# C**orporate Governance Reform and Risk-Taking: Evidence from an Emerging Market**

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## ABSTRACT

Recent empirical evidence from developed markets suggest a negative effect of corporate governance reform (CGR) on a firm's risk-taking owing to higher compliance burden. We revisit this nexus in an emerging market setup that reflects relatively weaker market forces of corporate control and higher likelihood of expropriation by dominant insiders. Contrary to the evidence from developed markets, we find stricter CGR leads to higher corporate risk-taking in emerging markets. Further, we report that following stricter CGR, firms with higher ownership concentration and creditor stake pursue more risk-taking. Finally, our study also shows that risk-taking is an important channel through which CGR supplies higher firm valuation. Results of our study support the view that stringent regulatory interventions are positive in evolving regulatory environment of emerging markets.



*JEL Codes:* G32; G34; G38

*Key Words:* corporate governance reform; risk-taking; emerging market; natural-experiment.

## 1. Introduction

The question of whether stricter corporate governance reform (CGR) encourages or deters value-enhancing corporate risk-taking is central to regulatory economics. However, extant literature offers conflicting theoretical predictions. One side of the argument suggests that stricter CGR amplifies compliance costs, shrinks managerial flexibility and discourages managers/insiders from undertaking value-enhancing risky projects. The recent evidence on corporate risk-taking from developed economies supports this view (see Cohen et al., 2007; Bargeron et al., 2010). For instance, Bargeron et al. (2010) show that in comparison to Canadian and UK firms, risk-taking appetite of US firms has diminished significantly following the introduction of the Sarbanes Oxley Act (SOX).[1] They note that the increased financial and criminal liability imposed by CGR on the controlling insiders and managers may reduce insiders' motivation to undertake positive NPV risky investments.

However, an alternative theoretical perspective challenges the negative relation between CGR and risk-taking. This view maintains that dominant insiders, including managers and controlling shareholders, have incentives to pursue conservative investment policies because they extract higher utility from private benefits. The derived utility largely depends on the likelihood of whether the legal framework and market based corporate governance mechanism discourage the consumption of private benefits (John et al., 2008). Thus, to the extent that stricter CGR attenuates the extraction of private benefits by dominant insiders, it should encourage the value-enhancing risk-taking appetite of firms (Durnev et al., 2004; Stulz, 2005; John et al., 2008).[2]

[1] Another strand of literature contends that a negative relation exists between excessive investor protection and value-relevant risk-taking with 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).

[2] Supporting this theoretical conjecture, John et al. (2008) show that the quality of legal enforcement and minority protection positively relate to firms' risk-taking across countries.

In light of the tension between two seemingly opposing theoretical predictions and empirical evidence, we examine the effect of stricter CGR on risk-taking in the emerging market context of India. Our focus on an emerging economy is driven by the stylized fact that emerging markets, in general, face evolving (and therefore relatively weaker) legal and market forces of corporate controls, leading to higher agency problems between dominant insiders and minority outsiders (Bekaert and Harvey, 2003; Harvey et al., 2004; Claessens and Yurtoglu, 2013).[3] For example, Morck et al. (2005) and Stulz (2005) note that in poor investor protection countries, firms are largely characterized of having dominant insiders[4] with significant cash flow rights and control of substantial private benefits.[5]

With the existence of higher agency conflict, the private benefits of dominant insiders in the firms of poorer investor protection countries are significantly higher, which should increase investment conservatism. This contrasts with firms in developed economies, where market forces of corporate control are relatively well developed. We would therefore expect CGR in emerging markets to substitute missing market-based governance, resulting in *Pareto* improvement in corporate risk-taking. Following this argument, we examine whether stringent CGR in an emerging market context improves value-relevant risk-taking activities of firms. To do so, we identify a CGR shock in India, popularly known as Clause-49, which offers us a quasi-experimental set-up (we discuss Clause-49 CGR in section 2). An important feature of Clause-49

[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.

[4] For instance, in case of the Indian equity market, Stulz (2005) shows that for the year 2002, 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 United States and the United Kingdom respectively. Note our sample begins from 2000 and therefore these figures are applicable.

[5] Stulz (2005) shows that the potential risks of expropriation (on a scale of 0-10 with higher value indicating lower risk of expropriation) during the period of 2002 for the United States and the United Kingdom were 9.98 and 9.71 respectively. The figure for India in the same period was 7.75.

regulation is that it is not applicable to all listed firms. This provides an exogenous distinction between firms affected by Clause-49 (treated group hereafter) and firms unaffected by Clause-49 (control group hereafter) groups. Using this institutional set-up, we address the following three issues. First, we answer an important policy question of whether stringent CGR in emerging market context has a positive effect on corporate risk-taking. Second, economic argument (see section 3.2) suggests that firms with higher insiders' dominance and creditors' stake, *ceteris paribus*, undertake investment conservatism. We therefore investigate whether stricter CGR obliges otherwise conservative firms, owing higher ownership concentration or higher creditors' stake, to pursue higher risk-taking. Finally, we examine the value relevance of risk-taking triggered by exogenous CGR.

Empirical estimations from our difference-in-differences (DID) design provide the following main findings. First, with *Earnings-Volatility*, *Capital Expenditure*, and *R&D Expenditure* as proxies of corporate risk-taking, we find a statistically significant and economically material increase in corporate risk-taking of the treated firms following enforcement of Clause-49 in India.[6] This outcome is consistent with the economic argument that corporate risk-taking is positively associated with improvements in corporate governance (see Stulz, 2005; John et al., 2008). Our results survive rigorous robustness tests. These tests include the use of highly comparable treated and control groups and addresses the issue of pre-enforcement compliance differences among firms. Further, the test of false experiments rules out the possibility of confounding events before or after the CGR shock driving the results.

Our results on ownership heterogeneity show that following stringent CGR, firms with higher ownership concentration pursue more value-enhancing risky projects relative to firms with

[6] The DID estimation shows that, on an average, there is an increase of at least 0.51, 2.37 and 0.24 percentage points of *Earnings-Volatility*, *Capital Expenditure* and *R&D Expenditure* respectively of the treated firms in the post CGR enforcement period.

lower ownership concentration. Likewise, firms with higher creditors' stake also appear to pursue more risk-taking relative to firms with lower creditors' stake. Taken together, these results are in line with our central argument that stringent CGR forces otherwise conservative firms to undertake risky investments.

Finally, we find that in the post CGR enforcement period, higher risk-taking is associated with higher market valuation of the treated firms. In terms of economic magnitude, one standard deviation increase in risk-taking, proxied by *Earnings-Volatility* is associated with an increase in firm valuation, measured by market-to-book value of equity (MB), of the treated firms by 0.137 units, in our sample for post-enforcement period. This result indicates that risk-taking is a significant channel through which CGR supplies higher value to a firm. These findings are particularly relevant for firms operating in an emerging markets environment with weaker market based corporate governance, as these firms would otherwise adopt corporate conservatism (Ayyagari et al., 2011) or else would engage in costlier firm level signals to convey their better corporate governance practices to the market (Pinkowitz et al., 2006).

This paper contributes to the following strands of literature. First, we add to the literature on CGR and risk taking (John et al., 2008, Bargeron et al., 2010) by examing the issue in the context of an emerging market where private benefits of dominant insiders are significant and market based corporate scrutiny is weaker.[7] We show that in such a setting, stricter CGR that induce adequate deterrence of non-compliance reduces insiders' utility from private consumption, and encourage these insiders to make value-enhancing risky investment decisions. Our contribution to this strand of literature is to support the view that stringent interventions are positive in an evolving regulatory environment of emerging markets.

[7] Claessens and Yurtoglu (2013) report the differences between emerging and developed markets with respect to quality of firm level governance and, more importantly, the enforcement likelihood.

Second, our paper also adds to the literature on the heterogeneity in ownership concentration and creditors' stake in explaining the association between CGR and corporate risk-taking. Literature documents that larger private benefits make concentrated owners more conservative (John et al., 2008; Paligorova, 2010; Boubakri et al., 2013). Similarly, studies also suggest that creditors are interested in protecting their own interests over those of shareholders and have incentive to influence firms to pursue conservative investment policies (Morck and Nakamura, 1999; Acharya et al., 2011). We show that the positive effect of CGR on risk-taking is even stronger when firm faces higher ownership concentration or when creditors' stake is high.

Third, literature offers extensive support on the positive impact of corporate governance enforcement on firms' market valuation (see Lemmon and Lins, 2003; Black and Khanna, 2007; Dharmapala and Khanna, 2013, Fauver et al.,2017 among others). Specifically, Dharmapala and Khanna (2013) exploit the same set-up as ours and show the positive effect of CGR (Clause-49) on firm valuation. However, they do not test whether higher risk taking, driven by better corporate governance, may enhance firm valuation following CGR. We endeavor to fill-in this void by identifying corporate risk-taking as an important mechanism through which CGR augments higher firm value. We show that following CGR firms undertaking more riskier investments, at least in part, experience higher market valuation.

Finally, several recent papers examining the role of CGR have identified empirical challenges, such as endogeneity (predominantly reverse causality) and selection bias, casting doubts on the credibility of a causal link (Atanasov and Black, 2016). Our research design attempts to deal with this challenge by exploiting a setting where CGR is exogenously imposed through mandatory intervention.

The rest of the paper is organized as follows. Section 2 provides a brief explanation of Clause-49. Section 3 develops the hypotheses motivating our empirical analysis. We discuss data in Section 4. Section 5 discusses the empirical results and section 6 concludes the paper.

## 2. Clause-49

The corporate governance environment in India was largely informal prior to the induction of Clause-49 in 2000 (Dharmapala and Khanna, 2013). As Indian companies began to seek external financing this led to the need for a sound corporate governance regulatory framework to ensure better investor protection. In 1998, the Confederation of Indian Industry introduced the voluntary Corporate Governance Code, which was adopted by only few major companies. Thus, a consensus among Indian policy makers was that a mandatory set of corporate governance rules were required to attract outside investors to the Indian firms. Consequently, the Code evolved into mandatory Clause-49 provisions. Clause-49 of the stock exchange listing agreement is a set of corporate governance reforms enacted by the Securities and Exchange Board of India (SEBI), the governing body of listed companies in India, in February 2000.[8] Clause-49 is also popularly referred as the SOX of India (see Black and Khanna, 2007 for the comparison between Clause-49 and SOX)[9]. This new mandatory clause in the equity listing agreement introduced greater compliance, disclosure, board independence and transparency (see Appendix 1 highlighting the key features of Clause-49). Figure 1 depicts timeline for the implementation of the Clause-49.

…**Insert Figure 1 about here**…

[8] Further details on Clause-49, can be obtained from the website of the SEBI (http://www.sebi.gov.in/commreport/Clause-49.html).

