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The Importance of Directors' Information Access: Evidence from Board Risk Reporting

Hami Amiraslani
INSEAD, hami.amiraslani@insead.edu

Carolyn Deller
The Wharton School, University of Pennsylvania, cdeller@wharton.upenn.edu

Christopher Ittner
The Wharton School, University of Pennsylvania, ittner@wharton.upenn.edu

Thomas Keusch
INSEAD, thomas.keusch@insead.edu

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We examine the antecedents and implications of directors' access to internal information. Using proprietary data on board risk reporting practices, we document that boards receive more frequent and comprehensive internal risk information when more board directors are independent and when the board chair is a nonexecutive, which enables non-executive directors to have more influence on board meeting agendas and reporting. We further show that board risk reporting contributes to board effectiveness as it is negatively (positively) related to future firm risk (performance). These relations are more pronounced when analyst coverage complements internal risk reporting to complete directors' information mosaic. Our findings offer novel insights on the economic role of board reporting practices.

Key words: Corporate Governance; Boards; Board Independence; Board Reporting; Risk Management.

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1. Introduction

The board of directors is at the apex of a firm's governance structure. Studies examining boards' effectiveness in conducting their monitoring and advising roles focus mainly on board characteristics (e.g., expertise) and CEO attributes (e.g., power). Given that boards are composed primarily of non-executives who have limited ongoing involvement in firms' operations, directors' internal information access is likely an important determinant of board effectiveness. Yet, the role of this information access is not well understood, largely because internal board reporting is unobservable to researchers. In this paper, we begin to fill this gap by leveraging novel survey data on board reporting practices combined with standard archival databases.

Specifically, we focus on board risk reporting (hereafter BRR), as risk oversight is one of the key responsibilities of the board of directors. Laws, regulations, or codes in almost all leading economies require boards to conduct risk oversight (OECD 2021). Moreover, proxy advisory firms, credit rating agencies, and corporate directors increasingly recognize the economic relevance of risk oversight (e.g., S&P 2018; ISS 2020; Beasley et al. 2021; Cheng et al. 2021) and contend that a prerequisite for effective board risk oversight is timely and comprehensive board risk reporting. Our survey data capture these two central properties of BRR, including the frequency of risk reporting to the board and its committees, and the provision of information to the board on key and emerging risks, risk drivers, risk management action plans and accountability, and risk tolerances and metrics. According to board risk oversight frameworks, timely and comprehensive BRR allows boards to set the tone at the top and oversee their firms' risk management activities by (a) establishing a common understanding of and accountability for key and emerging risks; (b) assessing the implementation and effectiveness of risk management processes; (c) determining whether decisions are within the risk appetite set by the board; (d) evaluating the effectiveness of internal controls; (e) integrating risk, planning, and performance discussions to optimize the risk-return tradeoff; and (f) enabling dynamic responses to unexpected events that threaten strategic objectives or offer new opportunities (COSO 2009; NYSE 2019; Braumann et al. 2020; UK Government 2023).

Against this backdrop and consistent with theory (e.g., Song and Thakor 2006; Adams and Ferreira 2007; Harris and Raviv 2008), we find that BRR is more frequent and comprehensive in firms with a greater percentage of non-executive board directors and when these directors plausibly have more influence on board meeting agendas and

board reporting practices through a non-executive board chair. Supporting the prediction that directors' information access in general – and board risk reporting in particular – are consequential for board effectiveness (e.g., Adams and Ferreira 2007; Duchin et al. 2010), we further find that BRR is significantly related to measures of future firm risk and performance, even after controlling for past risk and performance. These relations are stronger in firms with greater analyst following, consistent with external information provided by analysts complementing internal BRR to complete directors' information mosaic (e.g., Duchin et al. 2010; Cheynel and Levine 2020).

Our findings contribute to prior research on directors' information sources. To the best of our knowledge, Cornelli et al. (2013) and Schwartz-Ziv and Weisbach (2013) are the only studies on the role of internal information in boards' decision-making. Examining board minutes of state-owned firms, Schwartz-Ziv and Weisbach (2013) show that boards demand additional information for about 8% of the issues discussed in the boardroom. For a sample of private equity backed firms, Cornelli et al. (2013) find that boards consider soft information to a much greater extent than objective performance indicators in CEO turnover decisions. We extend this line of research by examining formal board risk reporting and providing evidence on the relation between directors' characteristics and their internal risk information access, as well as specific outcomes that are plausible consequences of such information access.

Our evidence also adds to the broader literature on board effectiveness. Hambrick et al. (2015) contend that directors are effective if they have independence, expertise, bandwidth, and motivation. Our results suggest that (risk) information access is another important determinant of directors' effectiveness. While we focus on *internal* information access, Duchin et al. (2010) show that the effectiveness of non-executives depends on the transparency of firms' *external* information environments and Armstrong et al. (2014) document that firms improve their *external* transparency to facilitate non-executive directors' effectiveness. Our paper complements these studies by examining firms' *internal* BRR practices, which can complement or substitute for external information, and can also be influenced by managers' incentives to withhold information (e.g., Adams and Ferreira 2007; Adams et al. 2010).

2. Hypothesis Development

Prior research argues that the effectiveness of non-executive directors depends on their access to firm-specific information as these directors are less informed about the firm than its managers (Duchin et al. 2010; Armstrong et

al. 2014). To bridge this information gap, non-executives can demand information to improve their monitoring and advising ability (Armstrong et al. 2014). If boards seek internal risk reports to become better informed about firms' exposures and risk management activities, we expect boards with greater non-executive director representation to demand more frequent and comprehensive risk reporting. This leads to our first hypothesis, which predicts that:

Hypothesis 1: BRR is positively related to the proportion of non-executive directors on the board.

While managers' desire for advice from non-executive directors may prompt them to be forthcoming with risk information, they may also have incentives to withhold such information to limit the board's monitoring ability (Adams and Ferreira 2007). A non-executive board chair is likely to be able to counter these incentives since the chair is actively involved in setting board meeting agendas and thus in shaping board reporting (Jensen 1993; Balsam et al. 2016). Thus, our second hypothesis predicts that:

Hypothesis 2: BRR is positively related to the presence of a non-executive board chair.

Turning to the question of board effectiveness, we examine whether the extensiveness of BRR is related to future firm outcomes. Following theory (e.g., Adams and Ferreira 2007), we predict that more timely and comprehensive board risk reporting improves non-executive directors' risk oversight effectiveness, and thereby lowers (unwanted) future firm risk by allowing them to set risk-taking expectations, monitor managers' risk management practices and risk-related decisions, and to more effectively respond to emerging risks that threaten the achievement of the firm's objectives (COSO 2009). Therefore, our third hypothesis predicts that:

Hypothesis 3: BRR is negatively related to future firm risk.

