Journal of Contemporary Accounting and Economics xxx (xxxx) xxx

Contents lists available at ScienceDirect

Journal of Contemporary Accounting and Economics

journal homepage: www.elsevier.com/locate/jcae

Role of corporate governance in moderating the risk-return paradox: Cross country evidence

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ARTICLE INFO

Article history:
Received 4 December 2020
Revised 5 February 2022
Accepted 1 March 2022
Available online xxxx

JEL Classification:
G34
G32

Keywords:
Corporate governance
Risk-return association
Paradox
Bull and bear periods
Country-level heterogeneity

ABSTRACT

This paper investigates the possible nexus between the 'risk-return paradox' and corporate-governance of firms in a cross-country cross-cultural setup. We use corporate governance as well as accounting risk and return data for a large dataset of 45,322 firm-years from 27 countries and show that the firm-level risk-return association may be a non-linear one, contingent on the firm performance. Firms which are below the industry median in terms of operating performance, exhibit an inverse relation in line with Bowman's (1980) 'paradox' while those above-median exhibit a positive risk-return association. Further, we establish empirically that such risk-return association could be due to the rent-seeking actions of managers and that strong corporate-governance in a firm substantially moderates and reverses these effects. Our results are robust and hold strong through a number of robustness tests.

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1. Introduction

Risk-return association in financial markets is typically expected to be positive, i.e., bearing higher risk is justified when expected returns are higher (Sharpe, 1964; Ghysels et al., 2005). This risk-return trade-off should also apply to firm-level strategic decisions that involve risks such as entering new markets, launching new products, and exploring new ways to prune costs. Therefore, to maximize shareholders' wealth, managers may possibly undertake high-risk investments if they are expected to yield commensurate higher returns for shareholders (Chari et al., 2019). Thus, prior knowledge of such a risk-return association is critical from the perspective of firms and their stakeholders, especially managers. Our study draws its primary motivation from this premise.

Bowman (1980) reports an interesting risk-return 'paradox,' or a negative correlation between accounting risk and return. This observation is counterintuitive to the generally accepted theory in traditional finance, as highlighted above (Sharpe, 1964; Ghysels et al., 2005). Since then, a series of empirical studies have presented possible theoretical and empirical explanations for this. 'Prospect theory' (Kahneman and Tversky, 1979), 'behavioural theory' (Cyert and March, 1963; Bromiley, 1991), 'agency theory' including 'value-reducing risk-taking' (Andersen et al., 2007; Chari et al., 2019), and 'career concerns' of managers (Dewatripont et al., 1999), to name a few. However, most of these studies draw their inferences based on US

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https://doi.org/10.1016/j.jcae.2022.100313
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Please cite this article as: R. DasGupta and S.G. Deb, Role of corporate governance in moderating the risk-return paradox: Cross country evidence, Journal of Contemporary Accounting and Economics, https://doi.org/10.1016/j.jcae.2022.100313

data. Whether Bowman's 'paradox' is generalizable across different countries with wide inherent variability, to the best of our knowledge, has yet to be explored extensively. A few recent studies, such as Patel et al. (2018) and Dasgupta and Deb (2020), have used data from non-US countries to check the validity of the paradox. However, many potential dimensions of inherent variability, such as stages of economic growth, market cycles, legal systems, investor-protection rights, national culture, and various other firm-level heterogeneity are not controlled for in those studies. The current study draws its secondary motivation from this premise.

We revisit Bowman's risk-return paradox in a cross-country, cross-cultural context, using accounting risk and return data from 27 countries, and control for many country-level and firm-level heterogeneity factors in our analysis. We use data from 2666 firms across 27 countries (15 from developed economies and 12 from emerging economies) during the period from 1999 to 2015 to explore these issues. Our results show that the risk appetite of international firms and the resulting risk-return association may be nonlinear, meaning they are contingent on the current level of firm performance. Firms that are below the industry median in terms of operating performance exhibit Bowman's (1980) 'paradox', while firms that are above the median exhibit a positive risk-return association. Our findings are in line with several earlier studies, a majority of which were performed in the context of US markets (Lehner, 2000; Holder et al., 2016). However, a significant finding from the study is that the risk-return 'paradox' disappears for all firms with strong corporate governance, irrespective of their performance. Therefore, we posit that a paradoxical risk-return association arises out of managerial rent-seeking actions resulting from 'value-reducing risk-taking' and 'career concern' objectives, and this effect is moderated or even eliminated in the presence of strong corporate governance. Our results are robust and hold strong even after controlling for firm-level heterogeneities such as size, age, and leverage. They also hold strong after controlling for country-level heterogeneities such as economic development, legal systems, investor protection rights, and distinct national culture. We substantiate our results through a series of robustness tests.

Our study seeks to contribute to the theoretical and empirical literature on the risk-return 'paradox' by providing explanations for these patterns and discussing their policy implications. It is different from some of the related previous studies and contributes to the existing literature in several ways. First, the most critical contribution of this study is to demonstrate the impact of a firm's corporate governance on this risk-return association. This line of research tries to augment insights from theories of 'value-reducing-risk-taking' (Andersen et al., 2007; Chari et al., 2019) and 'managerial career concern' (Dewatripont et al., 1999) to explain the observed partial risk-return 'paradox'[1]. These theories have recently come up in the context of agency costs and their impact on shareholders' wealth. Our study seeks to provide empirical validation of these theories. We show that it is the rent-seeking actions of managers that lead to the risk-return 'paradox' in the first place and that strong corporate governance can potentially reduce or nullify these effects. Second, within a set of chosen measures of corporate governance of a firm, we highlight that a few specific measures, such as board size, board independence, proportion of female directors, board experience, and board quality are of relatively greater importance in affecting the risk-return relationship. This result, we believe has not been reported before in the extant literature (Chari et al., 2019, for example). Third, as most previous studies on the risk-return paradox were performed in a US setting, we explore whether the phenomenon of Bowman's risk-return paradox is ubiquitous in a cross-country cross-cultural setup. In the process, we explore whether country-level heterogeneity factors, such as economic development, legal systems, investor protection rights, and national culture have any impact on the risk-return association. Very few studies (Kanagaretnam et al., 2011) highlight the influence of these country-level factors on firm-level risk-return associations. Fourth, we ask whether firm-level heterogeneity as highlighted in the extant literature, such as 'market power' (Andersen et al., 2007), 'nature of firm diversification' (Andersen et al., 2007), or 'previously existing risk' (Bromiley, 1991), have any impact on the risk-return association? Finally, we show that the risk-return association we obtain does not change dynamically across market swings (i.e., bull and bear periods). This finding is against the common perception that the association between firm performance and risk levels can alter across different market cycles, in line with the 'leverage hypothesis' (Black, 1976).

To the best of our knowledge, such detailed exploration of risk-return association in a cross-country cross-cultural set up has not been conducted so far and the current study is aimed at augmenting the existing pool of knowledge on the issue. The remainder of our paper is organized as follows: next section talks about the theoretical background, relevant literature and hypotheses developed, section 3 presents the data and methodology used, section 4 presents the results, section 5 discusses the implications of the results. In contrast, section 6 concludes the paper, followed by references.

2. Theoretical overview and hypothesis development

2.1. Explanations of the paradox from prospect theory

Kahneman and Tversky (1979) and Tversky and Kahneman (1992), initially in their 'prospect-theory' (henceforth PT) and later in their 'cumulative-prospect-theory' (henceforth CPT), question the typically theorized positive risk-return association. One of the main propositions of PT asserts that when expected returns are 'good' or above a preconceived target return level

[1] We use this term consistently in this study to imply an apparently paradoxical risk-return association for sample firms, contingent on their current performance level. Superior firms with above-median performance exhibits mostly a regular or positive risk-return relation, while poor-performing below-median firms exhibit a negative or inverted relationship.

(such as industry mean or median or the firm's past performance), managers of a firm show a 'risk-averse' attitude. In contrast, when the expected returns are below such targets, managers exhibit a 'risk-seeking' attitude. According to PT, when managers are risk-seeking, the risk-return association might not be positive. In that case, given two alternative investment opportunities offering similar levels of expected returns, one with higher risk would be preferred, as it grants a higher probability of extraordinary performance. However, such elevated risk-taking could also generate lower yields due to higher uncertainty. This implies that low return and high risk might co-occur, leading to a possible negative risk-return association. Although PT and CPT explain an individual's decision-making under conditions of risk or uncertainty, empirical studies (Lehner, 2000; Kliger and Tsur, 2011; DasGupta and Deb, 2020) have also used it to explain firm-level decision-making. Bowman (1980) ratifies this observation at the firm level, which is famously known as 'Bowman's paradox.' Bowman's explanation for this 'paradox' is that losing firms tend to unsuccessfully assume more risk to increase the chances of eventually making profits. This attempt can result in a cluster of weak firms with higher risk and lower returns and a group of superior firms that can increase their yields while simultaneously reducing risk. Many empirical studies also lend support to this argument (Holder et al., 2016; Díez-Estebana et al., 2017).

2.2. Explanations from behavioural theory

Behavioural theory (henceforth BT) (Cyert and March, 1963) is the other theory that explains the 'paradox' from an organizational behaviour perspective. According to BT, the amount of risk taken by managers is a function of the performance level they expect versus the performance level they aspire to attain (Bromiley, 1991; Shinkle, 2012). When the expected performance is higher than the aspiration level, managers tend to maintain the status quo (Greve, 1998). If, on the other hand, managers expect performance to fall below aspiration level and the gap is wide enough to create a sense of crisis, they tend to undertake enhanced risks. These enhanced risks can be in the form of implementing new procedures and techniques and new investments to increase operating performance. (Grinyer and Mckiernan, 1990). Thus, BT posits that poor performers with expectations that are lower than aspirations tend to undertake risky organizational changes, resulting in a negative risk-return association. In contrast, superior performers with higher expectations maintain the status quo, and therefore, their risk-return association stays positive.