[9] Also, popular financial press has widely covered the comparison of Clause-49 with SOX. See http://www.business-standard.com/article/companies/sarbanes-norms-guiding-clause-49-implementation-105111401044_1.html dated November 14, 2005 and https://www.scribd.com/document/34356924/New-Clause-49-vs-SOX

Firms with paid-up equity capital more than or equal to Indian Rupees (INR) 30 million were subject to the Clause-49 regulation. Firms with paid-up equity capital less than INR 30 million were not required to comply with Clause-49 regulation. The initial penalty for violation was delisting. However, in 2004, the amendment to the Securities Contracts (Reform) Act 1956 included Section 23E that imposed significant financial and criminal penalties for violations of the listing agreement (up to INR 250 million per violation). Literature on punishment suggest that one of the means of improving the enforcement environment, at least in evolving regulatory environment, is to introduce stricter sanctions (Becker, 1968). Similarly, sociological view on penalties for punishment maintains that labelling an act as "criminal" can stimulate adequate deterrence of non-compliance (Ball and Friedman, 1965). As criminal punishment offers a credible threat to induce sufficient deterrence of non-compliance (Dharmapala and Khanna, 2013), the imposition of stringent and economically large sanctions in CGR that would hold corporate directors personally accountable for non-compliance is expected to influence corporate decisions including risk-taking. In fact, it is this imposition of severe financial and criminal liabilities that makes Clause-49 comparable to SOX. Therefore, we use the year 2004 as the year of enforcement of CGR in our analysis.

We identify three major provisions in Clause-49 that should affect corporate risk-taking. These are: board independence, independence of audit committees, and certification by CEO/CFO. Independent directors are often valued for working in favor of the shareholders by preventing insider from diverting cash flows. Marginal value of independent directors increases when they are assigned crucial roles, such as sitting on audit committees (Nguyen and Nielsen, 2010). Clause-49 sets a minimum threshold for the required proportion of independent directors as part of the board. Board independence decreases the extraction of private benefits by increasing the likelihood

of detecting private benefits (John et al., 2008). Therefore, through board-independence, Clause-49 should induce positive value enhancing risk-taking behavior of dominant insiders.[10]

Likewise, Clause-49 requires audit committee with the minimum of three directors, two-third of which are required to be independent and at-least one with experience in financial management. Beasley (1996) argues that audit committees enhance the board of directors' capability to monitor management by providing them with deep understanding of the financial situation of the company. The clause also requires certification by the auditor or company's secretary on the compliance of corporate governance provisions and disclosures. The third important provision in Clause-49, whereby certifications on financial statements and internal control mechanism by the CEO/CFO are mandated, increases personal accountability of management and insiders on firm's decisions. Taken together, structure and accountability of board, audit committee and management team increases the likelihood of detecting insiders' expropriation (John et al., 2008). At the same time, these provisions may increase compliance burden as shown by previous studies (Cohen et al., 2007; Bargeron et al., 2010).

One concern with the enforceability of Clause-49, as is true with many other emerging economies, is that the sanctions could still struggle to translate from provision to practice in the wake of a weaker enforcement environment. However, the legal set-up for Clause-49 was such that enforcement under Section 23E 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 laws issues and which addresses SEBI appeals), and followed by a final appeal to the Supreme Court. Reports

[10] Extant literature shows negative relationship between board independence and risk-taking with the existence of higher monitoring cost of outside directors in industry with higher growth prospects. For instance, Coles et al. (2008) show a positive effect of proportion of a board consisting of inside directors on R&D expenditures. This differs to our setup where we argue board independence oblige otherwise conservative firms to undertake risky investments by reducing extraction of private benefits.

suggest that number (turnaround time) of settled cases on enforcement decisions has been increasing (decreasing) in the post enforcement periods on issues enforced by SEBI and the Securities Appellate Tribunal.[11] Similarly, survey by Balasubramanian et al. (2010) finds that the majority of Clause-49 affected firms have complied with Clause-49 provisions in the post enforcement.[12] Taken together, Clause-49 was introduced with an arguably clear system for the prompt handling of cases for non-compliance, providing a credible improvement in the likelihood of enforcement.

The applicability of Clause-49 was backward looking, meaning that if a firm has met paid-up capital and/or net-worth criteria at any point in the past, it was required to adhere to, even if it did not fall within the compliance bracket during the enforcement year. This reduces the possibility of self-selection of firms to remain unaffected by manipulating their paid-up capital and or net-worth. This exogenously imposed feature allows a more direct test of whether CGR affects corporate risk-taking of affected firms. However, the treated firms are larger firms in comparison to their control peers by the definition of Clause-49 applicability. We address this concern in our empirical design through a series of sub-sample tests in the empirical section 5.

## 3. Hypotheses Development

In this section, we develop four hypotheses that we test in this study. The first is our primary hypothesis on the effect of CGR on corporate risk-taking in an environment with a higher likelihood of expropriation by dominant insiders and weaker market mechanisms of corporate scrutiny. As this is the pivotal research question of the paper, we set out a theoretical framework

[11] Evidence can be found in reports such as Securities and Exchange of Board of India, Handbook of Statistics on the Indian Securities Market 2008, pp. 66-71and and SEBI, Annual Report 2007-08, pp. 103-114, 119-129.

[12] Balasubramanian et al. (2010) note that on an average there has been greater compliance with provisions of Clause-49, however, the compliance is far from universal.

to develop this hypothesis. Our second and third hypotheses discuss two important determinants established in the literature that influence firms to pursue conservative investment policies. These two factors may therefore carry moderating effects on the link between CGR and risk-taking. Our fourth hypothesis enquires the value-relevance of corporate risk-taking.

*3.1. Corporate Risk-taking and CGR*

The theoretical argument on corporate risk-taking in our setting is in the spirit of John et al. (2004). The model conjectures that corporate risk-taking is a utility function of dominant insider from an investible project and this utility consists of two components as shown in equation (1):

$$Risk - taking \Longrightarrow U(I) = U(W) + G(P) \quad (1)$$

where *U(I)* is the utility from investment and *U(W)* is the utility derived from the wealth effect of investment. *G(P)* is the utility derived from the private benefits of the insiders where *P* monetary value of private benefits. Wealth is a positive function of investment, as shown in equation (2).

$$W = F(Y) \quad (2)$$

where W is the wealth derived from investment. $Y = [H, L] \ \ s.t. \ \ H > I > L$; Y is the present value of cash flow from investment, *H* is the cash flow if the investment is successful and *L* if the investment is a failure, expressed in present value terms. *I* is the investment value.

It follows that risk-taking is a positive function of utility from the wealth effect and that for a utility maximizing insider, utility from the wealth effect of investment and utility from private benefits substitute for each other (John et al., 2004). *G(P)* of Equation (1) relates to the governance parameter, as shown in equation (3):

$$G(P) = -g(\emptyset) \quad (3)$$

where $\emptyset$ is the probability that private consumption is detected and prosecuted. The negative sign indicates the inverse relation between the two variables. From Equation (3) we can see that as $\emptyset$ increases utility $G(P)$ decreases. The implication of equations (1), (2) and (3) is that an improvement in $\emptyset$ results in a reduction of utility from private consumption $G(P)$, requiring insiders to substitute this loss with gains from the wealth effect. Thus, a positive relation exists between the corporate governance parameter $\emptyset$ and corporate risk-taking.

The question of whether CGR translates into a meaningful positive shift in governance parameter ($\emptyset$) depends on the cost and benefit of the CGR to a firm, given the market context of corporate control. CGR intervention has a cost of compliance, $\emptyset_c$ and benefits from independent scrutiny of corporate decisions, $\emptyset_b$. Therefore, the net benefit of CGR enforcement is as shown in equation (4):

$$(\emptyset_b - \emptyset_c) = \emptyset \qquad (4)$$

In a setup that already has a stronger market-forces of corporate scrutiny, CGR may not translate into a meaningful shift in $\emptyset_b$; however, additional compliance requirement may increase the cost of compliance $\emptyset_c$. In other words, the net benefit of enforcement $(\emptyset_b - \emptyset_c) = \emptyset$ could be negative thereby reducing corporate risk-taking. This results in a negative relation between CGR and risk-taking. The empirical evidence of Cohen et al. (2007) and Bargeron et al. (2010) in a developed market context confirms this theoretical prediction.

In contrast, in an environment with weaker market-based corporate governance, CGR can translate into a meaningful $\emptyset_b$, by substituting the missing market-based corporate scrutiny and leading to net positive benefits of intervention i.e. $(\emptyset_b - \emptyset_c) = \emptyset$ is positive. In other words, if the cost of CGR justifies the additional wealth effect, firms may undertake positive net present value

(NPV) risky projects, as can be the case for firms operating in emerging markets with higher likelihood of expropriation by dominant insiders. As the high exposure of dominant owners leads them to implement a conservative approach for the sake of their own control and private benefits, an improvement in CGR should encourage greater value-enhancing risk-taking demanded by the increasing role of outside investors. We therefore hypothesize ($H_1$) a positive relation between CGR and risk-taking in an emerging market context with weaker market-based corporate scrutiny and higher private benefits of dominant insiders at stake.

*$H_1$: Relative to unaffected firms, CGR increases corporate risk-taking of affected firms in an environment with weaker market-based corporate control.*

*3.2. Role of Ownership and Creditors' Stake*

In this sub-section, we address the issue of what could explain the strength of connection between CGR and risk taking. The literature has identified ownership concentration and creditors' stake, among others, as major determinants of corporate conservatism favoring firms that pursue less risk-taking activities (see Morck and Nakamura, 1999; John et al., 2008; Paligorova, 2010). We develop a set of hypotheses addressing these two important sources of firms' heterogeneity. Theory suggests ownership structure should have a direct effect on the investment decisions of a firm given the evidence that concentrated ownership is associated with a higher value of private benefits by dominant insiders (Dyck and Zingales, 2004; Paligorova, 2010). Thus, when a firm faces a greater likelihood of minority expropriation by the dominant insiders, CGR should reduce the extraction of private benefits by increasing the likelihood of detecting and prosecuting misappropriations (John et al., 2008; Aggarwal et al., 2010; Faccio et al., 2011). Corresponding this implies that CGR should increase corporate risk-taking of firms with greater concentrated

ownership in comparison to firms with less concentrated ownership. Thus, we test the following second hypothesis:

*$H_2$: In comparison to lower concentrated ownership, firms with higher ownership concentration undertake more risk-taking following the introduction of CGR.*

Similarly, creditors' dominance is associated with higher corporate conservatism. When creditors have more influence on a firm's decisions, they may exercise their power to protect their interests over a firm's interests. This may compel firms to opt for conservative investment policies thereby reducing corporate risk-taking (see Morck and Nakamura, 1999; Acharya et al., 2011). The economic argument suggests that CGR, which shifts monitoring roles to minority-shareholders, should improve the influence of these shareholders, relative to their creditors, on the firm's investment decisions. The resulting minority empowerment should enable a firm to pursue more value-relevant risk-taking. Following this economic argument, we test the following third hypothesis:

*$H_3$: In comparison to lower creditors' stake, firms with higher creditors' stake undertake more risk-taking following the introduction of CGR.*

### *3.3. Risk-Taking, CGR and Firm Valuation*

Our theoretical framework contends that with the intervention of CGR, corporate risk-taking reflects a firm's decisions to undertake positive NPV risky projects. A number of studies provide empirical evidence on the positive role of CGR on a firm's value (Black and Khanna, 2007; Dharmapala and Khanna, 2013, among others). For example, Dharmapala and Khanna (2013) use

the same institutional set-up as ours and find strong evidence of the positive effect of CGR (Clause-49) on firm valuation. Aligning with this evidence and our theoretical framework, corporate risk-taking should therefore be the channel for adding value to firms. To examine this conjecture, we set our fourth hypothesis on the value relevance of risk-taking. Specifically, we hypothesize that corporate risk-taking is an important channel through which CGR enforcement supplies value to a firm.

