this section, we examine the cross-sectional analysis by exploring the moderating effects of the information environment, corporate governance quality and performance on the association between subcommittee effectiveness and directors' attrition and joining.

5.2.1. Effect of information environment

We examine the effect of the information environment on the association between board subcommittee effectiveness and directors' attrition (joining). First, we test whether a firm's information environment significantly affects the association of board subcommittee effectiveness and director turnover. While acknowledging the potential of board subcommittees to hinder communication (Li et al., 2001), we mainly predict a positive effect of subcommittees on communication as the hindrance to communication is empirically observed when the subcommittee members lack formal authority (Aghion and Tirole, 1997). The pioneering studies by Hermalin and Weisbach (1998), Dahya et al. (2002), and Huson et al. (2004) suggest that the information and governance quality can influence director turnover in that governance mechanisms are related to the probability of either eliminating underperforming directors or with hiring better incoming directors.

To conduct this investigation, we employ audit quality (*BIG4* variable),[8] liquidity (*AMIHUD*) and analyst following (*ANALYST*) as a proxy for the corporate information environment. *BIG4* is a dummy variable, which equals 1 for firms audited by Big 4 auditors and 0 otherwise. *AMIHUD* is an average ratio of the daily absolute return to the (dollar) trading volume on that day, giving the absolute (percentage) price change per dollar of daily trading volume, or the daily price impact of the order flow (multiply this variable with −100,000 for presentation). *ANALYST* is the number of analysts following the firm employed as a proxy for the information environment (Osma and Guillamón-Saorín, 2011). For each fiscal year, we sort firms into high and low information asymmetry groups based on the median value of each information asymmetry measure. We use a dummy variable high information asymmetry and interact this variable with NCE (RCE). Our proxies for high information asymmetry are Non-Big Audit *(NON-BIG4*), higher Amihud (*LOWLIQ*), and lower analysts following (*LANALYSTS*). We report our results for the firm-level information environment in Table 4. Our coefficient estimates on the interactions between the board subcommittee effectiveness measures and *NON- BIG4, LOWLIQ, and LANALYSTS* variables are negatively significant for the director attrition sample and positively significant for the director attraction sample. We find that the effect of board subcommittee effectiveness on directors' attrition(joining) is stronger for firms with a poorer information environment.

5.2.2. Effect of governance mechanisms

The agency framework reports that effective corporate governance practices mitigate agency costs by reducing information asymmetry through enhanced disclosures. Previous studies (Williamson, 1983) show that a remuneration committee makes recommendations about remuneration packages to the board and provides such information to stakeholders to reduce agency problems in relation to remuneration policies. A nomination committee with independent directors should have good quality information about potential candidates for the new CEO position, which can reduce the information asymmetry in new CEO selection (Zhang, 2008). Bradbury (1990) argues that audit committees reduce information asymmetry between insiders and outsiders, given the information and governance effects on director turnover, we posit that the effect of board subcommittee effectiveness to be more pronounced for firms with higher information asymmetry and weaker corporate governance mechanisms.

We examine the effect of the governance quality on the association between board subcommittee effectiveness and directors' attrition(joining). As a governance quality measure, we use the *TOP20,* i.e.*,* fractions of shares held by Top 20 institutional investors and board independence (*BIND*) is the percentage of independent directors on the board as our measures for the governance quality mechanisms. For each fiscal year, we sort firms into high and low governance quality groups based on the median value of each governance measure. We use a dummy variable weak governance and interacted with this variable with *NCE (RCE)*. Our proxies for weak governance mechanisms are *LTOP20* and Lower board independence (*LBIND*). We report our results for firm-level governance environment in Table 5.

Our coefficient estimates on the interactions between the board subcommittee effectiveness measures and *LTOP20* and *LBIND* variables are negatively significant for the director attrition sample and positively significant for the director attraction sample. We find that the effect of board subcommittee effectiveness on directors' attrition(joining) is stronger for firms with a weak governance

[8] The literature shows higher financial information quality among firms audited by Big 4 auditors that those audited by other firms (Teoh and Wong, 1993; Krishnan, 2003; Francis and Wang, 2008; Ball et al., 2012; Alhadab and Clacher, 2018).

Table 4
The role of information environment.

Panel A: Information Environment (BIG4)				
Variables	Director	Attrition	Director	Joining
	(1)	(2)	(3)	(4)
NCE	−0.0779		0.0657	
	(−0.98)		(0.81)	
RCE		−0.0547		0.0517
		(−0.61)		(0.77)
NON-BIG4	0.4295	0.4178	−0.2096	−0.1889
	(1.18)	(1.09)	(−0.61)	(−0.36)
*NCE*NON-BIG4*	−0.1911		0.7726	
	(−4.52)***		(5.43)***	
*RCE*NON-BIG4*		−0.9356		0.7299
		(−3.23)***		(2.87)***
Constant	5.3088	5.2432	−4.7871	−4.7452
	(13.65)***	(13.04)***	(−12.36)***	(−12.51)***
All controls	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI
Pseudo R^2	0.2521	0.2509	0.2093	0.2070
Obs	10,640	10,640	10,640	10,640
Panel A: Information Environment (AMIHUD)				
Variables	**Director**	**Attrition**	**Director**	**Joining**
	(1)	(2)	(3)	(4)
NCE	−0.0029		0.0015	
	(−0.62)		(0.62)	
RCE		−0.0011		0.0031
		(−0.03)		(0.16)
LOWLIQ	0.0022	0.0025	−0.0014	−0.0058
	(0.06)	(0.05)	(−0.05)	(−0.09)
*NCE*LOWLIQ*	−0.0064		0.0046	
	(−1.87)*		(1.82)*	
*RCE*LOLIQ*		−0.0054		0.0042
		(−1.98)**		(1.88)*
Constant	4.5924	4.547402	−4.1451	−4.1589
	(11.85)***	11.33004	(−10.76)***	(−10.94)***
All controls	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI
Pseudo R^2	0.2447	0.2429	0.2028	0.2011
Obs	10,640	10,640	10,640	10,640
Panel A: Information Environment (ANALYST)				
Variables	**Director**	**Attrition**	**Director**	**Joining**
	(1)	(2)	(3)	(4)
NCE	−0.0885		0.0747	
	(−0.96)		(1.02)	
RCE		−0.0738		0.0724
		(−0.82)		(0.99)
LANALYST	0.1957	0.1877	−0.2319	−0.2241
	(0.74)	(0.63)	(−0.86)	(−0.71)
*NCE*LANALYST*	−0.1258		0.0819	
	(−6.09)***		(5.26)***	
*RCE*LANALYST*		−0.0808		0.0847
		(−4.36)***		(3.73)***
Constant	4.2750	4.2249	−3.8341	−3.8409
	(10.99)***	(10.43)***	(−9.95)***	(−10.50)***
All controls	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI
Pseudo R^2	0.2114	0.2101	0.1758	0.1734
Obs	10,640	10,640	10,640	10,640

