Corporate Governance Reform and Risk-Taking: Evidence from an Emerging Market

ABSTRACT

Empirical evidence from developed markets suggests a negative effect of corporate governance reform (CGR) on corporate risk-taking primarily due to higher compliance costs. We revisit this relation in an emerging market categorized by weaker market forces of corporate control and higher likelihood of expropriation by dominant insiders. Using a natural experiment, we find that CGR in an emerging market context leads to higher corporate risk-taking. We further show that CGR encourages risk-taking of otherwise conservative firms with higher ownership concentration and creditors' stake. Our study also demonstrates risk-taking as an important channel through which CGR enhances firm-valuation. The findings also support the view that stricter CGR enforcement may have a positive investment impact in an evolving regulatory environment.

JEL Codes: G32; G34; G38
Key Words: corporate governance reform; risk-taking; emerging market; natural-experiment.

1. Introduction

Recent studies show that corporate governance reform (CGR) discourages corporate risk-taking. This view, which is primarily based around the experience of adopting the Sarbanes-Oxley Act (SOX) in the US, suggests that CGR increases compliance costs, shrinks managerial flexibility and discourages managers/insiders from undertaking potentially value-enhancing risky projects. In this context, Bargeron et al. (2010) show a significantly diminished risk-taking appetite of US firms following the introduction of the Sarbanes Oxley Act (SOX). They argue that the increased personal accountability of managers by SOX reduces insiders' motivation to pursue risky investments. Cohen et al. (2013) make a similar argument and note that the reduced risk-taking activities of US firms following the implementation of SOX is partly due to increased compliance burden.[1]

There is an alternative view which predicts a positive relation between CGR and risk-taking. John et al. (2008) show that corporate risk-taking increases significantly in better governance environments. They argue that better investor protection lowers both the magnitude and importance of private benefits to dominant insiders and the preference of non-equity stakeholders to invest conservatively leading to growth in risky investments. This view is also supported by the argument that the expected diversion of corporate resources for private benefits is lower for higher investor protection regimes (Shleifer and Wolfenzon, 2002), and that CCR could substitute for the relatively weaker market forces of corporate scrutiny, particularly in emerging markets, (Miller

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

and Reisel, 2012; Dharmapala and Khanna, 2013). The resulting substitutive effect of regulatory reform can therefore encourage risk-taking.[2]

In light of these two opposing predictions and empirical evidence, we examine the effect of an important CGR, called Clause-49, on risk-taking behaviour for listed firms in the context of India, a large and important emerging market. Our focus on an emerging economy to examine CGR and corporate risk taking is driven by the stylized fact that emerging markets, in general, face evolving and therefore relatively weaker market forces of corporate control with the prevalence of ownership concentration further amplifying the agency related problems between dominant insiders and minority outsiders (see Bekaert and Harvey, 2003; Harvey et al., 2004; Claessens and Yurtoglu, 2013).[3] For example, Stulz (2005) notes 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]

After a few years of groundwork, India implemented a CGR in the year 2000 with the adoption of "Clause-49" which introduced greater disclosure, board independence and transparency. However, following Dharmapala and Khanna (2013), we primarily focus on the amendment of Securities Contracts Act 1956 to introduce Section 23E in 2004 which expanded

[2] There are two possible theoretical arguments predicting negative relation between firm's corporate governance and risk-taking. First, improvement in investor protection reduces the benefits of monitoring provided by dominant insiders (Burkart et al., 2003), resulting to less prevalence of dominant shareholders across firms. This reduction allows greater managerial discretion to pursue less risk taking (John et al., 2008). Second, in a weaker investor protection regime, a dominant insider might exploit complex ownership structure and take more risks in units where he has lower cash flow rights and tunnel the proceeds to units where his cash flow rights are higher (Johnson, et al., 2000; John et al., 2008). The contradictions in these two opposing theoretical predictions highlights the significance of empirical inquiry.

[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 (a period covered by our sample), the value-weighted percentage of market capitalization held by corporate insiders was 58%. This is compared to the figures of 16% and 11% for the United States and the United Kingdom respectively.

[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.

personal liabilities of management, board and audit committee and imposed significant financial and criminal penalties for non-compliance of provisions of Clause-49.[6] However, only listed firms that had paid-up equity capital of more than or equal to Indian Rupees (INR) 30 million at any point in their traded history were subject to comply with this regulation. The imposition of Section 23E in 2004 allows us to categorize firms into categories of treated and control groups avoiding the possibility of self-selection bias. This provides us an ideal regulatory setup to empirically answer the following questions relating CGR and corporate risk-taking in the context of emerging market.

First, we examine the effect of introducing Section 23E in 2004 on the risk-taking activities of firms in emerging market. Second, the theoretical predictions following John et al (2008) suggests a positive relation between insiders' ownership and investment conservatism. Given the weaker market forces of corporate control and higher ownership concentration in emerging markets, the associated private benefits of controlling insiders favouring investment conservatism should be higher (Bertrand et al., 2002; Gul et al., 2010). Therefore, we examine the moderating role of CGR (Section 23E) in influencing the nexus between ownership concentration and corporate risk-taking. Third, the literature suggests that creditors may demand more investment-related restrictions for firms when agency and information asymmetry related problems are relatively more severe (Chava and Roberts, 2008) or when country-level legal environment is weaker (Miller and Reisel, 2012). Since the objective of CGR is to reduce agency and information asymmetry related constraints, we examine whether the introduction of Section 23E in the year 2004 mediates the link between creditors' stake and corporate risk-taking. Finally, empirical research, specific to our institutional set-up, shows that following the 2004 governance reform the

[6] This makes the reform closely comparable with SOX as noted by Black and Khanna (2007).

valuations of Indian firms have significantly improved (Dharmapala and Khanna, 2013). Accordingly, we argue that enhanced risk-taking could potentially be the channel through which the increase in firm valuation may be observed.

