

Does good corporate governance constrain cash flow manipulation? Evidence from India

Abstract

Purpose - We examine whether firm-level corporate governance measures and regulatory reforms constrain manipulation of operating cash flows, an important firm performance indicator.

Design/methodology/approach - Our sample comprises of firms from an emerging market, India with data from 2005-2011. We use the methodology given in Lee (2012) and multiple regressions.

Findings - We find that cash flow manipulation is likely to increase with an increase in the controlling ownership. Further, board diligence and better audit fail to curb such manipulation. However, we do find that such manipulation has gone down in the recent years, and diligent boards constrain it, possibly due to the recent steps taken by the Indian Government for improving the corporate governance environment in India.

Practical implications - Our findings can act as feedback for the regulators and policy makers. Potential investors and analysts may also benefit from our study; since they can be more vigilant about the firms' cash flow manipulation practices and demand better governance.

Originality/value – Our findings suggests that good corporate governance makes managers substitute earnings management with cash flow manipulation.

Keywords: *big four auditor; cash flow manipulation; corporate governance; operating cash flows; ownership structure.*

JEL Classification: M41, G32, G34

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1. Introduction

There has been a lot of research on the role of ownership and firm level corporate governance measures like board characteristics and auditors in constraining earnings management (Klein, 2002; Peasnell et al., 2005). However, research on the effectiveness of these measures in curbing the manipulation of another important accounting metric, operating cash flow is nonexistent. In this paper, we examine whether the firm level corporate governance measures and regulatory reforms constrain cash flow manipulation.

The literature on cash flow manipulation suggests that managers have incentives to manipulate cash flows. As more number of firms and analysts are now likely to issue cash flow forecasts (DeFond and Hung, 2003; Wasley and Wu, 2006; DeFond and Hung, 2007), managers may engage in meeting or beating these forecasts. Consistent with this argument, research suggests that stock prices are likely to react positively to such cash flow surprises (DeFond and Hung, 2003; Zhang, 2007; Brown et al., 2013). Not surprisingly, Lee (2012) finds that managers in the United States inflate operating cash flows through misclassification and timing. Specifically, managers are likely to move cash inflows and outflows within the operating, investing and/or financing categories of the cash flow statement. They may also delay the payments and accelerate the receipts at the end of the year.

We focus on an emerging market, India where regulation and corporate governance are comparatively weaker as compared to those in the developed markets like the United States. Further, majority of the firms are affiliated to business groups and are being run by the family members of the founders. Hence, controlling shareholders are likely to have a lot of say in the decision-making within the firm.

We find that cash flow manipulation in the Indian firms is likely to increase with an increase in the shareholding of promotersⁱ i.e. the controlling owners. This suggests that promoters consider operating cash flow an important performance indicator for the stakeholders, and encourage such manipulation. We also find that board diligence (attendance of directors being the proxy) fails to curb cash flow manipulation. In fact, such manipulation increases with the diligence. Further, auditing by a Big 4 auditor is positively associated with cash flow manipulation.

Since diligent boards do constrain earnings management in India (Sarkar et al., 2008), our findings suggest that good governance and audit inadvertently prompt managers to substitute earnings management with cash flow manipulation. It seems that directors on the board of Indian companies are too focused on earnings management and do not pay much attention to cash flow manipulation, thinking that cash flows are not prone to manipulation. However, we do find that the Big 4 auditors curtail these practices in the firms audited by them which comprises of more independent directors. This shows the joint effectiveness of better governance and audit.

We also examine whether recent steps taken by the Indian Government, post the accounting fraud at Satyam, for improving the corporate governance in India have had any impact on the magnitude of cash flow manipulation. We do find that such manipulation has gone down in the recent years. Not only that, boards now seem to be aware of cash flow manipulation and diligent boards have been successful in curbing it.

This paper, thus, contributes to the literature on cash flow manipulation by showing the role of corporate governance and regulation in constraining the manipulation of an

ⁱ Securities and Exchange Board of India (SEBI) defines a promoter as "the person or persons who are in control of the company, directly or indirectly, whether as shareholder, director or otherwise; or person or persons named as promoters in any document of offer of securities to the public or existing shareholders or in the shareholding pattern, disclosed by the company under the provisions of the Listing Agreement".

important performance indicator, operating cash flow. The paper proceeds as follows. Section 2 discusses the institutional environment in India. Section 3 discusses the related literature and our hypotheses. We discuss sample selection in section 4. Section 5 contains the research design. Our findings are discussed in Section 6. We conclude in section 7.