The basic premises of both PT and BT are thus quite similar. In this study, we first test whether predictions based on PT and BT hold in our cross-country setup. Accordingly, we frame our first two hypotheses as follows:

Hypothesis 1: Firms with superior performance show a positive (conventional) risk-return association.

Hypothesis 2: Firms with inferior performance show a negative (paradoxical) risk-return association.

2.3. Agency theory and the impact of corporate governance

Another strand of theoretical explanations for the risk-return paradox comes from agency theory. Agency theory posits that managers, although employed by firms to act in the best interest of shareholders, might instead indulge in maximizing personal benefits. It is quite natural for managers to be more concerned about their careers in the form of job security, job mobility, and pay rather than shareholder interests. These managerial rent-seeking actions can lead to selective risk-taking, which can be value-reducing for shareholders but value-enhancing for themselves. For example, they can undertake risky investments to project themselves as transformative leaders in the managerial job market (Dewatripont et al., 1999; Andersen et al., 2007; Koerniadi et al., 2013; Chari et al., 2019; etc.). It is argued that such actions by managers can lead to a negative risk-return association. These theories are in sync with the propositions of PT, given the assumptions that managers of a firm in trouble could be risk-seeking and hence might result in a negative risk-return association for the firm.

The corporate governance literature posits that appropriate corporate governance may align the risk orientations of managers and owners (Brick and Chidambaran, 2010). Some essential corporate governance mechanisms documented in previous literature that affect a firm's risk-taking behaviour are board size (Adams et al., 2010; Belghitar and Clark, 2015), board independence (Adams et al., 2010; Belghitar and Clark, 2015; Bird et al., 2017), etc.); female directors (Arena et al., 2015; Belghitar and Clark, 2015); board activity (Lipton and Lorsch, 1992); board busyness (Ferris et al., 2003); board tenure (Vafeas, 2003); board age (Ali, 2014); board involvement and board quality (Lipton and Lorsch, 1992;, etc.) and CEO duality and CEO power (Pathan, 2009; Adams et al., 2010;, etc.). Based on these arguments, we propose our next two hypotheses as follows:

Hypothesis 3: The positive (conventional) risk-return association of superior firms is due to strong corporate governance.

Hypothesis 4: The negative (paradoxical) risk-return association of poorly performing firms is due to weak corporate governance.

2.4. Explanations from country-heterogeneity arguments

La Porta et al. (1997, 2008) argue that country-level heterogeneous traits such as the legal system, investor protection rights, and national culture can also impact a firm's risk-return association. Studies posit that the presence of a robust legal framework and the rule-of-law should increase the level of risk-taking by firms (Acharya et al., 2011). On the other hand, it is also proposed that when investor protection improves, there is less fear of expropriation by managers, and consequently, there could be less need for concentrated ownership by dominant shareholders (Burkart et al., 2003). This, in turn, might

result in greater managerial discretion to implement safe and low-risk investment policies. In contrast, in a low-investor-protection scenario, non-equity conservative stakeholders such as banks, governments, and organized labour might influence investment policy for their benefit and safety (Roe, 2006).

The role of national culture in firm risk-taking has also been documented recently in finance research (Mihet, 2013, for example). These studies argue that national culture can explain the institutional, legal, and economic environments of a country at the macro level, which can further influence a firm's risk-taking decisions. Hofstede (2001), Growiec and Growiec (2011), and Kanagaretnam et al. (2011) propose an 'uncertainty avoidance index' (UAI) and 'power distance index' (PDI) to capture cultural heterogeneity across countries. We posit that firms in low-UAI countries tend to take more risks in search of additional returns (Kanagaretnam et al., 2011), and firms in low-PDI countries also take on more risk because of the presence of a strong element of trust in the system (Growiec and Growiec, 2011). Accordingly, we construct a combination of these two indices into a composite cultural index, as detailed in the next section.

Based on the existing arguments and counterarguments mentioned above, our next hypothesis below tries to capture the impact of country-level heterogeneity on the firm-level risk return association:

Hypothesis 5: The risk-return association is contingent on country-level heterogeneity, such as legal systems, national culture, and investor protection mechanisms.

2.5. Explanations from firm-heterogeneity arguments

The empirical literature highlights that firm-level heterogeneity, such as market power (captured by firm age and size) and previously existing risk and liquidity can influence the risk-return relation for a firm (Woo, 1987; Andersen et al., 2007). These studies posit that superior firms run by quality management can simultaneously reduce risk and increase return by exploiting these different features unique to them. For example, firms with higher 'market power' would benefit from factors such as economies of scale and greater bargaining power with suppliers and distributors and can have the ability to pass on some of their risk to customers or suppliers instead of their shareholders. Therefore, 'market power' captured by firm size and age is expected to be directly related to return and inversely related to risk and can potentially lead to a 'risk-return paradox.' Various related studies further present arguments for or against this hypothesis. Liao (2006) suggests that new entrants, i.e., young firms, usually face negative returns because of their less efficient production processes and limited access to financial resources. Hence, risk-taking at the early stage of the life cycle for a firm can yield poor performance (Habib and Hasan, 2017), leading to a risk-return paradox. In contrast, Henderson and Benner (2000), Kotha et al. (2011), and others argue that younger firms are generally less constrained by routines, processes and structures and are therefore more flexible and nimbler in their operations, while ageing inertial organizations have below-average performance and increase their propensity to risk. Likewise, smaller firms are generally associated with reduced bureaucracy and centralized decision-making, therefore resulting in nimble organizations whose managers are bestowed with a higher capability to adapt (Deb et al., 2019).

Some studies (Acharya et al., 2007; Subramaniam et al., 2011) posit that firm liquidity/cash holdings might also influence their risk-return association. They argue that larger firms with greater access to capital markets typically hold lower levels of cash and exhibit risk-seeking attitudes, while smaller firms hold relatively higher amounts of cash to avoid financial distress and show risk-averse attitudes (Subramaniam et al., 2011). This implies a risk-seeking attitude for large firms and an opposite approach by their small counterparts (Gupta, 2017).

Bromiley (1991) further suggests that the 'previously existing risk level' of firms can also influence the risk-return association (Gupta, 2017). He argues that a firm that is already at a higher level of variability in terms of operating performance is likely to enhance expectations of internal and external stakeholders and can expectedly default in its explicit or implicit commitments. Hence, most stakeholders, such as customers, suppliers, and employees, would demand an incremental monetary incentive to induce them into a transaction with such a firm. This would raise transaction costs and result in lower operating performance levels, which in turn can lead to a negative risk-return association.

Given these arguments made with respect to firm heterogeneity, we control for these variables in our models, although we specifically do not frame any separate hypotheses towards that.

3. Data and methodology

3.1. Sample construction

We select all firms indexed in benchmark indices from 27 countries (15 developed and 12 emerging countries) and collect data on all related firm-level variables from the BLOOMBERG database. Our study period spans 17 years, ranging from 1999 to 2015. We use annual published data of sample firms as of December 31st of each year (expressed in US-dollar terms). We filter our sample by including only those firms that existed continuously from 1999 to 2015 and for which all data are available. This translates into a final sample of 45,322 firm-years (2,666 firms existing continuously for 17 years). Table 1 shows the distribution of sample firms across countries.

Table 1
Data of sample countries.

Country	Economic status	Benchmark Index	Number of firms#	Legal system*	Investor protection rights*	National culture score**
Australia	Developed	ASX 200	130	Common-law	Strong rights	87
Belgium	Developed	BEL 20	13	French-Civil-law	Poor rights	159
Canada	Developed	TSX Comp.	154	Common-law	Strong rights	87
France	Developed	CAC 40	37	French-Civil-law	Poor rights	154
Germany	Developed	DAX 30	29	German-Civil-law	Poor rights	100
Hong Kong	Developed	Hang Seng	35	Common-law	Strong rights	97
Japan	Developed	Nikkei 225	169	German-Civil-law	Strong rights	146
Korea	Developed	Kospi	90	German-Civil-law	Poor rights	145
Newzeland	Developed	NZX 50	22	Common-law	Strong rights	71
Singapore	Developed	Straits Times	22	Common-law	Strong rights	82
Spain	Developed	IBEX 35	19	French-Civil-law	Strong rights	143
Switzerland	Developed	SMI	17	German-Civil-law	Poor rights	92
UK	Developed	FTSE 100	71	Common-law	Strong rights	70
USA	Developed	S&P 500	371	Common-law	Strong rights	86
Netherlands	Developed	AEX	20	French-Civil-law	Poor rights	91
Argentina	Emerging	MERVAL	19	French-Civil-law	Strong rights	135
Brazil	Emerging	BOVESPA	31	French-Civil-law	Poor rights	145
Mexico	Emerging	IPC	23	French-Civil-law	Poor rights	163
China	Emerging	Shanghai Comp.	718	German-Civil-law	Poor rights	110
India	Emerging	NSE 500	261	Common-law	Strong rights	117
Indonesia	Emerging	JCI	215	French-Civil-law	Poor rights	126
Malaysia	Emerging	KLCI	21	Common-law	Strong rights	136
Pakistan	Emerging	KSE 100	66	Common-law	Strong rights	125
Philippines	Emerging	PSEi	23	French-Civil-law	Poor rights	138
Taiwan	Emerging	TWSE	34	German-Civil-law	Poor rights	127
Thailand	Emerging	SET 50	27	Common-law	Poor rights	128
Chile	Emerging	IPSA	29	French-Civil-law	Strong rights	149

This table presents the demographic data of sample countries. It incorporates the economic status (developed vs. emerging), number of firms from each of these countries representing our sample firms, the legal system (Common law, French Civil law and German Civil law) prevalent in these countries, the nature of investor protection rights (strong vs. poor) of these countries and the national culture score as calculated for each of these countries under this study.
Total number of sample firms is 2,666, out of which 1,199 from developed countries and remaining 1,467 from emerging countries.
* Legal system and investor protection rights (calculated based on six parameters' scores) information are collected from La Porta et al. (2008).
** National culture score is the sum total of power distance and uncertainty avoidance scores as taken from Hofstede (2001) and La Porta et al. (2008).