This table reports the results regarding the effect of information environment on the relations between subcommittee effectiveness and directors' attrition and joining. Director attrition (*DA*) is a dummy variable, which equals 1 if a director leaves the firm, and 0 otherwise. Director joining (*DJ*) is a dummy variable, which equals 1 if a director joins into the firm, and 0 otherwise. In Panel A, we present the results for information environment. We employ *BIG4, AMIHUD* and *ANALYST* as a proxy for corporate information environment. *BIG4* is a dummy variable, which equals 1 for a Big 4 audit firm and 0 for other firms. *AMIHUD* is an average ratio of the daily absolute return to the (dollar) trading volume on that day, giving the absolute (percentage) price change per dollar of daily trading volume, or the daily price impact of the order flow (multiply this variable with -100,000 for presentation). *ANALYST* is the number of analyst following. For each fiscal year, we sort firms into high and low information asymmetry groups based on the median value of each information asymmetry measure. We use a dummy variable high information asymmetry and interaction variable high information asymmetry* *NCE* (*RCE*) and other controls in the regressions. Our proxies for high information asymmetry are Non-Big Audit (*NON-BIG4*), higher Amihud (*LOWLIQ*), and lower analysts following (*LANALYSTS*). All control variables are as in Table 3 and measured over or at the end

of the previous year. The construction of the related variables is detailed in the Appendix A. The symbols ***, **, and * denote significance levels at the 1%, 5%, and 10% levels, respectively.

Table 5
The role of governance mechanisms.

Panel A: TOP20				
Variables	Director (1)	Attrition (2)	Director (3)	Joining (4)
NCE	−0.1033		0.0617	
	(−0.41)		(0.65)	
RCE		−0.0779		0.04521
		(−0.25)		(0.49)
LTOP20	0.0699	0.0314	−0.0928	−0.0777
	(0.93)	(0.51)	(−1.02)	(−0.59)
*NCE*LTOP20*	−0.1269		0.0925	
	(−2.74)***		(1.76)*	
*RCE*LTOP20*		−0.1159		0.1145
		(−2.32)**		(1.82)***
Constant	5.461	5.5851	−5.1933	−5.3320
	(14.04)***	(13.74)***	(−11.72)***	(−11.74)***
All controls	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI
Pseudo R^2	0.2614	0.2577	0.2238	0.2179
Obs	10,640	10,640	10,640	10,640
Panel B: Board Independence				
NCE	−0.1207		0.0749	
	(−0.98)		(0.86)	
RCE		−0.0993		0.0572
		(−0.32)		(0.59)
LBIND	−0.0776	−0.0446	0.1104	0.0928
	(−1.14)	(−0.64)	(1.38)	(0.63)
*NCE*LBIND*	−0.1455		0.1113	
	(−3.19)***		(2.69)**	
*RCE*LBIND*		−0.1339		0.1371
		(−2.82)***		(2.22)**
Constant	6.5728	6.7181	−6.2001	−6.4926
	(16.95)***	(16.59)***	(−14.08)***	(−14.11)***
All controls	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI
Pseudo R^2	0.2609	0.2570	0.2234	0.2177
Obs	10,640	10,640	10,640	10,640

This table reports the results regarding the effect of governance mechanisms on the relations between subcommittee effectiveness and directors' attrition and joining. Director attrition (*DA*) is a dummy variable, which equals 1 if a director leaves the firm, and 0 otherwise. Director joining (*DJ*) is a dummy variable, which equals 1 if a director joins into the firm, and 0 otherwise. We employ TOP20 and Board Independence(BIND) as proxies for corporate governance environment. TOP20 is the percentage of shares held by Top 20 institutional investors. BIND is the percentage of independent directors on the board. For each fiscal year, we sort firms into two groups based on the median value of each of the governance measures. We use a dummy variable for lower governance, and interaction variable poor governance* NCE (RCE) other controls in the regressions. All control variables are as in Table 3 and measured over or at the end of the previous year. The construction of the related variables is detailed in the Appendix A. The symbols ***, **, and * denote significance levels at the 1%, 5%, and 10% levels, respectively.

mechanism.

5.2.3. *Effect of firm performance*

In this section, we examine the effect of firm performance on the associations we have tested, i.e., the association between board subcommittee effectiveness and directors' attrition (joining). As prior studies (e.g., Fahlenbrach et al., 2017; Reeb and Upadhyay, 2010; Ntim, 2009) documented, performance is an important variable that may affect the decisions of directors to depart or new directors to join boards.

We measure firm performance using return on Assets (ROA) and Stock performance (RET) is the percentage change in monthly share prices as our measures for the performance. For each fiscal year, we sort firms into high and low performance measure groups based on the median value of each performance measure. We use a dummy variable (poor performance) and interacted with this variable with NCE (RCE). Our proxies for poor performance are LROA and LRAT. We report our results for firm-level governance environment in Table 6.

Our coefficient estimates on the interactions between the board subcommittee effectiveness measures and LROA and LRAT variables are negatively significant for the director attrition sample and positively significant for the director attraction sample. We find that the effect of board subcommittee effectiveness on directors' attrition(joining) is stronger for firms with poor performance.

Table 6
The role of performance.[a]

	Director Attrition (DA)		Director Joining (DJ)	
LROA	−0.0253	−0.0312	0.0185	0.0114
	(−2.16)**	(−2.48)**	(2.53)**	(1.93)*
NCE	−0.0308		0.0221	
	(−2.24)**		(2.58)**	
ACE		−0.0085		0.0129
		(−2.41)**		(2.52)**
*NCE * LROA*	−0.0514		0.0904	
	(−4.27)***		(7.29)***	
*RCE * LROA*		−0. 0858		0.0458
		(−7.44)***		(3.92)***
Constant	4.4315	4.3051	−7.3212	−7.2567
	(10.64)***	(9.43)***	(−13.48)***	(−13.35)***
All Controls	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI
Pseudo R2	0.2482	0.2471	0.2043	0.2037
Obs	9480	9480	9480	9480
Panel B				
LRET	−0.0248	−0.0360	0.0167	−0.0129
	(−2.44)**	(−2.69)**	(2.47)**	(2.08)**
NCE	−0.0291		0.0207	
	(−2.34)**		(2.74)***	
ACE		−0.0095		0.0139
		(−2.53)**		(2.60)**
*NCE * LRET*	−0.0536		0.092	
	(−4.54)**		(7.82)***	
*RCE * LRET*		−0.0937		0.0483
		(−7.70)**		(4.16)***
Constant	4.3636	4.2386	−7.8233	−7.7525
	(10.43)***	(9. 93)***	(−14.47)***	(−14.29)***
All Controls	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI
Pseudo R2	0.2478	0.2473	0.2045	0.2038
Obs	8978	8978	8978	8978