*$H_4$: Firms with higher risk-taking are associated with higher valuation following the introduction of CGR.*

## 4. Data

Our primary data source is the Prowess database, maintained by the Center for Monitoring Indian Economy (CMIE). Prowess provides detailed annual financial data and other firm-specific variables. The data are in the form of panel set-up of both listed and unlisted public limited companies with the sum of.[13] For our study, we primarily use all listed non-financial firms available in the database for the sample period of 2000 to 2007. To construct one of our risk-taking measures (*Earnings-Volatility*), we utilize earnings data from 1998 onwards. For our analysis on cross-listed Indian firm, we obtained the relevant data from Dharmapala and Khanna (2013).[14] Our dataset consists of sample of 26,584 firm-year observations of 3,839 non-financial firms listed in either the Bombay Stock Exchange (BSE) or National Stock Exchange of India Ltd. (NSE) for the period from 2000 to 2007 for which there is no missing data for at least one of the three measures

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

[14] 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 data on cross-listed Indian firms with those collected from the website www.adr.com.

of corporate risk-taking. A description of the variables used in the study is provided in Appendix 2 and a breakdown of the sample by industry is shown in Appendix 3. We use Prowess code to identify industry and group them in 22 broad industry sectors in the spirit of Vig (2013).

### *4.1. Risk-taking Proxies*

Drawing on the extant literature, we use three proxies capturing corporate risk-taking (John et al., 2008; Bargeron et al., 2010; Belloc, 2013; Boubakri et al., 2013). Our first proxy is *Earnings-Volatility* captures riskiness of return from corporate operations. As riskier projects seem to exhibit higher volatile returns, *Earnings-Volatility* captures the degree of risk-taking in firm's operations based on the volatility of firms' operating earnings (John et al., 2008; Boubakri et al., 2013). We calculate earnings-volatility as three-year rolling standard deviation of earnings where earnings are measured using earnings before interest, taxes, depreciation and amortization (EBITDA) expressed as a proportion of total assets. Our second measure, *Capital Expenditure* captures the size of tangible investments. This variable 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'. Finally, the third variable is *R&D Expenditure* measured as the total R&D expenditure scaled by total assets. *R&D Expenditure* captures a firm's level of innovative investments and is the input proxy of innovative risk-taking (Belloc, 2013).

### *4.2. Control Variables*

We use a number of control variables that may 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 a firm's ability and appetite 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 firm's capital structure (*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 an interest different from that of shareholders in a firm's risk-taking because of their fiduciary stake and concave payoff (Acharya et al., 2011). We measure *Leverage* as the book value of debt-to-equity ratio. The literature also establishes the association between a firm's operating liquidity (cash holding) and levels of corporate risk-taking (Denis and Sibilkov, 2010). For example, if a firm expects financing uncertainty, firms 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 the founding members, also considered insiders, can also determine 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)*.

Prowess reports data on ownership concentration (*OwnCon*) from 2001 onwards only. Similarly, the 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. Thus, the missing observations reduces the number of observations in different empirical specifications but they are systematic in nature.

## 5. Empirical Results

A number of studies argue that compared to other structural estimation methods, Difference-in-Differences (DID) is a preferable approach as it lends itself to establishing credible causality (see Atanasov and Black, 2016). We exploit the exogenous CGR shock of 2004 and employ the DID univariate and multivariate analyses to identify the causal effect of Clause-49. Our univariate estimates measure the average treatment effect of the treated group by differencing the unconditional expected value of corporate risk-taking proxies of firms affected by Clause-49 after enforcement with those before, and subtracting that from the after and before expected values of corporate risk-taking of unaffected firms. For the multivariate estimations, our identification strategy follows a DID regression model as shown in Equation (5).

$$Risk_{ijt} = \alpha + \beta.1_{(Clause49=1)}.1_{(After=1)} + \lambda.1_{(Clause49=1)} + \rho.1_{(After=1)} + \boldsymbol{X_{ijt}}.\boldsymbol{\delta} + \gamma_i + \vartheta_j + \tau_t + e_{ijt} \quad (5)$$

where $Risk_{ijt}$ are the dependent variables as defined in the earlier section ($i$ is indexed as the firm, $j$ for industry and $t$ is the year). $1_{(Clause49=1)}$ is an indicator variable that takes the value of one for treated groups and zero for control groups. We generate our treated group from those domestically listed firms that are exogenously affected by the reform, based on net-worth or paid-up capital. Likewise, the control groups are the ones not affected by the CGR. $1_{(After=1)}$ in Equation (5) is a categorical variable that takes the value of one for the post CGR enforcement period and zero otherwise. $\boldsymbol{X_{ijt}}$ is a vector of key control variables as defined earlier, $\tau_t$ is the time fixed effect, $\gamma_i$ is the firm fixed effect, and $\vartheta_j$ is industry fixed effects. Our key coefficient of interest, $\beta$, the interaction term $1_{(Clause49=1)}.1_{(After=1)}$ is the DID estimator of causal effect of the CGR on the treated firms.

In the following sub-section, we begin our empirical investigation with the examination of summary statistics followed by a discussion of univariate and multivariate DID results.

*5.1. Descriptive Statistics of Dependent and Control Variables*

Table 1 contains the mean, standard deviation and number of observations of the dependent and control variables for the entire sample as well as for the pre-enforcement (2000-2003) and post-enforcement periods (2004-2007). As seen there is a significant growth in firms' *Earnings-Volatility* (from 5.86% to 7.20%), *Capital Expenditure* (from 11.58% to 14.03%) and *R&D Expenditure* (from 1.21% to 1.64%) in the post Clause-49 enforcement period of 2004 in comparison to the pre-enforcement period. Three of the controls (*Size*, *Liquidity* and *MB*) have also witnessed growth in the post-enforcement period. However, *Leverage* has decreased,[15] and *OwnCon* remains virtually unchanged post 2004. The post-enforcement period's corporate risk-taking averages are also higher than the overall averages. These descriptive differences offer some preliminary indication that the 2004 CGR could have augmented the corporate risk-taking behaviour of the firms.

**…Insert Table 1 about here…**

*5.2. Univariate DID results on CGR and Risk-taking*

Table 2 reports the average value of risk-taking measures of treated firms and those of control firms before and after Clause-49 enforcement and the univariate DID estimates of the risk-taking proxies. Table 2 shows there are significant positive DID estimates of 1.55, 4.73 and 0.43 percentage points for *Earnings-Volatility, Capital Expenditure* and *R&D Expenditure*

[15] A decrease in leverage and increase in cash-holding have been discussed by Vig (2013) who suggests this decrease is a result of increased creditors' protection.

respectively. The univariate DID estimates of all three measures of corporate risk-taking are suggestive of the impact of Clause-49 on corporate risk-taking in the post enforcement period.

**…Insert Table 2 about here…**

To supplement the univariate DID results we present time series plots of the yearly average corporate risk-taking proxies of both treated and control group firms for the sample period. Figures 2, 3 and 4 present time series plots of de-meaned average values of *Earnings-Volatility*, *Capital Expenditure* and *R&D Expenditure* respectively. In figure 2, we see that in comparison to the control group, treated firms show positive increment in *Earnings-Volatility* after the enforcement of Clause-49 in 2004. There is no visible pattern for control firms except that there is a slight increase in Earnings-*Volatility* in 2006. Similarly, Figure 3 reveal an upward growth of *Capital Expenditure* of the treated group following 2004 CGR but again with no clear pattern visible for control firms. Figure 5 depicts a similar upward movement of *R&D Expenditure* of treated firms following enforcement. There is a slight decreasing pattern seen in *R&D Expenditure* of control from 2005 and 2006. However, the post-2004 averages are not different from those of pre-enforcement period. In summary, all the three figures point to the general trend in the growth of risk-taking proxies of treated firms whereas we do not observe such trend for the control group firms.

…**Insert Figures 2 to 4 about here**…

*5.3. Multivariate DID Panel Regression Results on Risk-taking and CGR*

In this sub-section, we report the output of DID panel regressions by estimating the general specification shown in Equation (5). For each of the corporate risk-taking proxies, we report three different models. The first baseline regression (model 1) includes the estimation with only firm,

industry and year fixed effects as controls, and the third regression (model 3) adds the other firm level controls. To consider the sensitivity of the coefficients to missing data, we incorporate a second regression (model 2) with firm, industry and year fixed effects for a subsample of firms with non-missing control variables.

The results in Table 3 show that the DID-coefficients of all the corporate risk-taking proxies carry expected positive signs and are statistically significant at the 1% significance level. These estimates suggest higher growth in the risk-taking activities of treated firms after the CGR relative to control group firms. Results from full specification models (model 3) suggest that risk-taking proxies except *Capital Expenditure* are negatively associated with size and coefficients are significant. Similarly, coefficients of *MB* are positively related to the proxies of risk-taking. Coefficients of other control variables are mostly in agreement with theoretical predictions, at least in terms of their signs, however they lack statistical significance. Results from the full specification (model 3) suggest that post 2004 *Earnings-Volatility, Capital Expenditure* and *R&D Expenditure* of treated firms increase by 0.51, 2.37 and 0.38 percentage points respectively corresponding to their control group counterparts. The results show that the risk-taking appetite of treated firms has increased following 2004 enforcement, supporting our prediction of our first hypothesis. As discussed in the theoretical framework, the CGR, through providing stricter provisions for penalties, could have reduced the extraction of private benefits by the dominant insiders, thereby encouraging them to undertake value enhancing risky positive NPV projects. The results are consistent with the economic perspective that predicts an increase in value enhancing risk-taking activities following improvement in corporate governance (Stulz, 2005; John et al., 2008).