2. Institutional environment in India

In India, financial reporting and disclosure requirements are mainly governed by the Companies Act (2013)ⁱⁱ, and the Institute of Chartered Accountants of India (ICAI), whereas corporate governance requirements come from the Securities and Exchange Board of India (SEBI), the securities market regulator. For preparation and presentation of information in the financial statements, ICAI issues Accounting Standards. Accounting Standard 3 (AS-3) issued by ICAI mandates preparation of the cash flow statement by listed companies. It also details the structure and classification of cash flows into operating, investing and financing activities.

The Confederation of Indian Industry (CII), India's largest industry and business association came up with the first voluntary code of corporate governance in 1998. The first draft of the code was publicly released in April 1998ⁱⁱⁱ. It was voluntarily adopted by few companies. In early 1999, SEBI set up the Birla Committee^{iv} under Kumar Mangalam Birla to promote and raise the standards of good corporate governance. The committee gave several recommendations to improve the board structure and functioning, along with the improved disclosures to shareholders. Afterwards Ministry of Corporate Affairs (MCA), set up the Naresh Chandra Committee in 2002, which recommended about independent auditing,

ⁱⁱ Available at <http://www.mca.gov.in/MinistryV2/companiesact.html> (Accessed on 14th February 2015).

ⁱⁱⁱ Available at http://www.acga-asia.org/public/files/CII_code_1998.pdf (Accessed on 8th February 2015).

^{iv} "Report of Committee Appointed by SEBI on Corporate Governance under the chairmanship of Shree Kumar Mangalam Birla" (Birla Committee Report). Available at <http://www.sebi.gov.in/commreport/corpgov.html> (Accessed on 8th February 2015).

non-audit services provided by the auditors, independent directors etc. Following the Enron scandal and the adoption of the Sarbanes-Oxley Act in the United States, SEBI formed the Narayana Murthy Committee in order to evaluate the existing corporate governance requirements. The committee in its report, submitted in 2003, suggested requirement of an audit committee, independence of the board, training for directors, etc. At present Clause 49 of the Listing Agreement comprises majority of these requirements.

3. Prior literature and hypothesis development

3.1. Cash flow manipulation

Managers can manipulate operating cash flows by delaying payments to their suppliers or by accelerating the receipts from debtors. They may also misclassify items in the cash flow statement (Lee, 2012) e.g. Nautica Enterprises Inc. took advantage of flexibility in the Generally Accepted Accounting Principles (GAAP) and classified proceeds from sale of 'available-for-sale' securities as operating cash inflows rather than investing cash inflows (Mulford and Comiskey, 2005). Asbury Automotive Group, Inc. recorded change in notes payable for vehicle inventory as an operating activity rather than financing activity despite the fact that inventory was purchased from a manufacturer unaffiliated with the lender (Hollie et al., 2011). HealthSouth Corp., Chambers Development Co., Inc. and WorldCom, Inc. allegedly reported operating expenses as capital expenditure to boost operating cash flows (Mulford and Comiskey, 2005).

Managers may have incentives to manipulate cash flows due to several reasons. First, more number of firms and analysts now issue cash flow forecasts (DeFond and Hung, 2003; Wasley and Wu, 2006; DeFond and Hung, 2007; Call, 2008). Managers may be interested in meeting or beating such forecasts as stock prices react positively to cash flow surprises (DeFond and Hung, 2003; Zhang, 2007; Brown et al., 2013). Second, investors now seem to

pay more attention to a firm's cash flows from operations (Schilit and Perler, 2010) possibly due to accounting scams by firms like Enron Corporation in the United States and Satyam Computer Services Limited in India where earnings and asset values were overstated. Third, operating cash flows are sustainable and are likely to affect firm valuation. Finally, debt covenants and executive compensation may be linked with these cash flows, motivating managers to indulge in creative cash flow reporting (Mulford and Comiskey, 2005; Frankel et al., 2014).

