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Problem Directors and Corporate Risk-Taking

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This study investigates the impact of a 'problem director' on the risk-taking propensity of a firm and its consequences for firm value. Analysing a sample of US companies, we find that corporate risk-taking propensity increases when a firm appoints a problem director. Our results are of economic significance, indicating that a one standard deviation increase in problem director's score leads to a 2.33% to 4.17% increase in corporate risk-taking. Mediation analysis reveals that a problem director increases firm risk-taking through reducing financial reporting quality. Further, a firm's risk-taking increases when a new problem director joins the board, and the damaging effect persists even after the problem director has left. Moreover, if a chief executive officer (CEO) is a problem director, s/he displays a greater predisposition for risk-taking. Moreover, when a problem director also sits on a board led by a problem CEO, we determine that the former will have an even greater propensity to take risks. Further analysis determines that the presence of problem directors damages long-term firm value in the aftermath of risk-taking behaviour. Overall, this study provides fresh evidence revealing a web of connections between a problem director, ineffective corporate governance and a decline in firm value.

Introduction

The integrity of a company's directors determines how effectively it is managed and stakeholders' perceptions of its probability of success. Research demonstrates that directors' actions can have a catastrophic effect on stakeholders (Beasley, 1996) and threaten firms' survival.[1] There is evidence that inappropriate conduct among some company directors is commonplace. Larcker and Tayan (2016) report that 34% of chief executive officers (CEOs) lie to the board or shareholders over drink-driving offences, undisclosed criminal records or falsified credentials; 21% undertake inappropriate relationships with subordinates, contractors or consultants; and 16% misuse corporate funds. Nevertheless, they are rarely dismissed, with most retained by their organizations with only restrictions on the scope of their power imposed (Larcker and Tayan, 2016), evidently impacting corporate policy and outcomes (Cumming, Dannhauser and Johan, 2015; Neville *et al.*, 2019). This suggests that corporate behaviours may be influenced by such directors, and some literature examines how their antecedents affect corporate decision-making (Amir, Kallunki and Nilsson, 2014a; Habib and Bhuiyan, 2016). Moreover, it

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[1]A salutary example of how a single, careless comment by a senior executive can destroy corporate value occurred in 1992, when Gerald Ratner, the chairman of the Ratner's chain of stores, sent the company into an almost terminal decline when he described one of the products they sold as 'total crap'. Profits crashed by 40% at Christmas that year, resulting in the closure of 330 stores (Buckingham and Kane, 2014).

is arguable that individuals engaging in malpractice are not averse to facing the hazards their misconduct is likely to present. Therefore, our study seeks to answer the concomitant question of whether their board membership increases a company's propensity to implement higher-risk policies that result in negative economic consequences for corporate value.

Corporate governance research, founded on upper echelons theory, demonstrates that behavioural traits, such as overconfidence and narcissism (Malmendier and Tate, 2005, 2008), influence decision-making on policies for innovation (Galasso and Simcoe, 2011), investment outcomes (Benmelech and Frydman, 2015), financial reporting quality (Mitra, Jaggi and Al-Hayale, 2019) and risk-taking (Cain and McKeon, 2016). Bai and Yu (2022) posit that firms with inexperienced directors are likely to suffer increased corporate fraud. Further studies establish that an executive's idiosyncratic behaviours and attitudes to risk influence corporate outcomes. Bernile, Bhagwat and Rau (2017) argue that exposure to a macroeconomic, personal or career-specific event affects CEOs' decision-making and that individuals who witness the extreme consequences of natural disasters in their early lives appear to be more cautious when confronting risk. Similarly, CEO power (Lewellyn and Muller-Kahle, 2012), CEO compensation (Benischke, Martin and Glaser, 2019) and political connections (Boubakri, Mansi and Saffar, 2013) encourage corporate risk-taking. In addition, Amir, Kallunki and Nilsson (2014a) determine that firms with criminally convicted or suspect directors and CEOs report more volatile earnings, partly to facilitate goodwill write-offs of unsuccessful acquisitions and partly to delay recognition of poor earnings. Habib and Bhuiyan (2016) suggest that directors with questionable professional backgrounds are responsible for lower-quality corporate governance and increased agency conflicts, degrading financial reporting quality. Our study augments these lines of inquiry by determining whether directors engaging in a range of misdemeanours are predisposed to pursue risk-taking activities, and the ramfications for corporate value.

Analysing a sample of 8926 firm-year observations of US firms between 2004 and 2018, we examine the relationship between problem directors and their predisposition to take risks, notwithstanding the concomitant financial outcomes. Our main result embodies economic significance, establishing that firms with problem directors present a 2.33% to 4.17% higher corporate risk than firms without problem directors, and determining that they exhibit a predilection for risk-taking. Our findings demonstrate that such individuals consistently underestimate the probability of negative outcomes by engaging in behaviours with the potential to undermine corporate wealth, signifying their inability to assess the risks implicit in their self-interested decision-making (Eide, Rubin and Shepherd, 2006; Garoupa, 2003).

We next perform a series of additional analyses to refine our understanding of this propensity. First, we examine the behavioural attributes of problem CEOs and confirm that a firm led by a chief executive who is also a 'problem director' has an increased tendency for risk-taking. Second, we assess the effect of a problem director's appointment and departure on risk-taking, finding that this increases in both instances. Third, we classify problem directors into various categories relating to their involvement in bankruptcies, fraud and corporate governance indiscretions, presenting evidence that risk-taking increases across all such categories. Fourth, we address the concerns of tokenism, seeking to determine whether the presence of problem directors is merely symbolic and their influence on decision-making is limited due to their under-representation on boards. Counter-intuitively, our study demonstrates that tokenism fails to moderate the association between a director with a tainted past and corporate risk-taking, and the latter increases even with the appointment of only one problem director. Fifth, our mediation analysis further reveals that boards with problem directors exhibit elevated levels of direct and indirect risk-taking, which is explicit in the lower financial reporting quality indicated by higher discretionary accruals. Finally, and most importantly, we conduct a moderation analysis to demonstrate that the presence of a problem director damages long-term firm value as a consequence of increased risk-taking. Moreover, the outcomes of the moderating analysis reinforce our assertion that a director displaying questionable judgement, and a propensity to engage in high-risk strategies, will seek to undermine a stringent governance structure that might otherwise preclude such behaviours. Therefore, firms employing directors with questionable antecedents maintain ineffectual corporate governance systems while they remain in post.

Our conclusions remain consistent following the application of a series of robustness tests. First, we consider alternative measures for corporate risk-taking to examine our findings' sensitivity. Second, we employ several techniques to alleviate endogeneity concerns. We address selection bias concerns through the Heckman (1979) model and address potential omitted variable issues by incorporating firm gender diversity and industry competition into our analysis. Third, we perform a propensity score matching analysis to reduce confounding biases. Further, we examine if the identified relationship has been affected by the 2007–2010 Global Financial Crisis (GFC), determining that our findings are consistent in GFC and non-GFC periods. Overall, our robustness analysis confirms that problem directors increase the uncertainty and ineffectiveness of decision-making because of their negative influence on internal control systems.

Our study contributes to extant research in two respects. First, we answer the call by Amir, Kallunki and Nilsson (2014a), who recommend the examination of the impact of tainted directorships on corporate fraud, sanctioned by the US Securities and Exchange Commission, and the appointment of '… relatively more convicted directors and senior executives' (p. 518). Whereas a paucity of studies examine how various demographic, emotional and board-specific characteristics affect corporate strategy (Azouzi and Jarboui, 2013; Bouslah *et al.*, 2018; Faleye, 2009; Mollah, Skully and Liljeblom, 2021; Sila, Gonzalez and Hagendorff, 2016), our investigation establishes that a director's questionable professional background impacts a company's financial policies and, in particular, its propensity to sustain risks, which carry negative long-term consequences for corporate value and shareholders' wealth. Our analysis has quantified the loss of value as ranging from 12.03% to 64.20% (Table 10). Therefore, our study differs from that of Bhuiyan (2015), who focuses on the influence of problem directors on firms' accounting operating performance. By investigating the impact of problem directors on firm value grounded in market valuation, we contribute supplementary evidence to an issue distinct from traditional firm performance metrics. Market-based measures of valuation integrate not only quantitative factors but also market sentiments and investors' forward-looking assessments (Haslam *et al.*, 2010). Therefore, our study firmly establishes a connection between a director's past misdeeds, ineffectual corporate governance and a decline in firm value.

Second, this study adopts a holistic approach by considering diverse aspects of problem directors' behaviour. Albeit earlier research suggests that directors' risk-taking activities are influenced by a criminal conviction (Amir, Kallunki and Nilsson, 2014a) or involvement in bankruptcy (Gopalan, Gormley and Kalda, 2021), our investigation augments these findings significantly by extending the range of misdemeanours and corporate malpractices that foster this predisposition. Whereas Gopalan, Gormley and Kalda (2021) show that risk-taking increases in firms when a director has past experience of bankruptcy, our study extends this thesis by establishing that directors involved in (i) litigation, (ii) corporate infractions, (iii) breaches of governance, (iv) accounting restatements, (v) an SEC violation or (vi) the granting of excessive CEO compensation also exacerbate a tendency for corporate risk-taking. Accordingly, this study presents fresh insights into the questionable behaviours of problem directors and their deleterious influence on the decision-making process. Further still, our study demonstrates that a CEO who is also a problem director engages in a greater level of risk-taking than would a single problem director. Moreover, when such a director also sits on a board led by a problem CEO, we discover that s/he will have an even greater propensity to take risks. Hence, our investigation identifies the negative economic impact arising from directors' prior transgressions as a supplementary factor influencing firm value, thereby enriching this discourse within upper echelons and agency theories.

This study augments practice by offering fresh insights to policymakers and regulators. Our findings identify weaknesses in corporate governance, the management of corporate risk, regulatory oversight and the effectiveness of investors' protections. Many of the greatest financial crises have been instigated by high-risk decision-making; therefore, heightening regulators' awareness of this potentiality could contribute to the stability of national and global economies. The detection and exclusion of tainted directors should be a priority for the regulators of corporate, national and international governance systems. In a globally interconnected world, the consequences of unchecked malpractices can be devastating for us all.

The remainder of the paper is organized as follows. The next section discusses the literature and develops the hypotheses. The third section explicates the research methods. The fourth section presents the main results and findings of the robustness tests. The fifth section presents the findings of additional analyses. The final section summarizes and concludes.

Theoretical background and hypothesis development

Managerial risk-taking is intrinsic to almost every corporate strategy, from long-term investment to short-term decision-making (Hoskisson *et al.*, 2017). Excessive risk-taking can cause financial distress, whereas excessive risk avoidance stunts growth and shareholder value (Brunnermeier, 2009). The principal–agent model rationalizes the tension between incentive alignment and managerial risk aversion. Agency theory contends that agency costs are consequential upon the goals and risk preferences of managers (Jensen and Meckling, 1976), with board members taking excessive risks to maximize their own wealth at the expense of the shareholders they are mandated to protect (Maher and Andersson, 2002). Whereas agency theory assumes all directors share similar personal attributes, norms and values, extant research contends that variations in directors' personal characteristics affect strategic decision-making when risk is involved (Tian, Jiang and Yang, 2022). Supporting this argument, upper echelons theory posits that directors' experience, behavioural norms and moral values influence firms' strategic decision-making (Hambrick, 2007; Hambrick and Mason, 1984). Studies grounded in this theory examine the effect of executives' attributes, including age (Ferris, Javakhadze and Rajkovic, 2017), gender (Sieben, Braun and Ferreira, 2016), tenure (Boling, Pieper and Covin, 2016), education (Barker and Mueller, 2002) and financial experience (Custodio and Metzger, 2014) on strategic decision-making. Other research confirms that managerial characteristics, including optimism (Heaton, 2005), overconfidence (Ben-David, Graham and Harvey, 2007) and early life experiences (Malmendier, Tate and Yan, 2011) affect corporate policies. Their conclusions indicate that executives' attributes and expertise influence a board's choices when determining the firm's leadership, with consequences for corporate outcomes.