Using a sample of 3839 listed non-financial firms and employing the difference-in-differences approach, we find strong and economically significant evidence that CGR is positively related to corporate risk-taking. More specifically, following the imposition of stricter penalties in 2004 we find a statistically significant and economically material[7] increase in corporate risk-taking of firms affected by Clause-49. Our findings are robust to additional tests and sensitivity analysis that use different proxies of risk-taking (earnings-volatility, capital expenditure and R&D expenditure) and the use of different treated and control groups. As our treated firms are larger in comparison to the control firms, we address endogeneity concerns stemming from size effect and pre-enforcement differences between the treated and control groups. We also reduce the possibility of confounding events other than 2004 CGR driving our results through false experimental tests. Further, we also address the possibility of self-selection bias by excluding those firms from our estimation whose paid-up equity capital changes post 2004 reform. Finally, we also demonstrate that the initial introduction of CGR in 2000 do not have visible effect on corporate risk-taking. This suggests that CGR positively affects corporate risk-taking in emerging markets only when governance regulations are accompanied with stricter financial and criminal sanctions for non-compliance that enhances the likelihood of effective enforcement.

Our examination on the moderating role of CGR in explaining the influence of ownership concentration on corporate risk-taking shows that following the CGR, firms with higher ownership concentration pursue more value-enhancing risky projects relative to firms with lower ownership

[7] 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.

concentration. The results on creditors' heterogeneity show that in comparison to the treated counterparts with lower creditors' stake firms with higher creditors' stake opt for more risk-taking following CGR. Finally, the results on the role of CGR on market valuation show that post CGR enforcement period of 2004 higher risk-taking is associated with a higher market valuation of the treated firms.

This paper contributes to the following strands of literature. First, we add to the literature on CGR and risk-taking. Previous studies provide evidence against CGR and corporate risk-taking in the market context where the general framework of investor protection is high. However, we show that link between CGR and risk-taking is postive in the context of an emerging market where private benefits of dominant insiders are significant, and market based corporate scrutiny is weaker. Second, our paper also adds to the literature on heterogeneity of ownership concentration and creditors' stake in the causal relation between CGR and risk-taking. Given the extensive evidence on the prominent role of ownership concentration and creditors' stake in risk-taking, particularly significant in the context of emerging markets (Bertrand et al., 2002; Gul et al., 2010 and Miller and Reisel, 2012), we contribute by showing the moderating role of CGR in explaining the association between ownership concentration and creditors' stake and risk-taking respectively.

Third, the literature offers extensive support on the positive impact of CGR on firms' market valuation (Lemmon and Lins, 2003; Black and Khanna, 2007; Dharmapala and Khanna, 2013; Fauver et al., 2017 among others). We complement Dharmapala and Khanna (2013) by showing corporate risk-taking as an important mechanism through which CGR augments higher firm valuation in an emerging market. Finally, several recent papers examining the role of corporate governance have identified empirical challenges, such as endogeneity (predominantly the effects of confounders and possible reverse causality) and selection bias (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 our hypotheses followed by the discussion on data in Section 4. Section 5 examines 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). However, 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 was necessary. Consequently, the Code evolved into the mandatory Clause-49 provisions in February 2000. Clause-49 of the stock exchange listing agreement is a set of corporate governance reforms enacted by the Securities and Exchange Board of India (SEBI), the governing body of listed companies in India.[8] Clause-49 introduced greater compliance, enhanced disclosure and transparency, and board independence. Appendix 1 highlights the key features of Clause-49.

Only firms that have achieved their paid-up equity capital more than or equal to Indian Rupees (INR) 30 million or net worth of INR 250 million at any point in their history since being listed were initially subject to the Clause-49 regulation. As shown in Figure 1 Clause-49 provided

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

a phased-in implementation period where larger firms were required to comply first followed by mid-sized and finally small sized firms. However, firms that were enlisted first time from 2000 onwards were required to comply at once, regardless of whether they met the criteria of paid-up capital/net worth or not. This implies that our control group comprises those firms who were enlisted prior to 2000 and who did not meet the two threshold criteria imposed by the reform.

…**Insert Figure 1 about here**…

The initial penalty for violation was delisting. In 2004, the amendment to the Securities Contracts Act 1956 included Section 23E that expanded personal liabilities of management, board and audit committee and imposed significant financial and criminal penalties for violations of the listing agreement (up to INR 250 million per violation). Even though delisting could provide a significant reputational penalty, the impact of delisting alone may not be adequate in an evolving regulatory environment of emerging market because of the inability to induce sufficient deterrence for non-compliance (Dharmapala and Khanna, 2013). Dutcher (2005) argues that only through stringent sanctions that introduce substantial criminal and financial penalties on board members, auditors and management team can regulatory interventions adequately deter corporate non-compliance. Further, Dharmapala and Khanna (2013) maintain that the threat of punishment through stricter financial and criminal penalties works better to bring effective effect of CGR in emerging markets and note that the imposition of harsher sanctions of Clause-49 in 2004 provides an unusual setup to test the effect of improved expected CGR enforcement on corporate behavior (Dharmapala and Khanna, 2013, pp 1057). In fact, it is the imposition of severe personal liabilities to the corporate decision makers including managers, board and auditors that makes Clause-49 comparable to SOX (see Bargeron et al., 2010 on the provisions of SOX). We therefore use 2004

as the year of enforcement of Clause-49 and is consistent with previous empirical studies (Dharmapala and Khanna, 2013).

The legal set-up for Clause-49 is such that enforcement under Section 23E (in 2004) would occur in the first instance by the SEBI with a potential appeal to the Securities Appellate Tribunal (a body formed to deal with securities law issues and which addresses SEBI appeals), and followed by a final appeal to the Supreme Court. Reports suggest that number (turnaround time) of settled cases on enforcement decisions has been increasing (decreasing) in the post enforcement periods of 2004 on issues enforced by SEBI and the Securities Appellate Tribunal.[9] 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 clause-49 period.[10] Taken together, Clause-49 intervention was introduced with an institutional arrangements for handling of cases for non-compliance, providing a credible improvement in the likelihood of enforcement following the intervention.

We identify three major provisions in Clause-49 that should affect corporate risk-taking in India. These are: board independence, independence of audit committees, and disclosure requirement. Independent directors are often valued for working in favor of the shareholders by preventing insiders from diverting cash flows. The 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 of concentrated insiders by increasing independent monitoring (John et al., 2008). Therefore, through board-independence, Clause-49 could induce positive risk-taking behavior of dominant insiders.