Importantly, the objective of risk management and risk oversight is not to minimize all risk given the risk-return tradeoff. Instead, the goal is to avoid, mitigate, or hedge unwanted downside risks while exploiting risk opportunities that fall within the organization's risk appetite and capabilities. We examine if internal risk reporting helps managers in establishing balance between risk and return while minimizing non-value-added risks by examining whether BRR is related to future firm performance in our fourth hypothesis:

Hypothesis 4: BRR is positively related to future firm performance.

These predicted relations are not free from tension for several reasons. First, critics argue that many boards adopt risk oversight practices as merely symbolic moves to conform to perceived "best practice" (e.g., Menon and Williams 1994; Westphal and Graebner 2010). Second, if non-executives are overburdened with other board duties or if they lack the skills for risk oversight, then the provision of internal risk information may not have the desired results (Ingley and van der Walt 2008; NACD 2013; ICSA 2014; Ashraf et al. 2023). Finally, to the extent that non-executives have access to external risk information, internal board risk reporting may be inconsequential (Duchin et al. 2010; Armstrong et al. 2014).

3. Sample and Data

3.1. The Aon Risk Maturity Index (RMI) Survey

We draw our sample from firms participating in Aon's RMI survey with available financial statement, stock market, and board data from Worldscope, Datastream, and BoardEx, respectively. Participating firms benefit by receiving immediate feedback from Aon in the form of a Risk Maturity Rating, along with comments and suggestions. The survey is aimed at high-level risk management and C-suite executives; it covers the major elements of the Committee of Sponsoring Organizations (COSO) enterprise risk management framework (COSO 2004), and was extensively pre-tested. Participation is solicited through industry and professional conferences and contacts with Aon clients.

Our analyses are based on publicly-traded firms from 31 countries that completed the survey between 2011 and 2019. Firms join the sample in the year they complete the survey. Some firms completed the survey in multiple years, resulting in 384 unique sample firms and up to 443 firm-years in our estimations. The most frequent countries in the sample (based on firm-year observations) are the United States (200), Australia (37), United Kingdom (28), and Canada (25). The most frequent one-digit SICs are heavy manufacturing (118), light manufacturing (83), transportation and public utilities (63), and services (53).

3.2. Board Risk Reporting

Boards rely on management for information about the firm's risk exposures and risk management process in order to effectively conduct their risk oversight responsibilities. As a result, scope and timeliness are key properties of

internal risk reporting between managers and board directors (COSO 2004, 2009). We assess the content and frequency of BRR using several survey questions.

The first question focuses on whether board reporting on the firm's risk profile includes information on: (a) key risks and associated risk management activities; (b) drivers and underlying causes of risk; (c) risk ownership responsibilities and accountabilities; (d) risk management action plans and outcomes; (e) risk tolerances, thresholds, and limits; (f) risk performance metrics and trends; and (g) information on emerging risks. The second and third questions focus on the frequency of risk reporting to the board and board committee(s) with risk oversight responsibilities, respectively. We use the average of the standardized responses to these nine survey items as our board risk reporting (*BRR*) variable.[1] We also measure *BRR scope* (based on question one) and *BRR frequency* (based on questions two and three) separately. Appendix A lists the survey questions and response options. Table 1 Panel A provides summary statistics.

3.3. Other Variables

The key determinants of *BRR* that we examine are *Board independence*, i.e., the fraction of non-executives on the board, and *Outside chair*, an indicator equal to one if the board chair is a non-executive director. In board effectiveness tests, we proxy for firm risk using the incidence of an accounting loss (*Loss*), probability of default (*Probability of default*), and stock return volatility (*Return volatility*), and use return on assets (*Profitability*) and *Tobin's Q* as measures of firm performance. We control for a battery of other board and firm characteristics (described in Appendix B) as well as country, industry, and year fixed effects. We also control for other board risk oversight practices that are not directly related to board risk reporting, as described in the Online Appendix. Appendix B includes the variable definitions and Table 1 (Panel B) provides summary statistics.

4. Empirical results

4.1. Hypotheses 1 and 2

Our first two hypotheses predict that the scope and timeliness of risk reporting are positively related to non-executives' representation on the board and the presence of a non-executive board chairperson. To test these

[1] The underlying items that we aggregate into the composite BRR score load on a single factor with an eigenvalue of 2.25. Factor loadings range between 0.33 and 0.65 and the Cronbach alpha is 0.74, indicating adequate construct reliability.

hypotheses, we estimate equation (1) using ordinary least squares (OLS) regressions with country, industry, and year fixed effects and standard errors clustered at the country level.

$$DV_{i,t} = \alpha_{country} + \alpha_{industry} + \alpha_t + \beta_1 \, Board\ independence_{i,t-1} + \beta_2 \, Outside\ chair_{i,t-1} + \gamma \, Controls_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

The results reported in column 1 of Table 2, where *DV* is the aggregate proxy for board risk reporting (*BRR*), support both hypotheses as *Board independence* and *Outside chair* are positively and significantly related to *BRR*. This is consistent with our predictions that internal board reporting is more important when there are more non-executives on the board, and that a non-executive board chair can influence board reporting to address directors' information needs. In columns 2 and 3, we separately examine the scope and the frequency of BRR. Consistent with column 1, *Board independence* and *Outside chair* are positively related to both components of BRR, although the relation between *Board independence* and *BRR frequency* is marginally insignificant at conventional levels (*p*-value=0.105, two-tailed). Collectively, the findings in Table 2 suggest that firms adjust their internal board reporting to directors' information needs, and that a benefit of separating the CEO and board chair roles may be elevating non-executives' access to more comprehensive and timely information.

4.2. Hypotheses 3 and 4

To examine the association between internal risk reporting and board effectiveness, we first test Hypothesis 3, which predicts that more extensive BRR is negatively related to future firm risk. We estimate equation (2) with standard errors clustered at the country level.

$$DV_{i,t+1} = \alpha_{country} + \alpha_{industry} + \alpha_t + \beta_1 \, BRR_{i,t} + \gamma \, Controls_{i,t-1} + \varepsilon_{i,t+1} \quad (2)$$

where the vector *Controls* includes *Board independence*, *Outside board chair* and the controls used in Table 2. We also include lagged dependent variables to mitigate concerns about reverse causality and correlated omitted variables, as well as an aggregate proxy, constructed from the Aon survey, capturing other board risk oversight practices unrelated to risk reporting. For brevity, we do not tabulate all control variables in the following tables, instead we report the full estimation results in the Online Appendix.