Prior studies have examined how the personal traits of managers affect corporate policies. Hackbarth (2008) incorporates managerial characteristics into a theoretical model of corporate financial policies relating to capital structure, presenting evidence that firms with overconfident CEOs use more debt and issue new debt more frequently. According to Kallunki and Pyykkö (2013), the risk of financial distress is increased by appointing directors with a poor credit history. Amir, Kallunki and Nilsson (2014a) demonstrate that firms employing more directors and CEOs with criminal convictions, or suspected of committing crimes, experience increased earnings volatility, higher goodwill write-offs from failed acquisitions and delays in releasing subpar earnings forecasts. Cronqvist, Makhija and Yonker (2012) testify that CEOs' personal leverage (i.e. mortgages) is positively associated with corporate leverage policies, indicating that firms' behaviour reflects the predispositions of their CEOs. This strand of research reveals that problem directors maintain lower monitoring levels, engage in more opportunistic behaviour and exercise a predilection for risk-taking.

Furthermore, similar research indicates connections between ineffectual corporate governance and directors with chequered histories, who undermine transparent financial reporting (Habib and Bhuiyan, 2016), increasing corporate fraud (Farber, 2005) and the likelihood of management failure (Habib, Bhuiyan and Rahman, 2019). According to Carver (2014), directors with higher incentives to maintain vigilance over financial reporting are less likely to retain the audit committee following a restatement. Fraudulent directors indicate weak board competence and integrity, undermining public confidence in executives' ability to monitor management and protect shareholders (Scarpati, 2003; Zahra, Priem and Rasheed, 2007). A director with a compromised reputation signals weak internal control systems, raising concerns about monitoring and suboptimal financial performance (Bhuiyan, 2015). Amir, Kallunki and Nilsson (2014b) argue that auditor partners with criminal convictions tend to audit companies with higher financial, governance and reporting risk. Arguably, this increases suspicions that tainted auditors are more amenable to overlooking weaknesses in corporate governance, suggesting that

their fiduciary role is compromised by clients' and their own past malpractices. Therefore, a lack of effective oversight results in poor corporate governance and a tendency for directors to engage in financial crime (Zam, Pok and Ahmed, 2014).

Moreover, directors convicted of, or suspected of, committing crimes are likely to see risk-taking differently from directors with impeccable reputations. Amir, Kallunki and Nilsson (2014a) provide evidence that if a firm's directors appear on a criminal and civil register, its performance declines. Palmer and Wiseman (1999) suggest that managerial risk-taking attitudes influence organizational risk-taking. Kaptein (2003) asserts that board members must work with high integrity to perform their monitoring and advisory responsibilities effectively. Therefore, appointing directors with a tainted reputation, or a history of questionable professional practice, may lead to a high propensity for making erroneous decisions, indicating a company's predisposition for corporate risk-taking. Therefore, based on the foregoing discussion, we hypothesize:

H1a: A propensity for corporate risk-taking increases in the presence of a problem director.

Albeit problem directors exhibit such tendencies, other studies argue that these directors help to maintain effective board governance. Fich and Shivdasani (2007) contend that fraudulent directors make firms less vulnerable to fraud, since they have the expertise to detect further wrongdoing. In addition, Amir, Kallunki and Nilsson (2014a) observe that many of the convictions linked to crime do not impair an individual's ability to exercise professional judgement. Miller and Toulouse (1986), discussing the adverse influence of such personalities, argue that their behaviour may be mitigated by interaction with other directors with a 'clean' or charismatic image. Moreover, Hvide (2002) argues that balancing excessive risk-taking with low effort levels helps firms sustain themselves. Interestingly, Bhuiyan and Hooks (2016) demonstrate that companies with problem directors have a better reputation for instituting green management policies than companies without problem directors. Thus, rather than detracting from professionalism and oversight, past involvement with improper or criminal activities inculcates experiences that transform them into highly proficient gatekeepers (Larcker and Tayan, 2016). Thus, it is unsurprising to see fearless entrepreneurs appoint problem directors to top managerial positions. Therefore, we propose a competing hypothesis:

H1b: A propensity for corporate risk-taking decreases in the presence of a problem director.

Research design

Data and sample

Primary data sources for our analysis are Compustat, Board Analyst (The Corporate Library),[2] Audit Analytics and CRSP databases for 2004−2018. Board Analyst flags 'problem directors' from 2004 and is publicly available until 2018. We use Compustat for firm fundamentals; Board Analyst for corporate governance and information concerning problem directors; Audit Analytics for audit opinion; and CRSP for stock return volatility.[3] To remove the effect of outliers, we winsorize firm-level variables at the 1% level in both tails of the distribution. We also exclude the firm years with missing observations. Therefore, our final sample comprises 8926 firm-year observations and 1353 firms for analysis.

Table 1 presents a detailed distribution of problem director frequency by sample firm years and industry. Manufacturing firms (two-digit SIC 31−40) have a higher percentage (26.2%) of problem directors in industry categorizations. Among our sample periods, four sample years (2010, 2012, 2013 and 2014) have the highest percentage of problem directors in year-wise sample categorization.

Dependent variables: Corporate risk-taking

We adopt corporate risk-taking (CRT) as a proxy for a company's risk management metric,

[2]Currently, Board Analyst is merged with GMI and is known as MSCI GMI rating. Corporate governance and problem director information for 2016–2018 is collected from MSCI GMI ratings. GMI ratings offers access to annual corporate governance (problem director) datasets starting from 2001 (2004) and provides proxy data for each year on over 3000 US companies indexed in S&P, Fortune and Russell.

[3]We have merged the four databases, generating an initial sample of 10,064 firm-year observations.

Table 1. Industry and year-wise (2004–2018) distribution of the sample

Industry distribution					Year-wise distribution				
SIC	Observation	DIRPROB	PDDUM	%PDDUM	Year	Observation	DIRPROB	PDDUM	%PDDUM
					2004	173	57	30	0.018
					2005	238	57	44	0.026
01–10	58	19	6	0.004	2006	559	36	30	0.018
11–20	480	181	102	0.061	2007	665	53	39	0.023
21–30	1175	292	178	0.107	2008	763	155	112	0.067
31–40	1845	663	437	0.262	2009	732	153	111	0.066
41–50	797	323	189	0.113	2010	830	232	163	0.098
51–60	1420	179	157	0.094	2011	815	217	154	0.092
61–70	1494	328	251	0.150	2012	792	219	163	0.098
71–80	1412	423	283	0.168	2013	819	216	164	0.098
81–90	74	16	16	0.010	2014	858	215	164	0.098
91–99	171	65	52	0.031	2015	750	205	161	0.096
					2016	297	227	109	0.065
					2017	310	239	116	0.069
					2018	325	208	111	0.066
Total	**8926**	**1799**	**1249**	**1.00**		**8926**	**2489**	**1671**	**1.00**

Notes: This table presents the summary statistics for problem directors by sample year and industry. SIC stands for the standard industrial classification. DIRPROB is the measure of the actual number of problem directors who exist in the firm. In contrast, PDDUM is a dummy variable that indicates whether a problem director exists in the firm. The sample period is from 2004 to 2018 in this study.

following existing research on corporate risk-taking (Teodósio, Vieira and Madaleno, 2021). We utilize three CRT metrics, combining corporate risk-taking activities based on R&D investment, market returns and accounting returns. First, R&D, the research and development investment level, measures investment risk. We estimate R&D as the research and development expenditure scaled by total assets. Bhagat and Welch (1995) indicate that R&D investment benefits are uncertain and have a lower probability of success, reflecting a risk-taking propensity for long-term investment.[4] Second, σ(MRET), the standard deviation of returns, is used as a market-based measure. We measure σ(MRET) as the annual standard deviation of monthly stock returns. The σ(MRET) is a conventional measure of corporate equity risk (Bargeron, Lehn and Zutter, 2010). A high (low) value of σ(MRET) denotes more (less) dispersion and thus high (low) levels of risk (Bargeron, Lehn and Zutter, 2010). Third, σ(ROA), the standard deviation of returns on assets, is used as an accounting measure. We compute σ(ROA) as the standard deviation of income before tax and extraordinary items, scaled by total assets, over the next three years (i.e. $Year_{t+1}$, $Year_{t+2}$ and $Year_{t+3}$). σ(ROA) captures the volatility of corporate earnings, that is riskier corporate operations lead to more volatile earnings, which is widely used as an indicator of risk-taking (Habib and Hasan, 2017; Nakano and Nguyen, 2012; Wright *et al.*, 2007). We use risk measures in 1-year-ahead values to capture the impact of an active problem director on the board.

Key independent variables: Problem directors

Our independent variable represents problem directors (PROBDIR), as defined by Board Analyst (2011). A director is so defined if s/he has been involved as a director or executive in one of the following incidences: (i) one or more corporate bankruptcies; (ii) major litigation or corporate infractions; (iii) major accounting restatements and other accounting scandals; or (iv) has served on compensation committees that have approved egregious CEO compensation packages, SEC violation or other similar circumstances. We use three proxies to measure problem directors (PROBDIR). First, we use PDDUM as a dummy variable, coded 1 if one or more board directors have been involved as a director or executive in any one of the four incidences, and 0 otherwise. Second, we use the number of problem

[4]Consistent with current accounting literature (Gomez-Mejia *et al.*, 2014), we set R&D equal to zero for missing values.

directors (DIRPROB) as a proxy for problem directors. Third, we measure problem directors on a board using the ratio of the number of problem directors to board size (PDPER).

Control variables

Previous research shows that corporate risk-taking is affected by internal factors and external business environments (John, Litov and Yeung, 2008). Therefore, we use several control variables in the regression model. LNSIZE is a proxy for firm size, measured as the natural logarithm of the firm's total assets. Large firms can diversify risk across product and service lines, so are expected to be less risky (Bargeron, Lehn and Zutter, 2010). We also control firm leverage (LEVERAGE), as higher leverage indicates higher debt and increased risk. Two variables are used as proxies for growth opportunities: the dividend to equity ratio (DIVEQTY) and the market to book value of assets (MTB). Firms with higher risk profiles (high MTB or low DIVEQTY) are expected to have higher growth options (Habib and Hasan, 2017). We control firm profitability (ROA), as profitable firms are less likely to engage in risk-taking (Nguyen, 2011). We also consider financial distress (LOSS), as distressed firms are unlikely to initiate risky projects. Corporate risk-taking depends on the firm's cash holding, as cash-rich firms face no immediate financial costs and can invest in riskier projects (Hirth and Viswanatha, 2011). Further, we include firm internal control weakness (ICW), as poor management controls may lead to excessive risk-taking (Ogneva, Subramanyam and Raghunandan, 2007). We include auditor opinion (OPINION) to capture the auditor's role in corporate risk-taking, as Hoelscher and Seavey (2014) suggest that higher-quality audits encourage shareholder-focused corporate risk-taking.

Furthermore, we control a group of corporate governance variables, including board size, board independence, CEO duality and ownership concentration. The corporate governance literature offers competing arguments between corporate governance attributes and their association with financial policies (John, Litov and Yeung, 2008). Large boards can experience coordination and communication problems, disagreeing and delaying decisions. Moreover, large groups can generate conflicting views such that a project becomes a collective compromise, with risky decisions being rejected (Sah and Stiglitz, 1991). Therefore, larger boards might take fewer risks. Consistent with Yermack (1996), we use the natural log of board size (BODSIZE). Moreover, an independent director (BODIND) is more likely to be concerned about shareholders' wealth, which may curb risky projects, resulting in lower risk-taking. We measure BODIND as a percentage of board size. A firm with CEO duality (CEODUAL) is likely to initiate more risky investments, which may prompt further risky behaviour. We measure CEO duality using a dummy variable equal to 1 if the roles of CEO and chairperson are combined, and 0 otherwise. As firms with greater ownership concentration are expected to undertake less risky projects, we measure ownership concentration as the percentage ownership of the largest shareholder (OWNCON).