[9] 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. 66-71 and SEBI, Annual Report 2007-08, pp. 103-114, 119-129.
[10] Balasubramanian et al. (2010) note that on an average there has been greater compliance with provisions of Clause-49. However, they find that the compliance is far from universal.

Similarly, board independence can shift monitoring roles from creditors to minority shareholders and have discouraging effect of investment conservatism.

The second major provision of Clause-49 is that it 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 deeper 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 increasing their accountability, which can increase effectiveness of monitoring, thus creating possible disutility of private benefits by the insiders.

The third important provision in Clause-49 is the disclosure requirement of which is aimed at improving transparency and reducing information asymmetry. Taken together, structure and accountability of board, audit committee and management team increase 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 (Bargeron et al., 2010; Cohen et al., 2013).

From empirical identification strategy point of view the obvious concern related to Clause-49 is whether firms could endogenously self-select themselves to be or not to be become compliant with the reforms. However, as noted above, the criteria for compliance is backward looking and multi-layered. There are several scenarios that could be contested to produce endogenous selection. First, even if a firm meets the current criteria of paid-up equity capital/net worth but do not wish to comply cannot alter its current criteria because if the firm had reached the paid-up capital/net worth criteria at any point in their history would have to comply. As a result of this

backward-looking criteria of Clause-49 application, such firms are unable to alter their paid-up capital. Second, if a firm which has had lower paid-up capital/net worth than the threshold required to comply may abstain from raising its capital base i.e. enhance its paid-up capital. However, if the firm is growing in size and making significant earnings, then it is very likely to reach the required net worth threshold. This is because net worth is that part of the capital base which is adjusted for retained earnings and several reserves, and therefore is less likely to be manipulated. Finally, if any firm is below the required threshold but wishes to be compliant with the reforms could endogenously issue additional equities to cross the paid-up capital criteria.

3. Hypotheses Development

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):

$$G(P) = -g(\emptyset) \tag{3}$$

where $\emptyset$ is the probability that private benefits 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 benefits $G(P)$, 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):

$$(\emptyset_b - \emptyset_c) = \emptyset \tag{4}$$

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, with an additional compliance requirement this could 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 Bargeron et al. (2010) and Cohen et al. (2013) in developed markets confirm 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 could undertake positive 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 with weaker market-based corporate scrutiny and higher private benefits of dominant insiders at stake.

H_1: Enforcement of CGR should increase corporate risk-taking in an environment of weaker market-based corporate control.

3.2. Role of Ownership Concentration and Creditors' Stake

The literature has identified ownership concentration and creditors' stake, among others, as major factors obliging firms to adopt investment conservatism (Morck and Nakamura, 1999; Chava and Roberts, 2008; John et al., 2008; Miller and Reisel, 2012). These factors are more likely to be noticeable in a weaker information and legal environment of emerging markets. We therefore develop a set of hypotheses on how heterogeneity on ownership concentration and creditors' stake would moderate the effect of CGR on risk-taking of firms in the context of an emerging market.

3.2.1. Ownership Concentration and the Effect of CGR on Risk-taking

Different ownership structures manifest into a different set of the agency problems in a firm. In the face of diffused ownership, as in the developed market of the US and the UK, agency problem arises mainly from the conflict of interests between outside shareholders (principals) and inside managers (agents) (Jensen and Meckling, 1976). These managers hold very low proportion of equity-ownership which may demand more monitoring of their actions and better alignment of interests through compensation contracting (Young et al., 2008; Cohen et al., 2013). On the contrary, in an emerging market environment, ownership is highly concentrated to few insiders who have full control over corporate decisions giving rise to the conflict of interests between dominant insiders and minority outsiders. In fact, studies provide convincing evidence that concentrated ownership is associated with a higher value of private benefits by dominant insiders (Bertrand et al., 2002; Dyck and Zingales, 2004; Gul et al., 2010). Empirical evidence also suggests that prevalence of dominant insiders who hold significant ownership stake can oblige firms in emerging economies to adopt investment conservatism (John et al, 2008; Gul et al., 2010).

Thus, in an environment of concentrated ownership, more resonating with an emerging market,[11] the normative literature suggests the need for more protection of minority rights against expropriation by dominant insiders, which may result from CGR (Claessens et al., 2002; Young et al., 2008). In a regime where firms face a greater likelihood of minority expropriation by the dominant insiders, CGR through its stricter mandatory provisions of independent corporate scrutiny, should reduce the extraction of private benefits by increasing the likelihood of greater monitoring and, detecting and prosecuting misappropriations (John et al., 2008; Aggarwal et al., 2008; Faccio et al., 2011). In line with this conjecture, CGR in an emerging market context should

[11] Claessens and Yurtoglu (2013) note that the direct equity ownership in India is in the region of 50% which are 16% and 11% for the United States and the United Kingdom respectively as noted by Stulz (2005).

decrease investment conservatism and increase value enhancing 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: Greater ownership concentration firms undertake higher levels of risk-taking in comparison to lower concentrated ownership firms following the enforcement of CGR.

3.2.2. Creditors' Stake and Effect of CGR on Risk-Taking

The literature suggests that with dominant creditors, investment in new risky projects may increase firms' financial distress and therefore creditors would favour corporate investment conservatism (Morck and Nakamura, 1999; Chava and Roberts, 2008; Roberts and Sufi, 2009; Acharya et al., 2011). The debt and equity holder agency problem can result in creditors demanding more repayment and withholding further credit, thereby providing a potential channel through which the conflict of interests between debt-holders and shareholders can impact corporate financial policy and result in investment conservatism (Tirole, 2006; Roberts and Sufi, 2009).

Studies show that creditors require more investment-related restrictions for firms when country-level legal environment is weaker (Miller and Reisel, 2012). Similarly, creditors' influence on investment conservatism is more pronounced when agency and information related problems are relatively more severe (Chava and Roberts, 2008). Given that emerging markets are characterized by weaker legal environment and higher agency related problems, firms pursue investment conservatism when they face higher creditors' dominance. This investment conservatism can be beneficial to monitor expropriation in the form of over-investments (Albuquerue and Wang, 2008). However, creditors' monitoring might undermine value- relevant risk-taking. CGR reduces the agency cost of debt through improved information environment and

independent scrutiny of corporate decisions. The resulting alignment of interest between creditors and shareholders should encourage a firm to pursue more value-relevant risk-taking. In line with this argument, we test the following third hypothesis:

H_3: Higher creditors' stake firms undertake higher levels of risk-taking in comparison to lower creditors' stake firms following the enforcement of CGR.