…**Insert Table 3 about here**…

*5.4. Robustness Checks on CGR and Risk-taking*

Eventhough we control for various firm level characteristics, firm-, industry- and time-fixed effects in our examination of the first hypothesis, there could be other alternative factors that could compete with the CGR effect. Alternatively, our results could be simply capturing some cyclical effect or may even reflect the potential heterogeneity observed in the treated and control groups. We address these empirical challenges in the following sub-sections.

*5.4.1. Placebo Test*

Our main tests rely on the premise that there is no other notable economy-wide shock in 2004, other than enforcement of Clause-49 as an explanation of 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.[16] However, it could be that our results are simply reflecting the effect of confounding (or cyclical) shocks before or after the 2004 intervention. To address this issue, we use a placebo examination. We design two false shock years, one for year 2002 (two years before the enforcement shock) and the other for year 2006 (two years after the enforcement shock). Our treated and control groups remain the same as exogenously determined by Clause-49. Dummy variable $1_{(After=1)}$ in Equation (8) takes the value of one for the year 2002 for False-experiment 1 (FSY=2002) and zero for two years before 2002. Similarly, for False-experiment 2 (FSY=2006), $1_{(After=1)}$ is one for the years 2006 and 2007 and zero for two years before 2006. Any finding of statistically significant and positive DID coefficients of these two different false experiments would weaken the credibility of the hypothesized effect of intervention on corporate risk-taking.

Table 4 reports the DID regression results from these false experiments. The estimates of all

[16] Similar findings are reported by Dharmapala and Khanna (2013) using the same regulatory shock.

three risk-taking proxies show an insignificant effect for both 2002 and 2006, imparting evidence that the possibility of false experiments capturing cyclical events are not driving our main findings.

**…Insert Table 4 about here…**

*5.4.2. Industry-Specific Shocks*

Another possibility that could undermine our causal claim is the effect of any industry-specific shocks that could drive the results.[17] Even though we control for time-invariant industry effect in our main empirical design, time-varying industry effects can still confound our results. To address this issue, we interact the industry variable, which takes a unique value for each industry defined in Appendix 3, with the year dummies and run DID regression with firm fixed effect and the interaction of industry and year. By doing so, we control for the industry-specific systematic shocks that could drive our results (see Vig, 2013). Table 5 presents the results from controlling for industry-specific shocks, if any, besides other firm controls. All the coefficients are statistically and economically significant. Thus, in both the above tests we rule-out the possibility that other concurrent shocks or industry-specific shocks could have confounded our results.

**…Insert Table 5 about here…**

*5.4.3. Alternative Treated and Control Groups*

One important concern facing the comparability of exogenously classified treated and control groups is that these firms differ in their characteristics. For example, by the definition of Clause-49 applicability, treated firms are larger firms and control firms are smaller firms. We address the issue of comparability by generating five different groups, depending on when the firms are affected by Clause-4 (based on the paid-up equity capital threshold) and use the two most

[17] For example, there could be a hypothetical possibility that (risky) investment opportunities and or competition of different industries have changed around the same time, thus driving the results.

comparable groups. As shown in Table 6, the three sub-groups I to III (IIIA and IIIB) are firms affected by Clause-49 reform classified based on their size.[18] Groups IVA and IVB are firms unaffected by Clause-49 and split on size.

**…Insert Table 6 about here…**

From the summary figures of all the groups in Table 6, we note that Group IIIB and Group IVA firms are clustered around the cut-off of paid-up capital of INR 30 million and are generally similar in terms of size and other firm characteristics. However, by our construction, Group IIIB firms are affected by Clause-49, whereas Group IVA firms are unaffected. Table 7 investigates whether our causal claim holds for these two highly comparable treated and control groups and reports DID estimates of corporate risk-taking with these two groups. We find results in favor of hypothesis 1.

**…Insert Table 7 about here…**

*5.4.4. Pre-Compliance Effect*

An important concern with the estimates could be that within the treated group firms there may be firms that were already complaint with the provisions of Clause-49, even before the CGR. Their inclusion in our sample as treated firms my thus bias our results. We deal with this probable concern by segregating firms within the treated group that were potentially already complying with corporate governance provisions very similar to that of Clause-49. We do so by isolating firms cross-listed in developed capital markets as the control firms. The bonding argument (Coffee,

[18] Group I comprises the largest firms that are listed as the flag "A" category and had to comply by 31 March 2001. Group II comprises mid-sized firms that have 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 need to comply by 31 March 2002. Groups IIIA and IIIB are small-sized firms with paid-up equity capital between INR 30 million and 100 million and had to comply by 31 March 2003. Group IIIA are firms with paid-up capital between 45 and 100 million and Group IIIB firms with paid-up capital between 30 and 45 million. Group IVA firms have paid-up equity capital between INR 15 and 30 million and Group IVB are firms with paid-up equity capital less than INR 15 million.

2002; Stulz, 1999; Karolyi, 2012) posits that internationally cross-listed firms, particularly of emerging markets, exhibit superior corporate governance compared to their domestic counterparts since the cross listed firms need to comply with the higher CGR requirement of the developed market listing agreement[19]. Therefore, we maintain that the effect of domestic CGR intervention should have no or least material effect on the corporate governance practices of cross-listed Indian firms relative to domestically listed firms. In our study, we identify 84 cross-listed non-financial firms (as or before 2004) within the firms affected by Clause-49 and use them as an alternative control group. We argue that these firms provide a strong control group for addressing the compliance difference prior to CGR.

One potential concern on the comparability of cross-listed firms with the whole sample of treated firms is that these firms, on average, are of larger size compared to overall treated firms. We therefore sort the size-decile of all treated firms (except the cross listed firms) based on average size before 2004, choose the uppermost decile firms as a size-matched treated group and compare these treated firms with the cross-listed firms as the control group. Table 8 reports DID regressions of these size-matched affected firms (average size of 8.85 versus 8.86 of cross-listed firms prior to Clause-49 enforcement where size is expressed in natural logarithm of book value of total assets in millions of INR). In line with our main findings, the DID coefficients of these matched groups are statistically significant and consistently positive over different specifications. Thus, the use of cross-listed firms as alternative control group rules out the possibility that our result is driven by pre-compliance difference within the treated firms.

[19] The bonding hypothesis 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, and weak legal protection of minority outside investors. To overcome these governance deficiencies, firms in developing markets choose to bond themselves credibly with developed markets' legal and financial institutions by means of international cross-listing.

**…Insert Table 8 about here…**

*5.5. Firm's Heterogeneity, CGR and Risk-taking*

In this section, we examine hypotheses 2 and 3 for which we use the difference-in-difference-in-differences (DIDID) estimation as shown in equation (6):

$$Risk_{ijt} = \alpha + \omega . 1_{(Clause49=1)} . 1_{(After=1)} . \overline{Z_\iota} + X_{ijt} . \delta + \gamma_i + \vartheta_j + \tau_t + e_{ijt} \quad (6)$$

where $\overline{Z_\iota}$ is the variable measuring cross-sectional heterogeneity among firms before the enforcement of Clause-49, i.e. ownership concentration and creditors' stake. The coefficient $\omega$ estimates the heterogeneous impact of CGR on risk-taking moderated by $\overline{Z_\iota}$. In other words, $\omega$ shows the differential impact of CGR on corporate risk-taking across the continuum of $\overline{Z_\iota}$.

*5.5.1. Role of Ownership Concentration*

To examine hypothesis 2 on how CGR affects risk-taking, conditional on firm's heterogeneity on ownership concentration, we proxy ownership concentration as the percentage of shares owned by promoters. 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 interact the variable with $1_{(Clause49=1)} . 1_{(After=1)}$ to obtain the triple interaction term: *DIDID-OwnCon*$= 1_{(Clause49=1)} . 1_{(After=1)} * \overline{OwnCon_\iota}$ as shown in Equation (6). For CGR to stimulate positive corporate risk-taking among firms with higher ownership concentration, $\omega$ of Equation (6) should be positive for cross-sectional variation in ownership before Clause-49.

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 with dominant show significant positive value of 0.05, 0.10 and 0.01 percentage points respectively. The results are consistent when we include all the controls in

model 2. Overall, the results suggest that in comparison to the treated peers with lower ownership concentration, corporate risk-taking of treated firms with higher ownership concentration has significantly increased following 2004 CGR enforcement supporting hypothesis 2. The findings are in line with the argument that improvement in corporate governance obliges firms, which are otherwise conservative because of insiders' dominance, to make more value-enhancing risky investment decisions (Stulz, 2005; John et al., 2008; Boubakri et al., 2013).

**…Insert Table 9 about here…**

*5.5.2. Role of Creditors' Stake*

To test hypothesis 3 on how CGR affects risk-taking conditional on a firm's heterogeneity on creditors' stake, we construct cross-sectional variation in firm's leverage by calculating a two-year average of the debt-equity ratio of firms before the enforcement of Clause-49. To the extent that higher leverage indicates the higher stake of creditors and that enforcement of Clause-49 empowers minority shareholders, we would expect a positive effect of Clause-49 on the treated firms with dominant creditors.

Table 10 reports the regression output of the triple interaction term, $DIDID - Leverage = 1_{(Clause49=1)}.1_{(After=1)} * \overline{Leverage_i}$. The *DIDID-Leverage* coefficients for all three risk-taking proxies are significant and positive in models 1 and 2, representing without and with controls. This suggests that in comparison to treated firms with lower creditors' stake, corporate risk-taking of firms with higher creditors' stake has increased significantly following the enforcement of Clause-49 supporting hypothesis 3. The results are consistent with the economic argument that CGR, which empowers shareholders over creditors, stimulates firms that would otherwise pursue less-risky investment policies (Morck and Nakamura, 1999; Acharya et al., 2011) to undertake higher risk-taking.

**…Insert Table 10 about here…**

*5.6. CGR, Risk-taking and Firm Value*

In this section, we investigate whether corporate risk-taking constitutes a significant channel through which CGR enforcement provides value to firms, as argued in hypothesis 4. We use a panel regression with firm value as the explanatory variable as shown in equation (7).

$$Value_{ijt} = \alpha + \theta.1_{(Clause49=1)}.1_{(After=1).}Risk-taking + \lambda.1_{(Clause49=1)} + \rho.1_{(After=1)} + \boldsymbol{X_{ijt}}.\boldsymbol{\delta} + \gamma_i + \vartheta_j + \tau_t + e_{ijt} \quad (7)$$

where we proxy firm value by the firm's market-to-book ratio (MB) of the firm's equity. All other control variables remain as in the main regression specified by equation (5). $1_{(Clause49=1)}.1_{(After=1)}.\ Risk-taking$ is an interaction term where *Risk-taking* is gauged by *Earnings-Volatility*.

