Journal of Corporate Finance xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Journal of Corporate Finance

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

Corporate governance reform and risk-taking: Evidence from a quasi-natural experiment in an emerging market

Santosh Koirala[a], Andrew Marshall[a], Suman Neupane[b], Chandra Thapa[a,*]

[a] Department of Accounting and Finance, University of Strathclyde, Scotland G4 0QU, United Kingdom
[b] UQ Business School, The University of Queensland, Brisbane, Queensland 4072, Australia

ARTICLE INFO

Keywords:
Corporate governance reform
Risk-taking
Emerging market
Quasi-natural experiment

JEL Codes:
G32
G34
G38

ABSTRACT

Existing studies suggest that stricter Corporate Governance Reform (CGR) reduces corporate risk-taking, primarily due to higher compliance costs and expanded liabilities of insiders or managers. We revisit the relationship between CGR and risk-taking in an emerging market set-up characterized by weaker market forces of corporate scrutiny and greater insider ownership, which encourages firms to pursue investment conservatism. Using a quasi-natural experiment, we find that stricter CGR leads to greater corporate risk-taking. We further show that risk-taking is an important channel through which CGR enhances firm value. Our findings support the view that stricter CGR can have a positive effect on corporate risk-taking and corporate investment decisions in an evolving regulatory environment.

1. Introduction

Studies on corporate governance reform (CGR) show that it discourages corporate risk-taking. These findings, which are primarily based on the experience of adopting the Sarbanes-Oxley Act (SOX) in the US, suggest that CGR that expands the personal liability of decision-makers for non-compliance increases the compliance burden, shrinks managerial flexibility, and discourages managers or insiders from undertaking potentially value-enhancing risky projects. Empirical evidence from Bargeron et al. (2010) that documents a reduction in the appetite for risk-taking among US firms following the introduction of SOX supports this view. They argue that the increased financial and criminal liability imposed by SOX reduces insiders' motivation to pursue risky investments. Cohen and Dey (2013) offer a similar argument and note that the reduced risk-taking activities of US firms following the implementation of SOX is partly due to the expanded personal liability of corporate insiders.[1]

There is an alternative view that predicts a positive relationship between CGR and risk-taking to the extent that CGR improves corporate scrutiny and the monitoring of insiders. John et al. (2008) show that corporate risk-taking is higher in firms operating in better governed environments. They argue that corporate risk-taking involves a utility trade-off for insiders between the wealth effect

* Corresponding author.
E-mail addresses: Santosh.koirala@strath.ac.uk (S. Koirala), a.marshall@strath.ac.uk (A. Marshall), s.neupane@business.uq.edu.au (S. Neupane), chandra.thapa@strath.ac.uk (C. Thapa).

[1] Another strand of literature contends that a negative relationship exists between excessive investor protection and value-relevant risk-taking, based on the argument that excessive shareholder empowerment leads to short-term opportunism at the cost of value-relevant, long-term (risky) investments (Belloc, 2013; Honoré et al., 2015).

https://doi.org/10.1016/j.jcorpfin.2018.08.007
Received 18 February 2018; Received in revised form 14 August 2018; Accepted 17 August 2018

from risky investments and extraction of private benefits.[2] Better investor protection not only lowers the magnitude and importance of private benefits but also reduces the cost of capital, thereby creating a higher wealth effect of investments (Stulz, 1999; Bekaert and Harvey, 2000; Errunza and Miller, 2000; Khanna and Palepu, 2000; Healy and Palepu, 2001). Thus, CGR, which increases investor protection, should increase insiders' appetite for potentially value-maximizing risky investments by shifting their utility toward the wealth effect of investment and away from the extraction of private benefits.

These two opposing views on the effect of CGR on corporate risk-taking motivate our empirical study. Moreover, our study focuses on a relatively weaker investor protection environment in an emerging market, where, compared to its developed market counterparts, concentrated ownership structures accentuate the conflict of interest between controlling insiders and minority shareholders (Bertrand et al., 2002; Bekaert and Harvey, 2003; Stulz, 2005; Claessens and Yurtoglu, 2013). For instance, Stulz (2005) notes that firms in countries with relatively weaker investor protection systems have dominant insiders with significant control over the resources that they use for private benefits.[3] Therefore, in an environment with relatively weaker market-based monitoring, stricter CGR can substitute the missing market forces of corporate scrutiny (Dharmapala and Khanna, 2013). The resulting substitutive effect of regulatory reform could, therefore, alter insiders' utility trade-off to pursue corporate risk-taking.

After a few years of initial groundwork, India implemented a major CGR in 2000 with the adoption of Clause-49, introducing greater disclosure requirements, board independence, and transparency. However, following Dharmapala and Khanna (2013), we primarily focus on the 2004 amendment of the Securities Contracts Act, 1956, which introduced Section 23E. Section 23E expanded the personal liabilities of the management, the board, and the auditors, and imposed significant financial and criminal penalties for non-compliance with the provisions listed under Clause-49. As the applicability of Clause-49 was based on the threshold of paid-up equity capital, only listed firms that had paid-up equity capital of more than or equal to Indian Rupees (INR) 30 million at any point in their traded history were required to comply with this CGR. Thus, the imposition of stricter provisions of Section 23E, along with the exogenously separated treated and control groups of firms based on paid-up equity capital, provides us with a regulatory set-up to empirically examine the following three hypotheses relating to CGR and corporate risk-taking. Our primary hypothesis examines whether the more stringent Section 23E, as introduced in 2004, deters or encourages corporate risk-taking activities in India. Second, since the literature suggests that investment conservatism may stem from the concentrated stakes of insiders, we examine whether CGR could play a moderating role in the link between risk-taking and variations in ownership concentration. Finally, given the evidence that CGR affects firm valuation positively, we test whether corporate risk-taking could potentially be an important channel in influencing firm valuation.[4]

Employing Regression Discontinuity (RD) around the threshold of paid-up equity capital and propensity matched difference-in-differences (PSM-DiD) design on a sample of listed non-financial Indian firms for the period between 2000 and 2007, we find strong evidence that CGR is positively related to earnings-volatility, which is our core measure of corporate risk-taking. We also use capital expenditure and R&D expenditure as additional corporate investment proxies to assess the impact of CGR on fixed and innovative investments respectively. Our results are similar and economically significant with these additional corporate investment proxies. Overall, the results suggest that CGR that expands significant financial and criminal penalties for corporate insiders may mitigate their investment conservatism and encourage them to undertake risky and value-enhancing investment projects.[5] These findings are in line with the economic perspective that predicts a rise in corporate risk-taking activities following improvement in the corporate governance regime through stringent sanctions (Stulz, 2005; John et al., 2008). This key finding of our study is robust to a series of robustness tests, including the use of alternative control and treatment groups, placebo experimentation, and self-selection bias (see Section 5.4).

Our examination of the possible moderating role of CGR on risk-taking across different ownership concentrations finds that, following CGR, firms with higher ownership concentration tend to take more risks relative to firms with lower ownership concentration. This result is consistent with the theoretical argument that CGR reduces the utility derived from private benefits and increases the utility derived from value-enhancing risky investments for concentrated insiders, thereby encouraging them to undertake risky investments (Bertrand et al., 2002; John et al., 2008; Gul et al., 2010). Finally, the results pertaining to the value-implication of corporate risk-taking show that, after the CGR enforcement period of 2004, higher risk-taking is associated with a higher market valuation of the treated firms. This finding suggests that risk-taking is an important channel through which CGR provides value to a firm.

This paper contributes to the literature in the following ways. First, we add to the ongoing debate of whether CGR deters or

[2] Utility from private benefits are derived from the ability of controlling insiders to consume resources which could either be monetary, such as very high salary for the block-holding insiders, or non-monetary, such as the amenities that come from controlling establishments, such as professional sport clubs, newspapers, and other social clubs (Paligorova, 2010).

[3] Using a de facto measure of firm level corporate governance standards, Claessens and Yurtoglu (2013) show that emerging markets' firms score much lower than the firms in developed markets. Similarly, Stulz (2005) shows that the potential risks of expropriation (on a scale of 0–10 with the higher value indicating a lower risk of expropriation) during the year 2002 for the US and the UK were 9.98 and 9.71 respectively. The figure for India in the same period was 7.75. He further shows that for 2002 (a period covered by our sample), the value-weighted percentage of market capitalization held by corporate insiders was 58%. This is compared to the figures of 16% and 11% for the US and the UK respectively.

[4] See Section 3 for relevant literature and discussion on developing all three hypotheses.

[5] As Clause-49 was introduced in 2000, we also examine whether the initial introduction of CGR in 2000 has any visible effect on corporate risk-taking, but find no evidence of it. This additional test further suggests that CGR affects corporate risk-taking positively in an evolving corporate governance regime when interventions are accompanied by additional expansion of personal liability and stricter financial and criminal sanctions for non-compliance (Dharmapala and Khanna, 2013).

encourages risk-taking. Our study suggests that the effect of CGR on risk-taking could be context dependent, where, in an emerging market set-up, CGR can positively affect corporate risk-taking. Although CGR could add an additional compliance burden, thus reducing the appetite for risk-taking (Bargeron et al., 2010; Cohen and Dey, 2013), our study shows that CGR could substitute the missing market-based corporate scrutiny and reduce investment conservatism, thereby encouraging value-relevant risk-taking in a set-up characterized by weaker market-based corporate governance.

Second, our paper also adds to the literature that relates ownership concentration to corporate risk-taking. Given the evidence that firms with concentrated insiders' ownership prefer risk avoidance (Bertrand et al., 2002; Gul et al., 2010; Paligorova, 2010; Faccio et al., 2011), we contribute by showing that CGR positively moderates the link between ownership concentration and risk-taking behavior of firms that would otherwise pursue investment conservatism. Finally, the literature supports the positive impact of CGR on firm valuation, specifically in the case of emerging markets (Fauver et al., 2017; Black and Khanna, 2007; Dharmapala and Khanna, 2013). We extend this literature by suggesting that higher risk-taking could be an important channel through which CGR may augment higher firm valuation.

The rest of this paper is organized as follows. Section 2 provides a brief explanation of Clause-49. Section 3 develops our hypotheses, which is followed by a discussion of the data in Section 4. Section 5 examines the empirical results, and Section 6 concludes the paper.

2. Clause-49

2.1. Background

The corporate governance environment in India was largely informal prior to the introduction of Clause-49 in 2000 (Dharmapala and Khanna, 2013). However, as Indian companies began to seek external financing, this led to the need for a sound regulatory framework for corporate governance to ensure better investor protection. In 1998, the Confederation of Indian Industry (CII) introduced the voluntary Corporate Governance Code, which was adopted by only a few major companies. Thus, the consensus among Indian policy-makers was that a mandatory set of corporate governance rules was necessary. Consequently, the Code evolved into the mandatory Clause-49 provisions in February 2000. Clause-49 of the stock exchange listing agreement is a set of CGRs enacted by the Securities and Exchange Board of India (SEBI), the governing body of listed companies in India.[6] Clause-49 introduced greater compliance, as well as enhanced disclosure, transparency, and board independence, with initial provisions of stock delisting for non-compliance. Appendix A highlights the key features of Clause-49.

Only firms that had achieved a paid-up equity capital of more than or equal to INR 30 million or a net worth of INR 250 million at any point in their history since being listed were initially subject to Clause-49. As shown in Fig. 1, Clause-49 provides a phased-in implementation period during which larger firms are required to comply first, followed by mid-sized firms and, finally, small-sized firms. However, firms that are listed for the first time from 2000 onward are required to comply immediately, regardless of whether they meet the criteria of paid-up capital or net worth. This implies that our control group comprises firms that are listed prior to 2000 and that do not meet the two threshold criteria imposed by the reform.

In 2004, the amendment to the Securities Contracts Act, 1956 included Section 23E, which expanded the personal liabilities of the management, the board, and the audit committee, and imposed significant financial and criminal penalties for violations of the listing agreement (up to INR 250 million per violation). Further, Dharmapala and Khanna (2013) maintain that the threat of stricter punishment and expansion of personal liability improves the expected enforcement of CGR in emerging markets. We use 2004 as the CGR enforcement year following previous empirical studies (Dharmapala and Khanna, 2013).[7]

2.2. Relevant provisions of clause-49

Apart from an overall improvement in corporate governance, we identify three specific provisions in Clause-49 that should affect corporate risk-taking in Indian firms: board independence, independence of audit committees, and certification by the CEO or CFO. First, Clause-49 mandates greater board independence and requires 50% of the board of directors to be independent when the Chairman of the board is the executive director and one-third (33%) to be independent when the Chairman is a non-executive. Second, Clause-49 requires an affected firm to have an audit committee with a minimum of three directors, two-thirds of which are required to be independent, and at least one with experience in financial management. The Clause also requires certification by the auditor or company secretary on compliance with corporate governance provisions and disclosures, thereby increasing their accountability. Third, Clause-49 mandates certifications of the financial statements and internal control mechanisms by the CEO or CFO, and expands the personal accountability of the management and insiders on a firm's decisions.

[6] Clause-49 is popularly referred to as the SOX of India. Black and Khanna (2007) offer a comparison between Clause-49 and SOX. Further details on Clause-49 can be obtained from the website of the SEBI (http://www.sebi.gov.in/commreport/Clause-49.html).