Empirical model

We estimate the following ordinary regression model to test the risk-taking behaviour of firms when a problem director is active on a board (H1):

$$\begin{aligned} CRT_{i,t+1} = {} & \partial_0 + \partial_1 (PROBDIR = PDDUM \text{ or } \\ & PDPER \text{ or } DIRPROB)_{i,t} + \partial_2 BODSIZE_{i,t} \\ & + \partial_3 BODIND_{i,t} + \partial_4 CEODUAL_{i,t} + \partial_5 OWNCON_{i,t} \\ & + \partial_6 LNSIZE_{i,t} + \partial_7 MTB_{i,t} + \partial_8 LEVERAGE_{i,t} \\ & + \partial_9 PM_{i,t} + \partial_{10} ROA_{i,t} + \partial_{11} LOSS_{i,t} + \partial_{12} ICW_{i,t} \\ & + \partial_{13} CASHTA_{i,t} + \partial_{14} DIVEQTY_{i,t} \\ & + \partial_{15} OPINION_{i,t} + \sum \partial_i YEAR_{i,t} \\ & + \sum \partial_j INDUSTRY_{i,t} + \varepsilon_{i,t}. \end{aligned} \quad (1)$$

where $CRT_{i,t+1}$ measures corporate risk-taking by firm i at time t+1. Our primary variables of interest are problem director proxies (∂_1) (i.e. PDDUM, PDPER and DIRPROB). We use two-way clustering at firm and year levels to estimate the regression models using ordinary least squares (OLS) regressions with standard errors corrected. We expect the coefficient ∂_1 to be positive (negative), since we hypothesize that a firm with 'problem directors' will probably display increased (decreased) risk-taking behaviours.

Empirical results and discussions

Descriptive statistics

Table 2, Panel A reports our main variables' descriptive statistics. Within our sample period, almost 18.7% of firm-year observations include at

Table 2. Data characteristics and basic statistics

Panel A: Descriptive statistics

Variables	N	Mean	SD	Min	p25	Median	p75	Max
σ(ROA)	8926	0.059	0.142	0	0.004	0.018	0.054	1.778
σ(MRET)	8926	0.117	0.073	0.001	0.07	0.1	0.144	0.982
R&D	8926	0.056	0.123	0	0	0	0.055	0.893
CAPEX	8926	0.033	0.067	0	0	0.012	0.036	0.859
BODSIZE	8926	2.154	0.320	1.099	1.946	2.079	2.303	3.135
BODSIZE (# directors)	8926	8.619	1.381	3	7	8	10	23
BODIND	8926	0.696	0.164	0	0.6	0.714	0.833	1
DIRPROB	8926	0.279	0.779	0	0	0	0	11
PDPER	8926	0.048	0.073	0	0	0	0	.857
PDDUM	8926	0.187	0.390	0	0	0	0	1
FEMPER	8926	0.102	0.103	0	0	0.1	0.167	0.625
OWNCON	8926	0.305	0.242	0.01	0.129	0.256	0.416	0.998
CEODUAL	8926	0.536	0.499	0	0	1	1	1
LNSIZE	8926	7.073	1.748	0.022	5.822	7.039	8.167	13.929
MTB	8926	2.437	7.059	−1.014	1.141	1.919	3.634	7.363
LEVERAGE	8926	0.192	0.213	0	0.001	0.116	0.325	0.802
PM	8,926	0.709	8.346	−1.908	−0.007	0.063	0.154	0.536
ROA	8926	0.074	0.202	−1.412	−0.008	0.023	0.065	1.617
LOSS	8926	0.153	0.432	0	0	0	0	1
ICW	8926	0.194	0.456	0	0	0	1	1
CASHTA	8926	0.144	0.159	0	0.024	0.087	0.208	0.67
DIVEQTY	8926	0.081	0.075	−1.022	0	0	0.031	0.235
OPINION	8926	0.087	0.283	0	0	0	0	1
|DACC|	8926	0.040	0.011	0	0.013	0.037	0.051	0.972

Panel B: Mean difference test

Variables (N = 8926)	PDDUM = 1 (N = 1671)	PDDUM = 0 (N = 7255)	Mean difference	t-Statistic
σ(ROA)	0.073	0.056	0.017	4.36***
σ(MRET)	0.117	0.114	0.003	2.02**
R&D	0.057	0.053	0.004	2.13**
CAPEX	0.046	0.030	0.016	8.96***
LNSIZE	7.702	6.928	0.774	16.56***
MTB	2.702	2.638	0.065	0.712
LEVERAGE	0.232	0.194	0.039	5.37***
ROA	0.089	0.062	0.027	3.60***
LOSS	0.162	0.141	0.021	2.09**
OWNCON	0.352	0.295	0.058	8.76***
BODSIZE	2.291	2.122	0.169	19.92***
BODIND	0.711	0.692	0.019	4.22***
CEODUAL	0.530	0.559	−0.029	−2.07***
FEMPER	0.115	0.099	0.016	5.48***
ICW	0.241	0.161	0.040	3.13***
PM	0.711	0.713	−0.002	−0.24
CASHTA	0.191	0.148	0.043	2.84***
DIVEQTY	0.094	0.026	0.068	7.02***
OPINION	0.078	0.090	−0.120	−1.56
|DACC|	0.041	0.032	0.009	2.97***

Table 2. (Continued)

Panel C: Correlation analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
σ(ROA) (1)	1.00																				
σ(MRET) (2)	0.27***	1.00																			
R&D (3)	0.42***	0.29***	1.00																		
CAPEX (4)	0.06***	0.13***	0.10***	1.00																	
BODSIZE (5)	−0.11***	−0.17***	−0.12***	−0.04***	1.00																
BODIND (6)	−0.04***	−0.08***	−0.06**	−0.04***	0.11***	1.00															
DIRPROB (7)	0.07***	0.03**	0.04***	0.09***	0.24***	0.05***	1.00														
PDPER (8)	0.16***	0.04***	0.03**	0.10***	0.06***	0.00	0.85***	1.00													
PDDUM (9)	0.05***	0.03**	0.04**	0.09***	0.21***	0.04***	0.75***	0.79***	1.00												
FEMPER (10)	−0.10***	−0.12***	−0.07***	−0.07***	0.25***	0.18***	0.04***	0.03**	0.06***	1.00											
OWNCON (11)	−0.02	−0.01	0.02	0.03**	0.25***	0.06***	0.09***	0.03*	0.09***	0.08***	1.00										
CEODUAL (12)	−0.08***	−0.09***	−0.07***	−0.06***	-0.06***	−0.00	0.03**	0.04***	0.02*	0.01	−0.05***	1.00									
LNSIZE (13)	−0.32***	−0.33***	−0.47***	−0.12***	0.44***	0.09***	0.17***	0.09***	0.17***	0.19***	-0.01	0.03**	1.00								
MTB (14)	−0.03*	0.04**	0.03**	−0.03	0.03	−0.05***	−0.03**	−0.02*	0.04**	0.05***	0.01	0.04**	−0.03**	1.00							
LEVERG (15)	0.06***	0.04***	−0.09***	0.07***	0.06***	−0.05***	0.05***	0.03**	0.06***	0.01	0.10***	0.02	0.14***	−0.03**	1.00						
PM (16)	−0.03**	−0.01	−0.09***	−0.01	−0.01	−0.00	−0.01	−0.01	−0.01	−0.01	0.01	−0.02	0.02	0.00	−0.02*	1.00					
ROA (17)	−0.50***	−0.34***	−0.64***	−0.03**	0.09***	0.02*	−0.00	−0.04***	−0.01	0.08***	−0.00	0.04***	0.33***	−0.00	−0.07***	0.07***	1.00				
LOSS (18)	0.33***	0.36***	0.47***	0.10***	−0.13***	−0.05***	−0.01	0.01	0.00	−0.08***	0.06***	−0.06***	−0.38***	0.02	0.05***	−0.04***	−0.16***	1.00			
ICW (19)	0.08***	0.11***	0.05***	0.06***	−0.02	0.03*	−0.01	−0.01	−0.03**	−0.02	−0.02	0.03**	−0.00	−0.01	0.03**	−0.01	−0.06***	0.07***	1.00		
CASHTA (20)	0.27***	0.07***	0.17***	−0.04***	−0.08***	−0.01	0.02	0.06***	0.03**	−0.03**	−0.01	0.01	−0.21***	−0.00	−0.07***	−0.01	−0.20***	0.11***	0.03**	1.00	
DIVEQTY (21)	−0.01	−0.03*	−0.02*	−0.01	0.00	−0.00	−0.01	−0.01	−0.01	0.02*	−0.01	−0.01	0.02*	0.18***	−0.01	0.00	0.05***	−0.03**	−0.01	0.00	1.00

Notes: Panel A reports the descriptive statistics for all variables, including dependent, independent and control variables. Here, σ stands for standard deviation. To address the concerns on outliers, all continuous variables have been winsorized at the top and bottom 1%. All variable definitions are reported in Appendix A. Data have been collected from four databases: Compustat, CRSP, Board Analyst and Audit Analytics. Panel B presents the mean difference test between firms with problem directors vs firms without problem directors. The mean difference has been calculated for each variable as mean (PDDUM = 1) – mean (PDDUM = 0). All variable definitions are reported in Appendix A. Panel C shows the correlation between the variables examined in this study. A higher value indicates a stronger relation while a lower value indicates a weaker relation. All variable definitions are reported in Appendix A. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

least one problem director; an average of 4.8% of directors are identified as problem directors and 27.9% of board members are identified as problem directors. The average of the corporate risk-taking measures R&D, σ(MRET) and σ(ROA) is 0.056, 0.117 and 0.059, respectively. Our sample has an average firm performance (ROA) of 0.074; an average of 15.3% firm-year observations show a negative profit (LOSS). On average, our sample firms hold almost 14.4% of total assets, retained as cash or cash equivalents; the mean value of leverage (LEVERAGE) is 0.192. The average percentage of independent directors (BODIND) is 69.6%; 53.6% of firm-year observations have CEO duality. Our sample represents an average of 19.4% firm-year observations with internal control weaknesses (ICW).[5]

Empirical results and discussions

Baseline results. Table 3 reports the OLS regression analysis results. We use three different measures for problem directors (PDDUM, PDPER and DIRPROB). Columns 1−3 present the relationship between corporate risk-taking and problem directors using the proxy PDDUM. The results demonstrate that PDDUM has a significant, positive relationship with all three risk-taking measures, indicating that firms with at least one problem director exhibit higher risk-taking than firms with none. In terms of economic significance, the coefficient reported in column 1 indicates that a one standard deviation increase in PDDUM increases risk-taking (σ(MRET)) by 2.33% from the mean ((0.007 $*$ 0.390)/0.117).[6]

In columns 4–6 we examine the second proxy for problem directors (PDPER), finding that firms with a higher percentage of problem directors undertake high-risk projects. Regarding economic significance, the coefficient reported in column 5 indicates that a one standard deviation increase in PDPER increases risk-taking ROA by 3.46%.[7]

Columns 7−9 show that the results are robust and significant at the 1% level using the third alternative proxy for problem directors (DIRPROB). Regarding economic significance, the coefficient reported in column 9 indicates that a one standard deviation increase in DIRPROB increases risk-taking R&D by 4.17%.[8] Taken together, the regression results confirm that a one standard deviation increase in problem director score leads to a 2.33%, 3.46% and 4.17% increase in corporate risk for the σ(MRET), σ(ROA) and R&D risk-taking measures, respectively.

Our findings consistently indicate that firm risk-taking is higher when a problem director is active on the board. Our analysis establishes that problem directors increase overall firm risk, arguably because of their inability to exercise sound professional and commercial judgement.[9] Our findings extend the literature by providing fresh evidence that these ingrained traits, inculcated by antecedent misbehaviours, increase a company's propensity to implement higher-risk policies, supporting H1a.

Regarding the control variables, we find that firms with higher leverage (LEVERAGE), and those experiencing internal control weakness (ICW), have a higher propensity for risk-taking. In contrast, large (LNSIZE) and profitable (ROA) firms are likely to engage in lower risk-taking. Moreover, firms with a higher proportion of independent directors (BODIND) engage in lower risk-taking. Our results are robust when controlling for industry and year effects.

Robustness tests

Our baseline results indicate a positive relationship between corporate risk-taking and firms with problem directors. However, our regression models may be confounded by omitted variables, reverse causality or model misspecification problems that could bias the findings' sign, magnitude or

[5]We have also conducted the mean difference test and correlation test (Table 2, Panel B).

[6]Calculated as ((0.007 $*$ 0.390)/0.117) = 0.0233, where 0.007 is the regression coefficient, 0.390 is the standard deviation of PDDUM and 0.117 is the mean risk-taking (σ(MRET)).