This table reports the results regarding the effect of performance on the relations between subcommittee effectiveness and directors' attrition and joining. Director attrition (DA) is a dummy variable, which equals 1 if a director leaves the firm, and 0 otherwise. Director joining (DJ) is a dummy variable, which equals 1 if a director joins into the firm, and 0 otherwise. Return on assets (ROA) and monthly stock return are employed as proxies for performance. We define a firm's stock market returns as percentage change in monthly share prices. For each fiscal year, we sort firms into two groups based on the median value of each of the performance measures. We use a dummy variable for lower performance, and interaction variable poor performance * NCE (RCE) other controls in the regressions. All control variables are as in Table 3 and measured over or at the end of the previous year. The construction of the related variables is detailed in the Appendix A. The symbols ***, **, and * denote significance levels at the 1%, 5%, and 10% levels, respectively.

[a] The sample size for this test is reduced compared to the baseline due to data availability.

5.3. Robustness checks

We use several approaches to check whether our results reported in the previous section are reliable.

5.3.1. Alternative variable approach

We first rerun Eq. (1) using alternative independent variables, *NCX* and *RCX* as a proxy for subcommittee effectiveness. The pioneering studies of Vafeas (1999) and Shivdasani and Yermack (1999) find that the existence of a nomination committee positively affects the selection of independent outside directors, and hence improves board monitoring. Anderson and Bizjak (2003) also report that the remuneration committee plays a key role in setting up compensation packages that both attract and retain top executives and offer the right incentives for directors to operate in shareholders' interests. Focusing on examining whether acquisitions transfer better corporate governance practices to target firms, Polovina and Peasnell (2020) find that the existence of board committees in the cross-border target firm improves its monitoring effectiveness in target countries with poor investor protection. Since the existence of subcommittees is to improve the monitoring and advising tasks of boards, we utilize the existence of subcommittees (*NCX* and *RCX*) as observable proxies for subcommittee effectiveness. *NCX* is a dummy variable, which equals 1 if a nomination committee exists in a reporting period and 0 otherwise. *RCX* is a dummy variable, which equals 1 if the remuneration committee exists in a reporting period and 0 otherwise. We report regression results in Panel A of Table 7.

Consistent with previous results, we find that coefficient estimates on *NCX* and *RCX* are negative and significant at the conventional levels for the director attrition sample, and positive for the director attraction sample. The results are consistent across all specifications, controlling for firm-level characteristics. These results confirm the main finding in our study that directors are less (more) likely to leave (join) firms with better subcommittee effectiveness.

Table 7
Alternative measures of Subcommittee effectiveness.

Panel A: The impact of Subcommittee existence on director						
	Director Attrition (DA)			Director Joining (DJ)		
	(1)	(2)	(3)	(4)	(5)	(6)
NCX	−0.1294		−0.1255	0.0125		0.0019
	(−6.83)***		(−6.36)***	(3.14)***		(2.74)***
RCX		−0.2919	−0.3864		0.0632	0.0672
		(−6.78)***	(−6.52)***		(4.08)***	(3.95)***
Constant	3.0804	2.8091	3.4591	−9.6989	−9.7346	−9.7661
	(11.56)***	(10.87)***	(12.38)***	(−26.16)***	(−25.90)***	(−25.50)***
All Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI	YI	YI
Pseudo R2	0.257	0.244	0.279	0.194	0.188	0.202
Obs	10,640	10,640	10,640	10,640	10,640	10,640
Panel B: The impact of Standalone Subcommittees Existence on Directors Turnover						
SNCX	−0.0101		−0.0086	0.0065		0.0052
	(−1.95)*		(−1.77)***	(2.10)**		(1.71)*
SRCX		−0.0231	−0.0175		0.0049	0.036
		(−2.40)**	(−1.68)*		(2.64)***	(2.19)**
NCE	−0.0345		−0.0215	0.0074		0.0039
	(−2.56)**		(−1.79)*	(2.06)**		(1.83)*
ACE		−0.0207	−0.0194		0.052	0.004
		(−2.09)***	(−1.88)*		(1.75)*	(1.69)*
*SNCX * NCE*	−0.0487		−0.0354	0.0316		0.0197
	(−4.95)***		(−2.97)***	(4.14)**		(2.57)**
*SRCX * RCE*		−0.0709	−0.0654		0.0541	0.0627
		(−5.43)***	(−4.34)***		(3.74)***	(3.98)***
Constant	9.4810	9.5694	9.4899	−8.9498	−8.9875	−9.0698
	(27.62)***	(28.29)***	(27.89)***	(−24.14)***	(−23.97)***	(−23.51)***
All Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI	YI	YI
Pseudo R2	0.2614	0.2528	0.2794	0.2108	0.2094	0.2349
Obs	10,640	10,640	10,640	10,640	10,640	10,640

The Panel A of table reports the results regarding the impact of subcommittee effectiveness on directors' attrition and joining. We use the probit baseline model to examine the impact of subcommittee effectiveness on director turnover using alternative measures of subcommittee effectiveness, *NCX* and *RCX*. *NCX* is a dummy variable, which equals 1 if nomination committee exists in a reporting period and 0 otherwise. *RCX* is a dummy variable, which equals 1 if remuneration committee exists in a reporting period and 0 otherwise. The Panel B of table presents the regression results on the impact of Standalone subcommittee's existence on Director attrition and new director joining. We use the probit baseline model to examine the impact of standalone sub-committee existence on director turnover using interaction measures of SNCX (SRCV) and NCE (RCE)., SNCX and SRCX. SNCX is a dummy variable, which equals 1 if firm with standalone nomination committee exists in a reporting period and 0 otherwise. *SRCX* is a dummy variable, which equals 1 if firm with stand-alone remuneration committee exists in a reporting period and 0 otherwise. Director attrition (*DA*), indicating the number of directors leaving the board, and Director joining the board (*DJ*).