We report the results in Table 11. Models 1 to 6 of Table 11 report the results of equation (7) without and with controls. We further run a regression with MB as the dependent variable and DID $=1_{(Clause49=1)}.1_{(After=1)}$ as the independent variable and report the results in column 7 to facilitate comparison with the results from Dharmapala and Khanna (2013). Columns 1 to 6 show that across the different controls, the firm value of higher risk-taking treated firms is greater than lower risk-taking firms (minimum value of 0.02 in model 1). In terms of economic magnitude, this implies one standard deviation increase in firm's risk-taking, as proxied by *Earnings-Volatility*, is associated with a minimum of 0.137 units increase in the value of treated firms (with an average standard deviation of *Earnings-Volatility* of 6.85 percentage points).[20]

[20] With standard deviation of *Earnings-Volatility* at 6.85 percentage points, the coefficient of 0.02 translates to 0.137 units (=0.02*6.85).

Model 7 shows that the valuation of treated firms has increased significantly (0.30) following the 2004 enforcement (which is in line with the results from Dharmapala and Khanna, 2013). In model 6, we note that after controlling for the contribution from risk-taking by including the triple interaction term, the economic magnitude of DID coefficient reduces significantly (from 0.30 to 0.12), suggesting a significant portion of value derived by treated firms after the CGR is associated with higher risk-taking by treated firms. The results suggest that corporate risk-taking is a channel through which CGR affects a firm's value. In summary, stricter CGR motivates otherwise conservative firms to undertake risky investment and this risk-taking behaviour is rewarded by a market with a higher valuation.

**…Insert Table 11 about here…**

## 6. Conclusion

The debate on the overall merit of stringent CGR on its effect on corporate investment decisions is one of the most important facing policy-makers. The literature provides two different theoretical perspectives on the effect of stricter CGR on a firm's corporate risk-taking. One argument is that stricter sanctions, which hold insiders personally liable for corporate affairs, increase the compliance burden and discourage insiders from undertaking risky corporate investment decisions. On the other side of the argument, utility from private consumption favors investment conservatism and CGR should therefore reduce this conservatism and encourage corporate risk-taking. This tension between the two theoretical arguments motivates us to examine the effect of CGR intervention in an emerging market context where there are weaker market forces of corporate control.

We argue that the effect of stringent CGR on corporate risk-taking is context dependent. These interventions in (developed) countries with better market forces of corporate scrutiny could be redundant, with no or negative investment outcomes as increased compliance costs of CGR

impedes positive NPV risky investments. However, similar interventions in an emerging market context reduce private benefits of dominant insiders, thereby expand corporate risk-taking appetite. To test our proposition, we exploit a CGR regulatory shock in the Indian capital market for the year 2004.

The main result, supported by a battery of robustness checks, provides strong evidence in support of our argument that stringent CGR interventions, in the context of emerging markets, drive risk-taking behavior of firms. Our results, which are driven by increased risk-taking among firms with higher ownership concentration and higher creditor stakes prior to CGR enforcement, suggest that stringent CGR in an emerging market context, increases the risk-taking of otherwise conservative firms. Our result also indicates that risk-taking is an important channel through which CGR harnesses higher valuation to firms. These findings imply that in an emerging market context with weaker market mechanism of corporate governance, stringent CGR substitutes missing market-forces of corporate control and brings about positive investment outcomes in the form of higher value-enhancing risk-taking. This evidence reassures the view that stringent interventions are positive in an evolving regulatory environment of emerging markets.

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## Table 1

## Descriptive Statistics

The table 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 increase in long-term assets scaled by previous year total long-term assets. *R&D Expenditure* is computed as a fraction of total assets. All three measures of risk-taking is expressed in percentage. *Size* is the natural logarithm of total assets expressed in millions of Indian currency (INR). *Leverage* is the 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 promoters 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.

| Variables | Overall [1] | Pre-Clause-49 [2] | Post-Clause-49 [3] | Difference [3-2] |
|---|---|---|---|---|
| Earnings-Volatility | 6.56 | 5.86 | 7.20 | 1.34*** |
| | (5.78) | (5.60) | (5.92) | |
| | 26580 | 12758 | 13822 | |
| Capital Expenditure | 12.82 | 11.58 | 14.03 | 2.45*** |
| | (11.20) | (10.21) | (11.92) | |
| | 22979 | 11408 | 11571 | |
| R&D Expenditure | 1.43 | 1.21 | 1.64 | 0.43*** |
| | (1.58) | (1.43) | (1.71) | |
| | 5524 | 2719 | 2805 | |
| Size | 6.13 | 6.02 | 6.23 | 0.21*** |
| | (1.86) | (1.77) | (1.95) | |
| | 22842 | 11328 | 11514 | |
| Leverage | 1.36 | 1.45 | 1.27 | -0.18*** |
| | (1.73) | (1.91) | (1.54) | |
| | 19560 | 9826 | 9734 | |
| Liquidity | 3.84 | 3.77 | 3.91 | 0.14*** |
| | (5.52) | (5.12) | (5.90) | |
| | 22858 | 11339 | 11519 | |
| OwnCon | 49.01 | 48.99 | 49.03 | 0.04 |
| | (19.98) | (19.62) | (20.07) | |
| | 16372 | 6686 | 9686 | |
| MB | 1.93 | 1.14 | 2.59 | 1.45*** |
| | (2.54) | (2.05) | (2.81) | |
| | 13523 | 6180 | 7343 | |

**Table 2**
**Empirical Strategy: Univariate difference-in-differences (DID) analysis of risk-taking**

This table introduces a basic empirical strategy for univariate DID analysis of the average value of $Risk_{ijt}$. We collapse data into single data points (based on averages) of treated and control groups both before and after the enforcement of Clause-49. This results in two data points per firm, one data point for Pre-Clause-49 period (2000 to 2003) and one for the Post-Clause-49 period (2004 to 2007). $Risk_{ijt}$ is one of the three measures of corporate risk-taking including (i) *Earnings-Volatility*, (ii) C*apital-Expenditure* and (iii) *R&D Expenditure* as defined in the notes to Table 1. *Treated group* includes domestically listed firms affected by Clause-49. *Control group includes* domestically listed Indian firms unaffected by Clause-49 as on 2004. Standard deviations of the points estimates of risk-taking measures are presented in parentheses in the second row and the number of observations are reported in the third row for each group. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance levels respectively. The sample period ranges from year 2000 to 2007. Source: Prowess database maintained by CMIE.

| Dependent Variables | Group | Pre-Cl49 | Post-Cl49 | Difference | t-stat | Diff-in-Diff (DID) |
|---|---|---|---|---|---|---|
| Earnings-Volatility | Treated | 5.79 | 7.36 | 1.57*** | 15.58 | 1.55*** |
| | | (5.28) | (6.85) | | | |
| | | 11020 | 11410 | | | |
| | Control | 6.82 | 6.84 | 0.02 | 0.07 | |
| | | (7.19) | (7.54) | | | |
| | | 1437 | 1554 | | | |
| Capital Expenditure | Treated | 11.51 | 14.57 | 3.06*** | 4.67 | 4.73*** |
| | | (10.73) | (12.01) | | | |
| | | 9647 | 9849 | | | |
| | Control | 12.02 | 10.35 | -1.67 | -1.18 | |
| | | (9.45) | (10.98) | | | |
| | | 1404 | 1427 | | | |
| R&D Expenditure | Treated | 1.23 | 1.70 | 0.47*** | 3.89 | 0.43** |
| | | (1.41) | (1.71) | | | |
| | | 2248 | 2333 | | | |
| | Control | 1.14 | 1.18 | 0.04 | 0.29 | |
| | | (1.90) | (1.49) | | | |
| | | 305 | 304 | | | |

**Table 3.**
**Empirical Strategy: Difference-in-Differences (DID) panel Regression**

This table reports the results from different specifications of regression equation:

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

where $Risk_{ijt}$ is corporate risk-taking proxied by (i) *Earnings-Volatility*, (ii) C*apital-Expenditure* and (iii) *R&D Expenditure* as defined in the notes to Table 1. $1_{(Clause49=1)}$ 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 years on or after 2004 and zero otherwise. $\boldsymbol{X_{ijt}}$ is a vector of firm level controls that includes size, leverage, liquidity, ownership concentration (OwnCon) and market-to-book (MB). $\gamma_i$ , $\vartheta_j$ and $\tau_t$ control for fixed effects of firm, industry and year respectively. $e_{ijt}$ is the error term. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen et al. (2009). *, ** and *** denote statistical significance at the 10%, 5% and 1% significance levels respectively. Columns [1] and [3] report regression without and with controls. Column [2] reports regression without control for the non-missing observations of all control variables. The sample period ranges from year 2000 to 2007. Source: CMIE database.

| | Earnings-Volatility | | | Capital Expenditure | | | R&D Expenditure | | |
|---|---|---|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [1] | [2] | [3] | [1] | [2] | [3] |
| DID | 1.24*** | 0.74*** | 0.51** | 5.09** | 3.38** | 2.37** | 0.25*** | 0.24** | 0.38*** |
| $[1_{(Clause49=1)}.1_{(After=1)}]$ | (3.54) | (3.11) | (2.20) | (3.47) | (2.74) | (3.13) | (3.66) | (3.23) | (5.08) |
| Size | | | -0.83*** | | | 0.61** | | | -0.45* |
| | | | (-6.00) | | | (2.71) | | | (-2.21) |
| Leverage | | | 0.00 | | | 0.05 | | | -0.00 |
| | | | (0.20) | | | (0.89) | | | (-0.03) |
| Liquidity | | | 0.00** | | | 0.00 | | | -0.00 |
| | | | (2.99) | | | (1.54) | | | (-0.03) |
| OwnCon | | | -0.01*** | | | -0.02 | | | -0.00 |
| | | | (-4.70) | | | (0.68) | | | (-0.69) |
| MB | | | 0.41*** | | | 0.09* | | | 0.01 |
| | | | (9.21) | | | (2.08) | | | (0.46) |
| Firm, Ind. and Year FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. $R^2$ (within) | 0.09 | 0.04 | 0.08 | 0.08 | 0.03 | 0.09 | 0.09 | 0.08 | 0.08 |
| No. of Firms | 3756 | 2089 | 2089 | 2905 | 2030 | 2030 | 817 | 646 | 646 |
| No. of Obs. | 25860 | 10952 | 10952 | 22319 | 10727 | 10778 | 5101 | 3424 | 3424 |