[7]Calculated as ((0.028 $*$ 0.073)/0.059) = 0.0346, where 0.028 is the regression coefficient, 0.073 is the standard deviation of PDPER and 0.059 is the mean risk-taking (σ(ROA)).

[8]Calculated as ((0.003 $*$ 0.779)/0.056) = 0.0417, where 0.003 is the regression coefficient, 0.779 is the standard deviation of DIRPROB and 0.056 is the mean risk-taking (R&D).

[9]Consistent with Gopalan, Gormley and Kalda (2021), we checked the robustness of our findings without including the financial institutions (SIC 60–69), utilities (SIC 49) and non-classifiable firms (SIC 90). Our results remain consistent with the preliminary findings. The results are reported in the Appendix (Table F).

Table 3. Main regression analysis

Variables	(1) σ(MRET)	(2) σ(ROA)	(3) R&D	(4) σ(MRET)	(5) σ(ROA)	(6) R&D	(7) σ(MRET)	(8) σ(ROA)	(9) R&D	VIF
Constant	0.209***	0.229***	0.043***	0.205***	0.215***	0.039***	0.208***	0.232***	0.042***	
	(19.53)	(10.62)	(3.05)	(19.25)	(10.15)	(2.81)	(19.45)	(10.80)	(2.97)	
PDDUM	0.007***	0.023***	0.006**	–	–	–	–	–	–	1.07
	(3.85)	(6.78)	(2.61)							
PDPER	–	–	–	0.033***	0.028***	0.038***	–	–	–	1.02
				(3.82)	(16.36)	(3.31)				
DIRPROB	–	–	–	–		–	0.004***	0.018***	0.003**	1.08
							(3.55)	(10.41)	(2.30)	
BODSIZE	−0.012***	−0.002	0.015***	−0.011***	0.003	0.016***	−0.012***	−0.003	0.015***	1.91
	(−4.56)	(−0.00)	(4.35)	(−4.20)	(0.62)	(4.63)	(−4.59)	(−0.58)	(4.33)	
BODIND	−0.016***	−0.020**	−0.006**	−0.016***	−0.017**	−0.004**	−0.016***	−0.020**	−0.004**	1.41
	(−4.07)	(−2.43)	(−1.97)	(−3.94)	(−2.10)	(−1.99)	(−4.04)	(−2.44)	(−2.12)	
CEODUAL	-0.001	0.003	−0.004**	−0.001	0.001	−0.004**	−0.002	0.002	−0.004**	1.02
	(−0.90)	(0.95)	(−2.10)	(−0.96)	(0.49)	(−2.17)	(−0.95)	(0.71)	(−2.13)	
OWNCON	−0.003	−0.025***	−0.011***	−0.004	−0.024***	−0.011***	−0.003	−0.024***	−0.011***	1.11
	(−1.20)	(−4.11)	(−2.86)	(−1.14)	(−3.93)	(−2.81)	(−1.10)	(−3.85)	(−2.79)	
LNSIZE	−0.067***	−0.014***	−0.015***	−0.066***	−0.014***	−0.015***	−0.007***	−0.014***	−0.014***	1.95
	(−12.96)	(−13.06)	(−21.45)	(−12.89)	(−14.14)	(−21.54)	(−12.86)	(−13.35)	(−21.42)	
MTB	0.014	−0.018	0.041**	0. 014	−0.017	0.041**	0.014	−0.018	0.041**	1.07
	(1.18)	(−0.74)	(2.62)	(1.19)	(−0.72)	(2.62)	(1.18)	(−0.74)	(2.62)	
LEVERAGE	0.010***	0.029***	0.031***	0.010***	0.031***	0.031***	0.010***	0.031***	0.031***	1.17
	(3.76)	(5.69)	(9.00)	(3.84)	(5.89)	(8.95)	(3.84)	(5.85)	(8.95)	
PM	0.027	0.005	−0.011***	0. 027	0.005	−0.011***	0. 028	0.005	−0.011***	1.01
	(1.58)	(1.47)	(−4.69)	(1.59)	(1.59)	(−4.69)	(1.57)	(1.49)	(−4.70)	
ROA	−0.047***	−0.276***	−0.276***	−0.046***	−0.269***	−0.276***	−0.047***	−0.274***	−0.276***	1.70
	(−11.06)	(−32.58)	(−49.98)	(−10.98)	(−32.05)	(−49.83)	(−11.09)	(−32.50)	(−50.01)	
LOSS	0.024***	−0.012***	−0.005**	0.024***	−0.011***	−0.005**	0.024***	−0.012***	−0.005**	1.84
	(12.31)	(−3.14)	(−2.06)	(12.40)	(−2.76)	(−1.97)	(12.34)	(−3.04)	(−2.03)	
ICW	0.015***	0.020**	0.003**	0.015***	0.020**	0.003**	0.015***	0.020**	0.004**	1.74
	(3.15)	(2.06)	(2.45)	(3.16)	(2.07)	(2.46)	(3.15)	(2.05)	(2.42)	
CASHTA	−0.005***	0.036***	−0.006***	−0.004**	0.034***	−0.007***	−0.003***	0.035***	−0.008***	1.08
	(−3.04)	(16.01)	(−4.74)	(−3.09)	(15.48)	(−4.82)	(−2.98)	(16.02)	(−4.70)	
DIVEQTY	−0.001	0.006**	−0.007	−0.001	0.006**	−0.006	−0.001	0.006**	−0.006	1.04
	(−0.74)	(2.12)	(−0.04)	(−0.73)	(2.18)	(−0.03)	(−0.72)	(2.17)	(−0.03)	
OPINION	−0.004**	−0.002	0.009	−0.004**	−0.002	0.009	−0.004**	−0.002	0.009	1.19
	(−2.51)	(−0.77)	(0.44)	(−2.54)	(−0.82)	(0.42)	(−2.52)	(−0.76)	(0.44)	
INDUSTRY	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
YEAR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Table 3. (*Continued*)

Variables	(1) σ(MRET)	(2) σ(ROA)	(3) R&D	(4) σ(MRET)	(5) σ(ROA)	(6) R&D	(7) σ(MRET)	(8) σ(ROA)	(9) R&D	VIF
N	8926	8926	8926	8926	8926	8926	8926	8926	8926	
F-statistic	59.66***	50.82***	165.84***	59.70***	53.47***	166.01***	59.71***	49.78***	165.59***	
Adjusted R^2	37.17	34.11	62.84	37.19	34.91	62.89	37.23	33.65	62.45	

Notes: This table analyses the impact of problem directors on firm risk-taking using OLS regression. We show the different measures of problem directors (PDDUM, problem directors dummy; PDPER, problem directors percentage; and DIRPROB, number of problem directors on a board) and their impact on risk-taking. We measure risk-taking by three indicators: standard deviation of monthly market return (σ(MRET)); standard deviation of return on asset (σ(ROA)); and R&D expenditure over total assets. The positive coefficient in models 1–9 indicates that risk-taking increases when a problem director is on the board. t-Statistics are given in parentheses. All variable definitions are reported in Appendix A. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

statistical significance (Wooldridge, 2002). For example, both problem directors and risk-taking may be impacted by the same unobservable common variables (Zaman, Baghdadi and Liu, 2021). To address these issues, we use three robustness tests, including the Heckman (1979) model to address selection bias, incorporation of firm gender diversity and industry competition to address potential omitted variable concerns and propensity score matching analysis to reduce confounding biases. Our findings remain robust and consistent across all three analyses. Further discussions on these methods are available in Appendix D.

Additional analysis

Entry and exit of a problem director and corporate risk-taking: Change-on-change analysis

The appointment of a reputable director increases stock market returns (Fahlenbrach, Low and Stulz, 2010), but a disreputable director may harm corporate governance and increase risk-taking (Fich, 2005). Thus, we examine the effect of the appointment and departure of problem directors on risk-taking. We use a dummy variable (PDENTRY), which equals 1 when a firm appoints a 'problem director' for the first time within the sample period, and 0 otherwise. We identify 295 firm years with first-time problem director appointments during our sample period. Similarly, we set a dummy variable (PDEXIT) equal to 1 when a 'problem director' leaves the board, and 0 otherwise. We identify 184 firm-year observations within our sample period when a problem director leaves the board. We perform a change-on-change analysis of these two dummy variables to evaluate the effect of the problem director immediately after entry to, or exit from, the board. We use the following regression model to identify the entry (exit) effect of a problem director on corporate risk-taking:

$$\begin{aligned}\Delta CRT_{i,t+1} = {} & \mu_0 + \mu_1 PROBDIR_{i,t}\,(PDENTRY \\ & or\ PDEXIT)_{i,t} + \mu_2 \Delta BODSIZE_{i,t} \\ & + \mu_3 \Delta BODIND_{i,t} + \mu_4 \Delta CEODUAL_{i,t} \\ & + \mu_5 \Delta OWNCON_{i,t} + \mu_6 \Delta LNSIZE_{i,t} \\ & + \mu_7 \Delta MTB_{i,t} + \mu_8 \Delta LEVERAGE_{i,t} \\ & + \mu_9 \Delta PM_{i,t} + \mu_{10} \Delta ROA_{i,t} \\ & + \mu_{11} \Delta LOSS_{i,t} + \mu_{12} \Delta ICW_{i,t} \\ & + \mu_{13} \Delta CASHTA_{i,t} + \mu_{14} \Delta DIVEQTY_{i,t} \\ & + \mu_{15} \Delta OPINION_{i,t} + \sum \mu_i YEAR \\ & + \sum \mu_j INDUSTRY + \varepsilon_{i,t} \end{aligned} \quad (2)$$

Table 4 presents the results of Equation (2). Our results show that the appointment of a problem director increases the firm's risk-taking propensity, consistent with our baseline results. In addition, we find that PDENTRY has a positive relationship with the proxies for corporate risk-taking at the 5% level. Similarly, we rerun Equation (2) to evaluate the effect of a problem director's departure on risk-taking. When a problem director leaves a board (PDEXIT), we find a positive but statistically insignificant relationship between PDEXIT and corporate risk-taking. One plausible explanation is that the departure of a problem director may not immediately change a firm's attitude to corporate risk-taking. Even when a director leaves, their decisions might continue to influence incumbent projects and the firm's strategic direction because the recruitment of a new director may be prolonged, delaying changes in existing strategy. Moreover, the departure of a problem director may signal a broader issue with the firm's governance structure or culture, which will take time to correct.

CEO as problem director and corporate risk-taking

Our results establish that a CEO who is also a problem director has a greater predisposition to take risks than a problem director. This is significant, because if a board fails to reach a consensus, then the CEO's role in decision-making becomes pre-eminent (Graham, Harvey and Puri, 2013). This is arguably because CEOs wield greater authority to shape corporate policy, particularly when the promotion or limitation of risk-taking depends on project viability. When an impasse occurs, CEOs can exert a decisive influence over decision-making (Malhotra *et al.*, 2018) and dominate a group when strategic choices are being made (Eisenhardt, 1999). Therefore, if the CEO is a 'problem director', this will have a significant impact on the degree of risk undertaken. Therefore, we examine the effect of the CEO's role when s/he has a questionable history. We have identified 303 CEOs as problem directors in our sample, and a dummy variable (PDCEO) is calculated to designate the firms they lead. We rerun Equation (1) to estimate the effect of problem directors who are CEOs, reporting the results in Table 5. The coefficient of PDCEO is consistently positive on all the measures of risk-taking, confirming our contention that a firm with a CEO who is a problem director is likely to engage in higher risk-taking