Table 8
Independent director attrition and director joining.

aw	Director Attrition (DA)			Director Joining (DJ)		
	(1)	(2)	(3)	(4)	(5)	(6)
NCE	−0.0296		−0.0346	0.0384		0.0340
	(−2.01)**		(−2.39)***	(3.40)***		(2.18)**
RCE		−0.0615	−0.0637		0.0557	0.0491
		(−4.50)***	(−4.83)***		(3.47)***	(3.40)***
Constant	5.1404	5.3572	5.0708	−8.4625	−8.3722	−8.4268
	(8.64)***	(8.67)***	(8.01)***	(−20.84)***	(−22.62)***	(−20.52)***
All Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI	YI	YI
Pseudo R2	0.2758	0.2600	0.2979	0.2214	0.2120	0.2457
Obs	10,640	10,640	10,640	10,640	10,640	10,640

This table presents the regression results on the impact of subcommittee effectiveness on independent Director attrition and independent director joining. We use the probit baseline model to examine the impact of subcommittee effectiveness on independent director turnover using alternative measures of director turnover. Independent Director Joining (DJ) is a dummy variable, which equals one if an independent director joins into the firm, and zero otherwise. Director attrition (*DA*) is a dummy variable, which equals one if an independent director leaves the firm, and zero otherwise. *CONTROLSi,t-1* is the set of control variables defined in Section 4.2. All control variables are included in the regressions with a one-year lag. We include industry-fixed, and year-fixed effects to control for cross-sectional and time-series dependence. The construction of the related variables is detailed in the Appendix A. The symbols ***, **, and * denote significance levels at the 1%, 5%, and 10% levels, respectively.

Table 9
Lagged independent variables and firm-fixed effects.

	Director Attrition (DA)			Director Joining (DJ)		
	(1)	(2)	(3)	(4)	(5)	(6)
NCE	−0.1675		−0.1779	0.1831		0.1946
	(−2.55)**		(−2.88)***	(2.87)**		(3.12)***
RCE		−0.1134	−0.1175		0.0718	0.0749
		(−2.09)**	(−2.47)**		(1.99)**	(2.18)**
SIZE	−0.0389	−0.0326	−0.0362	0.0191	0.0197	0.0198
	(−2.02)**	(−1.78)*	(−1.79)*	(0.61)	(0.64)	(0.69)
LEVRG	0.2008	0.0722	0.1300	−0.2953	−0.2791	−0.2827
	(2.50)**	(0.89)	(1.51)	(−2.24)**	(−2.12)**	(−2.14)**
ROA	−0.4066	−0.4395	−0.3879	0.5983	0.5804	0.5798
	(−3.38)***	(−3.61)***	(−3.01)***	(3.03)***	(2.92)***	(2.87)***
LOSS	0.2521	0.2181	0.1929	−0.2470	−0.2344	−0.2346
	(6.88)***	(5.94)***	(5.02)***	(−4.00)***	(−3.79)***	(−3.74)***
RETURN	−0.0290	−0.0299	−0.0342	0.0885	0.0904	0.0912
	(−1.70)*	(−1.79)*	(−1.88)*	(2.75)***	(2.81)***	(2.67)**
EARNQLT	0.3752	0.2553	0.2517	−0.1722	−0.1360	−0.1381
	(4.40)***	(3.08)***	(2.77)***	(−1.04)	(−0.81)	(−0.83)
lnSEGMENT	−0.1058	−0.1067	−0.1380	0.2207	0.2220	0.2231
	(−3.63)**	(−3.60)**	(−4.53)***	(5.60)***	(5.80)***	(6.14)***
CEONW	0.1155	0.1407	0.1174	−0.5301	−0.5267	−0.5290
	(1.71)*	(2.10)**	(1.69)*	(−6.55)***	(−6.52)***	(−6.43)***
CEO_NC	0.0278	0.1537	0.1159	−0.0537	−0.0640	−0.0827
	(0.46)	(2.83)***	(1.90)**	(−0.61)	(−0.78)	(−0.93)
CEO_RC	0.2612	0.0208	0.1060	−0.0425	−0.1191	−0.1275
	(5.19)***	(0.42)	(2.03)**	(−0.53)	(−1.49)	(−1.57)
lnBS	−0.3955	−0.1874	−0.1834	0.5314	0.4910	0.4938
	(−7.20)***	(−3.38)***	(−3.14)***	(5.49)***	(5.03)***	(5.06)***
lnMEET	−0.1818	−0.0659	−0.0847	0.1547	0.1298	0.1980
	(−6.31)***	(−2.27)**	(−2.71)***	(2.65)**	(2.17)**	(2.79)***
INDBS	−0.1007	−0.0659	−0.0738	0.0088	0.0015	0.0027
	(−10.27)***	(−6.65)***	(−7.13)***	(0.55)	(0.09)	(0.17)
lnREMUN	−0.0531	−0.0182	−0.0492	0.1695	0.1759	0.1740
	(−1.00)	(−0.36)	(−0.89)	(−1.41)	(−1.46)	(−1.44)
GOINGCON	0.2244	0.1326	0.1635	−0.5411	−0.5347	−0.5809
	(4.25)***	(2.52)**	(2.95)***	(−4.34)***	(−4.28)***	(−4.97)***
FINEX_AC	−0.0076	−0.0252	−0.0177	0.0490	0.0464	0.0732
	(−0.75)	(−2.56)**	(−1.69)*	(2.79)***	(2.67)**	(4.90)***
Constant	2.5601	2.3346	2.8748	−8.0607	−8.0904	−8.1166
	(9.62)***	(8.90)***	(10.22)***	(−21.78)***	(−21.57)***	(−21.22)***
Fixed Effects	YI	YI	YI	YI	YI	YI
Pseudo R2	0.2384	0.2210	0.2470	0.1917	0.1893	0.2019
Obs	10,640	10,640	10,640	10,640	10,640	10,640

Panel B: Controlling for firm fixed effects

	Director Attrition (DA)			Director Joining (DJ)		
	(1)	(2)	(3)	(4)	(5)	(6)
NCE	−0.1453		−0.1572	0.1282		0.1674
	(−2.80)***		(−2.93)***	(2.53)**		(2.28)**
RCE		−0.1092	−0.1132		0.0481	0.0581
		(−1.87)*	(−2.07)**		(1.70)*	(1.96)**
SIZE	−0.0266	−0.0278	−0.0274	0.0195	0.0201	0.0202
	(−1.01)	(−1.05)	(−1.03)	(0.62)	(0.64)	(0.66)
LEVRG	0.2053	0.2021	0.1920	−0.3015	−0.2850	−0.2901
	(1.92)*	(1.89)*	(1.79)*	(−2.29)**	(−2.16)**	(−2.28)**
ROA	−0.7759	−0.7632	−0.7752	0.6109	0.5927	0.4839
	(−4.60)***	(−4.52)***	(−4.98)***	(3.09)***	(2.98)***	(2.34)**
LOSS	0.2543	0.2431	0.2446	−0.2522	−0.2394	−0.2398
	(4.98)***	(4.49)***	(4.75)***	(−4.08)***	(−3.87)***	(−3.90)***
RETURN	−0.0839	−0.0480	−0.0948	0.0903	0.0423	0.1024
	(−3.16)***	(−2.17)**	(−3.94)***	(2.81)***	(2.62)**	(2.93)***
EARNQLT	0.3222	0.2976	0.4032	−0.1758	−0.1388	−0.1412
	(2.81)***	(2.09)**	(4.43)***	(−1.06)	(−0.83)	(−0.85)
lnSEGMENT	−0.7454	−0.4500	−0.8476	0.1823	0.1513	0.1363
	(−7.77)***	(−7.34)***	(−9.80)***	(2.97)***	(2.61)**	(2.54)**