Panel A of Table 3 examines the incidence of an accounting loss to capture the realization of an adverse risk event (columns 1-3), probability of default over the next twelve months (columns 4-6), and standard deviation of daily stock returns over the next year (columns 7-9). We consistently find negative relations between *BRR* and firm risk,

even after controlling for other board risk oversight activities and lagged dependent variables. Interestingly, Panel B of Table 3 reveals that the relation between *BRR* and firm risk is almost exclusively driven by BRR scope rather than frequency. Collectively, these results support Hypothesis 3, suggesting that internal risk reporting enhances directors' effectiveness in overseeing firm risk.

To further corroborate that board reporting is related to board effectiveness, we test Hypothesis 4, which predicts a positive relation between BRR and future firm performance. The results of estimating equation (2) with *Profitability* and *Tobin's Q* as the dependent variables are presented in Table 4. We find that *BRR* (Panel A) and in particular *BRR scope* (Panel B) are positively and significantly related to future return on assets (ROA), even after controlling for lagged ROA and other board risk oversight practices (columns 1-3). However, we find no significant relations with future *Tobin's Q* (column 4-6), potentially because internal risk reporting is unobservable to investors and hence difficult to be priced.[2] Although the results in Table 4 provide modest support for our hypothesis on the relation between BRR and future firm performance, they do not indicate that more extensive BRR leads to the rejection of risky but value-enhancing projects, i.e., negative relations between *BRR* and *Profitability* and *Tobin's Q*.[3]

4.3. Additional analyses

Duchin et al. (2010) report that information from *external* sources, e.g., sell-side analysts, enhances the effectiveness of non-executive directors. This raises the question of whether external information complements or substitutes for internal board reporting. We examine this question by estimating equation (3) with standard errors clustered at the country level.

$$DV_{i,t+1} = \alpha_{country} + \alpha_{industry} + \alpha_t + \beta_1 BRR_{i,t} + \beta_2 High\ analyst\ coverage_{i,t-1} + \beta_3 BRR_{i,t} \times High\ analyst\ coverage_{i,t-1} + \gamma Controls_{i,t-1} + \varepsilon_{i,t+1} \quad (3)$$

where *DV* represents the risk or performance outcomes analyzed in Tables 3 and 4 and *High analyst coverage* is an indicator equal to one if the number of analysts covering the firm is at the sample median or above. *Controls* includes *Board independence*, *Outside board chair*, lagged dependent variables, *Other risk oversight practices*, and the board and firm characteristics reported in Table 2.

[2] We remove *Book-to-market* as a control in columns (4)-(6) of Table 4 and instead control for lagged *Tobin's Q* in column (6).
[3] We recognize that our findings in Tables 2-4 represent associations rather than causal relations. As a result, we conduct tests to assess potential correlated omitted variable bias and report the results in the Online Appendix.

Estimates of the coefficient on the interaction term (β_3) are presented in Table 5 and suggest that internal board reporting and external information sources are complements in their relation with board effectiveness. For the risk outcomes *Loss* and *Return volatility*, β_3 is negative and significant, while it is positive and significant for *Profitability* and *Tobin's Q*. This suggests that board reporting enhances non-executives' effectiveness to a greater extent when used in conjunction with external information, which, in the case of analysts, can provide an outside perspective and inform directors about aspects of the macroeconomy and industry dynamics that may be less prominent in internal firm-specific reports (e.g., Piotroski and Roulstone 2004; Hutton et al. 2012; Hugon et al. 2016). While we find no significant interaction effects for *Probability of default*, the findings in Table 5 offer initial evidence that internal and external information can act as complements in directors' information mosaic (e.g., Cheynel and Levine 2020).

5. Conclusion

We examine a central issue in corporate governance, namely that non-executive directors face informational disadvantages vis-à-vis the managers they are tasked to advise and monitor. Despite its importance, prior literature on this issue is scant because internal information flows between managers and boards are usually unobservable to researchers. We leverage novel survey data to investigate board risk reporting as a key aspect of this information flow, and find results suggesting that managers respond to directors' information needs and this, in turn, is associated with board effectiveness.

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Appendix A

Survey Items for Board Risk Reporting Constructs

This table presents the three survey questions that we use to construct the BRR variable. The first question consists of seven items (1a - 1g) and respondents are asked to check all items that apply to their firm's board. Thus, this question can take all integer values between and including 0 and 7. The second and third questions present respondents with four mutually exclusive answer options and respondents check the appropriate option for each question. Each question takes on value 1 for option a, 2 for option b, 3 for option c, and 4 for option d.

1a	Reporting on the organization's risk profile includes key risks and associated risk management activities.
1b	Reporting on the organization's risk profile includes risk drivers and underlying causes.
1c	Reporting on the organization's risk profile includes risk ownership responsibilities and accountabilities.
1d	Reporting on the organization's risk profile includes risk management action plans and outcomes.
1e	Reporting on the organization's risk profile includes risk tolerances and thresholds / limits.
1f	Reporting on the organization's risk profile includes risk performance metrics / trends.
1g	Reporting on the organization's risk profile includes information on emerging risks.
2	The full board receives risk reports...
	a Infrequently or not on a predefined schedule
	b At least annually
	c At least twice yearly
	d Quarterly or more frequently
3	Board committees (with risk management oversight responsibilities) receive risk reports...
	a Infrequently or not on a predefined schedule
	b At least annually
	c At least twice yearly
	d Quarterly or more frequently