Lee (2012) finds that firms are more likely to upward manage operating cash flows when these are in financial distress or have long-term credit rating near the investment/non-investment grade cut-off. Also, existence of analysts' cash flow forecasts, desire to meet or beat such forecasts, and a higher association between a firm's stock returns and its cash flow from operations provide significant incentives to manipulate cash flows. Hollie et al. (2011) find that such manipulation is more prevalent in retail and financial sectors.

Poor accounting quality viz. earnings and cash flow manipulation is a bigger concern in emerging markets like India, which are likely to have weaker investor protection. According to Haw et al. (2011, pp. 522), "strong investor protection institutions minimize information asymmetry, reduce the extent of accrual earnings manipulation, enhance the quality of earnings, and lead to a more transparent corporate information environment...". Burgstahler et al. (2006) also suggest that institutional characteristics and capital market demands shape managers' reporting incentives, which in turn influence the level of disclosure and the quality of financial reports. Consistent with these arguments, Haw et al. (2004) and Leuz et al. (2003) find that accrual earnings management is more (less) pervasive in countries with weak (strong) investor protection. Behn et al. (2013) also find that the magnitude of classification shifting in income statement is more in the countries with weaker investor protection. Consequently, Indian firms are likely to engage in cash flow manipulation.

However, the magnitude of such misclassification is lower in India as compared to that in the United States (Nagar and Sen, 2016).

3.2. Corporate governance and cash flow manipulation

The literature has largely focused on examining the association of corporate governance with earnings management (Klein, 2002; Peasnell et al., 2005) and not with cash flow manipulation, the focus of our paper. Given the likelihood that a well-governed firm would like to improve its overall financial reporting quality which encompasses earnings as well as cash flows, we use the literature on earnings management and corporate governance to motivate our hypotheses. In other words, ideally any corporate governance mechanism should affect earnings and cash flow manipulation in a similar manner e.g. if board diligence curbs earnings manipulation then logically it has to curb cash flow manipulation too. There is a caveat though. Managers may treat earnings management and cash flow manipulation as substitutes and would be happy if they get an opportunity to manipulate at least one of the two accounting indicators, earnings or cash flows. To substantiate, stakeholders may take a positive view of the company even if one of the reported earnings or cash flow number meets or exceeds their expectations. In such a scenario, if directors are too focused on earnings management, they are less likely to pay attention to cash flow manipulation. Managers can then go on to manipulate cash flows.

Board Characteristics. The board of directors play a crucial role in monitoring the managerial activity and help in reducing agency costs (Jensen and Meckling, 1976; Fama and Jensen, 1983). Several studies have documented a significant relation between the characteristics of the board of directors and the integrity of accounting information. Important board characteristics that have been considered in the previous literature include board size, board independence, board attendance and outside directorships/chairmanships of the directors.

When it comes to size of the board, there is mixed evidence in the literature. Small boards limit the monitoring role, increase the chance of earnings management, and lead to information asymmetry (Azofra et al., 2005; Brick et al., 2006). However, Santiago and Brown (2009) find a positive relation between the board size and earnings management, for firms in Brazil, Mexico, and Chile. There is also a view that when there is low separation of control and ownership, even larger boards are influenced by the controlling shareholders, and the possibility of earnings manipulation increases (Fernandez et al., 1997; Core et al., 1999).

Board independence is considered to be an important tool for improving transparency and disclosures. It also ensures high quality financial reporting (Jaggi et al., 2009). Cheng and Courtenay (2006) find that higher board independence improves quality of the disclosures. It also helps in reducing the agency problem and increases earnings quality (Klein, 2002; Peasnell et al., 2005). Peasnell et al. (2005) examine the relationship between earnings management and board monitoring of firms in the United Kingdom. They find a negative relation between the proportion of outside directors and income increasing accruals. Similarly, Beasley (1996) finds that fraud firms are likely to have lower percentage of outside directors than the no-fraud firms. However, Sarkar et al. (2008) do not find any association between board independence and earnings management in India. They suggest that it is board diligence, as reflected in the attendance of directors, which is more likely to bring down earnings management.