(*continued on next page*)

Table 9 (*continued*)

Panel B: Controlling for firm fixed effects						
	Director Attrition (DA)			Director Joining (DJ)		
	(1)	(2)	(3)	(4)	(5)	(6)
CEONW	0.0768	0.0749	0.0753	−0.5413	−0.5378	−0.5387
	(0.95)	(0.84)	(0.97)	(−6.96)***	(−6.66)***	(−6.70)***
CEO_NC	0.0967	0.0085	0.0618	−0.0549	−0.0653	−0.0845
	(1.31)	(0.12)	(0.84)	(−0.62)	(−0.79)	(−0.95)
CEO_RC	0.0006	−0.1130	0.0875	−0.0434	−0.1217	−0.1303
	(0.09)	(1.73)*	(1.30)	(−0.55)	(−1.52)	(−1.64)
lnBS	−0.6861	−0.6540	−0.6484	0.5426	0.5014	0.5047
	(−8.61)***	(−8.16)***	(−8.08)***	(5.61)***	(5.14)***	(5.17)***
lnMEET	−0.0466	−0.0188	−0.0194	0.1580	0.1325	0.1326
	(−0.98)	(−0.39)	(−0.45)	(2.71)***	(2.27)**	(2.22)**
INDBS	−0.1032	−0.1014	−0.0981	0.0090	0.0016	0.0028
	(−7.88)***	(−7.82)***	(−7.48)***	(0.56)	(0.10)	(0.17)
lnREMUN	−0.1032	−0.1014	−0.1073	0.1730	0.1796	0.1779
	(−0.97)	(−0.95)	(−1.01)	(1.44)	(1.49)	(1.48)
GOINGCON	0.4606	0.4582	0.4545	−0.5525	−0.5460	−0.5477
	(4.82)***	(4.76)***	(4.74)***	(−4.43)***	(−4.37)***	(−4.39)***
FINEX_AC	−0.0553	−0.0552	−0.0537	0.0501	0.0474	0.0480
	(−3.88)***	(−3.87)***	(−3.76)***	(2.85)***	(2.71)***	(2.75)***
Fixed Effects	FY	FY	FY	FY	FY	FY
Pseudo R2	0.3760	0.3535	0.3854	0.3168	0.3058	0.3229
Obs	9283	9283	9283	9283	9283	9283

This table reports the results regarding the impact of subcommittee effectiveness on directors' attrition and joining. We use the following probit baseline model to examine the impact of subcommittee effectiveness on director turnover, controlling for lagged subcommittee effectiveness (Panel A) and firm-fixed effects (Panel B). Director attrition (*DA*) is a dummy variable, which equals 1 if a director leaves the firm, and 0 otherwise. Director joining (*DJ*) is a dummy variable, which equals 1 if a director joins into the firm, and 0 otherwise. All control variables are as in Table 3 and measured with a one-year lag period. All models are estimated with robust standard errors to correct for heteroscedasticity and are clustered at the firm level (Peterson, 2009). We present the results regarding the impact of subcommittee effectiveness on director attrition (columns 1 through 3) and director joining (columns 4 through 6). The construction of the related variables is detailed in the Appendix A. The symbols ***, **, and * denote significance levels at the 1%, 5%, and 10% levels, respectively.

Second, we investigate how stand-alone nomination and remuneration subcommittees are associated with director attrition (new director joining). If subcommittee existence affects director attrition (director joining) because of its role in enhancing corporate governance quality, we argue that the effect of subcommittee existence on director attrition (joining) should be stronger for firms with stand-alone committees. We examine how the impact of stand-alone subcommittee existence on director attrition (joining) and present the results in Panel B of Table 7. Stand-alone subcommittee existence (*SNCX* and *SRCX*) is a proxy for subcommittee effectiveness. *SNCX* is a dummy variable, which equals 1 if a firm with a stand-alone nomination committee exists in a reporting period and 0 otherwise. *SRCX* is a dummy variable, which equals 1 if a firm with a stand-alone remuneration committee exists in a reporting period and 0 otherwise. We find that the estimated coefficients of *SNCX (SRCX)* × *NCE (RCE)* are negative (positive) and significant for director attrition (joining). Overall, we find that the impact of stand-alone committees with subcommittee effectiveness on director turnover is significantly stronger than that for combined subcommittees.

In another set of robustness tests, we examine the relationship between subcommittee effectiveness and independent director turnover. Previous studies have confirmed the role of non-executive directors in good governance by providing their independent view in terms of business strategies, appointments, and performances (Crespí-Cladera and Pascual-Fuster, 2014). Independent directors can also enhance firm value and improve the quality of corporate governance through creating relationships among stakeholders (Reeb and Upadhyay, 2010; Grinstein and Valles Arellano, 2008; Lamoreaux et al., 2019).

We use the probit baseline model to examine the impact of subcommittee effectiveness on independent director turnover using alternative measures of director turnover. The results in Table 8 show that all our subcommittee effectiveness measures are negatively (positively) related to independent directors' attrition (joining) and significant at the conventional significant levels. These findings indicate that the relation between subcommittee effectiveness and independent director turnover continues to hold even after considering alternative variable measurement.

5.3.2. Endogeneity

It is possible that reverse causality or simultaneity problems drive the relationship between subcommittee effectiveness and director turnover. For example, potential reverse causality between director turnover and subcommittee effectiveness. To address this potential endogeneity issue, we first use the lagged value of subcommittee effectiveness measures in the regression and report the results in Panel A of Table 9. While the lagged variable cannot entirely address the endogeneity problem, they are suitable to alleviate the concern of reverse causality. The results again confirm a negative (positive) relation between subcommittee effectiveness and director attrition (director attraction).

It is possible that the observed relationship of subcommittee effectiveness and director turnover is driven by the presence of time-

Table 10
Entropy balancing (EB).