3.3. CGR, Risk-Taking and Firm Valuation

Our theoretical framework contends that following CGR intervention in an emerging market setup firms should undertake more positive NPV risky investments, which consequently should bring higher value to firms affected by the CGR. 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; Fauver et al., 2017 among others). Specifically, Black and Khanna (2007) and Dharmapala and Khanna (2013) show that CGR interventions in emerging market context are value-enhancing. However, what is not clear is the channel through which CGR influence firm valuation. Aligning empirical evidence from emerging markets with our theoretical framework, we argue that corporate risk-taking should therefore be the channel through which CGR translates into higher firm value. Therefore, we set our fourth hypothesis on the value relevance of risk-taking in an emerging market.

H_4: Firms with higher levels of risk-taking are associated with higher valuation following the enforcement 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 variable

of both listed and unlisted public limited companies.[12] For our study, we primarily use all listed non-financial firms available in the database for the sample period of 2000 to 2007. For our analysis on cross-listed Indian firm, we obtained the relevant data from Dharmapala and Khanna (2013).[13] 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 of corporate risk-taking[14]. 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 database 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 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* which 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

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

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

[14] Prowess variables are reported as of the December 31 each year; Therefore, any regulatory shift in a given year is expected to be reflected in financial data of the same year.

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 monetary value of R&D expenditure scaled by total assets. *R&D Expenditure* captures a firm's level of innovative investments and represents innovative risk taking (Belloc, 2013).[15]

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

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

the proportion of total shares held by promoters.[16] 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)*.

5. Empirical Results

We use the exogenous CGR of 2004 and 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 treated firms after GCR enforcement with those before, and subtracting that from the after and before expected values of corporate risk-taking of control 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 as the industry and t as 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 affected by the reform, based on net-worth or paid-up capital. Likewise, the control groups are the ones not affected by the CGR. $1_{(Aft\quad)}$ 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, τ_t is the time fixed effect, γ_i is the firm fixed effect, and ϑ_j is industry fixed effects. Our key coefficient of interest, β, the

[16] Prowess reports data on ownership concentration (*OwnCon*) from 2001 onwards only.

interaction term $1_{(Clause49=1)} \cdot 1_{(After\ \ )}$ 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 summary statistics for the dependent and control variables for the entire sample as well as for the pre-enforcement (2000-2003) and post-enforcement periods (2004-2007). It shows 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 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 significantly decreased,[17] 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 increased 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, 3.73 and 0.45 percentage points for *Earnings-Volatility, Capital Expenditure* and *R&D Expenditure*

[17] 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, at the 1% level. The univariate DID estimates of all three measures of corporate risk-taking are suggestive of an impact of Clause-49 on corporate risk-taking in the post enforcement period, supporting hypothesis 1.

…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 increase in *Earnings-Volatility* after the enforcement of Clause-49 in 2004. There are no visible changes in annual demeaned *Earnings Volatility* of control firms. Similarly, Figures 3 and 4 show upward trend in *Capital Expenditure* and *R&D Expenditure* of the treated group following 2004 CGR but again with no visible changes for control firms. In summary, all the three figures point to the general trend in the growth of risk-taking proxies of treated firms following 2004 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 section, we report the output of DID panel regressions by estimating the general specification shown in Equation (5) in Table 3. 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. 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 third regression (model 3) adds the other firm level controls to model 1.

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 supporting hypothesis 1. 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. As discussed in the theoretical framework, the CGR, through the stricter provisions for financial and criminal penalties for corporate insiders, could have reduced the extraction of private benefits by these 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 risk-taking activities following improvement in corporate governance (Stulz, 2005; John et al., 2008).

In terms of the controls, the results from full specification models (model 3) suggest that two of the risk-taking proxies *Earnings Volatility* and *R&D Expenditure* are negatively related to *Size*. To the extent that firm size captures firm's maturity, the result might suggest that mature firms pursue less growth oriented risk-taking, *ceteris paribus* (Miller and Friesen, 1984). However, *Capital Expenditure* is positively associated with *Size* which is indicative to the fact that in comparison to financially constrained firms which are typically smaller firms, unconstrained larger firms can more easily expand their Fixed Assets. Similarly, coefficients of *MB* are positively related to the proxies of risk-taking implying risk-taking are positively viewed by the investors.

Coefficients of other control variables are mostly in agreement with theoretical predictions, at least in terms of their signs, however they lack consistency in terms of statistical significance.

…**Insert Table 3 about here**…

5.4. Robustness Checks on CGR and Risk-Taking

Although we control for various firm level characteristics, firm-, industry- and time-fixed effects in our examination of the first hypothesis, there could be other differences in our treated and control groups that could confound the changes in corporate risk-taking Alternatively, our results could be simply capturing other contemporaneous shocks creating a spurious inference. We address these empirical challenges in the following sub-sections.

5.4.1. The Size Effect

One important concern facing the comparability of exogenously classified treated and control groups is that these firms differ in their characteristics. 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-49 (based on the paid-up equity capital threshold) and use the two most comparable groups. As shown in Table 4, 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 are also split on size.

[18] Group I comprises the larger 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.

…Insert Table 4 about here…

From the summary figures of all the groups in Table 4, we find 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 treated firms, whereas Group IVA firms are control firms. Table 5 investigates whether our causal claim in hypothesis 1 holds for these two highly comparable treated and control groups and reports DID estimates of corporate risk-taking with these two groups. The results in Table 5 are similar to Table 3 and provide further support for hypothesis 1.

…Insert Table 5 about here…

5.4.2. Pre-Compliance Effect

There is the possibility that within the treated group firms there could be firms that were already complaint with the provisions of Clause-49 since 2000, even before the CGR in 2004. Their inclusion in our sample as treated firms could bias our results. We deal with this by segregating firms within the treated group that were potentially already complying with corporate governance provisions very similar to those of Clause-49. We do so by isolating firms cross-listed in developed capital markets as the control firms. The bonding argument (Stulz, 1999; Coffee, 2002; Karolyi, 2012) suggests 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

[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.

or least material effect on the corporate governance practices of cross-listed Indian firms relative to domestically listed firms. We identify 84 cross-listed non-financial firms (as or before 2004) within the treated firms 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, we then 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 6 reports DID regressions of these size-matched treated 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 in Table 3, 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 reduces the possibility that our results for hypothesis 1 is driven by pre-compliance difference within the treated firms.