Appendix B
Variable Definitions

Variable	Description	Source
BRR	Average of the standardized responses for the nine survey items described in Appendix A.	Aon survey
BRR scope	Mean value of standardized survey items 1a through 1g described in Appendix A.	Aon survey
BRR frequency	Mean value of standardized survey questions 2 and 3 described in Appendix A.	Aon survey
Other risk oversight practices	Average of standardized responses to survey questions about whether: the board's understanding of the firms' risks and risk management activities is discussed, risk management activities are aligned with corporate strategy, the board and the firm's risk manager communicate outside of the regular board reporting channels, and risk oversight is part of boards' own performance evaluation (see the Online Appendix for details).	Aon survey
Outside chair	Indicator variable equal to 1 if the board chairperson is a non-executive director, 0 otherwise.	BoardEx
Board independence	Number of non-executive directors on the board scaled by board size.	BoardEx
Unitary board	Indicator variable equal to1 for one-tiered (unitary) boards, 0 for two-tiered boards.	Hand-collection
Board size	Number of directors on the board.	BoardEx
Board industry expertise	Number of non-executive directors who have worked in the focal firm's industry scaled by the total number of non-executive directors.	BoardEx
Board financial expertise	Number of non-executive directors who are financial experts (i.e., with accounting- or finance education or qualification) scaled by the total number of non-executive directors.	BoardEx
Board diversity	Number of female non-executive directors scaled by the total number of non-executive directors.	BoardEx
Board tenure	Average board tenure (in years) of non-executive directors.	BoardEx
Risk Committee	Indicator variable equal to 1 if the firm has a board committee that is dedicated to risk oversight, 0 otherwise.	BoardEx; hand-collection
Firm size	Market capitalization (WC08001) in $thousand.	Worldscope
Book-to-market	Ratio of the book value of equity (WC0350) to market capitalization (WC08001).	Worldscope
Leverage	Ratio of total debt (WC03255) to total assets (WC02999).	Worldscope
Profitability	EBIT (WC18191) scaled by lagged total assets (WC02999).	Worldscope
Loss	Indicator variable equal to 1 if EBIT is negative, 0 otherwise.	Worldscope
Return volatility	Standard deviation of daily stock returns.	Datastream
Tobin's Q	Ratio of the sum of total debt (WC03255) and market capitalization (WC08001) to total assets (WC02999).	Worldscope
Tangibility	Property, plant, and equipment (WC02501) scaled by total assets (WC02999).	Worldscope
Analyst coverage	Number of analysts following the firm (F1NE).	Worldscope
Probability of default	Probability that a firm will default on its obligations over the next 12 months (i.e., year t+1). The measure is constructed on a forward intensity function, whose inputs include the state of the economy (macro-financial risk factors) and the vulnerability of individual obligors (firm-specific attributes)	Credit Research Initiative of the National University of Singapore
Cross listing	Indicator variable equal to 1 for non-U.S. firms that are cross-listed in the U.S. (WC06100), 0 otherwise.	Worldscope

Table 1
Summary Statistics

Panels A and B provide summary statistics for the BRR survey items and the variables used in the estimations. The sample includes years 2011 to 2019 during which firms responded to the RMI survey. Appendix A provides the individual survey items that we use to calculate *BRR*, *BRR scope*, and *BRR frequency*, and Appendix B defines all variables.

Panel A: Board risk reporting survey items

	N	Mean	SD	25	Median	75
Reporting Key Risks	443	0.937	0.230	1.000	1.000	1.000
Reporting Risk Drivers	443	0.559	0.478	0.000	1.000	1.000
Reporting Risk Ownership	443	0.704	0.437	0.000	1.000	1.000
Reporting Risk Management	443	0.663	0.457	0.000	1.000	1.000
Reporting Risk Tolerances	443	0.341	0.456	0.000	0.000	1.000
Reporting Risk Metrics	443	0.402	0.473	0.000	0.000	1.000
Reporting Emerging Risks	443	0.628	0.467	0.000	1.000	1.000
Board Risk Reporting Frequency	443	2.576	0.996	2.000	2.000	3.250
Committee Reporting Frequency	443	3.024	1.002	2.000	3.000	4.000

Panel B: Variables used in the estimations

	N	Mean	SD	25	Median	75
BRR	443	0.000	0.570	-0.347	0.017	0.469
BRR scope	443	0.000	0.582	-0.364	-0.040	0.516
BRR frequency	443	0.000	0.905	-0.800	0.198	0.700
Other risk oversight practices	443	0.000	0.704	-0.497	0.025	0.557
Outside chair	443	0.711	0.454	0.000	1.000	1.000
Board independence	443	0.842	0.110	0.800	0.889	0.909
Unitary board	443	0.858	0.350	1.000	1.000	1.000
Board size	443	10.208	3.100	8.000	10.000	12.000
Board industry expertise	443	0.279	0.252	0.000	0.250	0.444
Board financial expertise	443	0.123	0.126	0.000	0.111	0.200
Board diversity	443	0.172	0.122	0.100	0.167	0.250
Board tenure	443	7.201	3.565	4.771	6.967	9.325
Risk committee	443	0.284	0.452	0.000	0.000	1.000
Ln (Firm size)	443	15.193	1.405	14.243	15.185	16.089
Book-to-market	443	0.572	0.438	0.271	0.467	0.757
Leverage	443	0.274	0.164	0.158	0.262	0.382
Profitability	425	0.076	0.079	0.043	0.073	0.116
Loss	425	0.101	0.302	0.000	0.000	0.000
Return volatility	442	0.018	0.008	0.013	0.016	0.021
Tobin's Q	424	1.351	1.034	0.787	1.100	1.610
Tangibility	443	0.298	0.241	0.100	0.231	0.453
Analyst coverage	443	1.658	1.035	0.693	1.609	2.565
Probability of default	423	0.229	0.671	0.006	0.037	0.160
Cross listing	443	0.147	0.354	0.000	0.000	0.000

Table 2
Board Risk Reporting Determinants

This table presents OLS analyses on the determinants of BRR. The sample includes years 2011 to 2019 during which firms responded to the RMI survey. The unit of analysis is the firm-year. *t*-statistics are based on standard errors clustered by country and appear in parentheses. *, **, *** indicate statistical significance at the 10, 5, 1% level, respectively (two-tailed). All independent variables are measured in the period preceding the RMI survey year. All variables are defined in Appendix B.

	(1)	(2)	(3)
	BRR	*BRR scope*	*BRR frequency*
Outside chair	0.075**	0.068*	0.102***
	(2.40)	(1.86)	(2.96)
Board independence	0.806**	0.744**	1.023
	(2.63)	(2.69)	(1.67)
Unitary board	0.105	0.149	-0.046
	(0.53)	(0.85)	(-0.15)
Ln (Board size)	-0.002	-0.003	0.001
	(-0.02)	(-0.02)	(0.00)
Board industry expertise	-0.142	-0.227*	0.155
	(-1.11)	(-1.72)	(0.96)
Board financial expertise	0.386**	0.221	0.965***
	(2.08)	(1.27)	(2.96)
Board diversity	0.059	0.236	-0.559**
	(0.37)	(1.34)	(-2.06)
Ln (Board tenure)	0.083**	0.073*	0.118
	(2.22)	(1.88)	(1.45)
Risk committee	-0.037	-0.085	0.132
	(-0.45)	(-0.99)	(1.15)
Ln (Firm size)	0.087***	0.087***	0.089**
	(7.74)	(6.30)	(2.38)
Book-to-market	0.052	0.039	0.097
	(0.55)	(0.44)	(0.70)
Leverage	0.202*	0.162	0.343
	(1.78)	(1.34)	(1.05)
Profitability	0.368	0.331	0.497
	(0.84)	(0.79)	(0.89)
Tangibility	0.067	0.149	-0.220
	(0.45)	(1.22)	(-0.77)
Analyst coverage	0.001	-0.005	0.021
	(0.02)	(-0.10)	(0.35)
Cross listing	-0.101	-0.121	-0.032
	(-1.12)	(-1.19)	(-0.20)
Country, industry, and year fixed effects	Yes	Yes	Yes
Observations	443	443	443
Adjusted R^2	0.118	0.084	0.155