There is mixed evidence when we talk about the association between board interlocking and earnings management. Several studies suggest that if the directors hold several positions (chairmanships and /or memberships); they become more knowledgeable and bring a diverse perspective to the board (Mizruchi and Stearns, 1994; Booth and Deli, 1996). Multiple directorships may also indicate good directorial reputation and quality (Fama, 1980; Fama and Jensen, 1983; Sarkar et al., 2008). These help the directors to monitor

the reporting process and control the compromises in earnings quality, which may lead to a negative relation between outside directorship and earnings management (Fama and Jensen, 1983). However, it is possible that directors with multiple outside directorships may be too busy to contribute, which may adversely affect the monitoring role of the board (Ferris et. al., 2003; Fich and Shivadasani, 2006). Sarkar et al. (2008) indeed find that the firms with busy boards are likely to exhibit higher earnings management.

When there is a concentration of power in the hands of CEO (when he is also acting as chairperson of the board), it can result in an adverse effect on the monitoring role of the board. Jensen (1993) suggests that the presence of a chairman who is also the CEO of a company could override the advantage of having independent directors on the board and weaken the functioning of the board of directors. Chau and Gray (2010) also argue that a chairperson, who is independent, has the freedom to manage a company since she/he can use the great amount of power and authority. With respect to earnings management, evidence is again mixed. Sarkar et al. (2008) find that such firms are likely to exhibit higher income-increasing earnings management. However, Xie et al. (2003) do not find any association between CEO duality and earnings management.

Overall, the literature is not unanimous in establishing the association between firm-level corporate governance mechanisms and earnings management. Hence, we don't have a directional hypothesis whether these mechanisms are likely to curb or increase the magnitude of cash flow manipulation. As discussed earlier, importantly, it is also possible that managers treat earnings management and cash flow manipulation as substitutes. Hence, we hypothesize, in null form:

H1: There is an insignificant association between corporate governance mechanisms and the magnitude of cash flow manipulation.

Ownership Structure. Ownership structure can act as an internal control mechanism and play an important role in supplying quality information to the market. Several studies have shown that the ownership structures can have significant impact on the quality of financial reporting due to the insider influence (e.g. Fan and Wong, 2002; Ball and Shivakumar, 2006; Haw et al., 2011). Hence, promoters' shareholding and institutional shareholding are likely to play an important role, and may influence the quality of earnings and cash flows.

Companies that have high controlling shareholding are likely to have less independent decision-making. Financial reporting practices and information environment of such firms may be affected due to the concentrated ownership. This can increase information asymmetry and result in more earnings management, as controlling shareholders may attempt to hide their private control benefits (Fan and Wong, 2002; Leuz et al., 2003).

Institutional investors play an active role in reducing the agency costs and improving the efficiency of information in the capital markets (Shleifer and Vishny, 1997; Rajgopal et al., 2002). On average, such investors are likely to curb earnings management (Chung et al., 2002). However, this association is likely to differ for those with transient or short-term ownership, and long-term ownership. Koh (2003, 2007) finds that transient institutional investors are less likely to restrict the aggressive earnings management as such investors have short-run interest in the firm. On the other hand, long-term investors are likely to discourage such practice. Sarkar et al. (2008) also suggest that the institutional shareholders are likely to reduce the opportunistic earnings management behavior of the promoters. Considering the discussion, we hypothesize:

H2: The magnitude of cash flow manipulation is likely to increase with the promoters' shareholding.

H3: The magnitude of cash flow manipulation is likely to decrease with the institutional shareholding.

3.3. Auditors

Auditing process plays an important role in reducing the information asymmetry between the corporate managers and stakeholders (Haw et al., 2011). There are several reasons documented in previous studies which support the notion that large auditors (Big N) provide quality audit e.g. availability of adequate resources (DeAngelo, 1981; Frantz, 1999), reputation risk and high costs imposed on the auditor in the event of audit failure (DeAngelo, 1981). Empirical evidence for the firms in the United States is consistent with these arguments, where Becker et al. (1998) and Francis et al. (1999) find that Big 6 auditors are likely to curb earnings management.

However, Francis and Wang (2008) find that earnings quality does not differ significantly amongst the clients of Big 4 and non-Big 4 auditors in the countries with weak investor protection. They suggest that the effectiveness of Big 4 auditors is driven by the level of investor protection in the country. Given the environment of comparatively weaker investor protection and corporate governance in India as compared to the United States (Narayanaswamy et al., 2012), it is unlikely that the auditor quality (Big 4 auditors) has any significant impact on the earnings or cash flow manipulation of their clients. Accordingly, we hypothesize, in null form:

H4: There is an insignificant association between the auditor quality and the magnitude of cash flow manipulation.