[7] The legal set-up for Clause-49 is such that enforcement under Section 23E (in 2004) would occur in the first instance by the SEBI, with a potential appeal to the Securities Appellate Tribunal (a body formed to deal with securities law issues and to address SEBI appeals) and followed by a final appeal to the Supreme Court. Reports suggest that the number (turnaround time) of settled cases on enforcement decisions has been increasing (decreasing) in the post-enforcement period of 2004 on issues enforced by the SEBI and the Securities Appellate Tribunal. Clause-49 intervention can therefore be argued to have a reasonably clear system of handling cases of non-compliance.

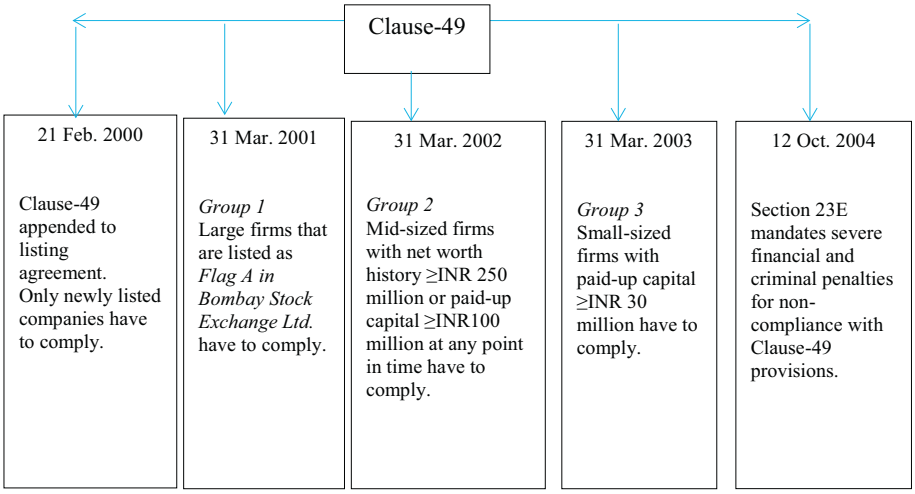

Fig. 1. Timeline of enforcement of Clause-49.

Taken together, these three provisions related to structure and accountability of the board, the audit committee, and the management team can encourage risk-taking and value-enhancing investments by decreasing the utility from private benefits and increasing the utility from the wealth effect of risky investments (John et al., 2008). At the same time, these provisions could also increase the compliance burden, discouraging corporate risk-taking, as documented by previous studies (Coles et al., 2008; Bargeron et al., 2010; Cohen and Dey, 2013).

2.3. Self-selection

One concern related to Clause-49 is whether firms could endogenously self-select to be exposed to or remain unaffected by the reform. Dharmapala and Khanna (2013) highlight two scenarios in which a firm could endogenously self-select to remain unaffected by the CGR, based on the threshold of paid-up equity capital and how these scenarios are less likely in a Clause-49 set-up. First, a firm that meets the current criteria of paid-up capital may choose not to comply by lowering its paid-up equity capital. However, this strategy is not realistic as the compliance criteria are backward-looking, and the firm would have been affected by Clause-49 if it had reached the paid-up capital or net worth criteria at any point in its history. Second, a firm may have had a lower paid-up capital or net worth than the threshold required to comply, and may wish to abstain from raising its capital base, that is, enhance its paid-up capital, to remain unaffected. However, if the firm is growing in size and earnings significantly, then it is very likely to reach the required net worth threshold. This is because net worth is that part of the capital base that is adjusted for retained earnings and several reserves, and is therefore less likely to be manipulated. Finally, if any firm is below the required threshold, but wishes to be affected by the regulation, it could endogenously issue additional equity to reach the paid-up capital threshold. However, Dharmapala and Khanna (2013) empirically do not observe any such strategic manipulation in the Indian data.

3. Related literature and hypotheses development

3.1. Corporate risk-taking and CGR

Economic theory models the effect of CGR on firm risk-taking as a utility function of an insider who derives utility from the wealth effect of investments and private consumption of the resources of a firm (John et al., 2008). A higher level of wealth effect from investment is positively related to insiders' appetite for value-enhancing risk-taking behavior. In contrast, a higher level of private benefit is negatively related to insiders' appetite for value-enhancing risk-taking behavior. The positive effect of CGR, as elaborated below, on a firm's risk-taking could stem from different channels.

First, higher utility derived from the investment-related wealth effect could be driven by the reduced cost of capital as a result of better corporate governance (Stulz, 1999; Bekaert and Harvey, 2000; Errunza and Miller, 2000; Khanna and Palepu, 2000; Healy and Palepu, 2001; Chen et al., 2009). There are three key arguments that explain why better corporate governance could lower the cost of capital. First, better corporate governance reduces information asymmetry between insiders and investors in the capital market through greater disclosure and independent monitoring, which subsequently lowers the information-related cost of capital (Stulz, 1999; Healy and Palepu, 2001). Second, progress in corporate governance improves stock liquidity in the market by reducing information asymmetry among traders (Chung et al., 2010). As liquidity is factored into the cost of capital estimation (Amihud and Mendelson, 2000; Easley and O'Hara, 2004), improved liquidity following CGR could also lower the cost of capital. Third, better investor protection attracts foreign investors, who play a crucial role in decreasing the cost of capital through international risk-sharing (Errunza and Miller, 2000) and better monitoring (Khanna and Palepu, 2000), and by providing greater market liquidity

(Errunza and Miller, 2000).

Second, as improved corporate monitoring lowers the magnitude and importance of the private benefits of insiders, CGR may discourage investment conservatism through independent board monitoring (Weisbach, 1988; Khanna and Palepu, 2000; Fauver et al., 2017; Lu and Wang, 2018). Similarly, harsher sanctions in mandatory CGR provisions increase the disciplinary pressure on insiders and may reduce the insiders' expected private consumption. Taken together, an improvement in CGR could therefore increase the utility from the investment-related wealth effect and decrease the utility from private benefits, both of which could encourage higher value-enhancing risk-taking.

Contrary to this positive prediction, studies also document evidence of the negative association between CGR and a firm's risk-taking behavior (Coles et al., 2008; Bargeron et al., 2010; Cohen and Dey, 2013). Previous studies suggest that stricter provisions of CGR, which assign expanded financial and criminal liabilities, increase risk-aversion and thus discourage decision-makers from taking on value-maximizing risky investments (Bargeron et al., 2010). Similarly, it is argued that for growing and innovative firms, greater external monitoring may be expensive (Coles et al., 2008). As CGR expands the role and number of external directors, this increased cost of independent monitoring could further dampen insiders' risk-taking appetite (Coles et al., 2008; Cohen and Dey, 2013).

Therefore, in hypothesis one (H_1), we empirically test the following two conflicting views on the role of CGR in corporate risk-taking.

H_{1a}. Ceteris paribus, enforcement of CGR should increase corporate risk-taking.

H_{1b}. Ceteris paribus, enforcement of CGR should decrease corporate risk-taking.

3.2. CGR, ownership concentration, and risk-taking

An emerging market set-up characterized by the prevalence of concentrated ownership structures, where few concentrated owners have full control over corporate decisions and resources, witnesses a higher conflict of interest between dominant insiders and minority outsiders (Stulz, 2005; Claessens and Yurtoglu, 2013). These concentrated owners could opt for lower risk-taking because of two important reasons.

First, concentrated insiders would derive higher utility of private benefits because of their higher control over corporate resources, which could incentivize them to pursue investment conservatism (Bertrand et al., 2002; John et al., 2008; Gul et al., 2010). CGR should reduce the expected utility from such private benefits by increasing the likelihood of monitoring and prosecuting misappropriation (Aggarwal et al., 2008; John et al., 2008). This reduction in the utility of private benefits could thus encourage risk-taking.

Second, concentrated insiders may choose to avoid risk-taking because of their under-diversified stake in a firm. For example, Paligorova (2010) finds that, compared to institutional counterparts like mutual funds, banks, financial, and industrial companies, concentrated individuals and large family shareholders tend to indulge in lower corporate risk-taking, largely due to their under-diversified stakes. Similarly, Faccio et al. (2011) note that large undiversified shareholders pursue more conservative investment policies. As CGR expands the influence of minority shareholders in corporate decision-making, this shift could positively induce the risk-taking activities of otherwise conservative firms because of concentrated ownership.

We therefore expect higher risk-taking in firms with higher ownership concentration, when compared to their counterparts with lower ownership concentration, following CGR. Accordingly, we state the following second hypothesis (H_2):

H_2. Ceteris paribus, enforcement of CGR should increase corporate risk-taking in firms with greater ownership concentration.

3.3. CGR and the value-implication of risk-taking

Existing studies find a positive role of CGR on a firm's market valuation (Black and Khanna, 2007; Dharmapala and Khanna, 2013; Fauver et al., 2017). Specifically, Black and Khanna (2007) and Dharmapala and Khanna (2013) show that CGR interventions in an emerging market context are value-enhancing. However, the channels through which CGR influences firm valuation are less clear.

Related literature also posits that higher corporate risk-taking should increase the market valuation of firms (John et al., 2008; Faccio et al., 2011). Aligning this empirical evidence with the possibility that CGR could positively affect corporate risk-taking, we argue that corporate risk-taking could therefore be the channel through which CGR translates into higher firm valuation. In other words, the market rewards the positive shift in risk-taking of firms following CGR with a higher valuation. Accordingly, our third hypothesis (H_3) is as follows:

H_3. Ceteris paribus, following the enforcement of CGR, firms with higher corporate risk-taking should have higher market value.

4. Data

Our primary source of data is the Prowess database, maintained by the Centre for Monitoring Indian Economy (CMIE). Prowess provides detailed annual financial data and other firm-specific variables of both listed and unlisted public limited companies.[8] For our

[8] The database has been used by a number of studies, including Lilienfeld-Toal et al. (2012), Vig (2013), and Gopalan et al. (2016).

study, we primarily use all non-financial firms available in the database for the sample period of 2000 to 2007 listed in or before 2000. For our examination of cross-listed Indian firms, we obtained the relevant data from Dharmapala and Khanna (2013).[9] Our dataset consists of a sample of 26,584 firm-year observations of 3839 non-financial firms listed on either the Bombay Stock Exchange (BSE) or the National Stock Exchange of India Ltd. (NSE) for the period 2000 to 2007 for which there are no missing data for at least one of the three proxies used in the analysis.[10] A description of the variables used in the study is also provided in Appendix B, and a breakdown of the sample by industry is shown in Appendix C. We use the Prowess database code to identify industries and group them into 22 broad industry sectors following Vig (2013).

4.1. Risk-taking and corporate investment proxies

Following the literature, we use earnings-volatility as our prime variable to capture corporate risk-taking in our empirical testing (John et al., 2008; Faccio et al., 2011; Boubakri et al., 2013). As riskier projects exhibit higher volatility, earnings-volatility captures the degree of risk-taking in a firm's operations, based on the volatility of the operating earnings (John et al., 2008; Boubakri et al., 2013). We calculate earnings-volatility as the three-year rolling standard deviation of earnings, where earnings is measured using earnings before interest, taxes, depreciation, and amortization (EBITDA) expressed as a percentage of total assets.

To gauge the effect of CGR on fixed and innovative investments, we also use two other alternative dependent variables: capital expenditure and R&D expenditure. Both of these measures of corporate investments are shown to be linked to risk-taking and have been used widely in the literature on risk-taking (Bargeron et al., 2010; Belloc, 2013; Koh and Reeb, 2015). Capital expenditure captures the size of tangible investments. It is computed as the difference between long-term assets for year “t” and year “t-1” scaled by long-term assets for year “t-1.” R&D expenditure reflects a firm's level of innovative investments (Bargeron et al., 2010; Belloc, 2013) and is measured as the total monetary value of research and development expenditure scaled by total assets.[11]

4.2. Control variables

We use a number of control variables that could also explain the cross-sectional and temporal variations of corporate risk-taking. Studies show that the size of a firm can play a key role in the ability and appetite of the firm to make investment decisions (Whited and Wu, 2006). We control for Size by taking the natural logarithm of total assets where assets are expressed in millions of INR. We also account for the capital structure of the firm (Leverage), as investment decisions and risk-taking are directly affected by access to finance (Almeida and Campello, 2007; Campello et al., 2010). Similarly, creditors can have interests that are different from those of shareholders in the risk-taking of a firm, because of their fiduciary stake and their concave payoffs (Acharya et al., 2011). We measure Leverage as the book value of debt-to-equity ratio. The literature also establishes an association between a firm's operating liquidity (cash holding) and levels of corporate risk-taking (Denis and Sibilkov, 2010). For example, if firms expect financing uncertainty, those with higher investment needs can build up liquidity to hedge against a possible future credit shock. Liquidity is measured as the ratio of liquid assets to current liabilities.