Table 4. Problem director entry and exit

Variables	(1) σ(MRET)	(2) R&D	(3) σ(ROA)	(4) CAPEX	(5) σ(MRET)	(6) R&D	(7) σ(ROA)	(8) CAPEX
Constant	0.199***	0.034	0.213***	0.0849***	0.199***	0.028	0.204**	0.080***
	(14.82)	(1.46)	(2.78)	(3.69)	(14.22)	(1.20)	(2.62)	(3.40)
PDENTRY	0.017***	0.020**	0.029**	0.023***	–	–	–	–
	(2.86)	(2.55)	(2.31)	(3.11)				
PDEXIT	–	–	–	–	0.012**	0.010	0.004	0.003
					(2.09)	(1.41)	(0.39)	(0.59)
BODSIZE	−0.010***	0.014**	0.002	−0.008*	−0.010***	0.014**	0.004	−0.005
	(−2.74)	(2.31)	(0.27)	(−1.87)	(−2.87)	(2.33)	(0.57)	(−1.42)
BODIND	−0.016***	0.006	−0.021**	-0.008	−0.017***	0.008	−0.019*	−0.009
	(−3.09)	(0.56)	(−2.04)	(−1.15)	(−3.12)	(0.78)	(−1.82)	(−1.13)
CEODUAL	−0.001	−0.004	0.002	−0.001	−0.002	−0.004	0.001	−0.001
	(−0.83)	(−1.03)	(0.45)	(−0.70)	(−1.06)	(−0.98)	(0.36)	(−0.66)
OWNCON	−0.003	−0.010	−0.022***	0.002	−0.003	−0.010	−0.022***	0.003
	(−0.69)	(−1.39)	(−2.77)	(0.46)	(−0.82)	(−1.54)	(−2.69)	(0.62)
LNSIZE	−0.006***	−0.014***	−0.011***	0.003**	−0.006***	−0.013***	−0.011***	0.003***
	(−7.59)	(−7.24)	(−5.35)	(2.37)	(−7.36)	(−7.14)	(−5.89)	(2.83)
MTB	0.001	0.003*	−0.002	−0.001	0.001	0.003*	−0.001	−0.001
	(0.40)	(1.70)	(−1.01)	(−1.10)	(0.54)	(1.67)	(−0.70)	(−1.01)
LEVERAGE	0.012**	−0.030**	0.021*	−0.014***	0.013**	−0.030**	0.020*	−0.012**
	(2.26)	(−2.40)	(1.67)	(−2.96)	(2.37)	(−2.42)	(1.68)	(−2.55)
PM	0.003***	−0.001***	0.005***	−0.003***	0.002***	−0.006***	0.003**	−0.002***
	(7.27)	(−10.95)	(3.11)	(−11.31)	(6.29)	(−7.29)	(2.38)	(−8.10)
ROA	−0.053***	−0.257***	−0.272***	−0.016**	−0.051***	−0.256***	−0.261***	−0.019**
	(−5.07)	(−12.52)	(−5.00)	(−1.99)	(−5.57)	(−12.17)	(−6.08)	(−2.37)
LOSS	0.023***	0.004	−0.009	0.014***	0.022***	0.002	−0.005	0.008**
	(7.10)	(0.91)	(−0.76)	(3.06)	(7.32)	(0.22)	(−0.55)	(2.56)
ICW	0.014**	−0.003	0.017	0.012**	0.015**	−0.002	0.014	0.012**
	(2.18)	(−0.40)	(1.10)	(2.21)	(2.24)	(−0.27)	(0.93)	(2.37)
CASHTA	−0.003	0.011	0.068***	−0.008	−0.003	0.010	0.066***	−0.008
	(−0.69)	(0.62)	(8.50)	(−1.49)	(−0.77)	(0.62)	(12.21)	(−1.51)
DIVEQTY	−0.002	0.006	0.006	0.004	−0.002	0.005	0.005	0.004
	(−1.39)	(0.33)	(1.16)	(0.43)	(−1.48)	(0.31)	(1.11)	(0.48)
OPINION	−0.004	0.004	−0.003	−0.004**	−0.004*	0.004	−0.002	−0.004**
	(−1.63)	(0.17)	(−0.52)	(−2.09)	(−1.91)	(0.17)	(−0.36)	(−2.35)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 4. (Continued)

Variables	(1) σ(MRET)	(2) R&D	(3) σ(ROA)	(4) CAPEX	(5) σ(MRET)	(6) R&D	(7) σ(ROA)	(8) CAPEX
N	7388	7388	7388	7388	7277	7277	7277	7277
F-statistic	50.47***	129.84***	41.27***	44.42***	50.11***	128.36***	42.54***	47.54***
Adjusted R^2	38.10	61.28	33.74	35.21	37.56	61.05	33.65	36.28

Notes: This table analyses the entry and exit effect of a problem director. PDENTRY is a dummy variable that assigns the value 1 when a firm appoints a problem director for the first time within the sample period, and 0 otherwise. PDEXIT is a dummy variable that assigns the value 1 when a problem director leaves the board, and 0 otherwise. The results show that the appointment of a problem director for the first time in a firm increases the propensity for risk-taking more than when a director leaves the company. t-Statistics are given in parentheses. All variables are defined in Appendix A. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 5. CEO as problem director

Variables	(1) σ(MRET)	(2) R&D	(3) σ(ROA)
Constant	0.205***	0.039*	0.216***
	(16.23)	(1.86)	(2.69)
PDCEO	0.004**	0.008**	0.023***
	(2.24)	(2.12)	(2.90)
BODSIZE	−0.011***	0.016***	0.003
	(−3.19)	(2.83)	(0.43)
BODIND	−0.016***	0.004	−0.018*
	(−3.18)	(0.46)	(−1.83)
CEODUAL	−0.001	−0.003	0.003
	(−0.65)	(−1.02)	(0.74)
OWNCON	−0.004	−0.011*	−0.026***
	(−1.00)	(−1.70)	(−2.97)
LNSIZE	−0.006***	−0.014***	−0.013***
	(−7.65)	(−8.29)	(−6.27)
MTB	0.001	0.005*	-0.002
	(0.50)	(1.72)	(−0.80)
LEVERAGE	0.010	−0.031**	0.031*
	(1.61)	(−2.50)	(1.68)
PM	0.003***	−0.002***	0.005**
	(6.90)	(−10.42)	(3.14)
ROA	−0.048***	−0.277***	−0.279***
	(−5.26)	(−5.93)	(−6.58)
LOSS	0.024***	−0.005	−0.012
	(8.14)	(−1.09)	(−1.27)
ICW	0.015***	−0.003	0.021
	(2.69)	(−0.43)	(1.53)
CASHTA	−0.003**	−0.007	0.036***
	(−2.31)	(−0.99)	(9.05)
DIVEQTY	−0.002	−0.003	0.007
	(−0.90)	(−0.04)	(1.46)
OPINION	−0.004**	0.008	−0.003
	(−2.10)	(0.40)	(−0.60)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
N	8926	8926	8926
F-statistic	59.46	165.78	49.18
Adjusted R^2	37.72	62.81	33.38

Notes: This table shows the impact of the CEO as a problem director in corporate risk-taking. PDCEO is defined as a dummy variable that takes the value 1 if a CEO is identified as a problem director, and 0 otherwise. The results confirm that the CEO as a problem director is likely to engage in higher risk-taking corporate activities. t-Statistics are given in parentheses. All variables are defined in Appendix A. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

corporate strategies. In addition, Table 6 shows the elasticity test[10] between a problem CEO and a problem director. The results show that problem CEOs (0.02971) have more explanatory power than problem directors (0.01466) in risk-taking, which confirms that problem CEOs tend to take more risks than problem directors. The results also indicate that in the presence of a problem CEO, a problem director inclines to engage in risky decision-making. The results indicate that in the presence of a problem CEO, the problem director's chance of being involved in risky activities increases by 6.74%.

[10]The elasticity test provides a homogeneous basis for comparison (Hillier *et al.*, 2011). We computed the elasticity based on the following formula:$E_i = \beta_i \frac{\bar{X}_i}{\beta^p \bar{X}}$where I represents the explanatory variable, β_i indicates its coefficient, $\overline{X_i}$ is its mean and $\beta^p \bar{X}$ captures the predicted value of the dependent variable evaluated at the mean of each regressor.

Table 6. Elasticity test

Variables	Elasticity	PDCEO	DIRPROB	Elasticity
PDCEO	0.02971	0	1	0.5420
		0	≥2	0.5492
PDDUM	0.01466	1	1	0.6094
		1	≥2	0.5821

Note: This table reports the elasticity test of problem directors. It shows the comparative explanatory power of problem CEOs (PDCEO) and problem directors (PDDUM) concerning risk-taking. PDDUM indicates whether there are problem directors on a board. The table also demonstrates the impact of problem directors (DIRPROB) on risk-taking in the presence and absence of a problem CEO (PDCEO) on a board. A value of DIRPROB = 1 indicates one problem director on the board, while DIRPROB ≥ 2 indicates two or more problem directors on a board. PDCEO is defined as a dummy variable that takes the value 1 if a CEO is identified as a problem director, and 0 otherwise. All variable definitions are reported in Appendix A.

Categorizations of problem directors and corporate risk-taking

Directors' questionable antecedents include engagement in corporate bankruptcy, fraudulent financial activities, financial restatements, violations of SEC rules and misappropriations related to executive compensation schemes, among others. We classify these variations into three different groups: bankruptcy (D_CHAP11), fraud (D_FRAUD) and corporate governance-related indiscretions (D_GOVERN). Bankruptcy can have serious consequences for a firm and its stakeholders, highlighting the importance of having competent and trustworthy directors who can effectively manage financial risks (Gopalan, Gormley and Kalda, 2021). Fraudulent activities can erode investor confidence and tarnish a firm's reputation (Zaman, Baghdadi and Liu, 2021), emphasizing the need for proactive measures to detect and prevent such misconduct. Finally, effective corporate governance promotes transparency and ethical behaviour, which are essential for the long-term sustainability and success of a firm. We rerun Equation (1) to test the subgroupings of problem directors. This analysis will provide valuable insights into how different types of problem director affect corporate risk-taking behaviour.

Table 7 reports the results. In columns 1–3, the coefficients of D_CHAP11, D_FRAUD and D_GOVERN are 0.005, 0.007 and 0.002 ($p < 0.10$), respectively, suggesting that a firm with a director who was involved in a bankruptcy, committed a fraud or engaged in questionable corporate governance practices exhibits a propensity for increased risk-taking. Consistently, in columns 4–6, the coefficients of D_CHAP11, D_FRAUD and D_GOVERN are 0.011, 0.003 and 0.003 ($p < 0.05$), respectively. Our findings are consistent across all the alternative measures of corporate risk-taking, such as σ(MRET), σ(ROA) and R&D, indicating that the presence of a director previously involved in a bankruptcy, fraud or governance-related scandal increases corporate risk-taking. Our findings confirm that a director with a tainted reputation, regardless of the cause, may be perceived as having poor judgement or questionable decision-making ability. This perception, in turn, contributes to a proclivity for heightened risk-taking.

Tokenism and the problem director

It might be argued that having one problem director on the board may not affect decision-making and that such a firm is unlikely to increase its propensity for risk-taking. However, a single problem director can weaken the internal control mechanism (Bhuiyan, 2015). Therefore, following the logic of critical mass theory (Kanter, 1977), we consider whether an increase in the number of problem directors increases the critical mass and substantially contributes to greater risk-taking. To account for tokenism in managerial decision-making, we subdivide the sample into three groups (Case 1, DIRPROB = 0; Case 2, DIRPROB = 1; Case 3, DIRPROB ≥ 2), which allows us to re-estimate Equation (1), comparing the three groups[11] (i.e. Case 1 vs Case 2; Case 2 vs Case 3; Case 1 vs Case 3).

Table 8 reports the results of comparing the three groups. In the first group (Set 1: Case 1 vs Case 2), Set 1 (DIRPROB = 0 vs 1), the result

[11] We thank an anonymous reviewer for suggesting this alternative analysis.