Panel A: Differences in covariates

	Before Matching		After Matching	
	High Effectiveness	Low Effectiveness	High Effectiveness	Low Effectiveness
	(1)	(2)	(3)	(4)
SIZE	4531.46	4306.19	4531.46	4531.46
LEVRG (%)	32.58	38.29	32.58	32.58
ROA (%)	0.04	0.03	0.04	0.04
LOSS	0.03	0.06	0.03	0.03
RETURN	0.24	0.18	0.24	0.24
EARNQLT	0.03	0.07	0.03	0.03
lnSEGMENT	1.85	1.59	1.85	1.85
CEONW	0.02	0.03	0.02	0.02
CEO_NC	0.07	0.03	0.07	0.07
CEO_RC	0.05	0.03	0.05	0.05
lnBS	3.36	2.18	3.36	3.36
lnMEET	2.97	2.05	2.97	2.97
INDBS	0.30	0.27	0.30	0.30
lnREMUN	7.30	6.28	7.30	7.30
GOINGCON	0.05	0.10	0.05	0.05
FINEX_AC	0.63	0.45	0.63	0.63

Panel B: EB regressions

	Director Attrition (DA)			Director Joining (DJ)		
	(1)	(2)	(3)	(4)	(5)	(6)
NCE	−0.1444		−0.1658	0.1156		0.1275
	(−2.48)**		(−2.32)**	(2.02)**		(2.07)**
RCE		−0.1392	−0.1279		0.0457	0.0512
		(−2.34)**	(−1.99)**		(2.17)**	(2.37)**
Constant	3.9874	4.1575	4.1784	−5.2725	−5.4238	−5.5696
	(8.90)***	(8.48)***	(8.67)***	(−10.77)***	(−10.71)***	(−10.97)***
Fixed Effects	YI	YI	YI	YI	YI	YI
Pseudo R2	0.222	0.248	0.259	0.203	0.201	0.238
Obs	10,640	10,640	10,640	10,640	10,640	10,640

This table presents the results on the effect of subcommittee effectiveness on directors' attrition and joining using the entropy balancing analyses. Panel A reports the mean values of all covariates for our treated and controlled sample (High Effectiveness vs. Low Effectiveness). Panel B reports the regression results using an EB framework. Director attrition (*DA*) is a dummy variable, which equals 1 if a director leaves the firm, and 0 otherwise. Director joining (*DJ*) is a dummy variable, which equals 1 if a director joins into the firm, and 0 otherwise. This study further employs a number of other firm-level control variables (*CONTROLSi,t-1*) that could potentially influence directors' attrition and joining. All control variables are as in Table 3 and measured over or at the end of the previous year. The symbols ***, **, and * denote significance levels at the 1%, 5%, and 10% levels, respectively.

Table 11
Additional control variables.

Panel A: Controlling audit committee characteristics						
	Director Attrition (DA)			Director Joining (DJ)		
	(1)	(2)	(3)	(4)	(5)	(6)
NCE	−0.1674		−0.1627	0.1588		0.1259
	(−6.28)***		(−6.09)***	(3.22)***		(2.03)**
RCE		−0.2440	−0.2330		0.0481	0.0338
		(−5.41)***	(−5.50)***		(3.34)***	(2.35)***
AUDSIZE	−0.0256	−0.0171	−0.0455	0.0335	0.0382	0.0484
	(−2.14)**	(−2.03)**	(−2.48)**	(1.77)*	(1.78)*	(1.56)
AUDIND	−0.0534	−0.0513	−0.0729	0.0550	0.0487	0.0408
	(−3.81)***	(−3.80)***	(−4.74)***	(1.71)*	(1.72)*	(1.33)
AUDCHIND	−0.1432	−0.1480	−0.1688	0.1210	0.1197	0.1602
	(−2.21)**	(−2.34)**	(−2.51)**	(3.40)***	(3.42)***	(5.05)***
Constant	3.0625	2.0211	2.9617	−6.9244	−6.8505	−6.8952
	(11.08)***	(7.63)***	(10.46)***	(−17.05)***	(−18.18)***	(−16.90)***
All Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI	YI	YI
Pseudo R2	0.272	0.257	0.290	0.196	0.192	0.213
Obs	10,640	10,640	10,640	10,640	10,640	10,640
Panel B: Controlling risk committee characteristics						
	Director Attrition (DA)			**Director Joining (DJ)**		
	(1)	(2)	(3)	(4)	(5)	(6)
NCE	−0.1755		−0.1728	0.1682		0.1313
	(−6.79)***		(−6.45)***	(3.53)***		(1.98)**
RCE		−0.2506	−0.2420		0.0499	0.0404
		(−5.59)***	(−5.56)***		(3.99)***	(2.92)***
RISKSIZE	−0.0609	−0.0728	−0.0766	0.0462	0.0446	0.0510
	(−1.71)*	(−1.84)*	(−1.99)**	(0.22)	(0.19)	(0.42)
RISKIND	−0.0747	−0.0820	−0.0697	0.0501	0.0490	0.0370
	(−1.98)**	(−2.27)**	(−2.14)**	(0.78)	(0.76)	(0.40)
RISKCHIND	−0.1601	−0.1588	1.5766	0.0983	0.1002	0.0949
	(−1.24)	(−1.09)	(−1.33)	(1.14)	(1.36)	(1.03)
Constant	3.1803	2.0988	3.0756	−7.1907	−7.1140	−7.1605
	(11.15)***	(7.17)***	(10.10)***	(−17.59)***	(−19.38)***	(−17.25)***
All Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI	YI	YI
Pseudo R2	0.274	0.260	0.294	0.201	0.198	0.214
Obs	10,640	10,640	10,640	10,640	10,640	10,640
Panel C: Controlling both audit and risk committee characteristics						
	Director Attrition (DA)			**Director Joining (DJ)**		
	(1)	(2)	(3)	(4)	(5)	(6)
NCE	−0.1618		−0.1594	0.1551		0.1211
	(−6.00)***		(−5.88)***	(3.06)***		(1.81)*
RCE		−0.2310	−0.2231		0.0460	0.0419
		(−5.10)***	(−5.16)***		(2.49)***	(2.69)**
AUDSIZE	−0.0201	−0.0134	−0.0357	0.0263	0.0300	0.0380
	(−1.97)*	(−1.33)	(−1.94)*	(1.93)*	(1.71)*	(1.44)
AUDIND	−0.0419	−0.0403	−0.0572	0.0432	0.0382	0.0320
	(−2.99)***	(−2.26)**	(−3.04)**	(1.22)	(1.35)	(1.04)
AUDCHIND	−0.1124	−0.1162	−0.1325	0.0950	0.0940	0.1257
	(−1.73)*	(−1.83)*	(−1.97)*	(2.66)**	(2.44)**	(3.37)***
RISKSIZE	−0.0724	−0.0866	−0.0911	0.0549	0.0530	0.0606
	(−2.32)***	(−2.18)**	(−2.61)**	(0.16)	(0.59)	(0.94)
RISKIND	−0.0888	−0.0975	−0.0829	0.0596	0.0583	0.0440
	(−2.42)**	(−2.90)***	(−2.45)**	(0.74)	(0.36)	(0.56)
RISKCHIND	−0.1904	−0.1888	1.8746	0.1169	0.1191	0.1128
	(−1.44)	(−1.60)	(−1.14)	(1.55)	(1.70)*	(1.47)
Constant	2.9320	1.9349	2.8355	−6.6293	−6.5586	−6.6014
	(10.26)***	(7.24)***	(10.02)***	(−16.34)***	(−17.28)***	(−16.60)***
All Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	YI	YI	YI	YI	YI	YI
Pseudo R2	0.2823	0.258	0.296	0.213	0.197	0.218
Obs	10,640	10,640	10,640	10,640	10,640	10,640