Table 3
Board Risk Reporting and Future Risk Outcomes

This table presents OLS analyses of the association between BRR and future firm risk. *t*-statistics are based on standard errors clustered by country and appear in parentheses. *, **, *** indicate statistical significance at the 10, 5, 1% level (two-tailed). All variables are defined in Appendix B.

Panel A: Overall board risk reporting

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Loss			*Probability of default*			*Return volatility*	
BRR	-0.057***	-0.075***	-0.058***	-0.189***	-0.212***	-0.097**	-0.001***	-0.001*	-0.001***
	(-3.25)	(-3.91)	(-2.99)	(-3.66)	(-3.60)	(-2.21)	(-3.95)	(-2.01)	(-2.77)
Other risk oversight practices		0.022			0.030			0.000	
		(1.02)			(1.51)			(0.22)	
Loss – Lagged			0.177***						
			(2.99)						
Probability of default – Lagged						1.049***			
						(6.18)			
Return volatility – Lagged									0.600***
									(15.55)
Controls and fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	425	425	425	422	422	420	442	442	441
Adjusted R^2	0.184	0.183	0.199	0.232	0.231	0.495	0.347	0.345	0.515

Panel B: Board risk reporting components

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Loss			*Probability of default*			*Return volatility*	
BRR scope	-0.059***	-0.075***	-0.059***	-0.172***	-0.194***	-0.098**	-0.001**	-0.001	-0.001**
	(-3.14)	(-3.37)	(-2.95)	(-3.02)	(-3.11)	(-2.65)	(-2.12)	(-1.56)	(-2.43)
BRR frequency	0.001	-0.002	0.000	-0.019	-0.023	-0.001	-0.000	-0.000	-0.000
	(0.04)	(-0.14)	(0.00)	(-0.62)	(-0.76)	(-0.03)	(-1.16)	(-1.13)	(-0.31)
Other risk oversight practices		0.024			0.033			0.000	
		(1.05)			(1.67)			(0.22)	
Loss – Lagged			0.176***						
			(2.96)						
Probability of default – Lagged						1.049***			
						(6.24)			
Return volatility – Lagged									0.600***
									(15.27)
Controls and fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	425	425	425	422	422	420	442	442	441
Adjusted R^2	0.183	0.182	0.198	0.231	0.229	0.495	0.345	0.344	0.513

Table 4
Board Risk Reporting and Future Performance Outcomes

This table presents OLS analyses of the association between BRR and future firm performance. *t*-statistics are based on standard errors clustered by country and appear in parentheses. *, **, *** indicate statistical significance at the 10, 5, 1% level (two-tailed). All variables are defined in Appendix B.

Panel A: Overall board risk reporting

	(1)	(2)	(3)	(4)	(5)	(6)
		Profitability			*Tobin's Q*	
BRR	0.015**	0.018***	0.012***	-0.034	-0.075	-0.008
	(2.51)	(2.89)	(3.20)	(-0.35)	(-0.89)	(-0.13)
Other risk oversight practices		-0.005			0.054	
		(-0.96)			(0.95)	
Profitability – Lagged			0.519***			
			(7.11)			
Tobin's Q – Lagged						1.060***
						(17.27)
Controls and fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	425	425	425	424	424	424
Adjusted R^2	0.214	0.213	0.401	0.331	0.330	0.800

Panel B: Board risk reporting components

	(1)	(2)	(3)	(4)	(5)	(6)
		Profitability			*Tobin's Q*	
BRR scope	0.018***	0.022***	0.017***	-0.028	-0.064	-0.035
	(3.98)	(4.67)	(4.52)	(-0.32)	(-0.81)	(-0.70)
BRR frequency	-0.003	-0.003	-0.005	-0.006	-0.012	0.025
	(-0.67)	(-0.56)	(-1.17)	(-0.16)	(-0.32)	(1.23)
Other risk oversight practices		-0.006			0.054	
		(-1.03)			(0.96)	
Profitability – Lagged			0.521***			
			(7.12)			
Tobin's Q – Lagged						1.061***
						(17.41)
Controls and fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	425	425	425	424	424	424
Adjusted R^2	0.216	0.215	0.406	0.330	0.328	0.800

Table 5
Board Risk Reporting, Analyst Coverage, and Future Firm Outcomes

This table presents OLS analyses examining whether the associations between BRR and future firm risk and performance are moderated by analyst following as a proxy for directors' access to external information. *t*-statistics are based on standard errors clustered by country and appear in parentheses. *, **, *** indicate statistical significance at the 10, 5, 1% level (two-tailed). All variables are defined in Appendix B.

	(1)	(2)	(3)	(4)	(5)
	Loss	*Probability of default*	*Return volatility*	*Profitability*	*Tobin's Q*
BRR	-0.023	-0.043	-0.000	0.004	-0.120
	(-1.18)	(-1.24)	(-0.71)	(1.34)	(-1.40)
High analyst coverage	0.136***	0.102*	0.003***	-0.018***	-0.113*
	(6.92)	(1.80)	(5.45)	(-3.25)	(-2.04)
BRR × High analyst coverage	-0.094***	-0.067	-0.001*	0.018**	0.198*
	(-2.88)	(-0.53)	(-1.93)	(2.12)	(1.97)
Other risk oversight practices	0.023	-0.020	0.000	-0.003	0.006
	(1.09)	(-1.10)	(0.28)	(-0.69)	(0.12)
Profitability – Lagged	-0.404**	-0.602*	-0.002	0.520***	-0.902*
	(-2.14)	(-1.78)	(-0.44)	(7.08)	(-1.82)
Loss – Lagged	0.193***				
	(3.65)				
Probability of default – Lagged		1.049***			
		(6.05)			
Return volatility – Lagged			0.596***		
			(15.42)		
Tobin's Q – Lagged					1.052***
					(17.97)
Controls and fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	425	420	441	425	424
Adjusted R^2	0.212	0.496	0.516	0.406	0.803