3.2. Variables and measures

3.2.1. Measuring firm performance

We use three accounting ratios to measure firm performance: i) return on assets (ROA), ii) cash ratio (CR), and iii) return on equity (ROE) (as an alternate measure under one of the robustness tests). ROA and ROE have been used in the majority of previous studies related to risk-return paradox (Bowman, 1980; Lehner, 2000; Dasgupta and Pathak, 2018), but they are sometimes affected by the fundamental drawbacks of 'accrual-based accounting' (Albrecht et al., 2004). Hence, we also introduce a new measure of firm performance CR, which has not been used in related studies (see Table 2 for details).

A few methodological criticisms of some of the previous studies are i) use of end-of-period asset/equity values rather than the beginning of the period and ii) failure to account for stock issuances and repurchases that occurred during the year while estimating return measures such as ROE and ROA (Baucus et al., 1993; Brick et al., 2015). We adjust for these by using the average of opening and closing values of the numbers during a year.

Intrinsic industry nature and competition might have a significant effect on the risk-return association because of heterogeneity (Becerra and Markarian, 2013). Hence, instead of raw performance measures, we use industry-adjusted performance (IAP henceforth, measured by firm performance in excess over industry mean performance) and corresponding risk estimates (rolling standard deviation of the IAP over the preceding six years).

3.3. Measuring risk

We estimate firm-level risk by utilizing the standard deviation of each of the above accounting measures, based on the preceding six years' numbers on a rolling basis (see Table 2).

Table 2
Description of variables.

Variables	Description
Firm performance:	
ROA	$ROA = \frac{Net\ Income}{Book\ Value\ of\ Asset}$
ROE	$ROE = \frac{Net\ Income}{Book\ Value\ of\ equity}$
CR	$CR = \frac{Net\ Operating\ Cash\ Flow}{Book\ Value\ of\ Asset}$
Firm risk:	
SD $[\sigma(P)_t]$	$\sqrt{\sum_{i=t-6}^{t-1} \frac{(P_i - \bar{P})^2}{n-1}}$ *where* $t = 2005, 2006, 2007 \ldots etc.$ $\&P = ROA, CR \& ROE$
Control variables:	
Size	ln(Book Value of Asset)
Age	ln(Time from Year of Inception)
Leverage	$\frac{Debt}{Equity}$
Liquidity	ln $(Cash \& Cash\ equivalents)$
Firm Diversification	1, if firm has related diversification, 0 otherwise
Corporate governance variables:	
Board Size	CG1 = ln(no of directors)
Board Independence	CG2 = ln(no of independent directors)
CEO Duality	CG3 = 1, if CEO and Chairman are different, 0 otherwise
Presence of Women Director	CG4 = ln(no of women directors)
Quality of Directors	$CG5 = \ln($ *average compensation of directors in million*)
Board Involvement	CG6 = ln(number of board meetings during the year)
Board Tenure	CG7 = ln(number of years the same board is working)
Board Experience	CG8 = ln(average age of board members)

This table provides a description of all the variables used in this study.

3.4. Measuring the impact of corporate governance variables and CG scores

As discussed in Section 2, agency problems, and hence managerial risk-taking, can be moderated to some extent by appropriate governance mechanisms captured by board characteristics. To explore this possibility, we create a 'corporate governance score' (CG henceforth). Kumar and Sivaramakrishnan (2008) use 'board independence', 'proportion of female directors', 'quality of independent directors' measured by average compensation and 'board experience' measured by the number of years the board is working, as possible proxies of a 'strong board.' Adams and Ferreira (2009) include 'board size,' measured by the number of directors, 'board involvement,' measured by the number of meetings, and 'board tenure,' measured by board age, as measures of an 'effective board.' Along similar lines, we create a comprehensive measure of corporate governance of a firm by combining eight board characteristics, as shown in Table 2.

The total CG score of the sample firms is estimated as the sum of all the individual CG scores from each variable using the following equation:

$$CG = \sum_{i=1}^{8} CG_i \tag{1}$$

To make the individual components comparable in their contribution to the final score, we use a natural log scale for each. A higher value of each of these CG variables (that is, the way we define them) should be the measure of robust corporate governance in a firm.

3.5. Control variables

Based on the arguments made with respect to firm heterogeneity in Section 2, we control for some firm-level traits (*size, leverage, liquidity, age and related diversification*[2]) in our analysis to segregate their effects. *Leverage* is used as a proxy for previously existing risk of the firm, *liquidity* represents slack resources, *size,* and *age* as proxies for 'market power' and *related diversification* to capture the synergy effect discussed in the footnote below. The methods used to measure these traits are detailed in Table 2.

3.6. Univariate analysis - full sample

As explained in the previous sections, if PT and CPT (Kahneman and Tversky, 1979) hold, we expect superior firms with past successes to exhibit a risk-averse attitude and poorly performing firms with previous losses to exhibit a risk-seeking

[2] In addition to other firm-level traits discussed in the previous section we also control for another variable: 'related diversification'. Bettis and Hall (1982), and Chang and Thomas (1989) posit that firms adopting 'related diversification' strategy would have higher correlations among different business units. This would cause higher overall variability in income. At the same time, expected returns would also be higher because of potential synergies among correlated business units, thereby leading to a positive risk-return association. However, for firms adopting 'unrelated diversification', the opposite could be true.

attitude. A few studies also suggest that increasing threats to survival due to poor relative performance w.r.t peers might stimulate greater and greater risk-taking by firms to escape such threats (Bowman, 1980; Bromiley, 1991). To explore this, we divide all sample firms into two broad categories - i) above-median firms and ii) below-median firms, based on whether their performance is above (below) the industry median[3]. We further subdivide each of these two broad categories of firms into five quintiles, q1 through q5, by sorting them in ascending order of performance, with q1(q5) representing firms with the lowest (highest) performance. We then determine the cross-sectional means of performance and the risk (measured by rolling standard deviation) of the respective performance measures for each subgroup. If the risk-return association is regular (positive), we expect the mean values of risk measures across q1 through q5 to increase. If it is not, then this analysis would prima-facie indicate the possibility of a paradoxical relation.

3.7. Multivariate regression model on the full sample

Next, we proceed to precisely find the nature of firm-level risk-return association across full and subsamples using the following multivariate regression model.

$$R_{i,t} = \alpha + \beta_1 \sigma_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AGE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 LIQ_{i,t} + \beta_6 DIVDUMRL_{i,t} + \varepsilon_{i,t} \quad (2)$$

where

$R_{i,t}$ = performance measure of the firm.
$\sigma_{i,t}$ = risk measured by past volatility estimated on a rolling basis over the previous 6 years.

SIZE, AGE, LEV and LIQ are firm size, firm age, firm leverage, and firm liquidity, respectively, and DIVDUMRL is the dummy variable representing related diversification in a firm, as defined above (see footnote 2). All these variables are used to control for firm-level heterogeneity, and the rationale for this is discussed above in Section 2.

We use a pooled-panel regression with fixed-effects correction (firm and year fixed effects) using data from both emerging and developed countries. We first check the validity of the random-effects model vis-à-vis a fixed-effects model based on the Hausman (1978) test ($\chi^2 = 51.20$; $p < 0.001$ for above-median model and $\chi^2 = 22.82$; $p < 0.001$ for below-median model) and find support for using the fixed-effects model.

If the slope coefficient β_1 in Eq. (2) above is positive and significant, it would imply a conventional positive risk-return association, while an insignificant or negative β_1 would indicate evidence of a paradox.[4] We run the model for all firms, firms from emerging and developed countries. We present the findings in the next section.[5]

3.8. Testing the impact of corporate governance on the risk-return association

We then proceed to test the impact of corporate governance on the risk-return association, in line with Hypotheses 3 and 4. For that, we sort all sample firms for each year in descending order of their *CG scores* and create four subdivisions, as follows: i) *Strong* CG (in top 90%-100%), ii) *High CG* (in top 60–90%), iii) *Medium CG* (30–60%), and iv) *Low CG* (bottom 30%). We then carry out univariate analyses as well as multivariate analyses within these CG-based subsamples to check the impact of CG on the risk-return relation of firms. We further explore the impact of individual CG variables on the risk-return association. For that, we run Model (2) exclusively within subsamples created based on individual CG variables. The purpose of this exercise is to further explore which of the chosen sets of CG variables are most significant in impacting the risk-return association, beyond just testing Hypotheses 3 and 4 above. The findings are reported in the next section.

4. Empirical results

4.1. Descriptive statistics and correlations results

Table 3 presents the descriptive statistics and cross correlations across the main variables of interest in the study. We observe higher variability in cash ratio and leverage and tighter ranges in size, age, and liquidity amongst our sample firms. The variance inflation factors (VIFs) are also represented in the table, which confirms the absence of any significant multicollinearity problems in our dataset (all VIFs are < 10). We find that the size of a firm has a significant negative association with firm performance for both ROA and CR measures. Firm leverage also shows a similar relationship with firm performance. Firm liquidity negatively impacts firm performance only under the CR measure. However, firm age has a significant positive impact on firm performance. In general, all firm-level control variables are negatively associated with ROA variability (ROAσ), but mixed evidence is found in the case of CR variability (CRσ).