…Insert Table 6 about here…

5.4.3. Placebo Test and the Effect of Introduction of Clause-49

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. However, it could be that our results are

simply reflecting the effect of confounding shocks before or after the 2004 intervention. To address this, 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. We re-run regression equation (5) only altering the Dummy variable $1_{(After=1)}$ which takes the value of one for years 2002 and 2003 for False-Experiment 1 (FSY=2002) and zero for two years before 2002. Similarly, for False-Experiment 2 (FSY=2006), $1_{(After\ \ )}$ is one for the years 2006 and 2007 and zero for two years before 2006. Columns 1 and 2 of Table 7 reports the DID regression results from these false experiments. The estimates of all three risk-taking proxies show an insignificant effect for both 2002 and 2006, suggesting that confounding events around the CGR are not driving our results.[20]

Similarly, our main results assume that introduction of Clause-49 in 2000 did not have significant effect in corporate risk-taking. We empirically test this assumption by running a DID panel regression from 1997 to 2002 with year 2000 as the CGR introduction year and report findings in Table 7 in column 3 for each of risk-taking proxies where we find that introduction of CGR in 2000 did not have visible effect on risk-taking appetite of treated firms.

…Insert Table 7 about here…

5.4.4. Industry-Specific Shocks

Another possibility that could undermine our causal claim is the effect that industry-specific shocks could drive the corporate risk-taking.[21] Even though we control for time-invariant industry

[20] In an unreported table, with 2003 (one year before true experiment year) as the false experiment year, we find results consistent with table 4. However, placebo with 2005 as false experiment year show significant positive effect which is consistent with the expectation that the effect of the CGR on risk-taking is persistent for 2005.

[21] For example, there could be a possibility that (risky) investment opportunities and/or competition between different industries have changed around the same time of the CGR and therefore driving the results.

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. Table 8 presents the results accounting for the effect of industry-specific shocks, if any, besides other firm controls. All the coefficients are statistically and economically significant.

…Insert Table 8 about here…

5.4.5. Addressing Self-selection Bias

From empirical identification strategy point of view the obvious concern related to Clause-49 is whether firms could endogenously self-select themselves to be or not to be compliant with the reforms. However, as noted earlier, the criteria for compliance is backward looking and multi-layered. There are several scenarios that could be contested to produce endogenous selection. First, if a firm meets the criteria of paid-up capital/net worth currently but do not wish to comply may reduce its paid-up capital by buying back shares from the market. However, even if the firm alters its current criteria it would still be subject to reform if it had reached the paid-up capital/net worth criteria at any point in their history. As a result of the backward looking exogenously imposed criteria such firms are unable to self-select themselves. Second, if a firm which has lower paid-up capital than the threshold (INR 30 million) required to comply may abstain from raising its capital base i.e. enhance its paid-up capital. However, if the firm is growing in size and making significant earnings, then it is very likely to reach the required net worth threshold of INR 250 million and becomes compliant. This is because net worth is that part of the capital base which is adjusted for retained earnings and several reserves, and therefore is less likely to be manipulated.

Finally, if any firm is below the required threshold on both criteria (paid-up capital and net worth) but wishes to be compliant with the reforms could endogenously issue additional equities to cross the paid-up capital criteria. However, even though theoretically there may be remote possibility of firms altering their paid-up equity capital to be self-selected, we examine the stability of paid-up equity capital of firms used in our dataset. We find the paid-up equity capital of most firms to be highly stable for the study period. However, to further reduce the possibility of firms endogenously increasing their equity-base or net worth to be exposed to the regulation, we eliminate 32 firms (out of 3839) whose changes in paid-up equity capital or net worth alter their Clause-49 status after the reforms and sanctions commences. In unreported results, the findings of our empirical estimations are robust to the exclusion of these firms and are more or less consistent with our main results reported in in Table 3. These results suggests that the two criteria imposed refrained the firms to endogenously self-select themselves whether to be compliant or not. In fact, the data shows very few number of firms made any attempt to alter the imposed criteria.

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

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

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

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 ω estimates the heterogeneous impact of CGR on risk-taking moderated by $\overline{Z_\iota}$. In other words, ω shows the differential impact of CGR on corporate risk-taking across the continuum of $\overline{Z_\iota}$.

5.5.1. Ownership Concentration and the Role of CGR

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*$= 1_{(Clause49=1)}.1_{(After\quad)} * \overline{OwnCon_i}$ as shown in Equation (6). For CGR to stimulate positive corporate risk-taking among firms with higher ownership concentration, ω 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 show significant positive values 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 improvements in corporate governance enables 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. Creditors' Stake and the Role of CGR

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 better aligns interests of creditors and shareholders through more transparency and independent scrutiny of corporate decisions, 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 following CGR is associated with higher firm valuation constitutes an important channel through which CGR enforcement provides higher firm valuation, 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). $1_{(Clause49=1)} . 1_{(After\ \ )} . Risk - taking$ is an interaction term where *Risk-taking* is gauged by *Earnings-Volatility,* and, $1_{(Clause49=1)}$ and $1_{(After=1)}$ are as defined in equation (5).

We report the results in Table 11. Models 1 to 6 of Table 11 report the results of equation (7) without and with controls. Our results in column 7 are to facilitate comparison with Dharmapala and Khanna (2013). Columns 1 to 6 show that across the different controls, the firm value of higher risk-taking treated firms is significantly 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 market value of treated firms (with an average standard deviation of *Earnings-Volatility* of 6.85 percentage points).[22]

Model 7 shows that the market valuation of treated firms has increased significantly (0.30 units) following the 2004 enforcement consistent with Dharmapala and Khanna (2013). In model 6, we find 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 an important channel through which CGR affects a firm's value supporting hypothesis 4.