Online Appendix

The Importance of Directors' Information Access: Evidence from Board Risk Reporting

Online Appendix Table OA1
Aon RMI Survey Questions for *Other risk oversight practices*

Board risk understanding

- Board understanding of the organization's top risks is…
  - N/A; not discussed
  - Inconsistent
  - Consistent
- Board understanding of the organization's existing risk management activities for key risks is…
  - N/A; not discussed
  - Inconsistent
  - Consistent
- Board understanding of the organization's quantified risk appetite (i.e., the amount of risk the organization is willing and able to take) is…
  - N/A; not discussed
  - Inconsistent
  - Consistent
- Board understanding of the organization's emerging risk profile is...
  - N/A; not discussed
  - Inconsistent
  - Consistent

Board and management risk alignment

- The Board and executive management have reached consensus on the overall risk management strategy for the organization.
  - No, overall strategy has not been discussed
  - Yes, informal consensus has been reached
  - Yes, with established and documented objectives for improving risk management
- Communications from the Board and executive management highlight the alignment of risk management strategy with overall strategy.
  - No, communications do not highlight alignment
  - Yes, and include informal references to concepts of risk appetite and tolerance
  - Yes, and include formal references to defined risk appetite and tolerances

Board and risk manager communication

- Does the Risk Management Leader engage Board members in dialogue outside of normal reporting requirements and appearances at meetings?
  - No
  - Yes

Board risk performance evaluation

- Risk management roles and responsibilities are incorporated into Board members' performance evaluations.
  - No
  - Yes

Online Appendix Table OA2
Board Risk Reporting and Future Risk Outcomes

This table reproduces the estimation results reported in Panel A of Table 3 including the coefficients and *t*-statistics for all control variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Loss			*Probability of default*			*Return Volatility*	
BRR	-0.057***	-0.075***	-0.058***	-0.189***	-0.212***	-0.097**	-0.001***	-0.001*	-0.001***
	(-3.25)	(-3.91)	(-2.99)	(-3.66)	(-3.60)	(-2.21)	(-3.95)	(-2.01)	(-2.77)
Outside chair	-0.071***	-0.071***	-0.075***	0.018	0.019	-0.045*	0.001	0.001	0.001
	(-2.88)	(-2.77)	(-3.26)	(0.50)	(0.52)	(-1.72)	(1.16)	(1.15)	(1.58)
Board independence	0.189	0.207	0.173	-0.107	-0.086	-0.253**	0.004	0.004	0.002
	(0.92)	(0.98)	(0.86)	(-0.45)	(-0.37)	(-2.09)	(0.70)	(0.68)	(0.31)
Unitary board	0.089	0.093	0.081	0.017	0.024	0.089	0.003**	0.003**	0.002
	(1.12)	(1.18)	(1.05)	(0.16)	(0.23)	(0.93)	(2.05)	(2.06)	(0.93)
Ln (Board size)	0.012	0.007	0.026	0.334**	0.329**	-0.039	-0.001	-0.001	-0.001
	(0.22)	(0.12)	(0.48)	(2.67)	(2.63)	(-0.55)	(-0.68)	(-0.69)	(-0.66)
Board industry expertise	0.140**	0.141**	0.122**	-0.077	-0.074	-0.070	0.004***	0.004***	0.001
	(2.68)	(2.68)	(2.36)	(-0.82)	(-0.78)	(-0.64)	(3.16)	(3.14)	(1.21)
Board financial expertise	0.172*	0.178*	0.200*	0.550*	0.557*	0.167	-0.001	-0.001	0.001
	(1.82)	(1.73)	(1.94)	(1.87)	(1.89)	(1.05)	(-0.34)	(-0.32)	(0.40)
Board diversity	0.111	0.108	0.111	0.169	0.166	0.295*	0.004	0.004	0.002
	(0.91)	(0.90)	(0.91)	(0.87)	(0.85)	(2.04)	(1.24)	(1.24)	(0.79)
Ln (Board tenure)	-0.039	-0.042	-0.039	-0.093**	-0.096**	-0.043	-0.003***	-0.003***	-0.001
	(-1.20)	(-1.36)	(-1.33)	(-2.11)	(-2.16)	(-0.91)	(-4.01)	(-4.05)	(-1.44)
Risk committee	-0.033	-0.034	-0.031	0.059	0.058	0.076	0.002*	0.002*	0.002**
	(-0.76)	(-0.79)	(-0.70)	(0.55)	(0.55)	(1.20)	(1.80)	(1.79)	(2.48)
Leverage	-0.107	-0.099	-0.127	0.261	0.269	-0.305**	0.002	0.002	0.000
	(-1.15)	(-1.03)	(-1.32)	(1.20)	(1.24)	(-2.43)	(0.55)	(0.53)	(0.12)
Ln (Firm size)	-0.026	-0.026	-0.021	-0.064**	-0.064**	-0.024	-0.002***	-0.002***	-0.001***
	(-1.58)	(-1.56)	(-1.30)	(-2.09)	(-2.09)	(-1.17)	(-7.75)	(-7.71)	(-2.95)
Profitability	-0.763**	-0.755**	-0.430**	-1.615**	-1.596**	-0.575*	-0.011	-0.011	-0.002
	(-2.74)	(-2.67)	(-2.12)	(-2.64)	(-2.61)	(-1.75)	(-1.62)	(-1.57)	(-0.36)
Book-to-market	0.072	0.074	0.077*	-0.145	-0.140	-0.112	0.004**	0.004**	0.004***
	(1.58)	(1.62)	(1.79)	(-1.16)	(-1.12)	(-0.97)	(2.12)	(2.10)	(3.23)
Tangibility	0.066	0.063	0.072	-0.078	-0.081	-0.005	0.001	0.001	0.001
	(0.64)	(0.59)	(0.64)	(-0.77)	(-0.82)	(-0.20)	(0.50)	(0.47)	(0.61)
Cross listing	0.039	0.041	0.046	-0.113	-0.108	0.002	0.002	0.002	0.002
	(0.70)	(0.72)	(0.80)	(-0.68)	(-0.65)	(0.03)	(1.35)	(1.36)	(1.56)
Analyst coverage	0.070***	0.070***	0.066***	0.030	0.030	0.034	0.002***	0.002***	0.001***
	(4.10)	(4.18)	(3.86)	(0.87)	(0.85)	(1.29)	(4.68)	(4.67)	(3.84)

Other risk oversight practices		0.022			0.030			0.000	
		(1.02)			(1.51)			(0.22)	
Loss - Lagged			0.177***						
			(2.99)						
Probability of default - Lagged						1.049***			
						(6.18)			
Return Volatility - Lagged									0.600***
									(15.55)
Country, industry, and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	425	425	425	422	422	420	442	442	441
Adjusted R^2	0.184	0.183	0.199	0.232	0.231	0.495	0.347	0.345	0.515

Online Appendix Table OA3
Board Risk Reporting and Future Performance Outcomes

This table reproduces the estimation results reported in Panel A of Table 4 including the coefficients and *t*-statistics for all control variables.