Promoters, as they are the founding members and insiders of a firm, can affect the level of corporate risk-taking (John et al., 2008). We control for ownership concentration (OwnCon) as the proportion of total shares held by promoters. Finally, risk-taking may also be influenced by the growth potential of firms, as argued by the literature on finance and growth (Levine, 2003). The growth potential of the firms is proxied by the ratio of market value of equity to its book value, Market-to-Book (MB). As corporate risk-taking may differ on the basis of time invariant firm-specific characteristics, such as gender (Faccio et al., 2016), we control for Firm Fixed Effect in our empirical models. Finally, we control for Year Fixed Effect to capture the effect of time-events driving our results.

5. Empirical results

5.1. Descriptive statistics

Table 1 contains summary statistics for the dependent and control variables for the entire sample, as well as for the pre-CGR (2000 − 2003) and post-CGR periods (2004–2007). It shows a statistically significant growth (at the 1% significance level) in firms' earnings-volatility (5.83% to 7.20%), capital expenditure (11.46% to 14.03%), and R&D expenditure (1.25% to 1.68%) in the post-CGR period in comparison with the pre-CGR period. Three of the controls (Size, Liquidity, and MB) also witnessed a significant increase in the post-CGR period. However, Leverage decreased significantly,[12] and there was no significant change in OwnCon in the post-CGR period. These descriptive differences offer some preliminary evidence that the enforcement of CGR could have increased

[9] We thank Dhammika Dharmapala and Vikramaditya Khanna for sharing their data on cross-listed Indian firms before the enforcement of Clause-49. We also matched the data on cross-listed Indian firms with those collected from the website www.adr.com.

[10] Prowess variables are reported as of March 31, each year. Therefore, we use March-end financial data for a given year as previous year-end data.

[11] Any missing R&D expenditure observations are not treated as zero, as Koh and Reeb (2015) suggest that firms for which R&D expenses are missing are significantly different from zero R&D firms. This exclusion significantly reduces the number of observations available for regressions with R&D Expenditure.

[12] A decrease in leverage may suggest the creditors' response to increased risk-taking on part of the firm. Alternatively, this may also imply attractiveness of equity financing when compared to debt financing in the post-2004 period.

Table 1
Descriptive statistics.

Variables	Overall	Pre-Clause-49	Post-Clause-49	Difference
	[1]	[2]	[3]	[3–2]
Earnings-volatility	6.54	5.83	7.20	1.37***
	(5.78)	(5.60)	(5.92)	
	26,336	12,630	13,706	
Capital expenditure	12.80	11.46	14.03	2.57***
	(11.20)	(10.21)	(11.92)	
	26,584	12,763	13,821	
R&D expenditure	1.47	1.25	1.68	0.43***
	(1.58)	(1.43)	(1.71)	
	5988	2974	3014	
Size	6.10	5.96	6.23	0.27***
	(1.86)	(1.77)	(1.95)	
	26,584	12,763	13,821	
Leverage	1.37	1.46	1.28	−0.18***
	(1.73)	(1.91)	(1.54)	
	19,560	9762	9794	
Liquidity	2.83	2.81	2.84	0.03**
	(5.52)	(5.12)	(5.90)	
	22,858	11,339	11,519	
OwnCon	49.09	49.08	49.09	0.01
	(19.98)	(19.62)	(22.07)	
	16,372	6929	9443	
MB	1.41	1.02	1.77	0.75***
	(2.54)	(2.05)	(2.81)	
	25,842	12,257	13,585	

Table 1 reports the average of variables (along with their standard deviation presented in the second row and number of observations presented in the third row for each variable) used in the analysis for the entire study period and also segregated into two periods, i.e. before Clause-49 enforcement (2000–2003) and after Clause-49 (2004–2007). Earnings-volatility is defined as a three-year rolling standard deviation of earnings before interest, taxes, depreciation and amortization (EBITDA) scaled by total assets. Capital expenditure is the change in long-term assets scaled by previous year total long-term assets. R&D expenditure is computed as a fraction of total assets. The measures of risk-taking and corporate investments are expressed in percentages. Size is the natural logarithm of total assets expressed in millions of Indian currency (INR). Leverage is the ratio of book value of debt to book value of equity. Liquidity is the book liquidity obtained by dividing liquid assets by current liabilities. OwnCon is the ownership concentration variable computed as shares owned by promoting shareholders as a percentage of total shares outstanding. MB represents the ratio of the market value of shareholders' equity to its book value. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance levels respectively. The sample period ranges from year 2000 to 2007. Source: CMIE database.

the corporate risk-taking behavior of the firms.

5.1.1. Clause-49 groups

Our treated group comprises listed Indian firms affected by Clause-49 and control group firms unaffected by CGR. By construction, the treated firms are larger than the control firms. We address the issue of comparability by generating four different groups, depending on when the firms were affected by Clause-49 (based on the paid-up equity capital threshold). Group 1 comprises the larger Indian firms (listed as flag “A” in BSE), which were required to comply by March 31, 2001. Group 2 comprises mid-sized firms with paid-up equity capital of at least INR 100 million or net worth of INR 250 million at any point since their incorporation. These firms were required to comply by March 31, 2002. Group 3 (3A and 3B) comprises small-sized firms with paid-up equity capital between INR 30 million and INR 100 million, and were required to comply by March 31, 2003. Group 3A consists of firms with paid-up capital ranging between INR 45 million and INR 100 million, and Group 3B consists of firms with paid-up capital ranging between INR 30 million and INR 45 million. Group 4A firms have paid-up equity capital ranging between INR 15 million and INR 30 million. Group 4B comprises firms with paid-up equity capital less than INR 15 million. Firms in Group 4 (4A and 4B) were not affected by Clause-49.

We present firm characteristics prior to CGR for all the four different groups in Table 2. The discontinuity around the paid-up equity capital threshold separates Group 3 firms (3A and 3B) as treated firms, whereas Group 4 firms (4A and 4B), which are the control firms, remain unaffected by our CGR. This exogenous separation of firms into treated and control groups by Clause-49 allows us to employ RD and difference-in-differences (DiD) designs for empirical investigation.

5.2. Main results

The RD approach is able to credibly estimate the causal effect of CGR on the risk-taking of treated firms. Further, RD design also overcomes concerns about the alternative effects driven by firms that may be far away from the paid-up equity capital threshold at which CGR was applicable. Our main results are based on the RD and DiD research designs.

Table 2
Firm characteristics of groups exogenously determined by clause-49 before 2004 enforcement.

Variables	Mean (SD), no. of observations						
	Treated groups				Control Groups		Alt. Control Group
	Group 1	Group 2	Group 3		Group 4		Cross-listed Firms
			Group 3A	Group 3B	Group 4 A	Group 4B	
Earnings-volatility	3.13	5.34	6.06	6.82	6.84	6.82	3.55
	(2.79)	(4.40)	(5.32)	(4.90)	(4.90)	(4.18)	(3.49)
	605	4729	2868	2542	918	642	326
Capital expenditure	16.49	10.87	11.28	11.41	9.97	12.87	14.16
	(12.44)	(10.57)	(10.18)	(10.23)	(10.71)	(9.37)	(12.46)
	607	4779	2881	2602	924	624	328
R&D expenditure	1.98	1.02	1.26	1.41	1.52	1.48	1.03
	(2.85)	(1.74)	(2.41)	(2.35)	(1.54)	(1.42)	(2.20)
	344	1102	483	302	286	261	208
Size	8.84	7.01	5.07	4.85	4.85	3.90	8.86
	(1.52)	(1.16)	(0.85)	(0.97)	(0.98)	(1.32)	(1.44)
	607	4779	2881	2602	924	624	328
Leverage	1.11	1.70	1.52	1.19	1.20	1.26	1.10
	(2.22)	(3.08)	(3.38)	(2.43)	(2.50)	(2.76)	(1.11)
	599	3856	2133	1795	464	589	326
Liquidity	2.66	3.30	2.62	2.33	2.34	2.50	2.47
	(6.76)	(9.37)	(3.41)	(1.94)	(6.92)	(3.65)	(1.93)
OwnCon	605	4444	2189	2408	556	637	326
	56.37	51.63	43.34	46.98	48.87	54.90	38.72
	(18.33)	(18.92)	(17.85)	(19.34)	(19.89)	(25.18)	(16.81)
	569	2780	1222	1378	290	364	326
MB	2.28	0.91	0.81	0.97	0.98	1.11	2.26
	(3.36)	(1.80)	(1.93)	(2.70)	(2.09)	(1.61)	(6.49)
	597	4617	2691	2511	907	608	326

Table 2 reports the average values of variables used in this study along with their standard deviations (in parentheses) and firm-year observations respectively of firms classified into five different groups based on the applicability of Clause-49 and size. Variables are defined in the notes to Table 1. Groups 1 to 3 firms are subject to Clause-49, as explained in the text. Group 1 firms are large-cap companies listed as the flag "A" category on the Bombay Stock Exchange Ltd. (BSE). Group 2 firms are mid-cap companies that have paid-up capital greater than INR 100 million or net worth greater than or equal to INR 250 million. Group 3 firms are low-cap firms that have paid-up capital between INR 100 million and 30 million. We classify 3A firms with paid-up capital between 100 million and 45 million and 3B firms with paid-up capital between 45 million and 30 million. Groups 4 comprise control firms. Group 4A firms have paid-up capital between INR 15 million and 30 million. Group 4B firms have paid-up capital less than INR 15 million. The last column reports summary statistics for cross-listed firms. The sample period is from 2000 to 2003. Source CMIE.

5.2.1. Regression discontinuity (RD) test

Following Lemieux and Milligan (2008) we conduct a RD test on the cross-section of firms for two years of post-CGR period (i.e., 2004–2005), as shown in eq. (1).

$$Risk_{it} = \alpha + \beta.\ 1_{(Treated=1)} + \delta(paid - up_i) + X_{it}.\ \delta + \vartheta_j + e_{it}, \tag{1}$$

where $1_{(Treated=1)}$ is a categorical variable taking the value of one for firms with paid-up equity capital of equal to or greater than INR 30 million and zero otherwise. $Risk_{it}$ is earnings-volatility as defined in the earlier section (i is indexed as the firm and t as the year). We use two additional corporate investment proxies (capital expenditure and R&D expenditure) as additional dependent variables. X_{it} is a vector of key control variables as defined earlier and ϑ_j is industry fixed effects. Our key coefficient of interest, β, is the discontinuity estimator of the causal effect of CGR on the treated firms. The main identification assumption of the RD approach is that $\delta(paid - up_i)$ is a smooth function of paid-up equity capital: that is, $\delta(paid - up_i)$ controls for any continuous impact of paid-up equity capital on a firm's risk-taking in 2004 and 2005.[13]

We report the results from the RD analysis in Table 3. Models (1) to (3) report coefficients for entire sample firms, whereas models (4) to (6) report coefficients only for firms in Groups 3 and 4, as described above. Table 3 shows that the coefficients on risk-taking and corporate investment measures are both positive and significant (at least at the 5% significance level), implying a discontinuous increase in risk-taking and corporate investment on the part of treated firms in 2004 and 2005. Similarly, compared to the entire sample, the coefficients of the threshold dummy for risk-taking and corporate investment proxies are higher in magnitude in subsample firms (reported in Models 4 to 6), which implies a stronger increase in corporate risk-taking in treated firms that are closer to the threshold. This result supports hypothesis 1a and rejects hypothesis 1b.

[13] In the results reported in Table 3 we assume $\delta(paid - up_i)$ to be linear in paid-up equity capital. However, the results are consistent with the polynomial functional form for $\delta(paid - up_i)$.

Table 3
Regression discontinuity around paid-up equity capital threshold.

	With entire Sample Firms			With Group 3 (treated) and Group 4 (control)		
	Earnings-volatility	Capital expenditure	R&D expenditure	Earnings-volatility	Capital expenditure	R&D expenditure
	[Model 1]	[Model 2]	[Model 3]	[Model 1]	[Model 2]	[Model 3]
Clause-49	0.73**	2.27**	1.05***	0.84**	2.64**	1.66***
	(2.34)	(2.23)	(2.94)	(2.43)	(2.52)	(2.73)
Size	−0.88***	1.31***	−0.50***	−1.61***	2.60***	−0.89**
	(−12.87)	(4.35)	(−2.86)	(−7.85)	(11.48)	(−2.51)
Leverage	−0.03	0.78***	−0.12***	−0.23***	1.53***	−0.01
	(−0.71)	(4.26)	(−6.58)	(2.91)	(4.01)	(−0.06)
Liquidity	−0.02	−0.03	−0.07*	−0.01	−0.13	−0.13
	(−1.28)	(−0.57)	(−1.77)	(−0.29)	(−1.17)	(−1.54)
OwnCon	−0.02***	−0.05*	−0.02***	−0.02*	−0.17***	−0.03***
	(−3.48)	(−1.79)	(−2.88)	(−1.78)	(−3.92)	(−3.39)
MB	0.43***	2.02***	0.37***	0.54***	3.20***	1.55***
	(7.87)	(6.81)	(3.64)	(4.78)	(5.52)	(3.03)
Constant	10.09***	5.74**	4.89***	8.83***	4.30**	6.97***
	(7.60)	(2.24)	(3.79)	(3.17)	(2.16)	(2.86)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3359	3353	1083	1416	1401	228
Adj. R^2	0.27	0.20	0.29	0.18	0.17	0.27

Table 3 reports the results of different specifications of the following regression equation:

$$Risk_{it} = \alpha + \beta.\ 1_{(Treated=1)} + \delta(paidup_i) + X_{it}.\ \delta + \vartheta_j + e_{it},$$

Where $Risk_{it}$ is risk-taking proxied by earnings-volatility. We further use two additional proxies of corporate investment: capital expenditure and R&D expenditure as dependent variables. Variables are defined in the notes to Table 1. $1_{(Treated=1)}$ is an indicator variable that takes the value of one for firms with paid-up equity capital of INR 30 million or more and zero otherwise. X_{it} is a vector of firm-level control variables. Firm level controls include size, leverage liquidity, ownership concentration (OwnCon) and market-to-book (MB). ϑ_j controls for industry fixed effects. e_{it} is the error term. Heteroscedasticity robust t-statistics are reported in parentheses. *, ** and *** denote statistical significance at 10%, 5% and 1% significance levels respectively. The sample period ranges from year 2004 to 2005. Source: CMIE database.