…Insert Table 11 about here…

6. Conclusion

The debate on the effect of CGR on corporate investment decisions is one important concern facing

[22] 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).

policy-makers. The literature provides two different theoretical perspectives on the effect of CGR on a firm's corporate risk-taking. One argument is that stricter sanctions, which hold the corporate insiders/managers personally liable for corporate affairs, increase the compliance burden and discourage insiders from undertaking risky investment decisions. On the other hand, utility from private benefits favours 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 especially where there are weaker market forces of corporate control.

We argue that the effect of CGR on corporate risk-taking is context dependent. CGR 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 expanding corporate risk-taking appetite. To test our proposition, we exploit a CGR regulatory enforcement in the Indian capital market for the year 2004.

Our main result, supported by robustness checks, provides strong evidence in support of our argument that stricter CGR interventions, in the context of emerging markets, increase risk-taking behaviour 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 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 with weaker market mechanism of corporate governance, CGR substitutes missing market-forces of corporate control

and brings about positive investment outcomes in the form of higher risk-taking. This evidence supports the view that stricter enforcement of CGR 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 (5.28) 11020	7.36 (6.85) 11410	1.57***	15.58	1.55***
	Control	6.82 (7.19) 1437	6.84 (7.54) 1554	0.02	0.07	
Capital Expenditure	Treated	11.51 (10.73) 9647	14.57 (12.01) 9849	3.06***	4.67	3.73***
	Control	12.02 (9.45) 1404	11.35 (10.98) 1427	-0.67	-1.18	
R&D Expenditure	Treated	1.25 (1.41) 2248	1.74 (1.51) 2333	0.49***	4.89	0.45***
	Control	1.50 (1.90) 305	1.54 (1.49) 304	0.04	0.29	

Table 3.
Difference-in-Differences (DID) Panel Regression of Risk-Taking

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

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

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). γ_i , ϑ_j and τ_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***
$[1_{(Clause49=1)}.1_{(After=1)}]$	(4.54)	(4.11)	(4.52)	(3.97)	(3.74)	(4.13)	(3.96)	(3.83)	(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)			(4.08)			(3.46)
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.

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	0.97	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 5.
Robustness Test: DID Panel Regression of Firms Clustered Around the Cut-off of Paid-up Equity 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). γ_i , ϑ_j and τ_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)	(3.91)	(5.39)	(3.99)	(3.57)	(3.81)	(3.56)	(4.54)	(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
			(0.67)			(-1.09)			(-1.23)
OwnCon			-0.01			-0.19			-0.04
			(-0.81)			(-1.03)			(-1.93)
MB			0.09			2.39			0.16
			(0.85)			(1.51)			(1.32)
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	0.02	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 6.
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:

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

where $Risk_{ijt}$is *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). γ_i , ϑ_j and τ_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)	(3.59)	(3.54)	(3.57)	(3.88)	(3.52)	(3.62)	(3.59)	(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			0.01			-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
			(1.61)			(1.44)			(1.28)
Firm FE									
Industry 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 4
Placebo test and Introduction Effect

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

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

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. $1_{(After\quad)}$ is an indicator variable that takes the value of one for two years after and including a false-shock year (FSY) and zero for two years before the FSY. We take years 2002 and 2006 as two different FSYs resulting in two false experiments and report in columns 1 and 2 for each proxy of risk-taking. To test the effect of introduction of Clause-49, in column 3, we define $1_{(After=1)}$ as a categorical variable that takes value of one for three years following and including the year of introduction of Clause-49 i.e. year 2000 and zero for three years before 2000. $\boldsymbol{X}_{ijt}$ is a vector of firm level controls that includes size, leverage, liquidity, ownership concentration (OwnCon) and market-to-book (MB). γ_i , ϑ_j and τ_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. Source: CMIE database.

	Earnings-Volatility			Capital Expenditure			R&D Expenditure		
	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
	(FSY=2002)	(FSY=2006)	(Intro=2000)	(FSY=2002)	(FSY=2006)	(Intro=2000)	(FSY=2002)	(FSY=2006)	(Intro=2000)
Clause-49*False-After	-0.06	-0.39	0.19	0.93	-2.31	0.91	0.02	0.15	0.05
	(-0.20)	(-1.17)	(1.08)	(0.02)	(-1.26)	(1.51)	(1.46)	(1.76)	(1.57)
Size	-0.89**	-0.29**	-0.31**	3.40***	2.85***	2.13***	-0.08**	-0.59***	-0.48***
	(-2.55)	(-2.63)	(-2.63)	(4.43)	(5.14)	(3.12)	(-2.41)	(-6.88)	(-4.81)
Leverage	-0.03	-0.14***	-0.13**	0.46**	0.52***	0.25**	0.00	-0.01	-0.01
	(-1.15)	(-3.27)	(-2.27)	(2.32)	(3.25)	(2.35)	(0.09)	(-0.33)	(-0.20)
Liquidity	0.00	0.00	0.01	-0.08**	-0.19**	-0.10**	-0.03	-0.04	-0.03
	(0.54)	(0.32)	(0.51)	(-2.05)	(-2.60)	(-2.58)	(-0.59)	(-1.66)	(-1.69)
OwnCon		-0.01			-0.04			-0.00	
		(-1.37)			(-0.97)			(-0.60)	
MB	0.01	0.10***	0.06	0.02	0.06*	0.03	0.07*	0.00*	0.01*
	(0.14)	(3.47)	(1.47)	(0.07)	(1.91)	(1.78)	(1.82)	(1.87)	(1.96)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2 (within)	0.02	0.03	0.02	0.08	0.09	0.09	0.02	0.04	0.03
No. of Firms	2089	2089	2020	2030	2030	2019	638	639	602
No. of Obs.	7416	7621	8121	7470	7696	8116	2136	2139	2809

Table 8.
Industry-specific shocks
This table reports the results from different specifications of regression equation:

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

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. $1_{(After\ \ )}$ 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). γ_i , ϑ_j and τ_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)	(3.62)	(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)			(3.88)			(3.56)
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 9
Exploring Cross-Sectional Heterogeneity: Ownership Concentration
This table reports the results of different specifications of the regression equation:

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

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). γ_i , ϑ_j and τ_t control for fixed effects of firm, industry and year respectively. e_{ijt} is the error term. ω 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)	(3.95)
Size		-0.01**		0.60**		-0.40*
		(-2.88)		(2.70)		(-1.90)
Leverage		-0.00		0.20		-0.00
		(-0.35)		(0.70)		(-0.14)
Liquidity		0.00		-0.36*		-0.02
		(1.19)		(-2.03)		(-0.28)
OwnCon		-0.00*		-0.17		-0.00
		(-1.85)		(-1.13)		(-0.45)
MB		0.00***		2.03***		0.01***
		(4.03)		(4.91)		(2.41)
Firm, Ind. and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2 (within)	0.01	0.03	0.02	0.04	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:

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

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 firm-level control variables. Firm level controls include size, leverage liquidity, ownership concentration (OwnCon) and market-to-book (MB). γ_i , ϑ_j and τ_t control for fixed effects of firm, industry and year respectively. e_{ijt} is the error term. ω 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)	(3.56)	(3.34)	(2.52)	(2.87)
Size		-1.35***		1.25***		-0.25**
		(-3.07)		(3.12)		(-2.33)
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)		(3.21)		(3.94)
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	0.04
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:

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

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. γ_i , ϑ_j and τ_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

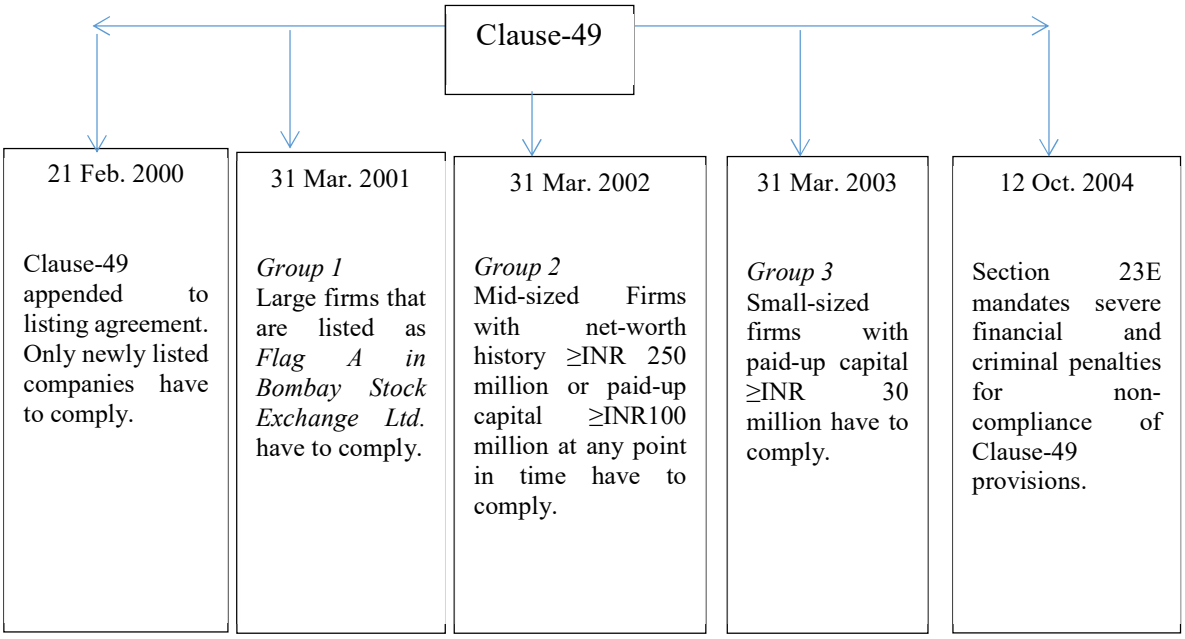
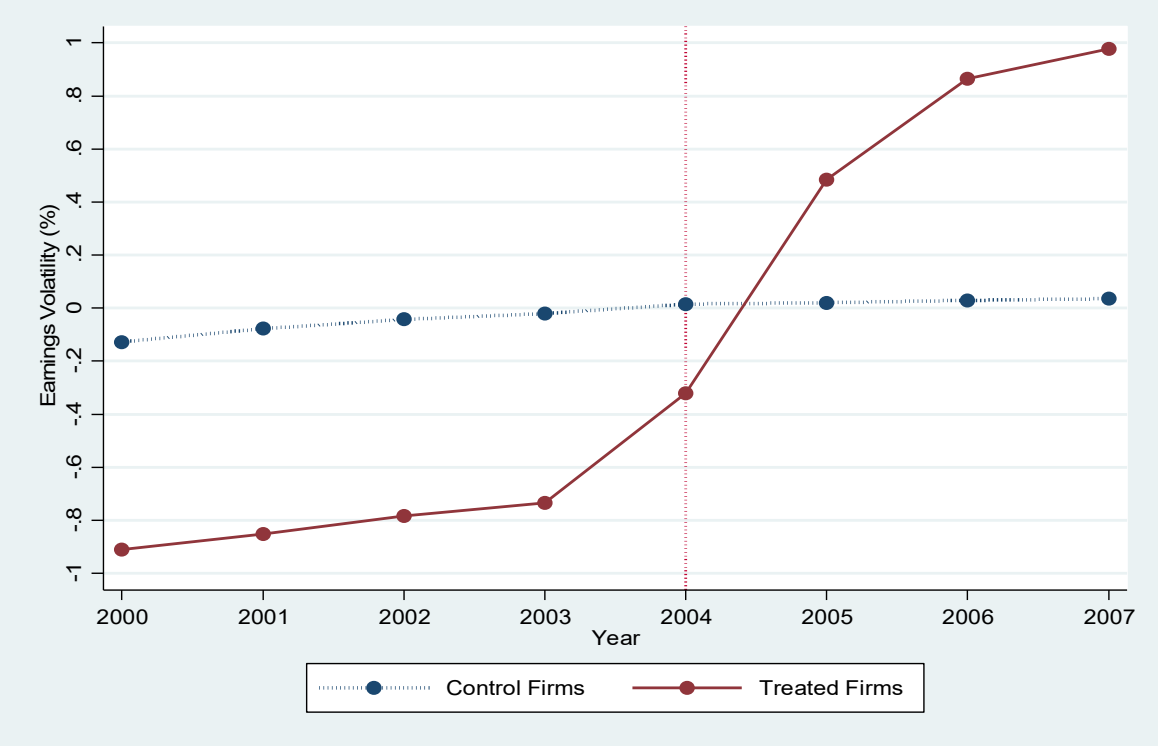
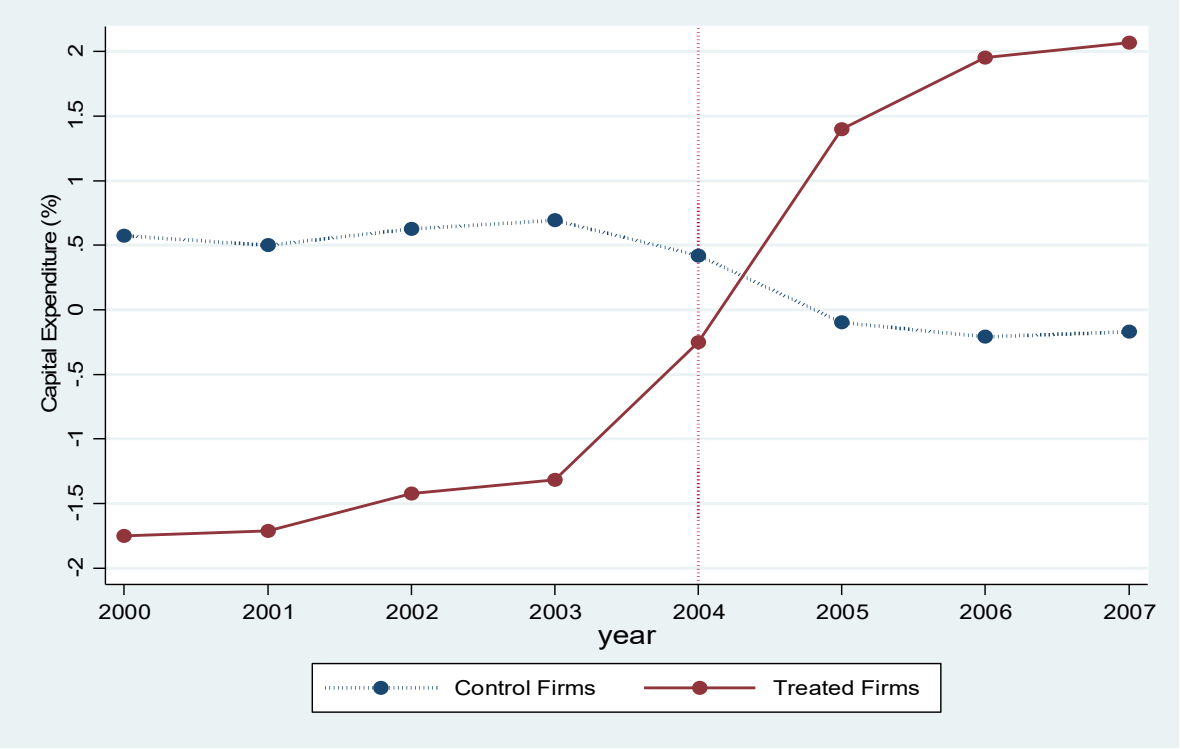