	(1)	(2)	(3)	(4)	(5)	(6)
		Profitability			*Tobin's Q*	
BRR	0.015**	0.018***	0.012***	-0.034	-0.075	-0.008
	(2.10)	(2.89)	(3.20)	(-0.35)	(-0.89)	(-0.13)
Outside chair	0.017***	0.017***	0.016***	-0.030	-0.028	-0.049
	(2.84)	(2.77)	(3.60)	(-0.38)	(-0.35)	(-0.89)
Board independence	-0.070*	-0.073*	-0.031	-0.021	0.022	-0.352
	(-1.74)	(-1.76)	(-1.05)	(-0.03)	(0.03)	(-1.04)
Unitary board	-0.016	-0.017	-0.019	-0.127	-0.118	-0.196
	(-1.05)	(-1.11)	(-1.37)	(-0.94)	(-0.88)	(-1.28)
Ln (Board size)	-0.028	-0.027	-0.014	-0.776***	-0.788***	-0.008
	(-1.60)	(-1.51)	(-0.79)	(-3.91)	(-3.91)	(-0.08)
Board industry expertise	0.007	0.007	-0.007	0.572***	0.577***	0.076
	(0.34)	(0.33)	(-0.55)	(3.19)	(3.25)	(1.15)
Board financial expertise	-0.017	-0.019	-0.024	0.134	0.147	0.159
	(-0.85)	(-0.88)	(-1.15)	(0.33)	(0.37)	(0.67)
Board diversity	-0.025	-0.024	-0.021	-0.098	-0.106	-0.023
	(-0.86)	(-0.84)	(-0.67)	(-0.27)	(-0.30)	(-0.09)
Ln (Board tenure)	0.005	0.006	0.003	0.053	0.047	0.085*
	(0.60)	(0.68)	(0.56)	(0.65)	(0.56)	(1.95)
Risk committee	-0.005	-0.005	-0.001	-0.098	-0.099	0.016
	(-0.44)	(-0.42)	(-0.12)	(-1.26)	(-1.25)	(0.23)
Leverage	-0.003	-0.004	0.039**	0.752	0.766	0.331
	(-0.14)	(-0.21)	(2.56)	(1.54)	(1.60)	(1.20)
Ln (Firm size)	0.011***	0.011***	0.005**	0.170***	0.169***	0.024
	(3.08)	(3.06)	(2.14)	(4.55)	(4.45)	(1.03)
Tangibility	-0.026	-0.025	-0.023	-0.158	-0.164	-0.104
	(-0.94)	(-0.88)	(-1.08)	(-0.90)	(-0.92)	(-1.46)
Cross listing	-0.016	-0.016	-0.008	-0.232*	-0.227*	-0.104*
	(-0.92)	(-0.93)	(-0.55)	(-1.93)	(-1.83)	(-1.86)
Analyst coverage	-0.008*	-0.008*	-0.008*	-0.001	-0.000	-0.018
	(-1.81)	(-1.85)	(-1.81)	(-0.01)	(-0.00)	(-0.44)
Book-to-market	-0.071***	-0.071***	-0.034**			
	(-6.32)	(-6.35)	(-2.54)			
Other risk oversight practices		-0.005			0.054	
		(-0.96)			(0.95)	
Profitability - Lagged			0.519***	5.656***	5.669***	-0.916*
			(7.11)	(4.05)	(4.03)	(-1.78)
Tobin's Q - Lagged						1.060***
						(17.27)
Country, industry, and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	425	425	425	424	424	424
Adjusted R^2	0.214	0.213	0.401	0.331	0.330	0.800

Online Appendix Table OA4
Board Risk Reporting, Analyst Coverage, and Future Firm Outcomes

This table reproduces the estimation results reported in Table 5 including the coefficients and *t*-statistics for all control variables.

	(1)	(2)	(3)	(4)	(5)
	Loss	*Probability of default*	*Return volatility*	*Profitability*	*Tobin's Q*
BRR	-0.023	-0.043	-0.000	0.004	-0.120
	(-1.18)	(-1.24)	(-0.71)	(1.34)	(-1.40)
High analyst coverage	0.136***	0.102*	0.003***	-0.018***	-0.113*
	(6.92)	(1.80)	(5.45)	(-3.25)	(-2.04)
BRR × High analyst coverage	-0.094***	-0.067	-0.001*	0.018**	0.198*
	(-2.88)	(-0.53)	(-1.93)	(2.12)	(1.97)
Outside chair	-0.076***	-0.047*	0.001	0.017***	-0.046
	(-3.29)	(-1.83)	(1.47)	(3.74)	(-0.82)
Board independence	0.254	-0.206	0.003	-0.044	-0.457
	(1.29)	(-1.31)	(0.50)	(-1.37)	(-1.34)
Unitary board	0.078	0.081	0.002	-0.020	-0.214
	(1.01)	(0.80)	(0.86)	(-1.34)	(-1.35)
Ln (Board size)	0.031	-0.029	-0.001	-0.015	-0.031
	(0.55)	(-0.42)	(-0.62)	(-0.89)	(-0.26)
Board industry expertise	0.104*	-0.083	0.001	-0.005	0.108
	(1.87)	(-0.68)	(0.95)	(-0.32)	(1.58)
Board financial expertise	0.202*	0.156	0.001	-0.024	0.182
	(1.93)	(0.95)	(0.37)	(-1.10)	(0.73)
Board diversity	0.126	0.311*	0.002	-0.022	0.001
	(1.04)	(2.04)	(1.00)	(-0.69)	(0.00)
Ln (Board tenure)	-0.031	-0.036	-0.001	0.003	0.082*
	(-1.08)	(-0.81)	(-1.13)	(0.44)	(1.82)
Risk committee	-0.041	0.074	0.002**	0.000	0.037
	(-0.97)	(1.32)	(2.48)	(0.05)	(0.51)
Leverage	-0.122	-0.314**	0.000	0.038**	0.323
	(-1.35)	(-2.32)	(0.05)	(2.49)	(1.29)
Ln (Firm size)	-0.022	-0.028	-0.001***	0.005**	0.032
	(-1.55)	(-1.44)	(-3.02)	(2.37)	(1.22)
Tangibility	0.073	0.007	0.001	-0.023	-0.128*
	(0.66)	(0.24)	(0.62)	(-1.14)	(-1.77)
Cross listing	0.069	0.005	0.002*	-0.011	-0.110*
	(1.29)	(0.07)	(1.81)	(-0.73)	(-1.77)
Other risk oversight practices	0.023	-0.020	0.000	-0.003	0.006
	(1.09)	(-1.10)	(0.28)	(-0.69)	(0.12)
Loss – Lagged	0.193***				
	(3.65)				
Probability of default – Lagged		1.049***			
		(6.05)			
Return volatility – Lagged			0.596***		
			(15.42)		
Profitability – Lagged	-0.404**	-0.602*	-0.002	0.520***	-0.902*
	(-2.14)	(-1.78)	(-0.44)	(7.08)	(-1.82)
Book-to-market	0.070	-0.127	0.004***	-0.033**	
	(1.54)	(-1.14)	(3.05)	(-2.42)	
Tobin's Q – Lagged					1.052***
					(17.97)
Country, industry, and year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	425	420	441	425	424
Adjusted R^2	0.212	0.496	0.516	0.406	0.803