3.4. Accounting fraud at Satyam and consequent regulatory changes

India has seen its biggest accounting fraud at Satyam Computer Services Limited. The company was India's one of the largest and most respected information technology services

companies. In January 2009, founder chairman of the company admitted to the corporate fraud of \$1.47 billion, having manipulated financial statements for more than seven years (Rajagopalan and Zhang, 2009). The books of accounts were prepared using several fraudulent means of reporting like fictitious cash deposits, misstated accounts receivables and payables, overstatement of assets, understatement of liabilities, etc. The case was considered as India's Enron.^v

Rajagopalan and Zhang (2008) report several reasons for the governance failure in emerging economies like China and India. They suggest that concentration of ownership and control and pyramidal ownership structures result into a greater control in the hands of the dominant shareholder and often lead to governance failure. This seems to be true in the case of Satyam also, since founder had a greater control over the company that might have resulted into the misuse of power and failure of governance.

After the fraud at Satyam was discovered, CII set up a task force^{vi} which recommended several steps to bring out reforms in the corporate governance policy. The National Association of Software and Services Companies (NASSCOM) formed a Corporate Governance and Ethics Committee^{vii} under the chairmanship of N. R. Narayana Murthy. SEBI initiated several reforms through a Committee on Disclosure and Accounting Standards in 2009. MCA also issued voluntary guidelines.

Considering such significant reforms and increase in the awareness among investors, we expect that the cash flow manipulation is likely to have gone down after the disclosure of

^v The Economist; January 8, 2009 (Available at <http://www.economist.com/node/12898777>, accessed on 9th February 2015).

^{vi} See *CII Sets Up Task Force on Corporate Governance*, Business Standard, January 12, 2009. (Available at http://www.business-standard.com/article/companies/cii-sets-up-task-force-on-corporate-governance-109011200082_1.html, accessed on 14th February 2015).

^{vii} See *NASSCOM Announces Formation of Corporate Governance and Ethics Committee*, Business Standard, February 11, 2009. (Available at http://www.business-standard.com/article/press-releases/nasscom-announces-formation-of-corporate-governance-and-ethics-committee-109021100123_1.html, accessed on 14th February 2015).

accounting fraud at Satyam. We also expect that the corporate governance arrangements (board characteristics and audit) should now be better able to control such manipulation.^{viii}

Thus, we hypothesize:

H5: The magnitude of cash flow manipulation is likely to have gone down post-Satyam fraud.

H6: Corporate governance mechanisms have become stronger post-Satyam fraud, and these are likely to have brought down the magnitude of cash flow manipulation.

4. Sample selection

Data for Indian firms has been obtained from Centre for Monitoring Indian Economy's (CMIE) Prowess database and spans for financial years ending on March 2005 to March 2011. Initial sample consists of 19,103 firm-years (Table 1). We remove firm-years for which negative sales or assets values are reported. 4,513 firm-years are lost due to unavailability of data for calculating unexpected operating cash flows. We require at least 10 firms in each industry-year for running industry-year regressions in order to estimate unexpected operating cash flows. We classify industries using 2-digit National Industrial Classification codes. Regressions are run on a sample with 10,977 firm-years. All continuous financial variables are winsorized at 1% and 99% by fiscal year.

/Table 1/

^{viii} The fraud at Satyam was a watershed event as it happened despite the past efforts to improve corporate governance in the country. This implies that previous efforts didn't bring the desired changes. However, additional quick reforms just after the disclosure of this fraud may have made managers and stakeholders alert. That is what we intend to test.