[3] We use ROA and CR as performance measures under the primary analysis and ROE as a performance measure under one of the robustness tests.
[4] Given a certain reported return performance we are trying to figure out the risk-level assumed by the firm to generate that return. Hence, we use risk (σ) as the independent and return as the dependent variable in our model.
[5] Since we already control for size, age, leverage, and liquidity of the firms within the model itself, we do not run the model within sub-samples based on these parameters.

Table 3
Descriptive statistics and correlations results.

Variables	N	Mean	Median	σ	p25	p75	ROA	ROAσ	CR	CRσ	SIZE	AGE	LEV	LIQ
ROA	26,582	4.84	3.88	7.83	1.23	7.85	1							
ROAσ	26,658	3.52	2.13	4.75	1.07	4.19	0.024**	1						
CR	26,645	7.41	6.73	12.38	2.04	12.03	0.409**	0.045**	1					
CRσ	26,640	5.57	3.88	8.12	2.13	6.80	0.001	0.012	-0.021**	1				
SIZE	26,658	4.42	4.18	1.22	3.53	5.24	-0.038**	-0.222**	-0.058**	0.016**	1			
AGE	26,660	1.42	1.34	0.32	1.18	1.67	0.040**	-0.099**	0.047**	-0.016*	0.403**	1		
LEV	26,658	25.07	23.47	17.72	11.26	36.29	-0.233**	-0.079**	-0.175**	−0.004	0.017**	-0.051**	1	
LIQ	26,577	3.19	2.99	1.27	2.36	3.94	0.005	-0.179**	-0.033**	0.016**	0.908**	0.334**	-0.063**	1
VIF							1.245	1.060	1.041	1.002	6.488	1.217	1.079	6.027

This table presents the descriptive statistics (mean, median, p25, p75, standard deviation [σ]) and correlations results of our studied variables. N denotes number of observations. SIZE, AGE and LIQ are log normalized. ROA denotes return on assets and CR implies cash ratio. LEV stands for leverage and LIQ indicates liquidity. Variance inflation factors [VIFs] confirm the absence of multicollinearity in our dataset [all VIFs are < 10]. Here, ** implies $p < 0.01$, and * denotes $p < 0.05$.

Univariate analysis of the full sample, economic development- and CG score-based subsamples

Tables 4-7 present the univariate test results. Tables 4 represent univariate test results for the full sample, developed countries, and emerging countries, while Table 5 presents the results of univariate tests within CG score-based subsamples. We observe that for firms that are 'above-median' in performance, the risk-return association is mostly positive/regular (R), which we infer from the monotonously increasing risk across return quintiles q1 through q5. For the below-median firms, however, the pattern reverses completely, i.e., the risk-return association is either negative or paradoxical (P). Just a few cases show U-shaped relation across results. This pattern seems to be robust and does not change across different performance measures (ROA or CR), different countries (developed or emerging), or CG scores. We thus find strong support for Hypotheses 1 and 2. An interesting observation here is that the only exceptions in this extremely robust pattern are the firms with high CG scores. For them, the relationship is positive irrespective of whether the firm is above or below the median in performance. In summary, apart from CG levels of firm, neither the level of economic growth of a country nor the choice of performance measures seem to have any effect on the pattern. Hence, there seems to be some support for Hypotheses 3 and 4.

4.2. Univariate analysis of country and firm heterogeneity-based subsamples

The potential influence of country-specific heterogeneity (legal system, culture, and investor protection rights) and firm-specific heterogeneity (market power in terms of size and age, previously existing risk proxied by leverage and liquidity) is already highlighted in Section 2.

First, to explore the impact of country-level heterogeneity, we form the following:

I. Three groups under the legal system, namely, '*Civil French*', '*Civil German*', and '*Common-law*' countries.
II. Two groups under investor protection rights, namely, '*strong*' and '*weak*' investor protection. For this, in line with La Porta et al. (1997, 2008), we use six important parameters[6] related to voting rights, also referred to as 'anti-directors' rights'. We create a score using these parameters, where the existence of such parameters in the company laws of respective countries would earn a score of 1. Therefore, a total score of 6 would be for countries offering the best investor protection, and a score of 0 implies the minimum possible protection. We categorize all countries from our sample as 'strong' investor protection rights countries if the overall score is above three and the remaining countries under 'weak' investor protection rights.
III. Two groups are created under national culture, namely, 'risk-taking' culture and 'risk-averse' culture. As mentioned before, in Section 2, we use UAI (uncertainty-avoidance index) and power-distance index (PDI) for the classification of firms into 'risk-taking' and 'risk-averse' categories. In this study, we use an average of these scores based on Hofstede (2001).[7] The low score firms that fall below our threshold score of 119[8] (1850 firms in total representing 12 countries) are classified under high 'risk-taking' cultures, and high score firms are considered under 'risk-averse' culture.

[6] These parameters are: allowance of a proxy vote by e-mail, restrictions to block shares before the general meeting, proportional representation by minority shareholders, rights to minority shareholders to challenge the directors' decision in court and the right to force the company to repurchase the shares, shareholders' pre-emptive rights to buy the new issue and percentage of shareholders' capital needed to call extraordinary shareholder's meetings.

[7] https://www.hofstede-insights.com/product/compare-countries.

[8] This is the average national culture score [see last column of Table 1] as calculated by dividing sum of culture score (3209) by the number of sample countries (i.e., 27).

Table 4
Univariate Analysis Results – full and economic development- based sample firms.

Variables	Above median					Summary	Below median					Summary
	q1	q2	q3	q4	q5		q1	q2	q3	q4	q5	
ROA (Overall)	−0.08	0.33	0.94	1.80	3.40	R	−8.16	−5.95	−4.83	−4.03	−3.40	P
ROA_{σ} (Overall)	2.31	2.61	2.81	3.14	3.51		6.61	4.94	4.33	4.02	3.76	
CR (Overall)	0.03	0.67	1.40	2.40	6.75	R	−20.51	−13.36	−10.16	−8.16	−6.75	P
CR_{σ} (Overall)	4.51	4.73	4.79	4.94	8.05		19.12	12.87	10.43	8.92	7.97	
ROA (Developed)	−0.04	0.33	0.86	1.67	3.15	R	−7.55	−5.58	−4.51	−3.74	−3.13	P
ROA_{σ} (Developed)	2.35	2.59	2.80	3.21	3.52		5.68	4.14	3.84	3.63	3.47	
CR (Developed)	−0.09	0.41	0.97	1.73	3.61	R	−8.45	−6.34	−5.11	−4.26	−3.59	P
CR_{σ} (Developed)	2.67	2.95	3.17	3.48	4.10		5.36	4.37	3.81	3.60	3.41	
ROA (Emerging)	0.00	0.42	1.00	1.82	3.42	R	−8.39	−6.17	−4.94	−4.08	−3.41	P
ROA_{σ} (Emerging)	2.41	2.60	2.81	3.09	3.46		6.72	5.21	4.57	4.22	3.95	
CR (Emerging)	−0.18	0.62	1.54	2.71	8.98	R	−28.66	−17.88	−13.43	−10.79	−8.95	P
CR_{σ} (Emerging)	5.98	5.99	6.12	6.40	11.49		29.71	18.67	14.71	12.63	11.33	

This table presents pooled mean values of firms' industry-adjusted return (i.e. IAP) measures and the corresponding risks (i.e. SD of ROA and CR) for the overall sample and within firms' sub-samples based on economic status. The classification schemes are discussed at length in the text. We also present a *summary* of such risk-return association at the two end columns of both sides. Here, R denotes regular risk-return association (i.e. positive), where the risk increases monotonously within return quintiles 1 (q1) through 5 (q5). P represents paradoxical risk-return relationship (i.e. negative) and U represents a u-shaped risk-return association where risk return relation is first positive and then negative or vice-versa. All the means are significant at 5% level of significance. Hence, we do not report the significance separately.

Table 5
Univariate Analysis Results – CG classification-based sub-samples.

Variables	Above median					Summary	Below median					Summary
	q1	q2	q3	q4	q5		q1	q2	q3	q4	q5	
ROA (Strong CG)	0.83	1.33	2.00	2.83	4.48	R	0.70	1.19	1.85	2.69	4.38	R
ROA_{σ} (Strong CG)	3.72	3.70	3.68	4.14	4.38		2.36	2.66	2.89	3.24	3.60	
CR (Strong CG)	0.95	1.47	2.10	3.09	5.28	R	3.32	4.46	5.71	7.27	10.53	R
CR_{σ} (Strong CG)	3.41	3.58	3.77	4.17	4.77		7.31	7.39	8.04	29.90	78.07	
ROA (High CG)	1.09	2.25	3.47	5.10	10.15	R	−1.38	−0.74	0.06	1.06	11.34	R
ROA_{σ} (High CG)	8.58	8.62	8.92	9.48	11.37		5.93	6.11	6.47	6.62	16.35	
CR (High CG)	0.95	1.47	2.10	3.09	5.28	R	0.89	1.46	2.10	2.99	4.78	R
CR_{σ} (High CG)	3.41	3.58	3.77	4.17	4.77		2.65	2.84	3.16	3.58	3.88	
ROA (Medium CG)	1.09	2.25	3.47	5.10	10.15	R	−7.27	−5.11	−3.90	−3.07	−2.43	P
ROA_{σ} (Medium CG)	8.58	8.62	8.92	9.48	11.37		6.74	5.00	4.33	3.85	3.50	
CR (Medium CG)	0.45	1.01	1.64	2.56	4.50	R	−9.98	−7.38	−5.96	−5.01	−4.27	P
CR_{σ} (Medium CG)	3.72	3.85	4.02	4.28	4.85		7.39	6.30	5.36	4.94	4.67	
ROA (Low CG)	1.02	1.58	2.30	3.19	4.86	R	−8.47	−5.95	−4.61	−3.63	−2.86	P
ROA_{σ} (Low CG)	3.37	3.18	3.45	3.87	4.23		6.73	5.05	4.59	4.22	3.90	
CR (Low CG)	0.54	1.21	1.92	2.89	5.13	U	−36.70	−21.75	−15.71	−12.28	−9.89	P
CR_{σ} (Low CG)	4.20	4.15	4.24	4.52	5.28		40.83	24.80	18.95	15.71	13.66	

This table presents pooled mean values of firms' industry-adjusted return (i.e. IAP) measures and the corresponding risks (i.e. SD of ROA and CR) for firms' sub-samples based on CG classifications. The classification is based on - i) Strong CG (in top 90%-100%), ii) High-CG (in top 60–90%), iii) Medium-CG (30–60%), and iv) Low-CG (bottom 30%). We also present a *summary* of such risk-return association at the two end columns of both sides. Here, R denotes regular risk-return association (i.e. positive), where the risk increases monotonously within return quintiles 1 (q1) through 5 (q5). P represents paradoxical risk-return relationship (i.e. negative) and U represents a u-shaped risk-return association where risk return relation is first positive and then negative or vice-versa. All the means are significant at 5% level of significance. Hence, we do not report the significance separately.