Figure 2
Time-series plot of Earnings-Volatility of treated and control group



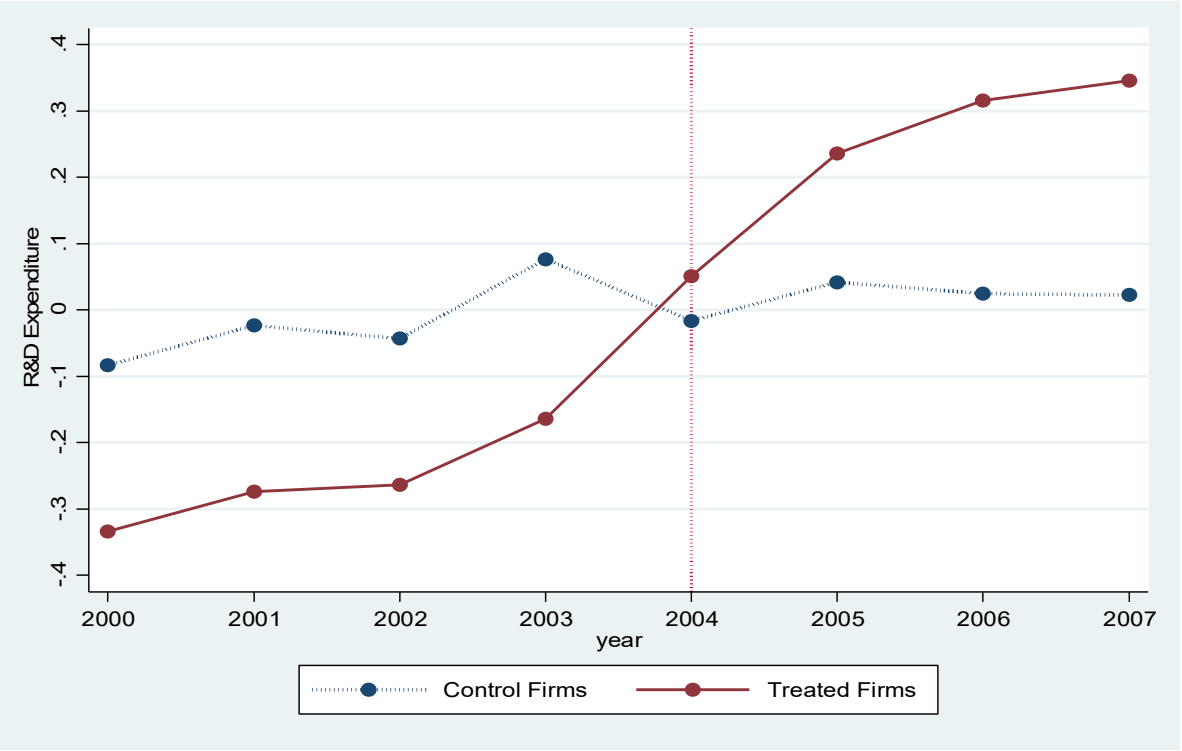
Note: Here, we plot the de-meaned values of the *Earnings-Volatility* of affected and unaffected firms over the study period of 2000-2007.Before-Clause-49 period is 2000 to 2003 and After-Clause-49 period is 2004 to 2007.We calculate *Earnings-Volatility* as a three-year rolling standard deviation of 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