This table presents the regression results on the impact of subcommittee's effectiveness on Director attrition and new director joining including additional control variables. Director attrition (*DA*) is a dummy variable, which equals 1 if a director leaves the firm, and 0 otherwise. Director joining (*DJ*) is a dummy variable, which equals 1 if a director joins into the firm, and 0 otherwise. *CONTROLSi,t-1* is the set of control variables defined in Section 4.2. All control variables are included in the regressions with a one-year lag. We include industry-fixed, and year-fixed effects to control for

cross-sectional and time-series dependence. The construction of the related variables is detailed in the Appendix A. The symbols ***, **, and * denote significance levels at the 1%, 5%, and 10% levels, respectively.

invariant firm-specific omitted variables. We mitigate this concern by performing an additional robustness check using firm and year fixed effects and present Panel B of Table 9. As shown, subcommittee effectiveness is significantly and negatively associated with director attrition and positively associated with director attraction even after controlling for firm-fixed effects. Overall, we conclude that our main findings are not driven by time-invariant firm-specific omitted variables.

In addressing endogeneity due to possible covariate imbalance, we also use entropy balancing (Hainmueller, 2012). This strategy aids in balancing the covariate distribution across treatment and control groups by assigning continuous weights to equalize the distribution moments for all covariates. To run this analysis, we construct a treatment versus control group of firms by contrasting the firms with high subcommittee effectiveness with firms with low subcommittee effectiveness and then assign one (zero) for high subcommittee effectiveness (low subcommittee effectiveness). In Table 10, Panel A provides the mean value of covariates for high subcommittee effectiveness and low subcommittee effectiveness before and after the matching. After matching, the average covariates for low subcommittee effectiveness are the same as those of high subcommittee effectiveness, confirming the accuracy of matching. Panel B shows the director attrition (director joining) regressions estimated using an EB framework. The coefficients of *NCE and RCE* $_{\text{are}}$ negative (positive) as well as significant at least at the 5% level, suggesting that subcommittee effectiveness reduces (increase) director attrition (director joining) to the highly effective subcommittee.

We consider four additional control variables in Table 11. We use audit committee size (*AUDSIZE*), audit committee independence (*AUDIND*), audit committee chairperson independence (*AUDCHIND*), risk committee size (*RISKSIZE*), risk committee independence (*RISKIND*), and risk committee chairperson independence (*RISKCHIND*) to account for another subcommittee mechanism (audit and risk committees). In line with our expectation, coefficients of director attrition (director joining) are still negative (positive) and significant at least at the 10% level across the specifications.

6. Conclusions

We examined the association of nomination and remuneration committees and director turnover, splitting turnover into attrition of existing directors and attracting new directors to join the board. Our basic contention is that nomination and remuneration committee effectiveness will induce confidence in existing and potential board members regarding the quality of corporate governance of the firm thereby fostering retention of existing directors and attracting new directors. Further, the effectiveness of these committees will contribute to reducing attrition and enhancing the attraction of new directors through effective recruitment and appropriate remuneration of directors. That is, these subcommittees improve market performance and firm performance, and therefore, will lead to a positive effect on the two components of director turnover. We further show that the relation between subcommittees and the two elements of director turnover is stronger for firms that use stand-alone nomination and remuneration committees than those with combined committees.

Our findings emphasize the importance of the nomination and remuneration committee's existence as well as its effectiveness in determining director turnover. The findings are robust to alternative proxies for subcommittee effectiveness and tests to address potential endogeneity issues related to subcommittee effectiveness. However, the possibility of other factors in our empirical setting causing endogeneity problems cannot be ruled out. Therefore, caution needs to be exercised when generalising our findings to different settings.

The findings of this study have significant implications for the director turnover literature in general and the Asia-Pacific region. First, we provide rationales and empirical evidence to indicate that director turnover models could be subject to under-specifications when director turnover is proxied by a single measure. Second, an understanding of the corporate governance design features of the Australian Securities Exchange listed firms vis-à-vis other major international stock exchanges such as the USA is important for investors, policymakers and researchers in the Asia-Pacific region. Asia-Pacific stock markets are interrelated with the US stock market (Comerton-Forde and Rydge, 2006; Kim, 2003). The present study enriches understanding of researchers and investors in the Asia-pacific region regarding the differences in the governance designs of the Australian Securities Exchange and its implications. Comerton-Forde and Rydge (2006) argued that enhancing the attractiveness of the Asia-Pacific stock markets for investors is an important consideration. Our study of the role of nomination committees and remuneration committees on the corporate governance strength contributes to understanding of governance quality of the ASX, which is an essential component of the overall stock exchange architecture. Given that our study focused mainly on demand side arguments for director attrition and attraction future, studies incorporating demand side drivers would contribute to a fuller understanding of director turnover.

CRediT authorship contribution statement

Sutharson Kanapathippillai: Writing – original draft, Resources, Investigation. **Premkanth Puwanenthiren:** Methodology, Formal analysis, Data curation. **Dessalegn Mihret:** Writing – review & editing, Supervision, Conceptualization. **Man Dang:** Formal analysis, Data curation.

Declaration of competing interest

None.