In terms of control variables, OwnCon is negatively related to all the proxies of risk-taking and corporate investments, and is consistently significant (at least at 10%) across different models and subsamples. This result is in line with the theoretical prediction that ownership concentration encourages a firm to pursue investment conservatism. Size seems to affect earnings-volatility and R&D expenditure negatively, and capital expenditure positively. Similarly, MB is significant and positively associated (at the 1% significance level) with risk-taking and corporate investment measures, implying the value relevance of risk-taking. Coefficients of Leverage and Liquidity also have the expected signs, even though they are not consistently significant across the models.

5.2.2. Propensity score matched difference-in-differences (PSM-DiD) Regression

Although the RD regression of the cross-section of firms around the threshold of paid-up equity capital provides evidence of the positive effect of CGR on firm risk-taking, there are other factors besides paid-up equity capital that may affect corporate risk-taking. We therefore apply Propensity Score Matching (PSM) to the firms around the threshold of paid-up equity capital to generate the most comparable treated and control firms and run a PSM-DiD regression for this subset of firms[14] in Group 3 (treated firms) and Group 4 (control firms).

In applying PSM, we first estimate a probit model using firms in Groups 3 and 4. The dependent variable is equal to one if the firm belongs to Group 3 and zero if it belongs to Group 4. The probit model includes all control variables from eq. (2). We use propensity scores estimated from Model (1) of Panel A in Table 4 to perform matching between treated and control firms, using the closest propensity score, following Smith and Todd (2005). This generates 171 pairs of matched firms from Groups 3 and 4. To examine whether treated and control firms generated from the PSM technique reduce the possible observable differences among treated and control groups prior to CGR enforcement, we further run the probit model with the matched sub-sample alone as a diagnostic test. As shown in Model (2) of Panel A in Table 4, no independent variables are significant in explaining the assignment of these matched firms into treated and control groups. In addition, the pseudo R^2 decreases sharply from 0.113, prior to the matching, to 0.023, following the PSM, thereby reducing the explanatory power of the model with the matched firms. This diagnostic test in Model 2 indicates that matching reduces possible observable differences among treated and control groups prior to CGR enforcement.

To assess the pre-CGR and post-CGR trends in risk-taking of the matched treated and control group within groups 3 and 4, we

[14] Additionally, we run DiD regression from two highly comparable treated (Group 3B) and control (Group 4A) firms from Table 2 clustered around the cut-off of paid-up capital of INR 30 million, and that are generally similar in terms of size and other firm characteristics and find that significantly positive DiD estimates are in line with hypothesis 1a. These results can be obtained from the authors on request.

Table 4
Propensity score Matched-DiD Regression around Paid-up Equity Capital Threshold.

	Dummy = 1 if in Group 3 of Treated Firms; 0 if in Control Firms.	
	Pre-match	Post-match
	[Model 1]	[Model 2]
Panel A: Pre-match Propensity Score Regression and Post-match Diagnostic Regression		
Size	0.30**	0.09
	(2.07)	(1.29)
Leverage	0.06**	0.01
	(2.61)	(0.34)
Liquidity	0.02*	0.01
	(1.96)	(0.89)
OwnCon	−0.00**	−0.00
	(−2.27)	(−0.72)
MB	0.12**	0.10
	(2.21)	(1.30)
Industry FE	Yes	Yes
Intercept	0.62***	0.52**
	(5.27)	(2.12)
Observations	3952	1368
p-value of χ^2	0.00	0.48
Pseudo R^2	0.113	0.023

	Earnings-volatility		Capital expenditure		R&D expenditure	
	[Model 1]	[Model 2]	[Model 1]	[Model 2]	[Model 1]	[Model 2]
Panel B: DiD Regression of treated and control firms based on pre-CGR PSM						
DiD	1.13***	1.23***	14.59***	9.52***	0.59***	0.58***
	(3.23)	(3.82)	(6.28)	(3.10)	(2.92)	(3.37)
Size		−0.12 (−0.37)		2.20 (1.45)		−0.22 (−1.56)
Leverage		0.06		1.33		0.10
		(0.56)		(1.09)		(0.78)
Liquidity		−0.00		−0.00		−0.16
		(−0.05)		(−0.00)		(−1.42)
OwnCon		−0.02		−0.01		−0.00
		(−1.17)		(−0.14)		(−0.39)
MB		0.12*		4.83***		0.09*
		(2.09)		(4.55)		(2.04)
Firm and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (within)	0.07	0.10	0.06	0.08	0.06	0.09
No. of Firms	342	342	342	342	190	190
No. of Obs.	2736	2589	2736	2697	602	602

	Mean Treated Difference (After-Before)	Mean Control Difference (After-Before)	Mean DiD Estimator (Treated-Control)
Panel C: Univariate DiD estimator of earnings-volatility, capital expenditure and R&D expenditure			
Earnings-volatility	0.57	0.05	0.52***
	(4.04)	(0.15)	(3.21)
Capital expenditure	3.56	0.83	2.73***
	(3.47)	(0.35)	(3.02)
R&D expenditure	1.99	−0.02	2.01***
	(3.29)	(−0.08)	(3.21)

Table 4 reports the results of DiD regression of a subsample of treated and control firms based on Propensity Score Matching (PSM) prior to CGR enforcement. Panel A presents parameter estimates from the probit model used to estimate propensity scores for firms in the treated and control groups pre-CGR. The dependent variable is one if the firm belongs to Group 3 (treated group) and zero if it belongs to Group 4 (control group) separated by the cut-off of equity capital of INR 30 million, as reported in Table 2. Model 1 of Panel A reports parameter estimates with the entire sample of Groups 3 and 4, whereas Model 2 reports those for the propensity score matched subsample. Heteroscedasticity robust t-statistics are reported in parentheses. Industry fixed effects are included in both Models in Panel A. Panel B presents DiD regression for matched firms as given by equation:

$$Risk_{it} = \alpha + \beta.\ 1_{(Clause49=1)}.\ 1_{(After=1)} + \lambda.\ 1_{(Clause49=1)} + \rho.\ 1_{(After=1)} + X_{it}.\ \delta + \gamma_i + \tau_t + e_{it},$$

where $Risk_{it}$ is risk-taking proxied by earnings-volatility. We further use two additional proxies of corporate investment: capital expenditure and R&D expenditure as dependent variables. Variables are defined in the notes to Table 1. $1_{(Clause49=1)}$ is an indicator variable that takes the value of one for 171 matched treated firms and zero for 171 matched control firms from Groups 3 and 4 of Table 4 respectively based on pre-CGR PSM. $1_{(After=1)}$

is an indicator variable that takes the value of one for years including and after 2004 and zero otherwise. X_{it} is a vector of firm level controls that includes size, leverage, liquidity, ownership concentration (OwnCon) and market-to-book (MB). γ_i and τ_t control for the fixed effects of firm and year respectively. e_{it} is the error term. Models [1] and [2] report regression without and with controls. Variables are winsorized at 1% and 99% for regression in Panel B. Standard errors are double clustered at the firm and year levels following Petersen (2009). Panel C presents univariate DiD estimates of the matched treated and control groups. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance levels respectively. The sample period ranges from year 2000 to 2007. Source: CMIE database.

present the time series of yearly average figures of earnings-volatility of these comparable firms for the period between 2000 and 2007 in Fig. 2.

We see in Fig. 2 that the control firms do not show a significant change in the trend following the 2004 CGR. Further, the visual impression of Fig. 2 shows that both the treated and control groups do not have significant differences in their pre-CGR trends. However, following CGR, the treated firms show a significant increase in risk-taking, in line with hypothesis 1a.

For estimating the causal effect of CGR on corporate risk-taking in the sample of these matched treated and control firms, we run the following regression specification (2):

$$Risk_{it} = \alpha + \beta.\ 1_{(Clause49=1)}.\ 1_{(After=1)} + \lambda.\ 1_{(Clause49=1)} + \rho.\ 1_{(After=1)} + X_{it}.\ \delta + \gamma_i + \tau_t + e_{it} \quad (2)$$

where $Risk_{it}$ is the dependent variable as defined in the earlier section (i is indexed as the firm and t as the year). $1_{(Clause49=1)}$ is an indicator variable that takes the value of one for treated firms and zero for control firms. $1_{(After=1)}$ in Eq. (2) is a categorical variable that takes the value of one for the post-CGR period and zero otherwise. X_{it} is a vector of key control variables as defined earlier. γ_i is the firm fixed effect and τ_t is the time fixed effect. DiD coefficient, β, is the coefficient of interaction term $1_{(Clause49=1)}.\ 1_{(After=1)}$, and measures the causal effect of CGR on the treated firms.

In Panel B of Table 4, we report the PSM-DiD regression results. It shows that the DiD coefficients of risk-taking and corporate investment proxies for these matched firms are significantly positive (at the 1% significance level). We also present the univariate mean DiD estimates of PSM firms for all risk-taking and corporate investment measures in Panel C, and find positive and significant univariate DiD estimates that are consistent with the results in Panel B. The results in Table 4 support hypothesis 1a further, and reject hypothesis 1b.

5.3. The effect of the introduction of clause-49 in 2000 on corporate risk-taking

Our empirical investigation so far has followed prior literature and we use the 2004 expansion of personal liabilities in CGR as the

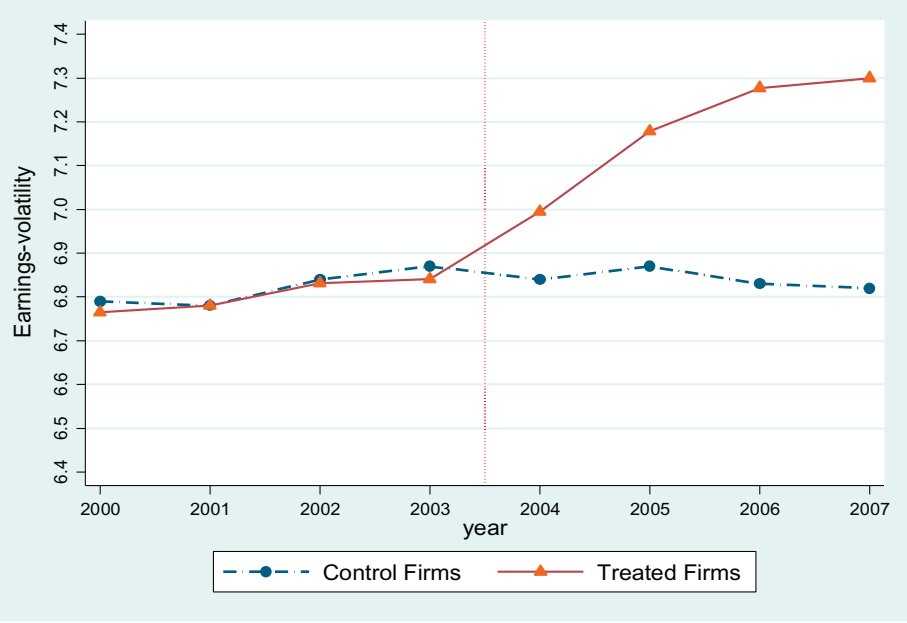

Fig. 2. Time-series plot of earnings-volatility of Propensity Score matched Treated and Control firms.
Note: Here, we plot the annual average of the earnings-volatility of Propensity Matched Treated and Control firms over the study period of 2000–2007. Before-CGR period is 2000 to 2003 and After-CGR period is 2004 to 2007. We calculate earnings-volatility as a three-year rolling standard deviation of operating earnings where operating earnings is EBITDA scaled by total assets expressed as a percentage. Source: CMIE database.

Table 5
The Effect of Introduction of CGR in 2000 on Corporate Risk-taking.