Table 7. Problem director categories and corporate risk-taking

Variables	(1) σ(MRET)	(2) σ(MRET)	(3) σ(MRET)	(4) σ(ROA)	(5) σ(ROA)	(6) σ(ROA)	(7) R&D	(8) R&D	(9) R&D
Constant	0.274***	0.272***	0.272***	0.240***	0.235***	0.236***	0.038***	0.040***	0.038**
	(24.153)	(24.058)	(23.919)	(10.691)	(10.511)	(10.534)	(2.602)	(2.693)	(2.553)
D_CHAP11	0.005***	–	–	0.011***	–	–	0.002***	–	–
	(2.798)			(2.815)			(2.793)		
D_FRAUD	–	0.007***	–	–	0.003**	–	–	0.007**	–
		(2.921)			(2.458)			(2.555)	
D_GOVERN	–	–	0.002*	–	–	0.003**	–	–	0.004*
			(1.781)			(1.999)			(1.831)
BODSIZE	−0.011***	−0.01***	−0.01***	0.005	0.005	0.005	0.015***	0.015***	0.016***
	(−3.634)	(−3.542)	(−3.465)	(0.774)	(0.932)	(0.87)	(3.983)	(3.967)	(4.032)
BODIND	−0.019***	−0.019***	−0.019***	−0.015*	−0.015	−0.015*	0.007	0.007	0.007
	(−4.141)	(−4.117)	(−4.087)	(−1.684)	(−1.642)	(−1.668)	(1.116)	(1.111)	(1.149)
CEODUAL	−0.001	−0.001	−0.001	0.004	0.004	0.004	−0.003*	−0.003*	−0.003*
	(−0.408)	(−0.374)	(−0.346)	(1.464)	(1.541)	(1.535)	(−1.659)	(−1.661)	(−1.685)
OWNCON	−0.002	−0.002	−0.002	−0.025***	−0.025***	−0.025***	−0.010**	−0.010**	−0.011**
	(−0.474)	(−0.487)	(−0.465)	(−3.647)	(−3.626)	(−3.628)	(−2.286)	(−2.271)	(−2.314)
LNSIZE	−0.006***	−0.006***	−0.006***	−0.015***	−0.014***	−0.014***	−0.015***	−0.015***	−0.015***
	(−10.578)	(−10.379)	(−10.239)	(−12.459)	(−12.236)	(−12.236)	(−19.078)	(−19.449)	(−19.134)
MTB	0.001	0.001	0.001	-0.001	-0.001	-0.001	0.001**	0.001**	0.001**
	(1.211)	(1.209)	(1.211)	(−0.881)	(−0.882)	(−0.884)	(2.365)	(2.367)	(2.370)
LEVERAGE	0.013***	0.013***	0.013***	0.041***	0.041***	0.041***	−0.031***	−0.031***	−0.031***
	(4.377)	(4.404)	(4.413)	(7.002)	(7.04)	(7.034)	(−8.201)	(−8.21)	(−8.208)
PM	0.001	0.001	0.001	0.001***	0.001***	0.001***	−0.001***	−0.001***	−0.001***
	(1.511)	(1.479)	(1.488)	(3.189)	(3.163)	(3.157)	(−5.866)	(−5.853)	(−5.85)
ROA	−0.049***	−0.05***	−0.05***	−0.287***	−0.288***	−0.288***	−0.269***	−0.269***	−0.269***
	(−10.533)	(−10.587)	(−10.605)	(−31.075)	(−31.148)	(−31.121)	(−44.207)	(−44.216)	(−44.229)
LOSS	0.025***	0.025***	0.025***	−0.014***	−0.014***	−0.014***	−0.004	−0.005	−0.004
	(11.129)	(11.152)	(11.133)	(−3.247)	(−3.244)	(−3.241)	(−1.541)	(−1.558)	(−1.54)
ICW	0.015***	0.015***	0.015***	0.020*	0.020*	0.020*	−0.004	−0.004	−0.004
	(2.679)	(2.702)	(2.685)	(1.854)	(1.858)	(1.863)	(−0.589)	(−0.604)	(−0.595)
CASHTA	−0.004***	−0.004***	−0.004***	0.035***	0.035***	0.035***	−0.008***	−0.008***	−0.008***
	(−3.092)	(−3.074)	(−3.066)	(15.487)	(15.505)	(15.495)	(−5.112)	(−5.119)	(−5.103)
DIVEQTY	−0.002	−0.002	−0.002	0.007**	0.007**	0.007**	0.001	0.001	0.001
	(−1.222)	(−1.217)	(−1.22)	(2.091)	(2.093)	(2.094)	(0.131)	(0.128)	(0.129)
OPINION	−0.004*	−0.004*	−0.004*	−0.002	−0.002	−0.002	0.001	0.001	0.001
	(−1.899)	(−1.93)	(−1.913)	(−0.499)	(−0.513)	(−0.518)	(0.533)	(0.55)	(0.542)

Table 7. (Continued)

Variables	(1) σ(MRET)	(2) σ(MRET)	(3) σ(MRET)	(4) σ(ROA)	(5) σ(ROA)	(6) σ(ROA)	(7) R&D	(8) R&D	(9) R&D
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7290	7290	7290	7290	7290	7290	7290	7290	7290
F-statistic	52.57	52.56	52.49	47.73	47.63	47.64	141.56	141.56	141.56
Adjusted R^2	0.383	0.383	0.382	0.36	0.36	0.36	0.625	0.626	0.625

Notes: This table shows the impact of the problem director and corporate risk-taking. D_CHAP11 is a dummy variable that equals 1 if the firm has a problem director who is identified as having been involved with a Chapter 11 application, and 0 otherwise. D_FRAUD is a dummy variable that equals 1 if the firm has a problem director who is identified as having been involved with financial misconduct and restatement, and 0 otherwise. D_GOVERN is a dummy variable that equals 1 if the firm has a problem director who is identified as having been involved with compensation-related misconduct, SEC violation or other, and 0 otherwise. The results confirm that firm risk-taking increases when a director is identified as a problem director for various reasons. t-Statistics are given in parentheses. All variables are defined in Appendix A. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 8. Tokenism effect of problem director on corporate risk-taking

Panel A: Descriptive details on problem director

Category	Problem director	Number of firms	% Firm-year
Case 1	0	7255	0.813
Case 2	1	1231	0.138
Case 3	2 or above	440	0.049
	Total	**8926**	**1**

Panel B: Regression results – tokenism effect of problem director on corporate risk-taking

Variables	(1) σ(MRET)	(2) σ(MRET)	(3) σ(MRET)	(4) R&D	(5) R&D	(6) R&D	(7) σ(ROA)	(8) σ(ROA)	(9) σ(ROA)
Constant	0.195***	0.231***	0.199***	0.141***	0.196***	0.143***	0.117***	0.273***	0.155***
	(33.41)	(16.26)	(31.13)	(17.75)	(10.57)	(16.73)	(12.52)	(8.24)	(13.55)
Set1	0.005**	–	–	0.003**	–	–	0.004**	–	–
	(2.43)			(2.08)			(2.18)		
Set2	–	0.016***	–	–	0.024***	–	–	0.077***	–
		(3.94)			(4.41)			(7.96)	
Set3	–	–	0.020***	–		0.021***	–	–	0.079***
			(5.96)			(4.60)			(13.12)
BODSIZE	−0.011***	−0.017**	−0.011***	0.023***	0.005	0.020***	0.007	−0.026	−0.003
	(−4.19)	(−2.74)	(−4.11)	(6.66)	(0.65)	(5.35)	(1.83)	(−1.77)	(−0.31)
BODIND	−0.017***	−0.022	−0.018***	0.015**	0.035**	0.009	−0.013**	−0.005	−0.016*
	(−4.01)	(−1.95)	(−3.91)	(2.61)	(2.46)	(1.40)	(−1.96)	(−0.20)	(−1.90)
CEODUAL	0.002	0.004	0.009	−0.006***	−0.015***	−0.007***	0.004	0.021**	0.003
	(1.34)	(1.22)	(0.65)	(−3.57)	(−3.17)	(−3.73)	(0.22)	(2.49)	(0.01)
OWNCON	−0.003	−0.005	−0.004	0.005	−0.003	0.008	−0.010**	−0.025	−0.019**
	(−1.32)	(−0.71)	(−1.23)	(1.29)	(−0.39)	(0.20)	(−2.15)	(−1.52)	(−3.21)
LNSIZE	−0.008***	−0.010***	−0.009***	−0.021***	−0.023***	−0.020***	−0.012***	−0.022***	−0.015***
	(−16.74)	(−9.08)	(−15.39)	(−30.84)	(−15.61)	(−26.70)	(−15.05)	(−8.45)	(−15.10)
MTB	0.001	−0.001	0.001	0.001*	0.001***	0.001*	−0.001	−0.004***	−0.00
	(0.32)	(−0.68)	(0.44)	(2.31)	(3.72)	(2.35)	(−0.06)	(−6.40)	(−0.22)
LEVERAGE	0.012***	0.013**	0.014***	−0.039***	−0.022**	−0.041***	0.028***	0.042**	0.042***
	(4.17)	(2.10)	(4.50)	(−11.01)	(−2.84)	(−10.24)	(6.73)	(2.95)	(7.76)
PM	0.001	0.001	0.001	−0.001***	−0.002***	−0.001***	0.001	0.007**	0.001
	(1.46)	(0.81)	(1.09)	(−4.14)	(−5.35)	(−5.25)	(0.27)	(3.29)	(0.49)
ROA	−0.058***	−0.055***	−0.045***	−0.316***	−0.324***	−0.306***	−0.254***	−0.395***	−0.263***
	(−12.66)	(−5.41)	(−9.48)	(−50.91)	(−24.63)	(−47.70)	(−34.70)	(−16.78)	(−30.48)

Table 8. (Continued)

Panel B: Regression results – tokenism effect of problem director on corporate risk-taking

Variables	(1) σ(MRET)	(2) σ(MRET)	(3) σ(MRET)	(4) R&D	(5) R&D	(6) R&D	(7) σ(ROA)	(8) σ(ROA)	(9) σ(ROA)
LOSS	0.031***	0.028***	0.034***	0.024***	0.003	0.026***	0.005	-0.019	-0.004
	(13.19)	(4.87)	(13.42)	(7.50)	(0.36)	(7.42)	(0.15)	(−1.42)	(−0.95)
ICW	0.015***	0.021***	0.013***	0.013***	0.013**	0.011***	0.015***	0.006	0.014***
	(8.41)	(4.36)	(7.11)	(5.28)	(2.15)	(4.46)	(5.19)	(0.61)	(3.97)
CASHTA	−0.002	−0.006***	−0.007	0.009	−0.010***	0.027***	0.029***	0.024***	0.070***
	(−1.19)	(−4.44)	(−0.32)	(0.54)	(−5.40)	(8.74)	(13.52)	(6.92)	(16.68)
DIVEQTY	−0.001	−0.004	−0.001	0.003	−0.009	0.002	0.004*	0.020	0.005
	(−0.78)	(−0.61)	(−0.81)	(1.14)	(−1.23)	(0.83)	(1.91)	(1.52)	(1.57)
OPINION	−0.006*	0.016*	−0.007**	−0.033***	−0.025*	−0.030***	0.009*	0.033	0.002
	(−1.93)	(1.82)	(−1.98)	(−7.36)	(−2.13)	(−6.12)	(1.77)	(1.59)	(0.31)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
N	8486	1671	7695	8486	1671	7695	8486	1671	7695
F-statistic	58.09***	15.06***	50.16***	156.29***	33.58***	149.25***	45.27***	20.10***	44.34***
Adjusted R^2	38.72	43.12	36.51	62.63	60.95	63.78	30.20	47.71	33.84

Notes: Panel A reports the descriptive statistics of problem directors in three different groups (Case 1, DIRPROB = 0; Case 2, DIRPROB = 1; Case 3, DIRPROB ≥ 2). Panel B reports the tokenism in problem directors and corporate risk-taking. The results compare among the number of problem directors (Case 1, no problem directors; Case 2, one problem director; Case 3, more than two problem directors) on a board and their propensity for risk-taking: Set 1, Case 1 vs Case 2; Set 2, Case 2 vs Case 3; Set 3, Case 1 vs Case 3. The results indicate that tokenism does not influence the relationship between problem directors and corporate risk-taking. t-Statistics are given in parentheses. All variables are defined in Appendix A. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 9. Mediation analysis (M = |DACC|)