Appendix A. Variable definitions

Variables	Acronym	Description	Data sources
1. Dependent variables			
Director Attrition	*DA*	A dummy variable, which equals one if a director leaves the company, and zero otherwise.	Boardroom Connect 4
Director Joining	*DJ*	A dummy variable, which equals one if a director joins into the company, and zero otherwise.	Boardroom Connect 4
2. Firm-level variables			
Nomination Committee Effectiveness	*NCE*	A composite index to measure effectiveness of nomination committee. Each committee should consist minimum of three members, the majority of the members should be independent and an independent director should chair it. If each condition is satisfied, we give a value of 1 and otherwise 0. The effectiveness of nomination committee will have a maximum/minimum score of 5 and 0.	Boardroom Connect 4
Remuneration Committee Effectiveness	*RCE*	A composite index to measure effectiveness of remuneration committee. Each committee should consist minimum of three members, the majority of the members should be independent and an independent director should chair it. If each condition is satisfied, we give a value of 1 and otherwise 0. The effectiveness of remuneration committee will have a maximum/minimum score of 5 and 0.	Boardroom Connect 4
Nomination Committee Existing	*NCX*	Dummy variable, which equals 1 if nomination committee exists in a reporting period and 0 otherwise.	Boardroom Connect 4
Standalone Nomination Committee Existing	*SNCX*	Dummy variable, which equals 1 if firm with stand-alone nomination committee exists in a reporting period and 0 otherwise.	Boardroom Connect 4
Remuneration Committee Existing	*RCX*	Dummy variable, which equals 1 if remuneration committee exists in a reporting period and 0 otherwise.	Boardroom Connect 4
Standalone Remuneration Committee Existing	*SRCX*	Dummy variable, which equals 1 if firm with stand-alone remuneration committee exists in a reporting period and 0 otherwise.	Boardroom Connect 4
Total assets	*SIZE*	Logarithm of total assets at the balance sheet date	DatAnalysis
Leverage ratio	*LEVRG*	The ratio of total debt to total assets. Total debt = Long term debt + Debt in current liabilities	DatAnalysis
Return on assets	*ROA*	The ratio of net income before extraordinary items to total assets	DatAnalysis
Loss firms	*LOSS*	A dummy variable, which takes the value of one for a firm making a loss during the previous year, and zero otherwise	DatAnalysis
Business segments	*SEGMENT*	Number of geographic segments	SIRCA
Top 20 institutional investors	*TOP20*	Fractions of shares held by Top 20 institutional investors	SIRCA
Board size	*BS*	Number of directors on the board	SIRCA
Board meetings	*BMEET*	Number of board meetings in the last fiscal year	SIRCA
Independent directors	*INDBS*	The percentage of independent directors on the board	SIRCA
CEO takeover	*CEONW*	A dummy variable, which equals 1 for a CEO took over in the current year; and 0 otherwise	SIRCA
Remuneration	*REMUN*	Total remuneration to the directors	SIRCA
Audit quality	*BIG4*	A dummy variable, which equals 1 for a Big 4 audit firm and 0 for other firms	SIRCA
Going concern opinion	*GOINGCON*	A dummy variable, which equals 1 if a going concern opinion and 0 for otherwise	SIRCA
Financial experts on the audit committee	*FINEX_AC*	Fraction of financial experts on the audit committee	SIRCA
CEO involvement in nomination committee	*CEO_NC*	A dummy variable with value 1 if a CEO is a member of the nomination committee and zero otherwise	SIRCA
CEO involvement in remuneration committee	*CEO_RC*	A dummy variable with value 1 if a CEO is a member of the remuneration committee and zero otherwise	SIRCA
Market Returns	*RETURN*	Percentage change in share price (Monthly)	DatAnalysis
Earnings Quality	*EARNQLT*	Discretionary accruals for a particular firm is calculated as the difference between the firm's total accruals and its non-discretionary accruals (NDAC), using model 5 of Kothari et al., 2005.	DatAnalysis
Audit committee size	*AUDSIZE*	Number of directors on the audit committee	Boardroom Connect 4
Audit committee independent directors	*AUDIND*	The percentage of independent directors on the audit committee	Boardroom Connect 4
Audit committee chair independent	*AUDCHIND*	A dummy variable with value 1 if the chair of the audit committee is independent and zero otherwise	Boardroom Connect 4
Risk committee size	*RISKSIZE*	Number of directors on the risk committee	Boardroom Connect 4
Risk committee independent directors	*RISKIND*	The percentage of independent directors on the risk committee	Boardroom Connect 4
Risk committee chair independent	*RISKCHIND*	A dummy variable with value 1 if the chair of the risk committee is independent and zero otherwise	Boardroom Connect 4

Appendix B. Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
DA (1)	1.00																				
DJ (2)	0.37	1.00																			
NCX (3)	−0.18	0.23	1.00																		
RCX (4)	−0.20	0.22	0.20	1.00																	
NCE (5)	−0.14	0.18	0.18	0.13	1.00																
RCE (6)	−0.11	0.12	0.13	0.14	0.14	1.00															
SIZE (7)	−0.32	0.39	0.39	0.42	0.41	0.38	1.00														
FINEX_AC (8)	−0.27	0.29	0.34	0.43	0.34	0.40	0.29	1.00													
INDBS (9)	−0.23	0.24	0.24	0.28	0.30	0.29	0.21	0.18	1.00												
GOINGCON (10)	0.12	−0.11	−0.17	−0.18	−0.29	−0.14	-0.14	−0.13	0.17	1.00											
SEGMENT (11)	−0.09	−0.10	−0.21	−0.17	−0.14	−0.15	−0.15	−0.11	0.14	0.11	1.00										
ROA (12)	−0.22	0.11	0.20	0.30	0.32	0.32	0.22	0.12	−0.32	0.23	0.24	1.00									
LOSS (13)	0.23	−0.20	−0.24	−0.29	−0.31	−0.31	−0.24	−0.18	0.33	−0.24	0.22	0.14	1.00								
LEVRG(14)	−0.11	0.17	0.21	0.20	0.27	0.23	0.23	0.19	0.11	0.27	−0.18	0.21	0.21	1.00							
lnREMUN (15)	−0.31	0.28	0.28	0.24	0.24	0.27	0.28	0.10	−0.22	0.21	−0.10	0.19	0.13	0.10	1.00						
lnBS (16)	−0.22	0.11	0.24	0.31	0.28	0.24	0.24	0.14	−0.18	0.29	−0.13	0.09	0.24	0.23	0.18	1.00					
TOP20 (17)	−0.06	0.08	0.10	0.10	0.17	0.08	0.11	−0.08	−0.07	0.12	−0.12	0.13	0.09	0.12	0.09	0.06	1.00				
CEONW (18)	0.05	−0.02	−0.07	−0.07	0.04	−0.08	−0.07	−0.07	−0.05	0.04	−0.07	−0.04	0.02	−0.07	−0.04	0.03	0.07	1.00			
BIG4 (19)	−0.06	0.04	0.04	0.04	−0.08	0.04	−0.04	−0.04	0.04	−0.02	0.04	−0.04	0.07	−0.03	0.01	0.08	0.03	0.01	1.00		
AMIHUD (20)	−0.11	0.12	0.03	0.12	−0.04	0.07	−0.05	0.08	0.04	−0.11	0.11	−0.03	0.05	−0.04	0.08	0.06	0.04	0.08	0.03	1.00	
ANALYST (21)	−0.08	0.14	0.02	0.14	−0.04	0.09	−0.06	−0.07	0.07	−0.09	0.13	-0.01	0.03	−0.07	0.05	0.04	0.07	0.01	0.02	0.01	1.00

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