	Earnings-volatility	Capital expenditure	R&D expenditure
	[Model 1]	[Model 2]	[Model 3]
	(Intro = 2000)	(Intro = 2000)	(Intro = 2000)
DiD	0.19	0.91	0.05
$[1_{(Clause49=1)}. 1_{(After=1)}]$	(1.08)	(1.51)	(1.57)
Size	−0.31**	2.13***	−0.48***
	(−2.63)	(3.12)	(−4.81)
Leverage	−0.13**	0.25**	−0.01
	(−2.27)	(2.35)	(−0.20)
Liquidity	0.01	−0.10**	−0.03
	(0.51)	(−2.58)	(−1.69)
MB	0.06	0.03	0.01*
	(1.47)	(1.78)	(1.96)
Firm and Year FEs	Yes	Yes	Yes
R^2 (within)	0.02	0.09	0.03
No. of Firms	2966	2958	602
No. of Obs.	8121	8116	2809

Table 5 reports the results from different specifications of the regression equation:

$$Risk_{it} = \alpha + \beta. 1_{(Clause49=1)}. 1_{(After=1)} + \lambda. 1_{(Clause49=1)} + \rho. 1_{(After=1)} + X_{it}. \delta + \gamma_i + \tau_t + e_{it},$$

where $Risk_{it}$ is risk-taking proxied by earnings-volatility. We further use two additional proxies of corporate investment: capital expenditure and R&D expenditure as dependent variables. Variables are defined in the notes to Table 1. $1_{(Clause-49=1)}$ is an indicator variable that takes the value of one for treated firms and zero otherwise. $1_{(After=1)}$ is a categorical variable that takes the value of one for three years following and including the year of introduction of Clause-49, i.e. year 2000 and zero for three years before 2000. X_{it} is a vector of firm level controls that includes size, leverage, liquidity and market-to-book (MB). γ_i and τ_t control for the fixed effects of firm and year respectively. e_{it} is the error term. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen (2009). t-statistics are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance levels respectively. Source: CMIE database.

enforcement year. In this section, we examine whether the initial introduction of Clause-49 in 2000 has an effect on corporate risk-taking. To do so, we run a DiD panel regression, as in Eq. (2). However, the $1_{(After=1)}$ of Eq. (2) in this case takes the value of one for years from 2000 to 2002 and zero for years from 1997 to 1999. Control and treated firms are all non-financial, domestically listed firms, as defined in the notes to Table 2. Control variables include all except OwnCon, as defined in the notes to Table 1. OwnCon does not appear as a control variable, as data on OwnCon are available only for 2001. Table 5 reports the findings for the proxies of risk-taking and corporate investments. We find that the introduction of CGR in 2000 does not have a significant effect on risk-taking of treated firms.[15]

Why do we fail to see any change in corporate risk-taking after the introduction of Clause-49? It is important to note that the initial penalty for non-compliance was delisting. Delisting is considered to be a significant sanction to deter non-compliance of regulatory provisions, as it affects, among others, a firm's access to and cost of external capital (Stulz, 1999; Brav, 2009). To examine this surprising finding further, we hand-collected data on delisting from 2000 to 2007. Our data show that 1245 firms were delisted between 2000 and 2007, of which only 20 firms were delisted on the ground of non-compliance with regulations. Only 12 firms were delisted for non-compliance with SEBI regulations not related to Clause-49, with no firm delisted on the ground of violating Clause-49. On the basis of this evidence, we argue that, in the absence of any actual delisting, the threat of being delisted as a penalty might not be robust enough to induce the expected changes in corporate behavior, particularly in the context of emerging markets (Dutcher, 2005; Dharmapala and Khanna, 2013; Claessens and Yurtoglu, 2013).[16]

The use of robust penalties to induce changes in corporate behavior is also supported by existing studies that highlight the importance of stronger sanctions for non-compliance (Dutcher, 2005).[17] For example, Dharmapala and Khanna (2013) in their investigation of CGR in India note that the prospect of public enforcement actions, in the form of expanded financial sanctions and criminal liabilities for non-compliance, may act as a strong stimulus to deter insiders from diverting corporate resources for their

[15] As Clause-49 is a phased-in reform affecting different treated groups in different times, in addition to investigating the introduction effect, as shown in Table 5, in an unreported table, we also examine the DiD regression using equation (2). We redefine $1_{(Clause-49=1)}$ as a categorical variable which takes the value of one if a firm is affected by Clause-49 in a year and zero otherwise, and an event indicator variable, $1_{(After=1)}$ which takes the value of one for three years following the applicability of clause-49 until 2003 and zero otherwise. The results are consistent, with no significant introduction effect as presented in Table 5.

[16] Claessens and Yurtoglu (2013) state that on average effective enforcement in advanced economies is twice as high as in emerging and transition economies.

[17] Becker's (1968) economic model notes that maximizing punishments for non-compliance, particularly monetary fines, may encourage expected enforcement.

personal benefit.[18] They also argue that in the absence of stricter enforcement provisions, even firms that are willing to adopt, or have already adopted, better corporate governance practices could incur significant costs to convince outside investors credibly. Further, the addition of more severe sanctions is a strong signal of greater reputational penalties. Consistent with the argument that sanctions need to be adequate to induce expected changes in corporate behavior (Dutcher, 2005), our findings highlight the importance of stricter CGR sanctions in stimulating corporate risk-taking.[19]

5.4. Robustness checks for hypothesis 1

Although we control for various firm-level characteristics, and firm and year fixed effects, in our examination of hypotheses 1a and 1b, there could be other differences in our treated and control groups that could have an impact on corporate risk-taking. Alternatively, our results could capture other contemporaneous shocks. We address these alternative explanations through a series of robustness checks in the following sub-sections, which strengthen the causality claim of the positive effect of CGR on corporate risk-taking further.

5.4.1. Addressing pre-CGR corporate governance differences among firms

It is possible that some of the firms within the treated group could be those that were exposed to a higher level of governance standards before CGR in 2004. Hence, their inclusion in our sample as treated firms, could lead to a bias in our results. We deal with this issue by identifying 84 firms within the treated group that are cross-listed in international exchanges as at or before 2004 and employ them as our alternative control group. Existing studies suggest that internationally cross-listed firms, particularly of emerging markets, exhibit superior corporate governance when compared to their domestic counterparts since the cross-listed firms need to comply with the higher CGR requirement of the developed market listing agreement (Stulz, 1999; Coffee Jr, 2002; Karolyi, 2012).[20] Therefore, we maintain that the effect of domestic CGR intervention should have a smaller effect on the corporate governance practices of cross-listed Indian firms, relative to firms listed domestically alone.

One potential concern regarding the comparability of cross-listed firms with the entire sample of domestically listed treated firms is that these firms, on average, are of larger size when compared to overall treated firms. To address this, we generate a size-decile of all treated firms (excluding the cross-listed firms) based on average size (natural logarithm of book value of total assets in millions of INR) before 2004, and assign size-matched treated firms to firms falling in the uppermost size-decile (average size of 8.85 versus 8.86 of cross-listed firms prior to 2004 CGR). We repeat the PSM as described in Section 5.2.2 from this size-matched universe of treated firms and obtain 81 pairs of propensity score matched treated firms and cross-listed firms as an alternative control group.

Table 6 reports PSM-DiD regressions of these size-matched treated firms.[21] In line with our main findings in Tables 3 and 4, the DiD coefficients of these matched groups, as reported in Panel B of Table 6, are positive and significant (at the 1% significance level). The results from univariate DiD estimates in Panel C are also consistent with our main results. Thus, the use of cross-listed firms as an alternative control group reduces the possibility of our results supporting hypothesis 1a. They are driven by pre-CGR corporate governance differences among treated firms.

5.4.2. Placebo test

Our main tests rely on the premise that there is no notable economy-wide shock in 2004, other than the enforcement of Clause-49, as an explanation of the systematic changes observed in corporate risk-taking. From our examination of the political economy of India through media coverage and previous empirical studies, we find no such economy-wide shock in 2004. However, it could be that our results are simply reflecting the effect of confounding shocks before or after the 2004 intervention or continuation of pre-existing trend. To address this, we use a placebo test. We design two pseudo-shock periods, one for 2002 (two years before the enforcement shock) and the other for 2006 (two years after the enforcement shock). Our treated and control groups remain the same as

[18] However, there is now some evidence that SEBI is imposing sanctions for non-compliance. For example, www.livemint.com notes the following for the year ending December 31, 2013: “As part of the initial action, the two exchanges (BSE and NSE) have imposed penalties and suspended trading in companies' shares mostly for non-compliance with clauses 35 and 49. BSE has imposed a total fine of Rs. 2.56 crores on companies breaching clause 35, and a fine of Rs. 44.54 crores for non-compliance with Clause-49. NSE has imposed a total fine of Rs. 9.34 lakhs on 32 firms. This fine amount will keep increasing since it is imposed on a per-day basis.” [Source (https://www.livemint.com/Money/BnUE7CAEJ5TUi6RApPwO6M/BSE-NSE-find-widespread-violation-of-listing-norms.html) accessed 4 June 2018, 18.23 BST]

[19] To reduce the possibility that industry-specific shocks like changes in investment opportunities and/or competition across different industries could confound our results, we interact with the industry dummy, which takes a unique value for each industry, as defined in Appendix 3, with the year dummies and run DiD regression with firm fixed effect and the interaction of industry and year. The results, which are unreported but can be obtained from the authors, are robust when we control for this effect in our model lending support to hypothesis 1a.

[20] The superiority of corporate governance of cross-listed firms is explained by the bonding argument. The argument contends that the prevalence of potential agency conflicts in firms in emerging economies, in large part, is a result of fragile regulatory oversight, inadequate transparency, and disclosure requirements, as well as weak legal protection of minority investors. To overcome these deficiencies in governance, firms in developing markets choose to bond themselves credibly with the legal and financial institutions of developed markets by means of international cross-listing (Stulz, 1999; Coffee Jr, 2002; Karolyi, 2012).

[21] The dependent variable of the probit model in Panel A in Table 6 is a dummy variable which takes the value of one if a firm is cross-listed in or before 2004, and zero if it is a Clause-49 affected firm in the uppermost size decile before 2004, and not cross-listed. The covariates for propensity score estimation in column 1 of Panel A are the same as in Eq. (2).

Table 6
Robustness Test: Propensity score Matched DiD with Cross-listed firms.

	Dummy = 1 if cross-listed; 0 if in uppermost size decile treated firms and not cross-listed.	
	Pre-match	Post-match
	[Model 1]	[Model 2]
Panel A: Pre-match Propensity Score Regression and Post-match Diagnostic Regression		
Size	0.28***	0.15
	(3.89)	(0.81)
Leverage	0.01	0.01
	(0.55)	(0.03)
Liquidity	−0.01	−0.00
	(0.51)	(−0.06)
OwnCon	−0.04***	−0.03
	(−3.69)	(−0.79)
MB	0.03**	0.02
	(2.19)	(1.04)
Industry FE	Yes	Yes
Intercept	−2.15***	−2.13***
	(−4.15)	(−3.42)
Observations	1364	648
Pseudo R^2	0.2371	0.08
p-value of χ^2	0.00	0.41

	Earnings-volatility		Capital expenditure		R&D expenditure	
	[Model 1]	[Model 2]	[Model 1]	[Model 2]	[Model 1]	[Model 2]
Panel B: DiD Regression of Propensity Score Matched Treated and Control Group.						
DiD	0.66***	0.52***	7.98***	9.21***	0.99***	0.56***
$[1_{(Clause49=1)}.\ 1_{(After=1)}]$	(4.41)	(3.96)	(4.68)	(2.86)	(2.97)	(4.49)
Size		0.23		−0.41		−0.21
		(−1.09)		(−0.35)		(−1.56)
Leverage		−0.00		0.04		−0.14
		(−0.13)		(0.24)		(−1.22)
Liquidity		−0.01		−0.05		−0.06
		(−1.07)		(−0.36)		(−1.27)
OwnCon		−0.02		−0.11		−0.01
		(−1.26)		(−1.81)		(−1.87)
MB		0.04***		1.33**		0.15***
		(3.36)		(4.43)		(3.26)
Firm and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (within)	0.05	0.06	0.03	0.08	0.02	0.09
No. of Firms	162	162	162	162	104	104
No. of Obs.	1296	1296	1296	1296	832	832

	Mean Treated Difference (After-Before)	Mean Control Difference (After-Before)	Mean DiD Estimator (treated-Control)
Panel C. Univariate DiD for earnings-volatility, capital expenditure and R&D expenditure			
Earnings-volatility	0.96***	−0.20	1.16***
	(3.88)	(−0.76)	(2.98)
Capital expenditure	10.29***	−1.63	11.92***
	(3.06)	(−1.07)	(2.76)
R&D expenditure	0.51**	0.05	0.46**
	(2.35)	(0.29)	(2.33)

Table 6 reports the results of DiD regression of a subsample of treated and control firms based on propensity score matching (PSM) prior to CGR enforcement. Panel A presents parameter estimates from the probit model used to estimate propensity scores for larger sized treated firms and firms cross-listed in international exchanges as at or before 2004 (alternative control firms), as shown in Table 2. The dependent variable is one if the firm is cross-listed and zero if it belongs to the uppermost size decile of treated firms and is not cross-listed. Model 1 of Panel A reports parameter estimates with the entire sub-sample of uppermost size decile treated firms and cross-listed firms without PSM, whereas Model 2 reports estimates with a propensity score matched 81-pair subsample. Heteroscedasticity robust t-statistics are reported in parentheses. Industry fixed effects are included in both Models in Panel A. Panel B presents DiD regression for the matched firms as given by equation:

$$Risk_{it} = \alpha + \beta.\ 1_{(Clause49=1)}.\ 1_{(After=1)} + \lambda.\ 1_{(Clause49=1)} + \rho.\ 1_{(After=1)} + X_{it}.\ \delta + \gamma_i + \tau_t + e_{it},$$

where $Risk_{it}$ is risk-taking proxied by earnings-volatility. We further use two additional proxies of corporate investment: capital expenditure and R&D expenditure as dependent variables. Variables are defined in the notes to Table 1. $1_{(Clause49=1)}$ is an indicator variable that takes the value of one for 81 matched treated firms using PSM and zero for the 81 firms cross-listed in international exchanges as at or before 2004. $1_{(After=1)}$ is an

indicator variable that takes the value of one for years including and after 2004 and zero otherwise. X_{it} is a vector of firm level controls that includes size, leverage, liquidity, ownership concentration (OwnCon) and market-to-book (MB). γ_i and τ_t control for the fixed effects of firm and year respectively. e_{it} is the error term. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen (2009). Panel C presents univariate DiD estimates of the matched treated and control groups. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance levels respectively. Models [1] and [2] report regression without and with controls. The sample period ranges from year 2000 to 2007. Source: CMIE database.