Accordingly, we carry out a similar univariate analysis within each of these subgroups based on country-heterogeneity factors.[9] Table 6 provides a summary of the results obtained from the univariate tests within subsamples based on country-level heterogeneity (legal system, national culture, and investor protection). These tests are conducted by pooling all firm-level data for each country within each category. The numbers in the cells indicate the number of countries out of the total 27, which on average indicate a positive (R), negative (P), or U-shaped risk-return association. Once again, we observe that, on average, the risk-return association is positive (R) for above-median firms, while it is negative (P) for below-median firms

[9] For the sake of brevity, in Table 4 we do not present the individual mean risk measures within each quintile but instead present the summary inference about the relation in terms of positive(R), negative(P) and U-shaped relationship.

Table 6
Univariate Analysis Results – legal system-, investor rights- and national culture-based sub-samples.

Panel A. Legal system - Above median firms						
Variables	Common Law countries		French Civil Law countries		German Civil Law countries	
	ROA	CR	ROA	CR	ROA	CR
R	9	9	6	6	2	6
U	2	2	4	4	4	0
Total	11	11	10	10	6	6
Panel B. Legal system - Below median firms						
P	6	8	5	6	5	5
U	5	3	4	3	1	1
Total	11	11	9*	9*	6	6
Panel C. Investor rights – Above median firms						
Variables	Strong rights		Poor rights			
	ROA	CR	ROA	CR		
R	10	10	7	11		
U	4	4	6	2		
Total	14	14	13	13		
Panel D. Investor rights – Below median firms						
P	9	11	7	8		
U	5	2	5	5		
Total	14	13*	12*	13		
Panel E. National culture – Above median firms						
Variables	Risk-taking		Risk-averse			
	ROA	CR	ROA	CR		
R	10	12	7	9		
U	4	2	6	4		
Total	14	14	13	13		
Panel F. National culture – Below median firms						
P	9	10	7	9		
U	4	4	6	3		
Total	13*	14	13	12*		

* 1 country has regular (R) risk-return association.

This table presents a country-summary of association of risk (i.e. SD of ROA and CR) and industry-adjusted performance (ROA and CR) within firms' sub-samples based on legal system (Common Law – 11 countries, French Civil Law – 10 countries and German Civil Law – 6 countries), investor rights (strong investor rights – 14 countries and poor investor rights – 13 countries) and national culture (risk-taking – 14 countries and risk-averse – 13 countries). More specifically, these document the number of countries showing positive or Regular(R), negative or Paradoxical (P) and U-shaped(U) risk-return association under these sub-samples.

Table 7
Univariate Analysis Results – size, age, leverage and liquidity- based sub-samples.

Panel A: Above median								
Variables	Small	Large	Young	Old	Low leverage	High leverage	Low liquidity	High liquidity
ROA	R	R	U	R	R	U	U	R
CR	U	R	R	R	U	R	R	R
Panel B: Below median								
ROA	P	P	P	P	P	P	P	P
CR	P	P	P	P	P	P	P	P

This table presents a *summary* of risk (i.e. SD of ROA and CR) and return (industry-adjusted returns [i.e. IAP of ROA and CR]) association for firms' sub-samples based on size, age, leverage and liquidity classifications. The classification schemes are discussed at length in the text. Here, R denotes regular risk-return association (i.e. positive), where the risk increases monotonously within return quintiles 1 through 5. P represents paradoxical risk-return relationship (i.e. negative) and U represents a u-shaped risk-return association where risk return relation is first positive and then negative or vice-versa. We do not present the corresponding pooled mean values for the sake of brevity.

irrespective of categories based on the legal system, national culture or investor protection. Thus, country-level heterogeneity seems to have no effect on the risk-return association we have observed thus far. Thus, we find no support for Hypothesis 5.

Furthermore, in addition to controlling for firm-level heterogeneity in our regression models, to further substantiate the findings, we create subsamples based on firm-level traits such as firm size, age, leverage, and liquidity and carry out a uni-

variate analysis within those subsamples. For this, we sort all sample firms for every year in descending order by their *size* and consider the top 30% of firms to be 'large firms' and the bottom 30% to be 'small firms'. Along similar lines, we classify firms into 'old' and 'young' (using 'firm-age'), 'high leverage' and 'low leverage' (using the D-E ratio), 'high-liquidity', and 'low-liquidity' firms (using cash and cash equivalent holdings).

Table 7 displays the results of this analyses. In the case of firms below the median, we observe a paradoxical risk-return association across all subsamples. For above median firms, on the other hand, we mostly find a regular association (R) with a few exceptions, where a mixed pattern of R- and U-type relations are observed.

In summary, the results of the univariate analysis indicate that country-level and firm-level heterogeneity do not have any significant differential impact on a firm's risk-return association. Corporate governance, on the other hand, has a significant impact on such a risk-return association. We discuss the implications of these results in detail in the next section.

4.3. Multivariate analysis results

Table 8 presents the results of the multivariate regression models for all firms and firms within the CG score-based partitions. We observe that the coefficients of both ROAσ and CRσ are positive and significant for firms above the median and negative and significant for firms below the median. A majority of the control variables are significant and have the expected signs in line with the arguments presented before in section 2 above. Coefficient of size is generally (with a few exceptions) negative, while the coefficients of liquidity and leverage are positive, for the overall pooled sample as well as for subsamples based on developed and emerging markets. The impact of the other control variables used (namely, age and related diversification), is not conclusive. In summary, the regression results generally ratify our preliminary observations from univariate analysis.

Table 9 presents the results of the same regression model run for CG score-based subsamples. Once again, the results from the univariate analysis are reinforced here. The coefficients of ROAσ and CRσ are positive for above-median firms, as well as for firms that are below the median but with strong corporate governance. Below-median firms with weak corporate governance are negative and significant. The impact of other control variables is similar to that for the full sample with few variations, as mentioned above. These observations ratify the primary findings from the univariate analyses. It is apparent that the 'value-reducing risk-taking' by managers (referred to in Section 2) of below-median (poorly performing) firms with weak corporate governance can be a significant contributor to the paradoxical risk-return association.

Having seen preliminary evidence that corporate governance plays a significant role in moderating the negative risk return relation for poorly performing firms, we delve deeper into the issue. We next explore the relative importance of each individual CG variable on the risk-return relation by running regression Model (2) within subsamples created based on them within the broad category of firms below the median (for which the inverse risk-return relation is found). The results are presented in Table 9 below. We find that board size, board independence, female directors, board experience and board quality are the most important CG variables that contribute significantly to moderating the observed negative risk-return relation in poorly performing firms. The other three variables (board tenure, board experience and board involvement) do not exhibit any significant impact, and for the sake of brevity, we do not report the results for them here.

5. Additional analyses

5.1. Running quantile regression for various return quantiles

To further establish the nonlinearity in the risk-return relationship, we carry out quantile regressions within return (R) quantiles using the multivariate Model (2) above in line with Li (2015). If the coefficients of $\sigma_{i,t}$ are different for various R quantiles, then that would indicate nonlinearity. We adopt this approach for two reasons. First, the classical properties of the OLS estimator, i.e., efficiency and minimum variance, are obtained under the restrictive assumption of IID, i.e., independently and identically (normally) distributed error terms. When the distribution of errors deviates from normality, the quantile regression estimator might be more efficient than the ordinary OLS. Second, we derive the quantile regression estimator by minimizing a weighted sum of absolute deviations. Accordingly, the parameter estimates are less sensitive to outliers and fat tails in the distribution of data, similar to ours. Thus, the quantile regression estimator is relatively robust to residual heteroscedasticity (Buchinsky, 1998). Therefore, we adopt this approach in line with Li (2015), who also demonstrates that the quantile regression method is better capable of capturing real associations between dependent and independent variables in the presence of nonlinearity, particularly for fat-tailed data distributions.

Table 10 reports the results of quantile regression. We find that the overall CG score has a significant positive impact specifically in lower quintiles for firms below the median. This further substantiates our earlier observation that corporate governance for a poorly performing (below median) firm has a strong positive impact on mitigating the 'value-reducing risk-taking' of managers for such firms, which, in turn, can be a significant contributor to the paradoxical risk-return association. However, for firms with a median greater than the standard, the risk return association is already positive, and the impact of CG across different performance quintiles is not conclusive.

Table 8
Regression Results.