Variables	(1) σ(MRET)	(2) |DACC|	(3) σ(ROA)	(4) |DACC|	(5) R&D	(6) |DACC|
Panel A: Regression estimates – SEM (independent variable = PDDUM)						
Constant	0.114***	0.123***	0.046***	0.124***	0.045***	0.015***
	(6.48)	(11.12)	(9.25)	(11.71)	(9.68)	(9.58)
PDDUM	0.011***	0.024***	0.015***	0.026***	0.006***	0.020***
	(2.26)	(6.48)	(3.81)	(5.69)	(2.99)	(6.02)
|DACC|	0.028***	–	0.082***	–	0.099	–
	(5.42)		(8.11)		(7.31)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
N	8926	8926	8926	8926	8926	8926
Panel B: Direct and indirect effects (independent variable = PDDUM)						
Direct effects		0.011***		0.015***		0.006***
		(0.00)		(0.00)		(0.00)
Indirect effects		0.001***		0.002***		0.002***
		(0.00)		(0.00)		(0.00)
Total effects		0.012***		0.017***		0.008***
		(0.00)		(0.00)		(0.00)
Panel C: Regression estimates – SEM (independent variable = PDPER)						
Constant	0.091***	0.164***	0.097***	0.210***	0.082***	0.203***
	(4.69)	(9.44)	(5.01)	(10.21)	(5.04)	(9.87)
PDPER	0.027***	0.127***	0.075***	0.112***	0.097***	0.104***
	(5.21)	(5.99)	(7.55)	(5.28)	(4.18)	(4.99)
|DACC|	0.032***	–	0.029***	–	0.037***	–
	(3.03)		(3.51)		(3.35)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
N	8926	8926	8926	8926	8926	8926
Panel D: Direct and indirect effects (independent variable = PDPER)						
Direct effects		0.032***		0.029***		0.037***
		(0.00)		(0.00)		(0.00)
Indirect effects		0.003***		0.008***		0.010***
		(0.00)		(0.00)		(0.00)
Total effects		0.035***		0.038***		0.047***
		(0.00)		(0.00)		(0.00)
Panel E: Regression estimates – SEM (independent variable = DIRPROB)						
Constant	0.124***	0.117***	0.098***	0.109***	0.987***	0.112***
	(5.28)	(9.57)	(5.52)	(9.41)	(5.98)	(9.51)
DIRPROB	0.038***	0.091***	0.071***	0.094***	0.099***	0.109***
	(3.40)	(4.17)	(3.53)	(3.76)	(3.88)	(3.93)
|DACC|	0.003***	–	0.012***	–	0.003***	–
	(6.32)		(6.47)		(5.81)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
N	8926	8926	8926	8926	8926	8926

Table 9. (Continued)

Panel F: Direct and indirect effects (independent variable = DIRPROB)			
Direct effects	0.003***	0.012***	0.003***
	(0.00)	(0.00)	(0.00)
Indirect effects	0.003***	0.007***	0.011***
	(0.00)	(0.00)	(0.00)
Total effects	0.007***	0.019***	0.014***
	(0.00)	(0.00)	(0.00)

Notes: This table shows the channel analysis using SEM. The absolute value of discretionary accruals (DACC) is considered a channel through which a problem director can be involved in risky activities. The results confirm that the problem director increases firm risk-taking directly and indirectly by increasing higher discretionary accruals. t-Statistics in parentheses. All variables are defined in Appendix A. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

shows a positive relationship with all three risk-taking measures, indicating that a firm with a single problem director has a higher risk-taking propensity (columns 1, 4 and 7: coefficient varies from 0.003 to 0.005, $p < 0.05$). In the second group (Set 2: Case 2 vs Case 3), our findings demonstrate a positive relationship between problem directors and risk-taking proxies (columns 2, 5 and 8: coefficient varies from 0.016 to 0.077, $p < 0.01$). In the third group (Set 3: Case 1 vs Case 3), we compare firm years with directors displaying no problematic behaviour and firms with two or more problem directors. Again, our findings indicate that the coefficient of the problem director is significant and positive (columns 3, 6 and 9: coefficient varies from 0.020 to 0.079, $p < 0.01$). Our results consistently indicate that tokenism does not influence the relationship between problem directors and firm risk-taking findings. Instead, firms engage in higher risk-taking even if only one problem director remains on the board.

Mediation analysis

The corporate governance literature suggests that monitoring becomes a concern when a director has questionable professional antecedents. Ferris, Javakhadze and Rajkovic (2019) argue that information asymmetry increases when economic agents have tainted reputations. Therefore, it is arguable that problem directors will increase agency conflicts and information asymmetry, thus inducing higher corporate risk-taking. In addition, problem directors with a myopic view of performance may prioritize short-term gains over long-term value, potentially introducing bias into corporate financial reporting (Habib and Bhuiyan, 2016). The cornerstone theory of corporate research examines how governance reduces agency conflicts between principals and agents (Jensen and Meckling, 1976). One way to reduce information asymmetries caused by agency conflicts is through higher-quality financial reporting (Cohen, Krishnamoorthy and Wright, 2004; Healy and Palepu, 2001; Roychowdhury, Shroff and Verdi, 2019). High-quality financial reporting is crucial for stakeholders to evaluate a firm's financial performance and make informed decisions. Financial reporting quality can also improve the outcomes of a firm's risk-taking propensity by reducing information asymmetries and increasing stakeholder confidence (Bedard and Gendron, 2010; Beyer *et al.*, 2010). Empirical research shows that firms with better financial reporting quality are more likely to engage in risk-taking that creates long-term value for all stakeholders (Ali and Gurun, 2009; Roychowdhury, Shroff and Verdi, 2019). Thus, we propose financial reporting quality as a potential mediator for the association between problem directors and corporate risk-taking.

We employ structural equation modelling (SEM) for characterizing and assessing the direct and indirect impacts of problem directors on corporate risk-taking. Under SEM, direct effects (problem director → corporate risk-taking) capture the influence of problem directors on corporate risk-taking that is not mediated by any other variable in the model. In comparison, indirect effects (problem director → financial reporting quality → corporate risk-taking) capture the influence of a problem director on corporate risk-taking channelled through firms' financial reporting quality proxied by discretionary accruals (|DACC|). Thus, the total impact of a problem director on corporate risk-taking is the sum of its

Table 10. Impact of problem director and corporate risk-taking on firm value

Variables	(1) TOBINSQ	(2) TOBINSQ	(3) TOBINSQ	(4) TOBINSQ	(5) TOBINSQ	(6) TOBINSQ	(7) TOBINSQ	(8) TOBINSQ	(9) TOBINSQ
Constant	2.053***	2.076***	1.97***	2.086***	2.124***	2.023***	2.057***	2.086***	1.983***
	(15.511)	(15.449)	(15.554)	(15.817)	(15.906)	(16.052)	(15.528)	(15.564)	(15.695)
PDDUM	−0.074***	−0.102***	−0.065***	–	–	–	–	–	–
	(−3.344)	(−2.873)	(−3.002)						
PDPER	–	–	–	−0.444***	−0.618***	−0.334***	–	–	–
				(−3.803)	(−3.358)	(−2.965)			
DIRPROB	–	–	–	–	–	–	−0.043***	−0.051***	−0.035***
							(−3.885)	(−2.934)	(−3.293)
σ(ROA)	0.134*	–	–	0.063*	–	–	0.088*	–	–
	(1.719)			(1.794)			(1.799)		
σ(MRET)	–	0.074**	–	–	0.097***	–	–	0.063**	–
		(2.511)			(2.709)			(2.449)	
R&D	–	–	2.642***	–	–	2.603***	–	–	2.635***
			(25.813)			(25.968)			(26.122)
PDDUM * σ(ROA)	−0.121**	–	–	–	–	–	–	–	–
	(−2.083)								
PDDUM * σ(MRET)	–	−0.187***	–	–	–	–	–	–	–
		(−2.771)							
PDDUM * R&D	–	–	−0.515***	–	–	–	–	–	–
			(−3.652)						
PDPER * σ(ROA)	–	–	–	−1.037***	–	–	–	–	–
				(−2.912)					
PDPER * σ(MRET)	–	–	–	–	−1.787**	–	–	–	–
					(−2.618)				
PDPER * R&D	–	–	–	–	–	−1.671***	–	–	–
						(−3.052)			
DIRPROB * σ(ROA)	–	–	–	–	–	–	−0.011**	–	–
							(−2.028)		
DIRPROB * σ(MRET)	–	–	–	–	–	–	–	−0.084***	–
								(−2.775)	
DIRPROB * R&D	–	–	–	–	–	–	–	–	−0.317***
									(−3.966)

Table 10. (Continued)

Variables	(1) TOBINSQ	(2) TOBINSQ	(3) TOBINSQ	(4) TOBINSQ	(5) TOBINSQ	(6) TOBINSQ	(7) TOBINSQ	(8) TOBINSQ	(9) TOBINSQ
BODSIZE	0.086***	0.087***	0.047	0.076**	0.075**	0.033	0.091***	0.09***	0.049
	(2.688)	(2.706)	(1.531)	(2.375)	(2.344)	(1.076)	(2.811)	(2.788)	(1.571)
BODIND	0.019	0.018	0.008	0.013	0.012	0.001	0.018	0.016	0.005
	(0.39)	(0.36)	(0.165)	(0.258)	(0.247)	(−0.004)	(0.367)	(0.332)	(0.113)
CEODUAL	−0.027*	−0.027*	−0.019	−0.027*	−0.026	−0.018	−0.026	−0.026	−0.018
	(−1.681)	(−1.679)	(−1.26)	(−1.66)	(−1.632)	(−1.147)	(−1.63)	(−1.623)	(−1.152)
OWNCON	−0.125***	−0.128***	−0.099***	−0.128***	−0.13***	−0.102***	−0.129***	−0.132***	−0.103***
	(−3.358)	(−3.432)	(−2.751)	(−3.424)	(−3.505)	(−2.842)	(−3.472)	(−3.547)	(−2.87)
LNSIZE	−0.112***	−0.113***	−0.078***	−0.113***	−0.114***	−0.079***	−0.113***	−0.114***	−0.079***
	(−17.678)	(−17.849)	(−12.566)	(−17.808)	(−18.025)	(−12.723)	(−17.838)	(−18.056)	(−12.717)
MTB	0.009***	0.010***	0.010*	0.007***	0.006***	0.006*	0.003***	0.003***	0.003*
	(2.581)	(2.595)	(1.911)	(2.609)	(2.598)	(1.908)	(2.610)	(2.595)	(1.906)
LEVERAGE	0.011	0.012	0.094***	0.007	0.009	0.092***	0.007	0.009	0.093***
	(0.318)	(0.374)	(3.052)	(0.222)	(0.289)	(2.957)	(0.222)	(0.296)	(2.991)
PM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(−0.298)	(−0.263)	(0.812)	(−0.306)	(−0.258)	(0.913)	(−0.29)	(−0.255)	(0.788)
ROA	−0.054	−0.079	0.609***	−0.057	−0.078	0.602***	−0.054	−0.079	0.604***
	(−0.984)	(−1.529)	(10.826)	(−1.045)	(−1.503)	(10.678)	(−0.99)	(−1.529)	(10.725)
LOSS	−0.086***	−0.085***	−0.078***	−0.086***	−0.086***	−0.081***	−0.086***	−0.086***	−0.081***
	(−3.577)	(−3.505)	(−3.365)	(−3.597)	(−3.558)	(−3.518)	(−3.578)	(−3.545)	(−3.502)
ICW	−0.052	−0.049	−0.043	−0.051	−0.049	−0.042	−0.051	−0.049	−0.042
	(−0.875)	(−0.826)	(−0.751)	(−0.857)	(−0.819)	(−0.739)	(−0.861)	(−0.823)	(−0.734)
CASHTA	0.065***	0.065***	0.083***	0.06***	0.065***	0.085***	0.061***	0.064***	0.084***
	(4.644)	(4.784)	(6.415)	(4.372)	(4.821)	(6.52)	(4.438)	(4.736)	(6.429)
DIVEQTY	0.041**	0.041**	0.042**	0.041**	0.041**	0.042**	0.041**	0.041**	0.042**
	(2.312)	(2.337)	(2.455)	(2.307)	(2.326)	(2.458)	(2.298)	(2.323)	(2.451)
OPINION	0.033	0.032	0.031	0.033	0.032	0.031	0.032	0.032	0.031
	(1.599)	(1.563)	(1.529)	(1.605)	(1.58)	(1.558)	(1.593)	(1.572)	(1.54)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	8926	8926	8926	8926	8926	8926	8926	8926	8926
F-statistic	52.84	52.81	64.61	52.81	52.80	64.51	52.84	52.82	64.66
Adjusted R^2	0.355	0.355	0.402	0.355	0.355	0.402	0.355	0.355	0.402