**Table 4**
**Placebo test: DID panel regression for False Experiments**

This table reports the results from different specifications of the regression equation:

$$Risk_{ijt} = \alpha + \beta.1_{(Clause49=1)}.1_{(FalseAfter=1)}\lambda.1_{(Clause49=1)} + \rho.1_{(FalseAfter=1)} + \boldsymbol{X}_{ijt}.\boldsymbol{\delta} + \gamma_i + \vartheta_j + \tau_t + e_{ijt},$$

where $Risk_{ijt}$ is corporate risk-taking proxied by (i) *Earnings-Volatility*, (ii) C*apital-Expenditure* and (iii) *R&D Expenditure* as 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. $1_{(False-After=1)}$ 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. $\boldsymbol{X}_{ijt}$ is a vector of firm level controls that includes size, leverage, liquidity, ownership concentration (OwnCon) and market-to-book (MB). $\gamma_i$ , $\vartheta_j$ and $\tau_t$ control for fixed effects of firm, industry and year respectively. $e_{ijt}$ is the error term. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen et al. (2009). *, ** 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.

| | Earnings-Volatility | | Capital Expenditure | | R&D Expenditure | |
|---|---|---|---|---|---|---|
| | (FSY=2002) | (FSY=2006) | (FSY=2002) | (FSY=2006) | (FSY=2002) | (FSY=2006) |
| Clause-49*False-After | -0.06 | -0.39 | 0.03 | -2.31 | 0.22 | 0.15 |
| | (-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*** |
| | (-2.05) | (-1.63) | (4.43) | (5.14) | (-0.41) | (-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 | -0.03 |
| | (-0.54) | (0.32) | (-2.05) | (-2.60) | (0.59) | (-1.66) |
| OwnCon | -0.01 | -0.01 | -0.04 | -0.04 | -0.01 | -0.00 |
| | (-0.98) | (-1.37) | (-0.97) | (-1.49) | (-1.94) | (-0.60) |
| MB | 0.01 | 0.10*** | 0.02 | 0.06* | 0.07* | 0.00 |
| | (0.14) | (3.47) | (0.07) | (1.81) | (1.82) | (1.07) |
| Firm, Ind. and Year FEs | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. $R^2$ (within) | 0.01 | 0.01 | 0.08 | 0.09 | 0.01 | 0.01 |
| No. of Firms | 2089 | 2089 | 2030 | 2030 | 638 | 639 |
| No. of Obs. | 7416 | 7621 | 7470 | 7696 | 2136 | 2139 |

**Table 5**
**Controlling effect of Industry-specific shocks**

This table reports the results from different specifications of regression equation:

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

where $Risk_{ijt}$ is corporate risk-taking proxied by (i) *Earnings-Volatility*, (ii) C*apital-Expenditure* and (iii) *R&D Expenditure*, as defined in the notes to Table 1. $1_{(Clause49=1)}$ 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 years on or after 2004 and zero otherwise. $\boldsymbol{X_{ijt}}$ is a vector of firm level controls that includes size, leverage, liquidity, ownership concentration (OwnCon) and market-to-book (MB). $\gamma_i$ , $\vartheta_j$ and $\tau_t$ control for fixed effects of firm, industry and year respectively. $e_{ijt}$ is the error term. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen et al. (2009). *, ** and *** denote statistical significance at the 10%, 5% and 1% significance levels respectively. Columns [1] and [3] report regression without and with controls. Column [2] reports regression without control for the non-missing sub-sample of all control variables. The sample period ranges from year 2000 to 2007. Source: CMIE database.

| | Earnings-Volatility | | | Capital Expenditure | | | R&D Expenditure | | |
|---|---|---|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [1] | [2] | [3] | [1] | [2] | [3] |
| DID | 0.81*** | 0.54*** | 0.44** | 4.80*** | 3.82** | 2.59** | 0.21*** | 0.25** | 0.33*** |
| $[1_{(Clause49=1)}.1_{(After=1)}]$ | (3.24) | (3.12) | (3.20) | (4.82) | (3.44) | (3.79) | (3.76) | (3.23) | (4.43) |
| Size | | | -0.84*** | | | 0.69** | | | -0.47** |
| | | | (-4.80) | | | (2.77) | | | (-2.29) |
| Leverage | | | 0.00 | | | 0.06 | | | -0.00 |
| | | | (0.32) | | | (0.67) | | | (-0.03) |
| Liquidity | | | 0.00** | | | 0.00 | | | -0.00 |
| | | | (2.72) | | | (1.66) | | | (-0.03) |
| OwnCon | | | -0.02*** | | | -0.01 | | | -0.00 |
| | | | (-3.70) | | | (1.64) | | | (-0.69) |
| MB | | | 0.40*** | | | 0.07* | | | 0.01 |
| | | | (5.21) | | | (1.88) | | | (0.46) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry * Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. $R^2$ (within) | 0.08 | 0.02 | 0.07 | 0.07 | 0.02 | 0.06 | 0.09 | 0.08 | 0.08 |
| No. of Firms | 3756 | 2089 | 2089 | 2905 | 2018 | 2030 | 817 | 646 | 646 |
| No. of Obs. | 25860 | 10952 | 10952 | 22319 | 10727 | 10778 | 5101 | 3424 | 3424 |

**Table 6**
**Firm Characteristics of Groups exogenously determined by Clause-49 before 2004 enforcement**

This table reports 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 applicability of Clause-49 and size. Variables are defined in the notes to Table 1. Groups I to III firms are subject to Clause-49 as explained in the text. Group I firms are large-cap companies listed as flag "A" category in Bombay Stock Exchange Ltd. (BSE). Group II 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 III firms are low-cap firms that have paid-up capital between INR 100 million and30 million. We classify IIIA firms with paid-up capital between 100 million and 45 million and III B firms with paid-up capital between 45 million and 30 million. Groups IV to V are control firms. Group IVA firms have paid-up capital between INR 15 million and30 million. Group IVB firms have paid-up capital less than INR15 million. The last column reports summary statistics for cross-listed firms. The sample period is from 2000 to 2003. Source CMIE.

| Variables | Mean (SD), *no. of observations* | | | | | | |
|---|---|---|---|---|---|---|---|
| | Treated groups | | | | Control Groups | | Alt. Control Group |
| | Group I | Group II | Group III | | Group IVA | Group IVB | Cross-listed Firms |
| | | | Group IIIA | Group IIIB | | | |
| 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 | 4829 | 2668 | 642 | 2918 | 642 | 301 |
| 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) |
| | 596 | 4384 | 2158 | 2387 | 829 | 575 | 288 |
| R&D Expenditure | 1.98 | 1.02 | 1.26 | 1.41 | 1.32 | 1.18 | 1.03 |
| | (2.85) | (1.74) | (2.41) | (2.35) | (1.54) | (1.42) | (2.20) |
| | 344 | 1402 | 233 | 245 | 81 | 61 | 163 |
| 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 | 4449 | 2203 | 2424 | 557 | 667 | 297 |
| 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 | 1795 | 2133 | 464 | 589 | 287 |
| 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) |
| | 605 | 4444 | 2189 | 2408 | 556 | 637 | 296 |
| OwnCon | 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) |
| | 369 | 2780 | 1222 | 1378 | 290 | 364 | 211 |
| MB | 2.28 | 0.91 | 0.81 | 0.79 | 0.98 | 1.11 | 2.26 |
| | (3.36) | (1.80) | (1.93) | (2.70) | (2.09) | (1.61) | (6.49) |
| | 457 | 2975 | 1015 | 1061 | 191 | 131 | 272 |

**Table 7.**
**Robustness Test: DID Panel Regression of firms clustered around the cut-off of paid-up capital**

This table reports the results from different specifications of the regression equation:

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

where $Risk_{ijt}$ is corporate risk-taking proxied by (i) *Earnings-Volatility,* (ii) C*apital-Expenditure* and (iii) *R&D Expenditure* as defined in the notes to Table 1. $1_{(Clause49=1)}$is an indicator variable that takes the value of one for listed firms affected by Clause-49 above the paid-up capital cut-off point (firms with paid-up capital greater than or equal to INR 30 and less than INR 45 million) and zero if a firm is below paid-up equity capital cut-off (paid-up equity capital less than INR 30 Million and greater than INR 15 million) as of 2003 and unaffected by Clause-49. $1_{(After=1)}$ is an indicator variable that takes the value of one for years on or after 2004 and zero otherwise. $\boldsymbol{X_{ijt}}$ is a vector of firm level controls that includes size, leverage, liquidity, ownership concentration (OwnCon) and market-to-book (MB). $\gamma_i$ , $\vartheta_j$ and $\tau_t$ control for fixed effects of firm, industry and year respectively. $e_{ijt}$ is the error term. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen et al. (2009). *, ** and *** denote statistical significance at the 10%, 5% and 1% significance levels respectively. For each risk-taking measure, columns [1] and [3] report regression without and with controls, whereas column [2] reports regression without control for the non-missing sub-sample of all control variables. The sample period ranges from year 2000 to 2007. Source: CMIE database.

| | Earnings-Volatility | | | Capital Expenditure | | | R&D Expenditure | | |
|---|---|---|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [1] | [2] | [3] | [1] | [2] | [3] |
| DID | 0.82*** | 0.69** | 0.79*** | 4.89** | 3.55*** | 6.95*** | 0.55** | 0.66** | 1.38*** |
| $[1_{(Clause49=1)}.1_{(After=1)}]$ | (4.05) | (3.01) | (5.39) | (3.37) | (3.50) | (3.81) | (2.46) | (2.54) | (8.20) |
| Size | | | -0.64 | | | 4.40 | | | -4.03 |
| | | | (-1.57) | | | (1.01) | | | (-0.98) |
| Leverage | | | -0.12 | | | 1.11 | | | -0.03 |
| | | | (-1.58) | | | (1.29) | | | (-0.10) |
| Liquidity | | | -0.02 | | | -0.00 | | | -0.00 |
| | | | (-0.69) | | | (-1.09) | | | (-1.23) |
| OwnCon | | | -0.01 | | | -0.19* | | | -0.04 |
| | | | (-0.81) | | | (-2.03) | | | (-1.93) |
| MB | | | 0.09 | | | 2.39** | | | 2.16** |
| | | | (0.85) | | | (2.61) | | | (2.32) |
| Firm, Ind. and Year FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. $R^2$ (within) | 0.02 | 0.02 | 0.05 | 0.03 | 0.03 | 0.05 | 0.02 | 0.01 | 0.04 |
| No. of Firms | 1095 | 531 | 531 | 8.00 | 488 | 488 | 117 | 103 | 103 |
| No. of Obs. | 7394 | 2449 | 2449 | 5862 | 2304 | 2304 | 671 | 410 | 410 |