Table 7
Placebo Tests.

	Earnings-volatility		Capital expenditure		R&D expenditure	
	[Model 1]	[Model 2]	[Model 1]	[Model 2]	[Model 1]	[Model 2]
	(FSY = 2002)	(FSY = 2006)	(FSY = 2002)	(FSY = 2006)	(FSY = 2002)	(FSY = 2006)
DiD-Placebo	−0.06	−0.39	0.93	2.31	0.02	0.15
$1_{(Clause49=1)}.\ 1_{(FalseAfter=1)}$	(−0.20)	(−1.17)	(0.02)	(1.26)	(1.46)	(1.76)
Size	−0.89**	−0.29**	3.40***	2.85***	−0.08**	−0.59***
	(−2.55)	(−2.63)	(4.43)	(5.14)	(−2.41)	(−6.88)
Leverage	−0.03	−0.14***	0.46**	0.52***	0.00	−0.01
	(−1.15)	(−3.27)	(2.32)	(3.25)	(0.09)	(−0.33)
Liquidity	0.00	0.00	−0.08**	−0.19**	−0.03	−0.04
	(0.54)	(0.32)	(−2.05)	(−2.60)	(−0.59)	(−1.66)
OwnCon		−0.01		−0.04		−0.00
		(−1.37)		(−0.97)		(−0.60)
MB	0.01	0.10***	0.02	0.06*	0.07*	0.00*
	(0.14)	(3.47)	(0.07)	(1.91)	(1.82)	(1.87)
Firm and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (within)	0.02	0.03	0.08	0.09	0.02	0.04
No. of Firms	2966	2966	2958	2958	638	639
No. of Obs.	7416	7621	7470	7696	2136	2139

Table 7 reports the results from different specifications of the regression equation:

$$Risk_{it} = \alpha + \beta.\ 1_{(Clause49=1)}.\ 1_{(FalseAfter=1)} + \lambda.\ 1_{(Clause49=1)} + \rho.\ 1_{(FalseAfter=1)} + X_{it}.\ \delta + \gamma_i + \tau_t + e_{it},$$

where $Risk_{it}$ is risk-taking proxied by Earnings-volatility. We further use two additional proxies of corporate investment: capital expenditure and R&D expenditure as dependent variables. Variables are defined in the notes to Table 1. $1_{(Clause-49=1)}$ is an indicator variable that takes the value of one for treated firms and zero otherwise. $1_{(After=1)}$ is an indicator variable that takes the value of one for two years after and including a false-shock year (FSY) and zero for two years before the FSY. We take years 2002 and 2006 as two different FSYs resulting in two false experiments and report in Models 1 and 2 for each proxy of risk-taking. X_{it} is a vector of firm level controls that includes size, leverage, liquidity, ownership concentration (OwnCon) and market-to-book (MB). γ_i and τ_t control for the fixed effects of firm and year respectively. e_{it} is the error term. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen (2009). t-statistics are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance levels respectively. Source: CMIE database.

determined by Clause-49. We re-run regression eq. (2), this time altering the dummy variable $1_{(After=1)}$ to $1_{(FalseAfter=1)}$ which takes the value of one for years 2002 and 2003 for False-Experiment 1 (FSY = 2002) and zero for two years before 2002. Similarly, for False-Experiment 2 (FSY = 2006), $1_{(FalseAfter=1)}$ is one for the years 2006 and 2007 and zero for two years before 2006.

Table 7 reports the DiD regression results from these false experiments. The estimates of risk-taking and corporate investment proxies show an insignificant effect for both 2002 and 2006, suggesting that confounding events around CGR are not driving our results.[22]

5.5. Channels through which CGR affects risk-taking

In the discussion of possible channels through which CGR could affect risk-taking in Section 3.1, we contend that a firm's risk-taking is related positively to insiders' utility from the wealth effect of investments and negatively to insiders' utility from private benefits. In this section we examine changes in the magnitude of the key channels in the post-CGR period compared to their pre-CGR values. We maintain that changes in these metrics following the CGR could encourage corporate risk-taking.

5.5.1. Cost of equity capital

As discussed in Section 3.1, we explore whether cost of equity capital has reduced significantly in the post-2004 period, which

[22] In an unreported Table, with 2003 (one year before true experiment year) as the false experiment year, we find the results to be consistent with Table 7. However, the placebo test, with 2005 as the false experiment year, shows a significant positive effect, which is consistent with the expectation that the effect of the CGR on risk-taking is persistent for 2005.

Table 8
Possible Channels of Increase in Risk-taking.

	Firms	Before	After	Mean Difference	DiD Estimator
		[1]	[2]	[2–1]	
Dividend Yield	Control	1.46	1.44	−0.02	
				(−0.15)	−0.33***
	Treated	1.66	1.31	−0.35***	(5.36)
				(−7.48)	
Amihud Illiquidity Ratio	Control	0.2798	0.1913	−0.088**	
				(−2.20)	−0.097***
	Treated	0.2441	0.0583	−0.186***	(−10.05)
				(−20.31)	
Days with Zero Return	Control	10.13	11.82	1.69***	
				(2.97)	−7.86***
	Treated	16.72	10.55	−6.17***	(7.89)
				(−14.19)	
Foreign Equity Ownership	Control	2.72	3.03	0.31	
				(0.64)	5.81***
	Treated	3.42	9.54	6.12***	(9.54)
				(20.04)	
Independent Board	Control	39.59	41.76	2.17***	
				(3.69)	5.54***
	Treated	36.78	44.49	7.71***	(6.61)
				(12.44)	

Table 8 reports the univariate results of different channels of increase in risk-taking. Dividend Yield is the ratio of dividend paid per share to market price per share of firm's common stock. Amihud Illiquidity Ratio is the annual average of the ratio of absolute return to the daily trading volume. Days with Zero Return is number of trading days with zero return as a proportion of total trading days in a year. Foreign Equity Ownership is the ratio of number of shares held by foreign non-promoting investors to total non-promoting shareholders. Independent Board is computed as a ratio of the number of independent board members to total board members. All variables except Amihud Illiquidity Ratio are expressed in percentages. Treated firms include firms affected by CGR and Control firms include those unaffected by the reform. The before period is 2000–2003 and after period is 2004–2007. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance levels respectively. Source: CMIE database. Sample period: 2000–2007.

could lead to higher positive net present value (NPV) investments. We examine the dividend yield of our sample firms as a proxy of cost of equity capital (Bekaert and Harvey, 2000; Errunza and Miller, 2000; Hail and Leuz, 2006). We compute the dividend yield as a ratio of dividend paid per share to the market price per share of a firm's common stock. Table 8 shows a 0.35 percentage points decrease (significant at the 1% significance level) in the dividend yield of treated firms, whereas the change in the dividend yield of control firms is not significant. This reduction in the cost of equity capital following CGR in 2004 could have encouraged corporate risk-taking.

5.5.2. Liquidity

We explore whether a decrease in cost of capital is associated with improvement in stock liquidity. To do so, we examine the changes in liquidity measures for the treated and control groups following the 2004 reform in Clause-49. We use two widely used measures of liquidity. First, we use the Amihud (2002) Illiquidity Ratio (ILR) as measured by the annual average ratio of absolute daily return to the daily trading volume. The second illiquidity measure that we use is the number of days with zero returns (DZR) as a proportion of total trading days in a year (Bekaert et al., 2007).[23] Table 8 shows that the Amihud ILR of treated firms decreases sharply by 0.186 units (significant at the 1% significance level) in comparison to a slight (0.088 units) decrease in control firms. Similarly, the DZR of treated firms decreases by 6.17 percentage points (significant at the 1% significance level) in comparison with an increase of 1.69 percentage points for the control groups. Overall, both illiquidity measures show a significant decrease for treated firms post-CGR when compared to those of control firms (significant negative DiD estimates at the 1% significance level). The improvement in (lowering of) liquidity (illiquidity) could encourage investment in positive NPV projects through a reduced cost of capital.

5.5.3. Foreign ownership

The increased presence of foreign investors can reduce the cost of capital through higher monitoring (Khanna and Palepu, 2000) and international risk-sharing (Errunza and Miller, 2000). To examine the changes in the ownership of foreign investors in our sample, we compute foreign equity ownership of the treated and control firms before and after CGR. We measure foreign equity

[23] ILR enables a relationship between the changes in stock price and trading volume. A lower ILR implies higher market liquidity. Zero returns occur when the cost of transactions becomes greater than the value of information for the informed trader, therefore reflecting concerns of the liquidity in informed trades on returns of securities (Lesmond, 2005; Bekaert et al., 2007). Further, greater transaction costs lead to a higher number of zero returns.

ownership as a ratio of the number of shares held by foreign non-promoter shareholders to the total number of shares held by all non-promoters. Table 8 shows that treated firms witness an average increase of 6.12 percentage points in foreign ownership (significant at the 1% significance level) in comparison with the insignificant increase of 0.31 percentage points for control firms. The univariate DiD estimate is a positive 5.81 percentage points and statistically significant at the 1% level. Increased foreign investors following CGR of 2004 could reduce the cost of capital and improve monitoring, both of which can encourage value-enhancing risk-taking.

5.5.4. Board independence

Studies note that independent directors are often valued for working in favor of shareholders by disciplining managers (Bhagat and Bolton, 2008). Board independence could positively affect value-enhancing corporate risk-taking in firms where insiders or managers are more likely to be risk-averse in pursuing more conservative investments (Lu and Wang, 2018). Similarly, independent boards are important for yielding innovative outcomes (Sena et al., 2018). The value-enhancing effect of independent directors increases when CGR mandates crucial roles for them, such as sitting on audit committees (Nguyen and Nielsen, 2010). Board independence can be an important channel in encouraging investment in wealth-creating risky projects, as better monitoring and accountability can reduce private consumption (Johnson et al., 2000; John et al., 2008; Claessens and Yurtoglu, 2013). To assess this channel, we calculate an Independent Board metric as a ratio of the number of independent board members to the total number of board members. As expected, and implied by the provisions of Clause-49, Table 8 shows that the Independent Board of treated firms increases by 7.71 percentage points in the post-CGR period when compared to a relatively smaller increase (2.17 percentage points) of independent boards of the control firms in the same period.

To sum up, our examination of the potential channels through which CGR can impact risk-taking and corporate investments shows that, following CGR, treated firms experience lower cost of capital, potentially resulting from higher liquidity, a higher presence of foreign investors, and better scrutiny of corporate decisions through a greater degree of board independence. Similarly, an increase in independent monitoring by an independent board and foreign owners can help reduce the utility from expected private benefits, thereby encouraging value-maximizing risk-taking and corporate investments. Taken together, the shift in these factors is likely to encourage corporate risk-taking of treated firms in post-CGR period, in line with hypothesis 1a.

5.6. Ownership concentration and the role of CGR

In this section, we examine hypothesis 2 by using the difference-in-difference-in-differences (DiDiD) estimation as shown in Eq. (3):

$$Risk_{it} = \alpha + \omega.\ 1_{(Clause49=1)}.\ 1_{(After=1)}.\ \overline{OwnCon_i} + \chi.\ 1_{(Clause49=1)}.\overline{OwnCon_i} + \lambda.\ 1_{(Clause49=1)} + \rho.\ 1_{(After=1)} + X_{it}.\ \delta + \gamma_i + \tau_t + e_{it} \quad (3)$$

where $\overline{OwnCon_i}$ is the two-year average of promoters' shareholding before the enforcement of Clause-49. The coefficient ω estimates the impact of CGR on the cross-section of treated firms based on the heterogeneity of their ownership concentration prior to CGR. For CGR to stimulate positive corporate risk-taking among firms with higher ownership concentration, ω of Eq. (3) should be positive.

To examine hypothesis 2, we proxy ownership concentration as the percentage of shares owned by promoting shareholders. We calculate the two-year average of promoters' shareholding before the enforcement of Clause-49 to generate heterogeneity in ownership structure prior to Clause-49 enforcement and make the variable interact with $1_{(Clause49=1)}.\ 1_{(After=1)}$ to obtain the triple interaction term: DiDiD-OwnCon= $1_{(Clause49=1)}.\ 1_{(After=1)} * \overline{OwnCon_i}$ as shown in Eq. (3).