Panel A. All countries – above median										
Variables	ROA					CR				
	All firms	Strong CG (>90%)	High CG (60–90%)	Medium CG (30–60%)	Low CG (<30%)	All firms	Strong CG (>90%)	High CG (60–90%)	Medium CG (30–60%)	Low CG (<30%)
Constant	0.048***	2.153**	4.261**	0.012**	0.011**	0.019**	1.134**	2.991**	0.004**	0.004**
σ	0.136***	0.317***	0.095*	0.063**	0.060**	0.092**	0.179**	0.027**	0.042**	0.027**
SIZE	−0.004***	−0.005*	0.000	−0.002*	−0.002*	−0.001**	−0.001*	0.000	−0.002	−0.002
AGE	−0.003***	−0.039**	−0.012*	−0.002*	−0.001*	−0.002	−0.007	−0.003	−0.001	−0.001
LEV	0.002	0.041*	0.036*	0.018**	0.016**	0.002**	0.025*	−0.037	0.003*	0.012*
LIQ	0.003***	−0.000	−0.000	0.004**	0.003**	0.001**	−0.000	−0.000	0.033*	0.001*
DIVDUMRL	0.006	−2.805	−1.071	−0.001	−0.001	0.003	−1.113	−0.337	−0.001	−0.002
Adj. R^2	21.8%	29.1%	33.1%	24.7%	29.6%	23.2%	36.5%	34.0%	27.5%	35.0%
Panel B. All countries – below median										
Constant	0.130***	3.556**	6.114	7.003**	5.207**	0.088**	3.173**	5.664**	1.21**	2.834**
σ	−0.504***	**0.159*** **	**0.056***	−0.335**	−0.092**	−0.461***	**0.114** **	**0.037** **	−0.058**	−0.061**
SIZE	−0.013***	−0.000	0.000	−0.000	−0.000	−0.009**	−0.000	0.000	−0.000	−0.000
AGE	−0.005	−0.017	−0.019*	−0.012*	−0.006	−0.004	−0.008	−0.002	−0.005	−0.002
LEV	0.002	0.003*	0.046***	0.063**	0.028*	0.002**	0.002*	−0.010	−0.037	−0.013
LIQ	0.007***	0.024*	−0.000	0.028*	0.026*	0.005**	0.013*	−0.000	0.000	0.000
DIVDUMRL	−0.015	−1.485	−3.031	−0.027	−0.013	−0.012	−0.663	−1.682	−0.025	−0.006
Adj. R^2	23.6%	38.4%	33.9%	26.6%	26.6%	21.0%	30.1%	34.9%	25.0%	31.7%

Panel C. Developed and emerging countries								
	Developed countries				**Emerging countries**			
	Above median		**Below median**		**Above median**		**Below median**	
	ROA	**CR**	**ROA**	**CR**	**ROA**	**CR**	**ROA**	**CR**
Constant	0.097***	0.03**	0.217***	0.153**	0.025***	0.021**	0.075***	0.066**
σ	0.091**	0.049**	−0.491***	−0.384**	0.163***	0.143**	−0.498***	−0.495**
SIZE	−0.007***	−0.001**	−0.019***	−0.016**	−0.003***	−0.001**	−0.001	−0.001**
AGE	−0.009***	−0.003	−0.005**	−0.005	−0.002	−0.001	−0.003	−0.003
LEV	0.003	0.001*	−0.013	0.009**	0.032***	0.011**	−0.006	0.005**
LIQ	0.005***	0.004*	0.01***	0.009**	0.002*	0.002**	0.003*	0.003**
DIVDUMRL	0.006	0.006	−0.059***	−0.05	−0.001	0.003	0.009***	0.005
Adj. R^2	26.0%	29.9%	31.3%	29.5%	29.9%	36.5%	38.1%	33.0%

Model 1 $R_{i,t} = \alpha + \beta_1\sigma_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AGE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 LIQ + \beta_6 DIVDUMRL_{i,t} + \varepsilon_{i,t}$.
This table presents the regression results for firms from all, emerging and developed countries, and also sub-samples based on corporate governance scores of firms from all countries by classifying them in above median and below median firms. Here, SD of ROA and CR is the independent variable and industry-adjusted return (i.e. IAP) measures (i.e. ROA and CR) are the main dependent variable respectively. We also incorporate the firm-controls of size, age, leverage and liquidity and a dummy variable for firms which diversify in related industries.
*** It implies coefficient is significant at 1% level.
** It implies coefficient is significant at 5% level.
* It implies coefficient is significant at 10% level.

5.2. Robustness tests

We carry out several robustness tests to validate the results that we obtain in the primary analysis. First, this study uses return-on-equity (ROE) as an alternate return measure to check whether its findings from the main analysis are contingent on the choice of performance measures. As pointed out in Table 2, we calculate ROE by dividing net income implying profit-after-tax (PAT) by equity, which denotes shareholders' equity average for the year (after adjusting for share buybacks).

Second, *the 'leverage hypothesis'* (Black, 1976) posits the possibility of the existence of an asymmetric association between the volatility index and stock market movements. Therefore, this can presumably be extended to the firm-level risk-return association as well. Therefore, the association between a firm's operating performance and risk levels could vary across different market cycles. To explore that, we repeat the entire univariate analysis, as explained in Section 3, within subsamples based on bull and bear periods separately. We identify the bull and bear subperiods for each country by comparing its benchmark index's returns with the MSCI World index's returns for each study year on a rolling basis (see Dasgupta and Pathak, 2018). If the benchmark index return for a specific year is higher (lower) than the MSCI World index's yearly return, then we designate it as being in the bull (bear) period in that year. We pool all firm years in bull periods and bear periods separately across countries and repeat the entire univariate analysis separately for the pooled subsamples. We discuss the results in detail in the next section.

Table 9
Regression Results under high and high-medium CG classifications (below median firms).

Panel A: ROA										
Variables	Board size (BS)		Board independence (BI)		Women directors (WD)		Board experience (BE)		Directors quality (DQ)	
	Strong BS (>90%)	High BS (60–90%)	Strong BI (>90%)	High BI (60–90%)	Strong WD (>90%)	High WD (60–90%)	Strong BE (>90%)	High BE (60–90%)	Strong DQ (>90%)	High DQ (60–90%)
Constant	−3.049	9.279	7.995	10.371	−0.088	12.511*	1.871	9.529	−1.351	9.433
σ	**0.139****	**0.503*****	**0.240*****	**0.431*****	**0.527*****	**0.151****	**0.334*****	**0.382*****	**0.476*****	**0.215*****
SIZE	−0.386**	0.077	0.155	0.351	−0.162	0.579*	0.388	−0.041	0.082	0.277
AGE	1.433**	−0.080	0.125	−0.846	0.209	0.357	−0.577	0.961	0.412	0.163
LEV	−0.015	−0.039**	−0.106***	−0.058***	−0.010	−0.071***	−0.154***	−0.041**	−0.102***	−0.032**
LIQ	0.072	−0.185	−0.007	−0.095	0.051	−0.111	−0.190	−0.024	−0.110	−0.046
DIVDUMRL	−0.023	0.140	0.705	0.958	0.299	1.127	0.160	0.937	0.123	0.931
Adj. R^2	36%	31%	37.91%	32%	37.88%	32.79%	41.60%	26.07%	37.07%	27.05%
Panel B: CR										
Constant	−9.358	19.943	−9.817	25.053**	−1.774	34.222**	−0.175	27.615***	17.096**	27.615***
σ	**0.250*****	**0.114****	**0.195*****	−0.018	0.056	**0.514*****	0.088	**0.080***	**0.117***	**0.080***
SIZE	1.153***	0.121	0.306	−0.147	0.004	−0.529	−0.049	0.471	0.830**	0.471
AGE	−2.561**	0.245	0.419	1.730	1.965	1.840	0.156	0.057	−1.032	0.057
LEV	0.007	−0.080**	−0.030	−0.049	−0.140***	−0.056*	−0.027	−0.065***	−0.075**	−0.065***
LIQ	0.486**	0.546	0.706***	0.226	0.365	0.873**	0.724**	0.143	0.544**	0.143
DIVDUMRL	−0.079	1.763	−0.139	2.161	0.285	2.615	0.459	2.299	1.609	2.299
Adj. R^2	46.61%	34.47%	36.29%	48.12%	46.60%	51.60%	52.04%	46.11%	43.16%	46.11%

Model 1 $R_{i,t} = \alpha + \beta_1\sigma_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AGE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 LIQ + \beta_6 DIVDUMRL_{i,t} + \varepsilon_{i,t}$.
This table presents the regression results for below median firms from all countries under individual element's corporate governance score-based classification of strong CG (>90%) and high CG (60–90%). Here, SD (σ) of ROA and CR is the main independent variable and industry-adjusted return (i.e. IAP) measures (i.e. ROA and CR) are the dependent variable respectively. We also incorporate the firm-controls of size, age, leverage and liquidity and a dummy variable for firms which diversify in related industries.
*** It implies coefficient is significant at 1% level.
** It implies coefficient is significant at 5% level.
* It implies coefficient is significant at 10% level.

Table 11 presents the univariate analysis results under the robustness tests using the alternate performance measure (ROE) and analysing over bull and bear market cycles separately. We could see clear evidence of regular (i.e., positive) asso-

Table 10
Quantile Regression Results for below and above median firms.