**Table 8**
**Robustness Test: DID Panel Regression with larger firms matched to cross-listed groups**

This table reports the results from different specifications of the regression equation:

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

where $Risk_{ijt}$is *risk-taking* proxied by (i) *Earnings-Volatility*, (ii) C*apital-Expenditure* and (iii) *R&D Expenditure* as defined in the notes to Table 1. $1_{(Clause49=1)}$ is an indicator variable that takes the value of one for Clause-49 affected domestic firms falling in the uppermost size decile and zero for the cross-listed firms.$1_{(After=1)}$ is an indicator variable that takes the value of one for years on or after 2004 and zero otherwise. $\boldsymbol{X_{ijt}}$ is a vector of firm level controls that includes size, leverage, liquidity, ownership concentration (OwnCon) and market-to-book (MB). $\gamma_i$ , $\vartheta_j$ and $\tau_t$ control for fixed effects of firm, industry and year respectively. $e_{ijt}$ is the error term. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen et al. (2009). *, ** and *** denote statistical significance at the 10%, 5% and 1% significance levels respectively. Columns [1] and [3] report regression without and with controls. Column [2] reports regression without control for the non-missing sub-sample of all control variables. The sample period ranges from year 2000 to 2007. Source: CMIE database.

| | Earnings-Volatility | | | Capital Expenditure | | | R&D Expenditure | | |
|---|---|---|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [1] | [2] | [3] | [1] | [2] | [3] |
| DID | 0.93*** | 1.38** | 1.21** | 5.82** | 6.30*** | 8.62** | 0.32** | 1.19** | 0.47*** |
| $[1_{(Clause49=1)}.1_{(After=1)}]$ | (5.07) | (3.10) | (3.04) | (3.17) | (3.88) | (3.52) | (3.62) | (3.09) | (4.03) |
| Size | | | -0.12 | | | 2.20 | | | -0.42 |
| | | | (-0.37) | | | (1.45) | | | (-1.56) |
| Leverage | | | -0.14 | | | 0.17 | | | -0.17 |
| | | | (-1.19) | | | (0.30) | | | (-1.17) |
| Liquidity | | | -0.02 | | | -0.00 | | | -0.00 |
| | | | (-0.69) | | | (-0.89) | | | (-1.03) |
| OwnCon | | | -0.01 | | | -0.00 | | | -0.01 |
| | | | (-0.95) | | | (-0.01) | | | (1.65) |
| MB | | | 0.12** | | | 1.29* | | | 0.10*** |
| | | | (2.91) | | | (2.44) | | | (3.28) |
| Firm, Ind. and Year FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. $R^2$ (within) | 0.01 | 0.03 | 0.08 | 0.02 | 0.03 | 0.06 | 0.01 | 0.02 | 0.06 |
| No. of Firms | 249 | 224 | 224 | 232 | 216 | 216 | 156 | 143 | 143 |
| No. of Obs. | 1872 | 1364 | 1364 | 1786 | 1330 | 1330 | 1063 | 879 | 879 |

**Table 9**
**Exploring Cross-Sectional Heterogeneity: Ownership Concentration**

This table reports the results of different specifications of the regression equation:

$$Risk_{ijt} = \alpha + \omega.1_{(Clause49=1)}.1_{(After=1)}.\overline{OwnCon_i} + \lambda.1_{(Clause49=1)} + \rho.1_{(After=1)} + \boldsymbol{X}_{ijt}.\boldsymbol{\delta} + \gamma_i + \vartheta_j + \tau_t + e_{ijt},$$

where $Risk_{ijt}$ is *risk-taking* proxied by (i) *Earnings-Volatility*, (ii) C*apital-Expenditure* and (iii) *R&D Expenditure* as 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 on or after 2004 and zero otherwise. $\overline{OwnCon_i}$ is the two-year average of the percentage of promoters' shareholding before enforcement of Clause-49. $\boldsymbol{X}_{ijt}$ is a vector of firm level control variables. Firm level controls include size, leverage, liquidity and market-to-book (MB). $\gamma_i$ , $\vartheta_j$ and $\tau_t$ control for fixed effects of firm, industry and year respectively. $e_{ijt}$ is the error term. $\omega$ captures the effect of CGR on risk-taking on the affected firms moderated by the heterogeneity of ownership concentration before enforcement. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen et al. (2009). *, ** and *** denote statistical significance at 10%, 5% and 1% significance levels respectively. The sample period ranges from year 2000 to 2007.Source: CMIE database.

| | Earnings-Volatility | | Capital Expenditure | | R&D Expenditure | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [1] | [2] | [1] | [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) | (2.95) |
| Size | | -0.01** | | | | -0.40* |
| | | (-2.88) | | | | (-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 | | -0.00* | | -0.17 | | -0.00 |
| | | (-1.85) | | (-1.13) | | (-0.45) |
| MB | | 0.00*** | | 2.03*** | | 0.01 |
| | | (4.03) | | (8.91) | | (0.41) |
| Firm, Ind. and Year FEs | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. $R^2$ (within) | 0.01 | 0.03 | 0.02 | 0.02 | 0.01 | 0.02 |
| No. of Firms | 2084 | 2084 | 2090 | 2090 | 624 | 624 |
| No. of Obs. | 10594 | 10594 | 10657 | 10657 | 3241 | 3241 |

**Table 10**
**Exploring Cross-Sectional Heterogeneity: Leverage**

This table reports the results of different specifications of the following regression equation:

$$Risk_{ijt} = \alpha + \omega.1_{(Clause49=1)}.1_{(After=1)}.\overline{Leverage_i} + \lambda.1_{(Clause49=1)} + \rho.1_{(After=1)} + \boldsymbol{X}_{ijt}.\boldsymbol{\delta} + \gamma_i + \vartheta_j + \tau_t + e_{ijt},$$

where $Risk_{ijt}$is *risk-taking* proxied by (i) *Earnings-Volatility*, (ii) C*apital-Expenditure* and (iii) *R&D Expenditure* as 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 on or after 2004 and zero otherwise. $\overline{Leverage_i}$ is the two-year average of book debt to equity ratio before the enforcement of Clause-49. $\boldsymbol{X}_{ijt}$ is a vector of lagged firm-level control variables. Firm level controls include size, leverage liquidity, ownership concentration (OwnCon) and market-to-book (MB). $\gamma_i$ , $\vartheta_j$ and $\tau_t$ control for fixed effects of firm, industry and year respectively. $e_{ijt}$ is the error term. $\omega$ captures the effect of CGR on risk-taking on treated firms moderated by the heterogeneity of leverage before enforcement. Standard errors are double clustered at the firm and year levels following Petersen et al. (2009). *, ** and *** denote statistical significance at 10%, 5% and 1% significance levels respectively. The sample period ranges from year 2000 to 2007. Columns [1] and [2] report regression without and with controls for non-missing sub-samples of all control variables. Source: CMIE database.

| | Earnings-Volatility | | Capital Expenditure | | R&D Expenditure | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [1] | [2] | [1] | [2] |
| DIDID-Leverage | 0.15*** | 0.10*** | 1.25*** | 1.31*** | 0.05** | 0.05** |
| $[1_{(Clause49=1)}.1_{(After=1)}.\overline{Leverage_i}]$ | (3.76) | (3.15) | (3.26) | (3.34) | (2.52) | (2.87) |
| Size | | -1.35*** | | 6.25*** | | -0.25 |
| | | (-3.07) | | (3.12) | | (-1.33) |
| Leverage | | -0.01 | | -0.41 | | 0.00 |
| | | (-0.30) | | (-1.34) | | (0.02) |
| Liquidity | | 0.02* | | -0.40** | | -0.02 |
| | | (1.76) | | (-2.42) | | (-0.30) |
| OwnCon | | -0.02** | | -0.08 | | -0.00 |
| | | (-2.38) | | (-0.84) | | (-0.28) |
| MB | | 0.16*** | | 1.13** | | 0.03 |
| | | (4.40) | | (2.21) | | (0.94) |
| Firm, Ind. and Year FEs | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. $R^2$ (within) | 0.01 | 0.03 | 0.01 | 0.05 | 0.01 | 0.01 |
| No. of Firms | 2085 | 2085 | 2090 | 2090 | 624 | 624 |
| No. of Obs. | 10601 | 10601 | 10657 | 10657 | 3241 | 3241 |

**Table 11**
**Value Relevance of Risk-taking**

This table reports the results of different specifications of the following specification:

$$Value_{ijt} = \alpha + \varphi.1_{(Clause49=1)}.1_{(After=1)}.Risk-taking + \lambda.1_{(Clause49=1)} + \rho.1_{(After=1)} + \boldsymbol{X_{ijt}}.\boldsymbol{\delta} + \gamma_i + \vartheta_j + \tau_t + e_{ijt}$$

where $Value_{ijt}$ is MB. $1_{(Clause49=1)}$ 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 on or after 2004 and zero otherwise. $\boldsymbol{X_{ijt}}$ 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*. Variables are as defined in notes to table1. $\gamma_i$ , $\vartheta_j$ and $\tau_t$ control for fixed effects of firm, industry and year respectively. $e_{ijt}$ is the error term. Variables are winsorized at 1% and 99%. Standard errors are double clustered at the firm and year levels following Petersen et al. (2009). *, ** and *** denote statistical significance at 10%, 5% and 1% significance levels respectively. Source: CMIE database. The sample period ranges from year 2000 to 2007.

| | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|
| $DIDID$-Risk-taking | 0.02*** | 0.03*** | 0.03*** | 0.03*** | 0.05*** | 0.05*** | |
| $[1_{(Clause49=1)}.1_{(After=1)}.Risk-taking]$ | (3.28) | (3.18) | (3.93) | (3.98) | (4.20) | (4.07) | |
| DID | | | | | | 0.12* | 0.30*** |
| $[1_{(Clause49=1)}.1_{(After=1)}]$ | | | | | | (1.94) | (3.92) |
| Size | | 0.43*** | 0.46*** | 0.45*** | 0.71*** | 0.71*** | 0.66*** |
| | | (3.55) | (3.79) | (3.71) | (3.41) | (3.41) | (3.74) |
| Leverage | | | 0.13** | 0.13** | 0.11** | 0.11** | 0.11** |
| | | | (2.39) | (2.36) | (2.31) | (2.31) | (2.45) |
| Liquidity | | | | -0.01*** | -0.01*** | -0.01*** | -0.01*** |
| | | | | (-2.74) | (-2.89) | (-2.88) | (-2.73) |
| OwnCon | | | | | 0.02*** | 0.02*** | 0.02*** |
| | | | | | (4.84) | (4.84) | (4.91) |
| Firm, Ind. and Year FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. $R^2$ (within) | 0.03 | 0.03 | 0.04 | 0.04 | 0.05 | 0.05 | 0.05 |
| No. of Firms | 2706 | 2705 | 2358 | 2354 | 2161 | 2161 | 2194 |
| No. of Obs. | 13808 | 13806 | 13606 | 13563 | 11076 | 11076 | 11225 |