Table 9 reports the DiDiD-OwnCon coefficients without and with controls. Without controls (Model 1), the coefficients of DiDiD-OwnCon for earnings-volatility, capital expenditure, and R&D expenditure of treated firms show significant positive values of 0.05, 0.10, and 0.01 percentage points respectively (significant at the 1% level). The results are consistent when we include all the controls in Model 2 for all three proxies of risk-taking and corporate investments. Overall, the results suggest that in comparison with the treated peers with lower ownership concentration, corporate risk-taking of treated firms with higher ownership concentration has significantly increased, following the enforcement of CGR, supporting hypothesis 2. This is consistent with the argument that improvements in corporate governance enable firms, which are otherwise conservative because of insiders' dominance, to make more value-enhancing risky investment decisions (Stulz, 2005; John et al., 2008; Paligorova, 2010; Boubakri et al., 2013).

5.7. CGR, risk-taking, and firm value

In hypothesis 3 we argue that risk-taking could be an important channel through which the enforcement of CGR provides higher firm valuation. To test this conjecture, we investigate whether an increase in corporate risk-taking and corporate investments following CGR is associated with higher firm valuation. To do so, we use a panel regression with firm value as the explanatory variable, as presented in Eq. (4):

$$Value_{it} = \alpha + \theta.\ 1_{(Clause49=1)}.\ 1_{(After=1)}.Risk - taking\ (Corporate\ Investment) + \beta.\ 1_{(Clause49=1)}.\ 1_{(After=1)}. + \lambda.\ 1_{(Clause49=1)} + \rho.\ 1_{(After=1)} + X_{it}.\ \delta + \gamma_i + \tau_t + e_{it} \quad (4)$$

where we proxy firm value using Tobin's Q, computed as the ratio of the sum of total liabilities, book value of preferred stock, and market value of equity to the book value of total assets. We use book value, rather than the market value of preferred stock, because preference shares are traded very thinly in the Indian market during the study period. All control variables, except MB, remain as specified in Eq. (2). $1_{(Clause49=1)}.\ 1_{(After=1)}.\ Risk - taking\ (Corporate\ Investment)$ is an interaction term where Risk-taking (corporate

Table 9
Ownership Concentration and the Role of CGR.

	Earnings-Volatility		Capital Expenditure		R&D Expenditure	
	[Model 1]	[Model 2]	[Model 1]	[Model 2]	[Model 1]	[Model 2]
DiDiD-OwnCon	0.05***	0.01***	0.10***	0.07***	0.01***	0.01***
$[1_{(Clause49=1)} . 1_{(After=1)}]. \overline{OwnCon_i}]$	(4.41)	(3.71)	(3.94)	(3.11)	(4.09)	(3.95)
Interaction-Treated-OwnCon	0.00	0.00	0.00	0.00	0.00	0.00
$[1_{(Clause49=1)}.\overline{OwnCon_i}]$	(0.61)	(0.63)	(0.62)	(0.68)	(0.69)	(0.60)
Size		−0.01**		0.60**		−0.40*
		(−2.88)		(2.70)		(−1.90)
Leverage		−0.00		0.20		−0.00
		(−0.35)		(0.70)		(−0.14)
Liquidity		−0.00		−0.36*		−0.02
		(−1.19)		(−2.03)		(−0.28)
OwnCon		−0.01*		−0.17		−0.00
		(−1.85)		(−1.13)		(−0.45)
MB		0.00***		2.03***		0.01***
		(4.03)		(4.91)		(2.41)
Firm and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (within)	0.02	0.06	0.02	0.07	0.02	0.05
No. of Firms	2966	2966	2958	2958	667	667
No. of Obs.	14,845	14,845	14,859	14,859	3580	3580

Table 9 reports the results of different specifications of the regression equation:

$$Risk_{it} = \alpha + \omega . 1_{(Clause49=1)} . 1_{(After=1)} . \overline{OwnCon_i} + \chi . 1_{(Clause49=1)}.\overline{OwnCon_i} + \lambda . 1_{(Clause49=1)} + \rho . 1_{(After=1)} + X_{it} . \delta + \gamma_i + \tau_t + e_{it},$$

where $Risk_{it}$ is risk-taking proxied by earnings-volatility. We further use two additional proxies of corporate investment: capital expenditure and R&D expenditure as dependent variables. Variables are defined in the notes to Table 1. $1_{(Clause49=1)}$ is an indicator variable that takes the value of one for firms affected by Clause-49 and zero otherwise; $1_{(After=1)}$ is an indicator variable that takes the value of one for years including and after 2004 and zero otherwise. $\overline{OwnCon_i}$ is the two-year average of the percentage of promoters' shareholding before the enforcement of Clause-49. X_{it} is a vector of firm level control variables. Firm level controls include size, leverage, liquidity and market-to-book (MB). γ_i and τ_t control for the fixed effects of firm and year respectively. e_{it} is the error term. ω captures the effect of CGR on risk-taking (investments) over the cross-section of ownership concentration of the treated firms before enforcement. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen (2009). t-statistics are reported in parentheses. *, ** and *** denote statistical significance at 10%, 5% and 1% significance levels respectively. Models [1] and [2] report regression without and with controls for sample firms with non-missing control variables for each risk-taking measure. The sample period ranges from year 2000 to 2007.Source: CMIE database.

investments) is gauged by earnings-volatility (capital expenditure and R&D expenditure), and $1_{(Clause49=1)}$and $1_{(After=1)}$ are as defined in Eq. (2).

We report the results of the estimation in Table 10. Models 1 to 6 report the results of Eq. (4) without and with controls for each instance of risk-taking and corporate investment proxies as well. The results in Models 1 and 2 show that the firm value of higher risk-taking treated firms is significantly greater (at the 1% level) than that of lower risk-taking firms (minimum value of 0.04 in Model 1). In terms of economic magnitude, this implies a one standard deviation increase in a firm's risk-taking, as proxied by earnings-volatility, is associated with a minimum of 0.274 units increase in the Tobin's Q of treated firms (with an average standard deviation of earnings-volatility of 6.85 percentage points).[24] The value relevance proposition also holds for capital expenditure (Models 3 and 4) and R&D expenditure (Models 5 and 6).

There could be a possibility that the risk-taking and corporate investment proxies could overlap in terms of information content. In order to assess whether these measures contribute to higher firm valuation separately, as reported in Table 10, we run a horse-race procedure by including the triple interaction terms of these risk-taking and corporate investment measures together in a single model. Model 7 reports the interaction terms of earnings-volatility and capital expenditure together, and Model 8 uses triple interaction terms of all three proxies of risk-taking and corporate investments. We report Models 7 and 8 separately as the incorporation of the triple interaction with R&D expenditure in Model 8 significantly reduces the number of observations. Models 7 and 8 show that each of the three proxies of risk-taking and corporate investments is individually significant at the 1% level and contributes to higher firm valuation in the post-CGR period.

Finally, in Model 9 of Table 10, we replicate the evidence of Dharmapala and Khanna (2013) and find that firm valuation has increased in an economically meaningful magnitude in the post-CGR period. Our findings are consistent with those of Dharmapala and Khanna (2013). However, when compared to Model 8 (and Model 7) where we control for the contribution from risk-taking and corporate investments, the economic magnitude of the DiD coefficient reduces both in magnitude (from 0.89 to 0.38) and statistical significance, suggesting that a significant portion of value derived by the treated firms after the CGR is associated with higher risk-

[24] With standard deviation of earnings-volatility at 6.85 percentage points, the coefficient of 0.04 translates to 0.274 units (=0.04*6.85).

Table 10
Value implication of risk-taking.

	[Model 1]	[Model 2]	[Model 3]	[Model 4]	[Model 5]	[Model 6]	[Model 7]	[Model 8]	[Model 9]
Triple Interaction-earnings volatility	0.04***	0.05***					0.05***	0.03***	
$[1_{Clause-49=1}.\ 1_{After=1}.\ earnings - volatility]$	(9.47)	(5.01)					(5.17)	(3.00)	
Triple Interaction-capital expenditure			0.01***	0.01***			0.01***	0.01***	
$[1_{Clause-49=1}.\ 1_{After=1}.\ capital\ expenditure]$			(9.40)	(4.94)			(5.16)	(2.91)	
Triple Interaction-R&D expenditure					0.06***	0.06***		0.06***	
$[1_{Clause-49=1}.\ 1_{After=1}.\ R\ \&\ D\ Expenditure]$					(2.88)	(3.28)		(7.02)	
DiD		0.50***		0.27*		0.59***	0.51*	0.38*	0.89***
$[1_{Clause-49=1}.\ 1_{After=1}]$		(2.86)		(2.03)		(2.85)	(2.00)	(2.05)	(4.47)
Size		0.51***		0.48***		0.54***	0.51***	0.73***	0.54***
		(5.34)		(3.80)		(3.32)	(4.98)	(4.33)	(4.92)
Leverage		0.08**		0.08***		0.08*	0.08***	0.07	0.09***
		(2.58)		(2.82)		(1.95)	(2.62)	(1.35)	(3.34)
Liquidity		−0.01***		−0.00**		−0.01	−0.00**	−0.00	−0.01**
		(−3.50)		(−2.16)		(−0.33)	(−2.28)	(−0.14)	(−2.40)
OwnCon		0.01		0.01		0.00	0.01	0.01	0.01
		(1.75)		(1.65)		(0.48)	(1.64)	(1.30)	(0.98)
Firm and Year Fes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (within)	0.03	0.10	0.02	0.09	0.02	0.06	0.10	0.13	0.04
No. of Firms	3755	2966	3782	2958	838	667	2601	667	2700
No. of Obs.	25,144	14,845	25,842	14,859	5067	3580	14,564	3674	14,930

Table 10 reports the results of different specifications of the following specification:

$$Value_{it} = \alpha + \varphi.\ 1_{(Clause49=1)}.\ 1_{(After=1)}.\ Risk - taking + \beta.\ [1_{Clause-49=1}.\ 1_{After=1}] + \lambda.\ 1_{(Clause49=1)} + \rho.\ 1_{(After=1)} + X_{it}.\ \delta + \gamma_i + \tau_t + e_{it},$$

Where $Value_{it}$ is Tobin's Q calculated as a ratio of market value of total assets to its book value. $1_{(Clause49=1)}$ is an indicator variable that takes the value of one for firms affected by Clause-49 and zero otherwise; $1_{(After=1)}$ is an indicator variable that takes the value of one for years including and after 2004 and zero otherwise. X_{it} is a vector of firm level control variables, which include size, leverage, book liquidity and ownership-concentration (OwnCon). Risk-taking is gauged by earnings-volatility. We further use two other proxies of investments including capital expenditure and R&D expenditure as independent variables of interest. Variables are as defined in the notes to Table1. γ_i and τ_t control for the fixed effects of firm and year respectively. e_{it} is the error term. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen (2009). t-statistics are reported in parentheses. *, ** and *** denote statistical significance at 10%, 5% and 1% significance levels respectively. Source: CMIE database. The sample period ranges from year 2000 to 2007.

taking by these firms. These results further support our view that corporate risk-taking is an important channel through which CGR affects a firm's value, supporting hypothesis 3.

6. Conclusion

The debate on the effect of CGR on corporate investment decisions is a matter of concern for policy-makers. The literature provides two different theoretical perspectives on the effect of CGR on a firm's corporate risk-taking. One argument is that stricter CGR sanctions, which expand the financial and personal liability of corporate insiders for corporate affairs, increase the compliance burden and discourage insiders from undertaking value-enhancing risky investment decisions. On the other hand, expected utility from private benefits of the dominant insiders could favor investment conservatism to the extent of passing up positive NPV risky investments. CGR limits expected private benefits of the insiders through independent scrutiny and transparency, thereby encouraging these insiders to pursue value-enhancing risk-taking. The possibility of either of the two opposing economic predictions motivates us to empirically examine the effect of CGR intervention in an emerging market set-up where weaker market forces of corporate scrutiny make mandatory CGR an important policy tool to improve corporate governance practices.

Employing a major CGR in India, our main result, supported by a series of robustness checks, provides strong evidence in support of the argument that stricter CGR intervention increases corporate risk-taking. We argue that, contrary to recent evidence around SOX, stricter CGR in a set-up facing a weaker investor protection regime and the prevalence of dominant insiders could reduce the private benefits of dominant insiders, thereby expanding a firm's appetite for risk-taking.

Our results, which are driven by increased risk-taking among firms with higher ownership concentration, suggest that CGR increases the risk-taking of otherwise investment conservative firms. Our results also indicate that risk-taking is an important channel through which CGR harnesses higher valuation for firms. These findings imply that in a set-up with a weaker market mechanism of corporate governance, CGR substitutes weaker market forces of corporate scrutiny to stimulate value-enhancing risk-taking and corporate investments. This evidence supports the view that stricter corporate governance interventions can bring about positive investment outcomes in the evolving regulatory environment of emerging markets.