Notes: This table shows the impact of the problem director and corporate risk-taking on firm value. Firm value is measured using TOBINSQ. The results confirm that firm value reduced when a problem director affiliated firm engaged in higher corporate risk-taking. t-Statistics in parentheses. All variables are defined in Appendix A. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

direct and indirect effects. We explicitly construct the following empirical models to separate the direct and indirect effects of problem directors on corporate risk-taking (through financial reporting quality):

$$\mathrm{CRT}_{i,t} = \beta_0 + \beta_1 \mathrm{PROBDIR}_{i,t} + \beta_2 \mathrm{M}_{i,t} + \sum \mathrm{CONTROLS}_{i,t} + \sum_i \mathrm{YEAR}_{i,t} + \sum \beta_j \mathrm{INDUSTRY}_{i,t} + \varepsilon_{i,t} \quad (3A)$$

$$\mathrm{M}_{i,t} = \mu_0 + \mu_1 \mathrm{PROBDIR}_{i,t} + \sum \mathrm{CONTROLS}_{i,t} + \sum \mu_i \mathrm{YEAR}_{i,t} + \sum \mu_j \mathrm{INDUSTRY}_{i,t} + \varepsilon_{i,t} \quad (3B)$$

The direct effect of the 'problem director' on corporate risk-taking is captured by β_1 and the indirect effect of the 'problem director' is captured by $\beta_2 * \mu_1$. In line with the arguments above, we hypothesize that |DACC| mediates the relationship between problem directors and corporate risk-taking. In both the accounting and finance literatures, estimates of discretionary accruals are among the most frequently used indicators of financial reporting quality (Garcia-Meca and Sanchez-Ballesta, 2009). Discretionary accruals act as an inverse predictor of the accuracy of financial reporting (i.e. higher discretionary accruals indicate lower financial reporting quality and vice versa). We follow Kothari, Leone and Wasley (2005) to measure discretionary accruals. We also use the absolute value of the discretionary accruals component, **|DACC|**, to assess the quality of financial reporting, as a firm could have either income-increasing or income-decreasing accruals (Klein, 2002). We use three risk-taking proxies for CRT: σ(ROA), σ(MRET) and R&D. The mediation tests are conducted for each of the measures separately.

Table 9 reports the results of the mediation analysis examining the relationship between problem directors and corporate risk-taking (CRT = σ(ROA)), with **|DACC|** as a potential mediating channel. We report the direct and indirect effects of problem directors on corporate risk-taking. Panel A shows that PDDUM increases **|DACC|** significantly, indicating a positive effect of a problem director (PDDUM) on the financial reporting quality channel ($p < 0.01$). Moreover, the coefficient of PDDUM is positive ($p < 0.05$ or better) on corporate risk-taking measures. Overall, our findings demonstrate that a problem director has a direct effect on corporate risk-taking.

Panel B reports the results of the direct and indirect (mediation through **|DACC|**) effect of a problem director (PDDUM) on corporate risk-taking. The 'direct effect' of the problem director on corporate risk-taking is positive at the 1% level (coefficients range from 0.006 to 0.015). The indirect effect is positive (coefficients ranging from 0.001 to 0.002, $p < 0.01$). Finally, the 'total effect' of the problem director (PDDUM) on corporate risk-taking is significantly positive (coefficients ranging from 0.008 to 0.017, $p < 0.01$). Our findings are consistent across two other proxies of problem directors, PDPER and DIRPROB. Overall, our results confirm that problem directors increase corporate risk-taking individually and collectively through the reduction of the financial reporting quality (proxied by **|DACC|**) channel.

Consequence analysis: Problem directors, corporate risk-taking and firm value

Next, we investigate whether the association between a problem director and corporate risk-taking affects firm value, proxied by Tobin's Q. Imhof and Seavey (2014) argue that corporate risk-taking increases firm value, but the association reduces following the publication of management earnings forecasts. Gopalan, Gormley and Kalda (2021) suggest that firms take more risks when one of their directors has experience of bankruptcy at another firm. In contrast, Bhuiyan (2015) reports that a firm experiences negative accounting performance when there are problem directors on its board. Therefore, we expect that a problem director will moderate the association between corporate risk-taking and firm value, using the following equation to test this prediction:

$$\begin{aligned}\mathrm{TOBINSQ}_{i,t+1} = {} & \gamma_0 + \gamma_1 (\mathrm{PROBDIR} \\ & = \mathrm{PDDUM\ or\ PDPER\ or\ DIRPROB})_{i,t} + \gamma_2 \mathrm{CRT}_{i,t} \\ & + \gamma_3 \mathrm{PROBDIR} * \mathrm{CRT}_{i,t} + \gamma_4 \mathrm{BODSIZE}_{i,t} \\ & + \gamma_5 \mathrm{BODIND}_{i,t} + \gamma_6 \mathrm{CEODUAL}_{i,t} \\ & + \gamma_7 \mathrm{OWNCON}_{i,t} + \gamma_8 \mathrm{LNSIZE}_{i,t} \\ & + \gamma_9 \mathrm{MTB}_{i,t} + \gamma_{10} \mathrm{LEVERAGE}_{i,t} \\ & + \gamma_{11} \mathrm{PM}_{i,t} + \gamma_{12} \mathrm{ROA}_{i,t} \\ & + \gamma_{13} \mathrm{LOSS}_{i,t} + \gamma_{14} \mathrm{ICW}_{i,t} \\ & + \gamma_{15} \mathrm{CASHTA}_{i,t} + \gamma_{16} \mathrm{DIVEQTY}_{i,t} \\ & + \gamma_{17} \mathrm{OPINION}_{i,t} + \sum \gamma_i \mathrm{YEAR} \\ & + \sum \gamma_j \mathrm{INDUSTRY} + _{i,t}\end{aligned} \quad (4)$$

Our primary variable of interest is $\gamma_3 \text{PROBDIR} * \text{CRT}_{i,t}$ and we expect a negative coefficient with statistical significance.

Table 10 reports the results. The coefficient of PROBDIR (proxied by PDDUM, PDPER and DIRPROB) is negative ($p < 0.01$), suggesting that firm value reduces in the presence of problem directors. Further, the interaction coefficient (PROBDIR * CRT) is negative ($p < 0.05$), confirming that problem directors moderate the association between corporate risk-taking and firm value. For example, in column 3, the coefficient of PDDUM * R&D is −0.515 ($p < 0.05$), indicating that higher risk-taking by firms with problem directors reduces corporate value. This also embodies economic significance, with one additional problem director decreasing the firm value between 12.03% (column 9) and 64.20% (column 6) as a consequence of high risk-taking.[12] Our study supports previous research examining the relationship between corporate risk-taking and returns and demonstrates a positive association between risk-taking and firm value (John, Litov and Yeung, 2008; Koirala *et al.*, 2020). Bowman (1980) identifies two perspectives on corporate risk-taking and returns: directors can be risk-seekers as well as effective directors and may obtain higher returns and minimize risk-taking. Conversely, Díez-Esteban *et al.* (2017) find that firm risk-taking reduces returns when the expected returns are lower than the desired returns. Gopalan, Gormley and Kalda (2021) determine that directors who experience bankruptcy exhibit a higher risk-taking attitude when participating in less expensive bankruptcies, but not in costly and lengthy bankruptcies. Our study reconciles these two findings, showing that corporate risk-taking undertaken by problem directors damages firm value. Therefore, firms engaging in higher risk-taking experience a decrease in firm value when a problem director is present.

Conclusion

This study examines the influence of problem directors on corporate risk-taking. We argue that the antecedents of directors reflect their values and attitudes, which are significant predictors of corporate policy choices such as risk-taking. Given the critical fiduciary responsibilities of directors, it is essential to determine whether the behaviours of those with a tainted professional background adversely impact stakeholders' interests. Analysing a US sample of listed companies for 2004−2018, our study demonstrates that corporate risk-taking is higher when firms have problem directors. We further distinguish three types of problem directors, presenting convincing evidence supporting an increase in corporate risk-taking across all categories, elucidating that directors' histories, tainted by criminal, corrupt or dishonest activities, affect their choice of strategic alternatives in corporate decision-making. To test the sensitivity of our findings, we examine the effect of a problem director's entry (exit) and the role of a CEO identified as a 'problem director' on corporate risk-taking. Our results indicate that corporate risk-taking increases following the appointment of a problem director. Morever, we establish that a firm whose CEO is a problem director engages in higher corporate risk-taking. Furthermore, our empirical findings show a substantive negative relationship between the presence of a problem director and firm value, emphasizing the negative influence of problem directors on investors' perceptions of company prospects.

Our study contributes to the literature in relation to agency and upper echelons theories by extending our understanding of the range of management behaviours that determine directors' propensities to undertake high-risk strategies that undermine corporate value. As distinct from the study of Gopalan, Gormley and Kalda (2021), who assert that directors with a past involvement in a bankruptcy tend to take higher risk decisions, our investigation expands the lexicon of managerial behaviours in this respect. By further establishing that involvement in litigation, corporate infractions, accounting restatements, SEC violations or the granting of excessive CEO compensation also contribute to a director's inclination to take risks, we increase the scope of understanding of this behavioural trait. Further, we establish that a CEO who is also a problem director has a greater propensity to take risks than a problem director, indicating that firms led by such individuals will be exposed to a higher level of risk than a firm with only a problem director. Most notably, problem directors sitting on a board led by a problem CEO

[12]Economic significance (based on Table 10) calculated as: column 3, 19.49% (i.e. −0.515/2.642); column 6, 64.20% (i.e. −1.671/2.603); column 9, 12.03% (i.e. −0.317/2.635).

will have an even stronger inclination to engage in risky undertakings. Hence, this study provides significant insights into the idiosyncrasies of problem directors and their impact on firm decision-making. More importantly, we determine that the presence of a problem director undermines corporate governance and exerts a deleterious impact on shareholders' value in the long term, which varies between 12.03% and 64.20%.

Furthermore, this study introduces the influence of tokenism by determining whether a single problem director exerts an invidious influence on a board. Our findings indicate that if only one problem director sits on a board, like a rotten apple in a barrel, s/he may increase corporate risk-taking. We further demonstrate that problem directors impact firm risk-taking through direct and indirect channels. Notably, our mediation analysis reveals that a degradation in financial reporting quality serves as the mechanism through which problem directors' risk preferences influence firm risk-taking behaviours. Moreover, our study contributes to the risk-taking literature by focusing on the appointment and departure of a problem director, determining that both increase risk-taking, in the latter case arguably because it takes time for the effects of a risk-taking strategy to diminish, whereas the former exerts a long-term effect on firm value. These new insights advance our theoretical understanding of the web of interconnections between corporate governance and risk-taking behaviour.

Our findings also provide insights for policy and regulation. The propensity for problem directors to engage in risk-taking undermining corporate stability that potentially destroys corporate value should be of concern to regulators, stakeholders, external auditors, shareholders and, more importantly, the public at large. Regulation is clearly failing to detect and punish directors who abuse their positions, and regulators must create systems that do so. At the very least, a director's professional antecedents should be disclosed so that stakeholders and shareholders can evaluate any risks they face. Finally, membership of organizations (e.g. the National Association of Corporate Directors) should be a professional requirement, with certificates issued validating their fitness to practice and adherence to proper codes of ethics a prerequisite for appointment to a board.

Our research shares limitations with other research that indicates a potential for future investigations. For example, although our empirical findings enable us to identify a diversity of malpractices conducive to directors' risk-taking, our results give equal weight to the impact of all categories of wrongdoing on directors' behaviour. Can it be true that a director involved in a bankruptcy exerts no greater influence on corporate risk-taking than a director who has endorsed a generous increase to a CEO's remuneration? Is it therefore arguable that some directors exert a greater influence on risk-taking than others? Furthermore, does the misbehaviour of some problem directors lead to a greater loss in corporate value than the misbehaviour of others? Moreover, what other factors in a director's personal and professional lives might give rise to similar, aberrant behaviours?

Finally, the relationship between problem directors and their advisory and monitoring roles warrants much closer attention. While our current study focuses on the effect of a problem director's presence on risk-taking and its consequences for corporate value, future research should investigate the full extent of the problem director's role in shaping decision-making processes. Might it be the case that such directors, strongly motivated to indulge their risk-taking predilections, would seek to occupy roles giving them the authority to subvert corporate governance and monitoring procedures? This is clearly a multifaceted phenomenon, and its implications for corporate governance and oversight in a globally connected world make further research essential.

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