**Figure 1**
**Timeline of enforcement of Clause-49**

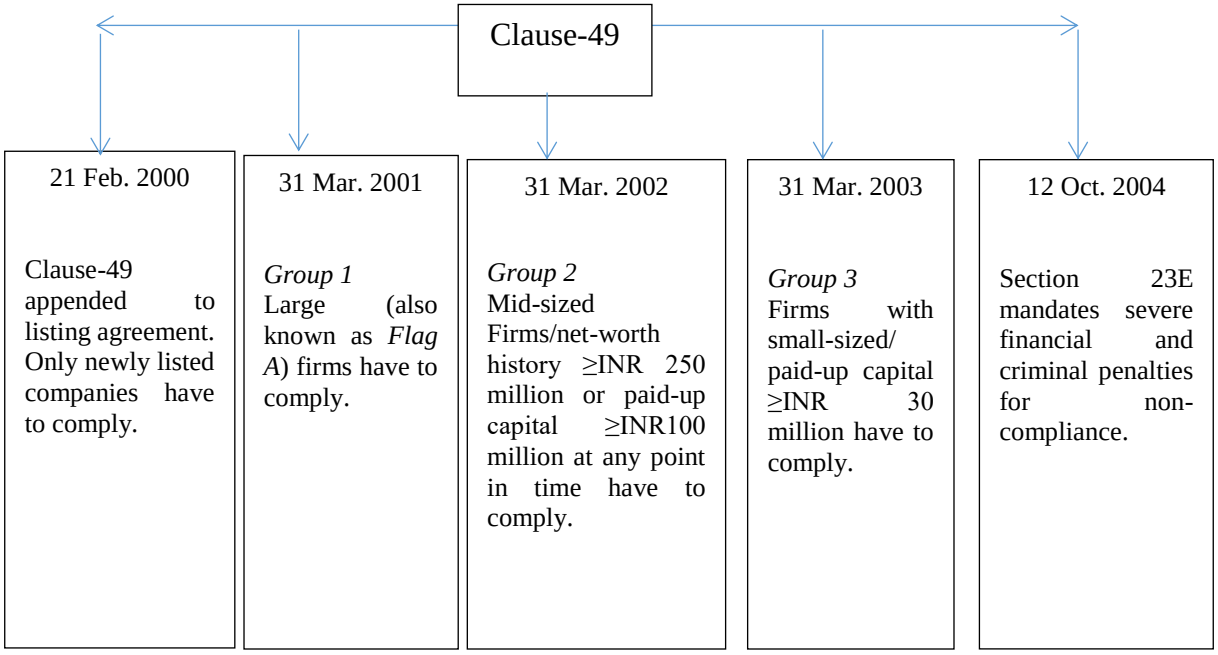
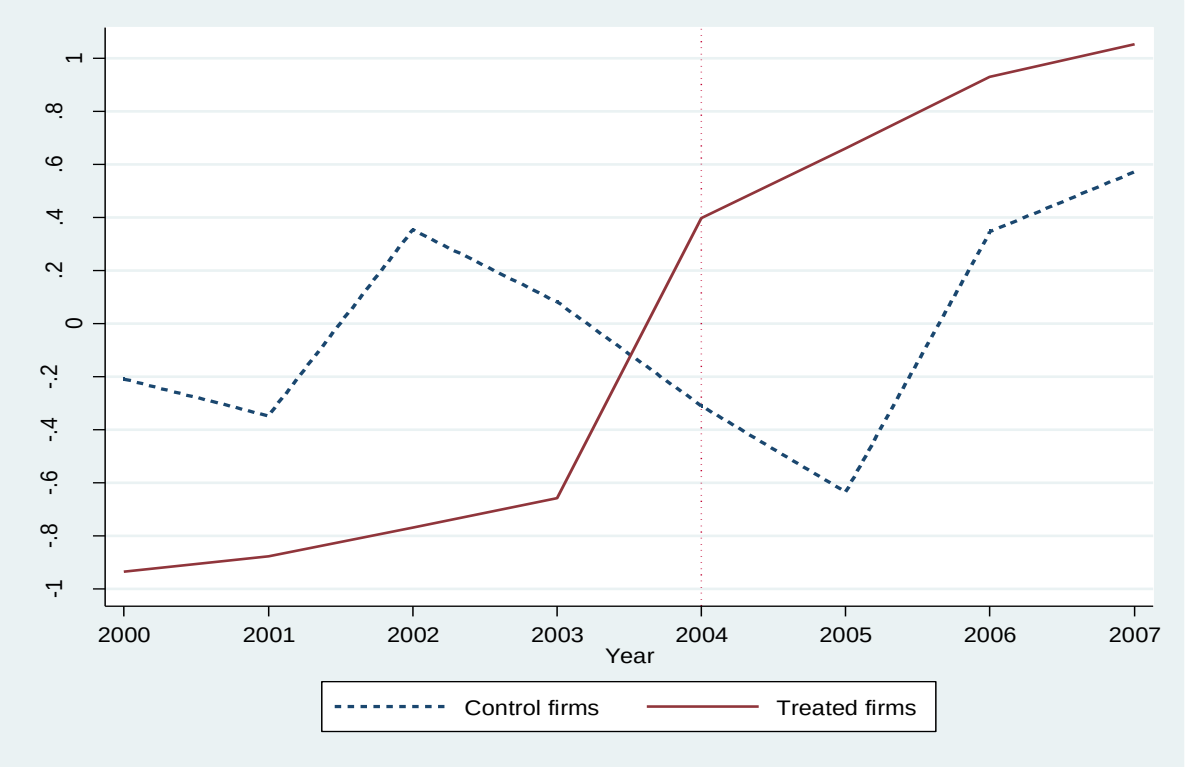
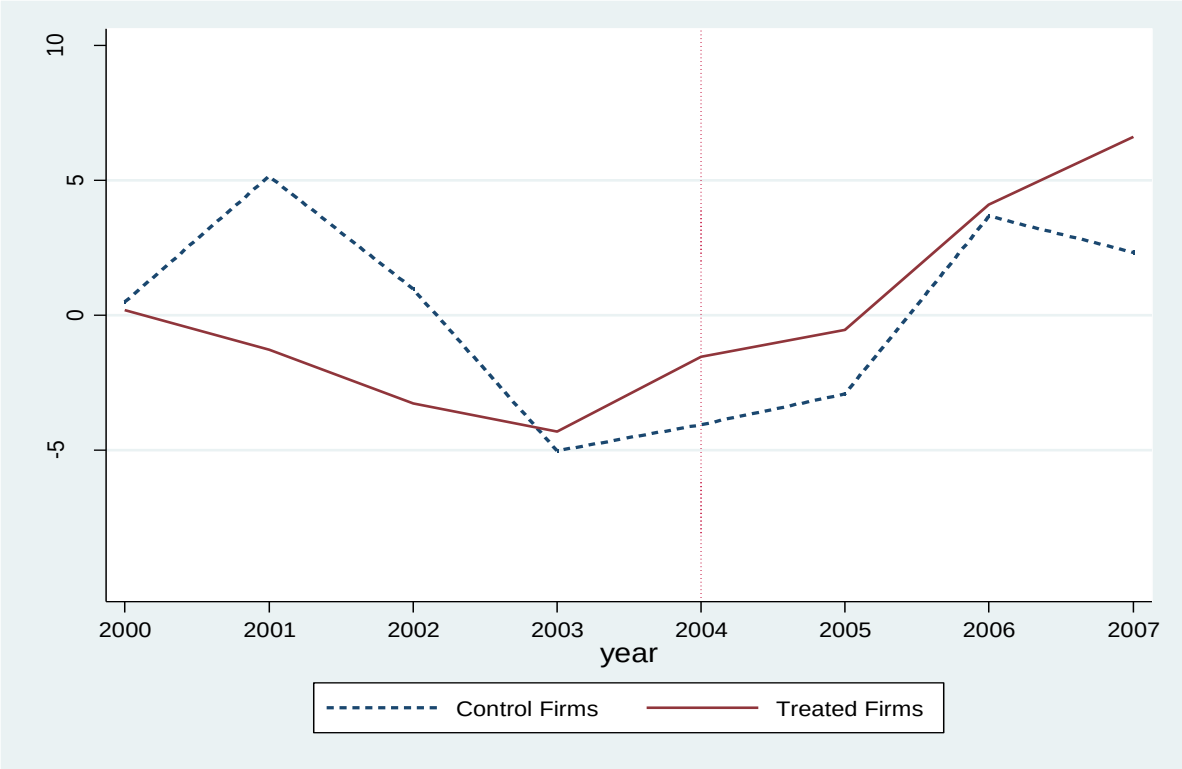


**Figure 2**
**Time-series plot of Earnings-Volatility of treated and control group**




Note: Here, we plot the de-meaned values of the *Earnings-Volatility* of affected and unaffected firms over the study period of 2000-2007.Before-Clause-49 period is 2000 to 2003 and After-Clause-49 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 in percentage. Source: CMIE database.

**Figure 3**
**Time-series plot of Capital Expenditure of treated and control group**




Note: Here, we plot the de-meaned values of the *Capital Expenditure* of listed Indian firms affected and unaffected by Clause-49 over the study period of 2000-2007. Before-Clause-49 period is 2000 to 2003 and After-Clause-49 period is 2004 to 2007. We calculate *Capital Expenditure*= Addition to Long-term asset *100/Total Long-term Assets of the previous year. Source: CMIE database.

**Figure 4**
**Time-series plot of R&D Expenditure of treated and control group**


Note: Here, we plot the de-meaned values of the R&D expenditure of listed Indian firms affected by and unaffected by Clause-49 over the study period of 2000-2007. Before-Clause-49 period is 2000 to 2003 and After-Clause-49 period is 2004 to 2007. We calculate *R&D Expenditure* =Total R&D Expenditure *100/Total Assets. Source: CMIE database.

# Appendix1

**Stylized Mandated Provisions of Clause-49**

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

**1. Requirement of independent directors:**

- Fifty percentage of board 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, and 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),
- 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 2**
**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 in percentage. | Derived from CMIE |
| Capital Expenditure | Increase in Long-term Assets as a percentage of previous year's total long-term assets expressed in 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 asset). | 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 3. | Derived from CMIE |

**Appendix 3**

**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 | 26584 |