Acknowledgements

The authors appreciate comments from Kose John, Halit Gonenc, Anand Venkateswaran, Debarati Basu, Jayant Kale, Jayati Sarkar, Madhu Veeraraghavan, Marc Goergen, Subrata Sarkar, Jayati Sarkar, Patrick McColgan, Vidhan Goyal, and the participants of the 4th Paris Financial Management Conference, 2016, NSE-IGIDR Conference on Corporate Governance, 2017, the 4th Young Finance Scholars' Conference, 2017, the Southern Finance Association Annual Meeting, 2017, and the Journal of Corporate Finance Special Issue Conference on Corporate Governance and Sustainability: Emerging Markets and Beyond, 2017. This paper also forms a part of a project under an NSE-IGIDR competitive research grant. We thank the National Stock Exchange of India and the Indira Gandhi Institute of Development Research for their generous funding.

Appendix A

A.1. Stylized Mandated Provisions of Clause-49

(Transcribed from http://indianboards.com/files/clause_49.pdf)

1. Requirement of independent directors:
   - Fifty percent of board of directors are required to be independent in the case where the Chairman is the executive director and one third (33%) if the Chairman is a non-executive.
   - Definition of Independent Directors: Independent directors are defined as those not having any material pecuniary relationship with the company, not related to Board members or one level below Board, and no prior relationship with the Company for the last three years. Nominee Directors of Financial Institutions are considered to be independent.
2. Board requirements and limitations:
   - Board required to meet four times a year (with a maximum of three months between meetings).
   - Limit on the number of committees a director can be on is 10, but only 5 for which a director can be the Chair of the committee.
   - Code of conduct is required.
3. Composition of audit committee:
   - The committee should have at least three directors of which two-thirds are required to be independent.
   - All the members of the audit committee should be financially literate.
   - At least one member of the audit committee should have accounting or financial management experience.
4. Role and power of audit committee:
   - The committee should conduct a minimum of four meetings in an accounting year with a gap between two meetings not exceeding four months.
   - The major role of the committee is to review statutory and internal audits, obtain outside legal or other professional advice, and review whistle-blower programmes, if any.
5. Disclosures:

   The clause requires firms to disclose the following:

   - Related party transactions,
   - Accounting treatments and departures,
   - Risk management,
   - Annual report, including discussion of internal controls adequacy, significant trends, risks, and opportunities,
   - Proceeds from offerings,
   - Compensation for directors (including non-executives), and obtain shareholders' approval,
   - Details of compliance history for the last three years, and corporate governance reports (and disclose adoption, if any, of mandatory and non-mandatory requirements) and
   - Corporate governance reports.

6. Certifications by CEO and CFO:
   - Financial statements,
   - Effectiveness of internal controls, and
   - Inform audit committee of any significant changes in the above.
7. Certifications by auditor or company secretary
   - Compliance with corporate governance

Appendix B. Appendix B Definition of variables

Variable	Description	Source
Dependent variable: Risk-taking		
Earnings-volatility	Three year rolling standard deviation of operating earnings where operating earnings is EBITDA scaled by total assets expressed as a percentage.	Derived from CMIE
Dependent variable: Corporate Investment		
Capital expenditure	Increase in Long-term Assets as a percentage of previous year's total long-term assets expressed as a percentage.	Derived from CMIE
R&D expenditure	R&D expenditure as a percentage of total assets.	Derived from CMIE
Control variables		
Size	Ln (book value of total assets).	Derived from CMIE
Leverage	Book debt to equity ratio.	CMIE
Liquidity	Book value of Liquid Assets/Current Liability.	CMIE
Ownership concentration	Shares owned by promoters (insiders) as percentage of total shares outstanding.	CMIE
MB	Market-to-book value of equity.	CMIE
Industry	22 industries as classified in Appendix C.	Derived from CMIE

Appendix C. Appendix C Industries classification

In this Table, we provide an industry breakdown of our sample.

Industry Code	Industries	No. of firms	Observations
1	Agricultural Products	153	1024
2	Automobiles and Transport	163	1247
3	Cement and Abrasives	48	361
4	Chemicals and Pharmaceuticals	446	2905
5	Computers, Software and ITs	238	1780
6	Construction	196	1370
7	Consumer Electronics	63	474
8	Diversified	76	570
9	Engines and Equipment	208	1623
10	Iron, Steel and Metals	246	1832
11	Leather and Rubber Products	34	253
12	Media and Entertainment	66	418
13	Minerals Products	21	155
14	Miscellaneous Items	37	182
15	Other Retail and Specialties	126	984
16	Paper and Wood Products	71	457
17	Plastics and Polymers	154	1186
18	Processed Food and Tobacco	76	591
19	Services	491	2872
20	Textiles	325	2040
21	Trading	535	3757
22	Wires and Cables	66	503
	Total	3839	26,584

References

Acharya, V.V., Amihud, Y., Litov, L., 2011. Creditor rights and corporate risk-taking. J. Financ. Econ. 102 (1), 150–166.
Aggarwal, R., Erel, I., Stulz, R., Williamson, R., 2008. Differences in governance practices between US and foreign firms: measurement, causes, and consequences. Rev.

Financ. Stud. 22 (8), 3131–3169.
Almeida, H., Campello, M., 2007. Financial constraints, asset tangibility, and corporate investment. Rev. Financ. Stud. 20 (5), 1429–1460.
Amihud, Y., 2002. Illiquidity and stock returns: cross-section and time-series effects. J. Financ. Mark. 5 (1), 31–56.
Amihud, Y., Mendelson, H., 2000. The liquidity route to a lower cost of capital. J. Appl. Corp. Fin. 12 (4), 8–25.
Bargeron, L.L., Lehn, K.M., Zutter, C.J., 2010. Sarbanes-oxley and corporate risk-taking. J. Account. Econ. 49 (1), 34–52.
Becker, G., 1968. Crime and punishment: an economic approach. J. Polit. Econ. 76 (2), 169–217.
Bekaert, G., Harvey, C.R., 2000. Foreign speculators and emerging equity markets. J. Financ. 55 (2), 565–613.
Bekaert, G., Harvey, C.R., 2003. Emerging markets finance. J. Empir. Financ. 10 (1), 3–55.
Bekaert, G., Harvey, C.R., Lundblad, C., 2007. Liquidity and expected returns: lessons from emerging markets. Rev. Financ. Stud. 20 (6), 1783–1831.
Belloc, F., 2013. Law, finance and innovation: the dark side of shareholder protection. Camb. J. Econ. 37 (4), 863–888.
Bertrand, M., Mehta, P., Mullainathan, S., 2002. Ferreting out tunneling: an application to Indian business groups. Q. J. Econ. 117 (1), 121–148.
Bhagat, S., Bolton, B., 2008. Corporate governance and firm performance. J. Corp. Finan. 14 (3), 257–273.
Black, B.S., Khanna, V.S., 2007. Can corporate governance reforms increase firm market values? Event study evidence from India. J. Empir. Leg. Stud. 4 (4), 749–796.
Boubakri, N., Cosset, J.C., Saffar, W., 2013. The role of state and foreign owners in corporate risk-taking: evidence from privatization. J. Financ. Econ. 108 (3), 641–658.
Brav, O., 2009. Access to capital, capital structure, and the funding of the firm. J. Financ. 64 (1), 263–308.
Campello, M., Graham, J.R., Harvey, C.R., 2010. The real effects of financial constraints: evidence from a financial crisis. J. Financ. Econ. 97 (3), 470–487.
Chen, K.C., Chen, Z., Wei, K.J., 2009. Legal protection of investors, corporate governance, and the cost of equity capital. J. Corp. Finan. 15 (3), 273–289.
Chung, K.H., Elder, J., Kim, J.C., 2010. Corporate governance and liquidity. J. Financ. Quant. Anal. 45 (2), 265–291.
Claessens, S., Yurtoglu, B.B., 2013. Corporate Governance in Emerging Markets: a survey. Emerg. Mark. Rev. 15, 1–33.
Coffee Jr., J.C., 2002. Racing towards the top? The impact of cross-listings and stock market competition on international corporate governance. Columbia Law Rev. 1757–1831.
Cohen, D.A., Dey, A., 2013. Corporate governance reform and executive incentives: implications for investments and risk taking. Contemp. Account. Res. 30 (4), 1296–1332.
Coles, J.L., Daniel, N.D., Naveen, L., 2008. Boards: does one size fit all? J. Financ. Econ. 87 (2), 329–356.
Denis, D.J., Sibilkov, V., 2010. Financial constraints, investment, and the value of cash holdings. Rev. Financ. Stud. 23 (1), 247–269.
Dharmapala, D., Khanna, V., 2013. Corporate governance, enforcement, and firm value: evidence from India. J. Law Econ. Org. 29 (5), 1056–1084.
Dutcher, J.S., 2005. From the boardroom to the cellblock: the justifications for harsher punishment of white-collar and corporate crime. Ariz. State Law J. 37, 1295–1319.
Easley, D., O'Hara, M., 2004. Information and the cost of capital. J. Financ. 59 (4), 1553–1583.
Errunza, V.R., Miller, D.P., 2000. Market segmentation and the cost of the capital in international equity markets. J. Financ. Quant. Anal. 35 (4), 577–600.
Faccio, M., Marchica, M.T., Mura, R., 2011. Large shareholder diversification and corporate risk-taking. Rev. Financ. Stud. 24 (11), 3601–3641.
Faccio, M., Marchica, M.T., Mura, R., 2016. CEO gender, corporate risk-taking, and the efficiency of capital allocation. J. Corp. Finan. 39, 193–209.
Fauver, L., Hung, M., Li, X., Taboada, A.G., 2017. Board reforms and firm value: worldwide evidence. J. Financ. Econ. 125 (1), 120–142.
Gopalan, R., Mukherjee, A., Singh, M., 2016. Do debt contract enforcement costs affect financing and asset structure? Rev. Financ. Stud. 29 (10), 2774–2813.
Gul, F.A., Kim, J.B., Qiu, A.A., 2010. Ownership concentration, foreign shareholding, audit quality, and stock price synchronicity: evidence from China. J. Financ. Econ. 95 (3), 425–442.
Hail, L., Leuz, C., 2006. International differences in the cost of equity capital: do legal institutions and securities regulation matter? J. Account. Res. 44 (3), 485–531.
Healy, P.M., Palepu, K.G., 2001. Information asymmetry, corporate disclosure, and the capital markets: a review of the empirical disclosure literature. J. Account. Econ. 31 (1–3), 405–440.
Honoré, F., Munari, F., de La Potterie, B.V.P., 2015. Corporate governance practices and companies' R&D intensity: evidence from European countries. Res. Policy 44 (2), 533–543.
John, K., Litov, L., Yeung, B., 2008. Corporate governance and risk-taking. J. Financ. 63 (4), 1679–1728.
Johnson, S., La Porta, R., Lopez-De-Silanes, F., Shleifer, A., 2000. Tunneling. Am. Econ. Rev. 90 (2), 22–27.
Karolyi, G.A., 2012. Corporate governance, agency problems and international cross-listings: a defense of the bonding hypothesis. Emerg. Mark. Rev. 13 (4), 516–547.
Khanna, T., Palepu, K., 2000. Is group affiliation profitable in emerging markets? An analysis of diversified Indian business groups. J. Financ. 55 (2), 867–891.
Koh, P.S., Reeb, D.M., 2015. Missing R&D. J. Account. Econ. 60 (1), 73–94.
Lemieux, T., Milligan, K., 2008. Incentive effects of social assistance: a regression discontinuity approach. J. Econ. 142 (2), 807–828.
Lesmond, D.A., 2005. Liquidity of emerging markets. J. Financ. Econ. 77 (2), 411–452.
Levine, R., 2003. More on finance and growth: more finance, more growth? Rev. Fed. Reserve Bank Saint Louis 85 (4), 31–46.
Lilienfeld-Toal, U.V., Mookherjee, D., Visaria, S., 2012. The distributive impact of reforms in credit enforcement: evidence from Indian debt recovery tribunals. Econometrica 80 (2), 497–558.
Lu, J., Wang, W., 2018. Managerial conservatism, board independence, and corporate innovation. J. Corp. Finan. 48, 1–16.
Nguyen, B.D., Nielsen, K.M., 2010. The value of independent directors: evidence from sudden deaths. J. Financ. Econ. 98 (3), 550–567.
Paligorova, T., 2010. Corporate risk taking and ownership structure. In: Bank of Canada Working Paper.
Petersen, M.A., 2009. Estimating standard errors in finance panel data sets: comparing approaches. Rev. Financ. Stud. 22 (1), 435–480.
Sena, V., Duygun, M., Lubrano, G., Marra, M., Shaban, M., 2018. Board independence, corruption and innovation. Some evidence on UK subsidiaries. J. Corp. Finan. 50, 22–43.
Smith, J.A., Todd, P.E., 2005. Does matching overcome LaLonde's critique of nonexperimental estimators? J. Econ. 125 (1), 305–353.
Stulz, R.M., 1999. Golbalization, corporate finance, and the cost of capital. J. Appl. Corp. Fin. 12 (3), 8–25.
Stulz, R.M., 2005. The limits of financial globalization. J. Financ. 60 (4), 1595–1638.
Vig, V., 2013. Access to collateral and corporate debt structure: evidence from a natural experiment. J. Financ. 68 (3), 881–928.
Weisbach, M.S., 1988. Outside directors and CEO turnover. J. Financ. Econ. 20, 431–460.
Whited, T.M., Wu, G., 2006. Financial constraints risk. Rev. Financ. Stud. 19 (2), 531–559.