Variables	Below median					Above median				
Panel A: ROA										
	q1	q2	q3	q4	q5	q1	q2	q3	q4	q5
Constant	−0.010	0.023**	0.040***	0.063***	0.045***	0.087***	0.098***	0.127***	0.219***	0.330
σ	−0.739***	−0.212***	−0.125***	−0.029	−0.000	−0.002	0.089**	0.168***	0.248***	1.800***
CG	0.001***	0.001**	0.001*	0.000	0.000	0.000	0.001***	0.002**	0.001	0.014
SIZE	−0.003**	−0.008***	−0.013***	−0.012***	−0.001	−0.008***	−0.020***	−0.029***	−0.038***	−0.110**
AGE	0.002	0.004**	0.006**	0.005***	−0.000	0.001	0.006**	−0.004	−0.012*	−0.100
LEV	0.015***	0.016***	0.015***	0.008**	0.002	−0.031***	−0.054***	−0.073***	−0.091***	−0.176*
LIQ	−0.001	0.000	0.002***	0.003***	0.000	0.003***	0.007***	0.013***	0.020***	0.064*
DIVDUMRL	−0.043	−0.003	−0.006*	−0.017***	−0.022	0.003	−0.009***	−0.015	0.032	−0.003
Panel B: CR										
Constant	0.017	0.046**	0.091***	0.107***	0.094***	0.132*	0.153	0.193	0.316**	1.018
σ	−0.518***	−0.376***	−0.168***	−0.105***	−0.006**	0.070	0.069	0.067	0.219	1.740
CG	0.003***	0.003***	0.002**	0.001***	0.000	0.000	0.002	0.002	0.000	−0.023
SIZE	−0.021***	−0.030***	−0.031***	−0.025***	−0.001***	−0.009**	−0.018**	−0.026**	−0.031***	−0.061
AGE	−0.003	0.000	0.002	0.002	0.000	−0.007	−0.011**	−0.016**	−0.035***	−0.018
LEV	0.041***	0.040***	0.037***	0.022***	0.001***	−0.035***	−0.067***	−0.097***	−0.110***	−0.073
LIQ	0.006***	0.012***	0.013***	0.010***	0.000**	0.006**	0.009	0.012	0.016***	0.062
DIVDUMRL	−0.045	−0.001	0.010***	0.004	−0.002***	0.015	0.018	0.088	0.089***	0.043

This table reports the quantile regression results for below and above median firms. Here, SD (σ) of ROA and CR is the main independent variable and industry-adjusted return (i.e. IAP) measures (i.e. ROA and CR) are the dependent variable respectively. We also incorporate the firm-controls of size, age, leverage and liquidity and a dummy variable for firms which diversify in related industries.
*** It implies coefficient is significant at 1% level.
** It implies coefficient is significant at 5% level.
* It implies coefficient is significant at 10% level.

Table 11
Robustness Tests - univariate analysis results.

Variables	All countries		Developed countries		Emerging countries	
	Above median	Below median	Above median	Below median	Above median	Below median
Panel A. Robustness test 1: using ROE as performance measure						
ROE	R	P	R	P	R	P
ROE (small firms)	R	P	R	P	U	P
ROE (large firms)	R	U	R	P	R	P
ROE (young firms)	R	U	R	P	R	P
ROE (old firms)	R	P	R	P	R	P
ROE (low leverage firms)	R	U	R	P	U	P
ROE (high leverage firms)	R	P	R	P	R	P
ROE (low liquidity firms)	R	P	R	P	R	P
ROE (high liquidity firms)	R	U	R	P	R	P
Panel B1. Robustness test 2: bull period*						
ROA	U	P	U	P	R	P
ROE	R	P	R	P	R	P
CR	R	P	R	P	R	U
Panel B2. Robustness test 2: bear period*						
ROA	U	U	R	P	P	P
ROE	R	R	U	P	P	P
CR	R	U	U	P	U	P

This table presents a summary of risk (i.e. SD) and return (industry-adjusted returns [i.e. IAP]) association for firms from all countries, developed countries and emerging countries under two main robustness tests i.e. ROE return measure and bull and bear periods sub-samples under our all sample-partitions. Here, R denotes regular risk-return association (i.e. positive), P represents paradoxical risk-return relationship (i.e. negative) and U represents a u-shaped risk-return association. We do not present the corresponding pooled mean values for the sake of brevity.
* All these robustness tests are also carried out on -samples based on country level heterogeneity (legal system, culture and investor protection). These results are also mostly in line with our earlier principal results. So, we do not report those results here separately for the sake of brevity.

ciation between risk and return for above-median firms and paradoxical relation for below-median firms. Table 12 shows the multivariate regression results under robustness tests, again using ROE as an alternate performance measure and analysing over bull and bear market cycles. Once again, our principal findings are firmly ratified. We find a positive risk-return association for above-median firms. For below-median firms, the relation is significantly negative except for those who have strong corporate governance[10]. Table 13 shows the multivariate regression analysis results within subsamples created based on the individual CG variables chosen. These subsamples demonstrate reasonable support for our main analyses by highlighting the relative importance of five specific CG variables from the set of eight originally chosen variables that moderate the generally robust risk-return pattern that we observe otherwise. We discuss the implications of the findings in the next section.

6. Summary and conclusion

This study explores the previously reported 'risk-return paradox' and examines whether the risk return relationship is contingent on measures of risk and return used, firm- or country-level heterogeneity, and market cycles. The study draws its primary motivation from the premise that prior knowledge of an established risk-return association is critical from the perspective of international firms. Such knowledge could help in shaping strategic decision-making processes involving risk or uncertainty, such as entering new markets, launching new products, and exploring new ways to prune costs. Managers need to undertake high-risk investments only if they yield commensurately higher returns for shareholders (Chari et al., 2019). We use accounting risk and return data from a sample of 45,322 firm-years from 27 countries, representing emerging and developed economies. We control for a large number of potential factors that may influence firm-level risk and return association. Using several univariate, multivariate, and robustness tests, we find evidence of a partial paradox in the risk-return association, which is contingent on the current level of firm performance. Firms that are below the median, in terms of performance, exhibit a negative (i.e., paradoxical) risk-return association primarily, while the firms that are above the median exhibit mostly a regular or positive risk-return relationship. These findings are in line with some other studies, a majority of which were in the context of US markets (Lehner, 2000; Becerra and Markarian, 2013; Holder et al., 2016).

The principal contribution of this study is that we establish that managerial rent-seeking actions can contribute to this observed risk return paradox in a firm and that corporate governance has a moderating impact on this paradox. Our results show that firms with strong corporate governance can shape the relationship between a firms' risk and return to a regular one by aligning managerial and shareholder interests and reducing the impact of rent-seeking actions by managers. Previous theories, such as 'value-reducing risk-taking' by managers (Andersen et al., 2007; Chari et al., 2019) and 'managerial career

[10] In addition to the two robustness tests mentioned here, we conduct two more robustness tests: i) using performance measures adjusted over the firm's mean performance in the previous three years, and ii) using a winsorized sample to negate the effect of outliers. However, these robustness test results are more or less in line with our principal results. Hence, for the sake of brevity, we do not report them separately.

Table 12
Robustness Tests - Regression Results.

	All countries		Developed countries		Emerging countries		Above median (corporate governance)				Below median (corporate governance)			
Variables	Above median	Below median	Above median	Below median	Above median	Below median	Strong CG (>90%)	High CG (60–90%)	Medium CG (30–60%)	Low CG (<30%)	Strong CG (>90%)	High CG (60–90%)	Medium CG (30–60%)	Low CG (<30%)
Panel A. Robustness test 1: using ROE as performance measure														
Constant	0.0195**	0.123**	0.0423**	0.22**	0.0208**	0.078**	1.1877**	3.5226**	0.0064**	0.0038**	3.41**	6.136**	1.656**	3.937**
σ	0.0921**	−0.516***	0.0547**	−0.51***	0.1582**	−0.500**	0.2294**	0.034**	0.0627**	0.039**	0.125**	0.039*	−0.073**	−0.091**
Size	−0.001**	−0.013**	−0.002**	−0.019**	−0.001**	−0.001**	−0.000	0.000	−0.002	−0.002	−0.000	0.000	−0.000	−0.000
Age	−0.0021	−0.005	−0.004	−0.005	−0.0007	−0.003	−0.007	−0.005	−0.002	−0.001*	−0.009	−0.003	−0.006	−0.003
Leverage	0.002*	0.002**	0.001*	−0.013*	0.013**	−0.006***	0.027	−0.039*	0.005	0.014**	0.002	−0.014	−0.043	−0.015
Liquidity	0.001**	0.007**	0.004**	0.009**	0.002**	0.003**	−0.000	−0.000	0.003	0.001	0.000	−0.000	0.000	0.000
Related Div.	0.0035	−0.015	0.0063	−0.06	−0.0005	0.008	−1.255	−0.405	−0.001	−0.002	−0.670	−2.179	−0.026	−0.009
Adj. R^2	27.5%	20.7%	25.0%	33.8%	32.3%	25.3%	28.7%	24.3%	24.6%	27.1%	31.7%	26.9%	36.3%	29.6%
Panel B1. Robustness test 2: bull period#														
Constant	0.09***	0.207***	0.034*	0.119***	0.058***	0.086***	1.799**	3.561**	0.010*	0.009*	2.984***	5.130***	5.876***	4.369***
σ	0.126***	−0.461***	0.13***	−0.498***	0.123***	−0.447***	0.239**	0.072**	0.048**	0.045**	0.199**	0.070*	−0.418*	−0.115*
Size	−0.006***	−0.017***	−0.004	−0.008	−0.006***	−0.006**	−0.000	0.000	−0.002	−0.002	0.000	0.000	0.000	−0.000
Age	−0.008***	−0.003	0.002	0.003	−0.005***	−0.006**	−0.044	−0.014	−0.002	−0.001	−0.020	−0.022**	−0.014*	−0.007*
Leverage	−0.003	−0.017*	0.015*	−0.01	0.06	0.027**	0.034	−0.030	0.015	0.013	0.003	−0.054**	−0.074*	−0.033*
Liquidity	0.004**	0.006***	0.002	0.001*	0.004	0.003	0.000	−0.000	0.004*	0.003*	0.000	−0.000	0.000	0.000
Related Div.	0.01	−0.021	−0.003	0.006***	−0.014	0.031***	−2.133	−0.815	−0.001	−0.001	−1.153	−2.354	−0.021	−0.010
Adj. R^2	24.7%	21.0%	26.5%	38.2%	29.9%	31.6%	34.3%	39.0%	29.1%	34.8%	32.6%	28.8%	22.6%	22.6%
Panel B2. Robustness test 2: bear period#														
Constant	0.061**	0.161**	0.015**	0.104**	0.047**	0.067**	2.288***	4.529***	0.013***	0.012***	3.287***	5.652***	6.474***	4.813***
σ	0.023**	−0.307**	0.064**	−0.476**	0.061**	−0.386**	0.282***	0.085**	0.056**	0.053**	0.127**	0.045	−0.268**	−0.074**
Size	−0.002**	−0.01**	−0.004**	−0.005**	−0.004**	−0.005**	−0.000	0.000	−0.002	−0.002	0.000	0.000	0.000	−0.000
Age	−0.006	−0.002	0.002	0.002	−0.002	−0.004	−0.038	−0.012	−0.002	−0.001	−0.019	−0.021*	−0.014*	−0.007
Leverage	−0.003*	−0.012**	0.017**	−0.008**	0.039**	0.018**	0.040	−0.035	0.018	0.016	0.003	−0.048*	−0.065	−0.029*
Liquidity	0.001*	0.005**	0.001**	0.001**	0.004**	0.002**	0.000	−0.000	0.004	0.003	0.000	−0.000	0.000	0.000
Related Div.	0.003	−0.015	−0.002	0.005	−0.007	0.021	−2.801	−1.069	−0.001	−0.001	−1.371	−2.798	−0.025	−0.012
Adj. R^2	29.9%	28.5%	31.7%	27.0%	30.4%	38.6%	22.74%	25.87%	19.30%	23.13%	34.20%	30.19%	23.69%	23.69%