Online Appendix Table OA5
Coefficient Stability

This table examines the robustness of the results for our hypothesis tests, specifically the coefficient stability tests following the method of Altonji et al. (2005) and Oster (2019). Column 1 includes the table – column associated with each dependent variable – independent variable combination and specification. Column 2 (3) presents the coefficient of regressing the dependent variable on the independent variable of interest without (with) controls and fixed effects. Column 4 (5) reports the unadjusted R^2 of the model with (without) controls and fixed effects. Column 6 reflects the Π factor, which is a researcher assumption as to how much explanatory power a correlated omitted variable will incrementally provide to the model. Column 7 includes the R^2 max parameter, that is, the product of the R^2 of the fully specified model and the Π factor. Column 8 reports the δ statistic, which is a measure of the magnitude that a correlated omitted variable would need to have relative to controls included in the model in order to reduce the effect of the independent variable of interest to zero. Absolute values of δ greater than 1.00 suggest a robust result. All variables are defined in Appendix A of the paper.

Dependent & independent variables:	Table – Column (Panel)	β without controls	β with controls	R^2 without controls	R^2 with controls	Π	R^2 max (5) × (6)	|δ|
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BRR, Outside chair	2-1	0.08612	0.07546	0.005	0.242	1.3	0.314	4.51595
BRR, Board independence	2-1	0.45944	0.80581	0.008	0.242	1.3	0.314	8.39444
Loss, BRR	3-1 (A)	-0.05171	-0.05742	0.010	0.305	1.3	0.396	15.35634
Loss, BRR	3-2 (A)	-0.05171	-0.07466	0.010	0.306	1.3	0.398	6.11988
Loss, BRR	3-3 (A)	-0.05171	-0.05808	0.010	0.320	1.3	0.416	16.55601
Probability of default, BRR	3-4 (A)	-0.17629	-0.18897	0.022	0.345	1.3	0.449	11.22790
Probability of default, BRR	3-5 (A)	-0.17629	-0.21247	0.022	0.346	1.3	0.450	3.56356
Probability of default, BRR	3-6 (A)	-0.17766	-0.09691	0.023	0.571	1.3	0.743	2.16027
Return volatility, BRR	3-7 (A)	-0.00203	-0.00137	0.019	0.440	1.3	0.573	3.28175
Return volatility, BRR	3-8 (A)	-0.00203	-0.00148	0.019	0.440	1.3	0.573	1.67696
Return volatility, BRR	3-9 (A)	-0.00203	-0.00098	0.019	0.585	1.3	0.761	1.85102
Profitability, BRR	4-1 (A)	0.01430	0.01453	0.011	0.329	1.3	0.428	9.95234
Profitability, BRR	4-2 (A)	0.01430	0.01820	0.011	0.329	1.3	0.428	4.51462
Profitability, BRR	4-3 (A)	0.01430	0.01202	0.011	0.490	1.3	0.638	5.52189

Online Appendix Table OA6
Impact Threshold of a Confounding Variable (ITCV)

This table examines the robustness of the results for our hypothesis tests, specifically the ITCV results following Frank (2000). Column 1 includes the table – column associated with the estimated specification. Column 2 presents the ITCV for the independent variable of interest. Column 3 indicates the control variable with the largest impact and column 4 reports the impact threshold for the control variable in column 3. Column 5 reports the ratio of the ITCV for the independent variable of interest (column 2) divided by the impact value of the largest control variable (column 4) as a benchmark. Absolute values of the benchmark greater than 1.00 suggest a robust result. All variables are defined in Appendix A of the paper.

Dependent & independent variables	Table – Column (Panel)	ITCV	Control with the largest impact	Control impact value	Benchmark (2)/(4)
	(1)	(2)	(3)	(4)	(5)
BRR, Outside chair	2-1	0.0231	*Risk committee*	0.0219	1.0548
BRR, Board independence	2-1	0.0352	*Ln (Firm size)*	0.0387	0.9096
Loss, BRR	3-1 (A)	-0.0688	*Board financial expertise*	0.0043	-16.0000
Loss, BRR	3-2 (A)	-0.1035	*Book-to-market*	0.0064	-16.1719
Loss, BRR	3-3 (A)	-0.0553	*Board financial expertise*	0.0059	-9.3729
Probability of default, BRR	3-4 (A)	-0.0908	*Board financial expertise*	0.0102	-8.9020
Probability of default, BRR	3-5 (A)	-0.0878	*Board financial expertise*	0.0112	-7.8393
Probability of default, BRR	3-6 (A)	-0.0133	*Risk committee*	0.0038	-3.5000
Return volatility, BRR	3-7 (A)	-0.1031	*Board independence*	0.0053	-19.4528
Return volatility, BRR	3-8 (A)	-0.0024	*Book-to-market*	0.0105	-0.2286
Return volatility, BRR	3-9 (A)	-0.0425	*Risk committee*	0.0125	-3.4000
Profitability, BRR	4-1 (A)	0.0073	*Ln (Firm size)*	0.0167	0.4371
Profitability, BRR	4-2 (A)	0.0499	*Other risk oversight practices*	0.0159	3.1384
Profitability, BRR	4-3 (A)	0.0660	*Board independence*	0.0092	7.1739

Online Appendix References

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