Model 1 $\sigma_{i,t} = \alpha + \beta_1 R_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AGE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 LIQ + \beta_6 DIVDUMRL_{i,t} + \varepsilon_{i,t}$.

This table presents the regression results of all, emerging and developed countries for above median and below median firms under two main robustness tests i.e. ROE return measure and bull and bear periods sub-samples under our all sample-partitions based on corporate governance scores. Here, SD of ROA (and ROE under the ROE return measure) is the independent variable and industry-adjusted return (i.e. IAP) measures (i.e. ROA [and ROE under the ROE return measure]) are the main dependent variable respectively. We also incorporate the firm-controls of size, age, leverage and liquidity and a dummy variable for firms which diversify in related industries.

*** It implies coefficient is significant at 1% level.

** It implies coefficient is significant at 5% level.

* It implies coefficient is significant at 10% level.

All these robustness tests are also carried out on -samples based on country level heterogeneity (legal system, culture and investor protection). These results are also mostly in line with our earlier principal results. So, we do not report those results here separately for the sake of brevity. Except ROE, in both robustness tests CR results are mostly in line with the ROA results. So, again we do not present these results for the sake of brevity.

Table 13
Robustness Tests - Regression Results under high and high-medium CG classifications (below median firms).

Panel A: ROE										
Variables	Board size (BS)		Board independence (BI)		Women directors (WD)		Board experience (BE)		Directors quality (DQ)	
	Strong BS (>90%)	High BS (60–90%)	Strong BI (>90%)	High BI (60–90%)	Strong WD (>90%)	High WD (60–90%)	Strong BE (>90%)	High BE (60–90%)	Strong DQ (>90%)	High DQ (60–90%)
Constant	−0.543	−9.983	7.785	−26.763	13.199	5.805	19.335	−0.944	86.114**	−0.324
σ	0.000	0.000	**0.128****	0.001	**0.212*****	0.000	**0.412*****	0.001	0.000	0.000
SIZE	0.106	2.153**	0.709	1.350	0.741	2.091**	2.177**	0.254	1.567	1.626**
AGE	−2.130	−6.386**	−0.182	−4.351*	−3.016	−2.237	−5.271*	0.143	−6.133*	−2.108
LEV	−0.172***	−0.254***	−0.326***	−0.316***	−0.150**	−0.380***	−0.511***	−0.170***	−0.440***	−0.168***
LIQ	1.117**	−0.368	0.414	−0.703	−0.652	−1.109*	0.203	−0.825	−0.639	−0.170
DIVDUMRL	0.261	−0.503	0.914	−1.775	1.173	0.549	1.534	0.249	5.561	0.524
Adj. R^2	32.62%	26.07%	21.53%	25.91%	28.78%	33.64%	26.73%	30.28%	31.24%	30.51%
Panel B: Bull sub-period (ROA)[#]										
Constant	0.464	−40.208**	−9.107*	−27.635**	−11.292*	−29.875**	−7.707	−45.204**	−5.046	−42.748***
σ	**0.202*****	**0.305*****	**0.169*****	**0.309*****	**0.261*****	**0.197*****	**0.298*****	**0.314*****	**0.258*****	**0.412*****
SIZE	1.108***	1.067*	0.009	0.597	0.765**	0.114	0.579**	1.551**	0.320	0.675
AGE	−2.094**	−2.645	0.442	−1.160	−1.994**	−0.357	−1.825**	−3.923**	−0.490	−1.314
LEV	−0.069***	−0.113***	−0.019*	−0.120***	−0.057***	−0.108***	−0.030**	−0.098***	−0.044***	−0.123***
LIQ	0.232	0.697	0.509**	0.919**	−0.034	1.436***	0.605***	0.574	0.125	0.918**
DIVDUMRL	0.365	−2.228	−0.269	−1.385	−0.515	−1.534	−0.150	−2.564	−0.056	−2.397
Adj. R^2	31.74%	28.01%	24.99%	34.11%	27.07%	36.42%	31.33%	26.73%	31.43%	32.01%
Panel C: Bear sub-period (ROA)[#]										
Constant	38.910**	−15.584	17.853	−6.208	4.869	−18.407	22.115	18.274	15.202	16.468
σ	−0.534***	0.037	−0.374***	0.002	**0.094***	0.091	−0.092	**0.323*****	**0.149****	**0.132***
SIZE	−1.437**	0.748	−1.446*	−1.455*	−0.333	−0.007	0.144	−1.114	−0.858	−0.170***
AGE	3.845**	−1.059	2.867	4.249	1.631	0.169	−1.010	3.884	2.616	−3.278**
LEV	−0.150***	−0.101***	−0.080**	−0.133***	−0.087***	−0.125**	−0.129***	−0.021	−0.118***	0.018
LIQ	0.846**	0.259	0.834*	0.614	0.933**	0.182	0.455	−0.161	−0.019	0.577
DIVDUMRL	2.753	−0.557	1.452	0.006	0.907	−0.726	1.809	1.922	1.318	1.754
Adj. R^2	51.77%	36.55%	41.29%	45.66%	49.76%	42.7%	46.67%	41.71%	49.5%	43.44%

Model 1 $R_{i,t} = \alpha + \beta_1 \sigma_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AGE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 LIQ + \beta_6 DIVDUMRL_{i,t} + \varepsilon_{i,t}$.

This table presents the regression results for below median firms from all countries under individual element's corporate governance score-based classification of strong CG (>90%) and high CG (60–90%) under our robustness tests for alternative return measure (i.e. ROE), and also under bull and bear sub-periods. Here, SD (σ) of ROA and CR is the main independent variable and industry-adjusted return (i.e. IAP) measures (i.e. ROA and CR) are the dependent variable respectively. We also incorporate the firm-controls of size, age, leverage and liquidity and a dummy variable for firms which diversify in related industries.

*** It implies coefficient is significant at 1% level.

** It implies coefficient is significant at 5% level.

* It implies coefficient is significant at 10% level.

[#] CR results under bull and bear sub-periods are mostly in line. Accordingly, here we don't report these results for the sake of brevity.

concerns' (Dewatripont et al., 1999), are posited as potential explanations for the risk-return paradox. Our results thus provide empirical validation of these explanations in a cross-country, cross-regulatory, and cross-cultural setup. We also show that within the general framework of corporate governance, board size, board independence, presence of female directors, board experience and board quality are the most critical elements moderating the observed risk-return relation in firms.

These findings have meaningful implications for all investors in individual and institutional capacities, for the process of portfolio formation and rebalancing and of formulating suitable strategies. They can also have significant policy implications for external stakeholders in a firm such as government and regulators in a wider international context. Our results are robust and hold within subsamples based on market power (size and age), previously existing risk, liquidity, industry affiliation, market swings, and country-level heterogeneity, such as levels of economic development, prevailing investor protection rights, legal systems, and national culture.

Despite our best efforts, we acknowledge a few limitations in this study. There are possibilities for further augmentation of this study through future research endeavours. Any firm-risk study needs to address the issue of what risk measure is appropriate in a given environment or situation. Accounting risk, market risk, probability of losses, lack of predictability, and managerial risk are all potential measures of risk. The choice of risk perspective would surely shed additional light on the nature of the risk-return association, the possible presence of the risk-return 'paradox', and their behavioural implications. In this study, we mostly restrict ourselves to conventional measures of risk, such as variability in a firm's return on assets (ROA) or return on equity (ROE) and cash flow. However, ex ante measures of firm risk might sometimes be preferable to ex post measures (Bowman, 1980), such as the variance of analysts' forecast of earnings. If several analysts forecast the earnings of a given firm, the variance in their forecasts could be associated with the ex-ante uncertainty of that earnings stream. Similarly, a more extensive array of performance measures could also be used. We look forwards to bringing in these dimensions as potential future augmentations of this study.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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