5. Research design

We estimate unexpected operating cash flows using the model proposed by Dechow et al. (1998), and used in Roychowdhury (2006) and Lee (2012). According to this model (Equation 1), a firm's cash flow from operations (*cfo*) is a function of sales (*s*) and change in sales (Δs). Lee (2012) validates the model using a sample of cash flow restatement firms and finds that unexpected cash flows estimated using this model do capture the manipulation. However, in order to ensure that the unexpected cash flows are not influenced by the extreme firm performance, we also control for a firm's net income in this model. All variables are scaled by lagged total assets (*a*). Variable definitions are given in the appendix.

$$\frac{cfo_{i,t}}{a_{i,t-1}} = \beta_0 + \beta_1 \left(\frac{1}{a_{i,t-1}} \right) + \beta_2 \left(\frac{s_{i,t}}{a_{i,t-1}} \right) + \beta_3 \left(\frac{\Delta s_{i,t}}{a_{i,t-1}} \right) + \beta_4 \left(\frac{ni_{i,t}}{a_{i,t-1}} \right) + \epsilon_{i,t} \quad (1)$$

We run equation one for every industry-year with minimum 10 observations. Expected operating cash flows are estimated for each firm-year using the estimated coefficients from equation one. Unexpected operating cash flows (*ue_cfo*) are calculated as the difference between reported operating cash flows and predicted operating cash flows.

To test the effect of board characteristics, ownership concentration and auditor on cash flow manipulation (proxied by *ue_cfo*), we use equation two. We run this equation on the pooled data, correcting for the cross-sectional and time-series dependence using two-way (firm and year) cluster-robust standard errors (Petersen, 2009).

$$ue_cfo = \alpha_0 + \alpha_1 b_{size} + \alpha_2 ind + \alpha_3 att + \alpha_4 chp + \alpha_5 dir + \alpha_6 ceo_chair + \alpha_7 big4 + \alpha_8 pro + \alpha_9 inst + \alpha_{10} roa + \alpha_{11} size + \alpha_{12} mtb + \alpha_{13} dacc + \omega \quad (2)$$

We test for possible change in the magnitude of cash flow manipulation after the Satyam fraud, using equation three. We introduce a dummy variable *sat*, which is 1 for the financial years ending March 2010 and March 2011, and 0 otherwise. This variable is also

interacted with all the governance variables. We also use control variables like firm size (*size*), return on assets (*roa*), market-to-book ratio (*mtb*) and discretionary accruals (*dacc*) as in Lee (2012).

$$ue_cfo = \alpha_0 + \alpha_1 b_{size} + \alpha_2 ind + \alpha_3 att + \alpha_4 chp + \alpha_5 dir + \alpha_6 ceo_chair + \alpha_7 big4 + \alpha_8 pro + \alpha_9 inst + \alpha_{10} sat + \alpha_{11} roa + \alpha_{12} size + \alpha_{13} mtb + \alpha_{14} dacc + u \quad (3)$$

6. Empirical results

6.1. Descriptive statistics

Table 2 contains the descriptive statistics. Median sales (*sale*) and assets (*at*) are INR 1518.4 million and INR 1851.4 million, respectively. As compared to Prowess population, our sample comprises of large firms. Median sales and assets for the population are INR 518.90 million and INR 641.40 million, respectively. Mean (median) operating cash flows (*cfo*) of sample firms are INR 860.087 million (INR 66.100 million). Median unexpected operating cash flows (*ue_cfo*) are positive (0.003). On average, there are about 8 directors on the board (*b_size*) of each Indian firm, 49% of whom are independent (*ind*). Directors attend about 74% of the meetings (*att*) on average. Only about 8% of the firms are being audited by the Big 4 auditors (*big4*). We find average promoter (*pro*) and institutional (*inst*) shareholding to be about 51% and 9%, respectively. The correlations are reported in Table 3.

/Tables 2 and 3/

The trend of unexpected cash flows and corporate governance variables since 2005 is given in Table 4. We see that cash flow manipulation (*ue_cfo*) has gone down during our sample period, and is the minimum in 2011. This is likely due to the recent changes in the

regulatory environment. Consistent with this argument, we notice an increase in the size of the boards (*b_size*), their independence (*ind*), attendance of the directors (*att*), and audit by the Big 4 auditors (*big4*). We also see a decline in the ceo-duality (*ceo_chair*) and other chairpersonships of directors (*chp*).

/Table 4/

6.2. Impact of board characteristics and ownership

Results with respect to our hypotheses one to three are given in Table 5. Consistent with our arguments, we find that cash flow manipulation (*ue_cfo*) increases with an increase in the shareholding of promoters (*pro*) (Column 1, Table 5). This seems to be true for both domestic (*pro_dom*) and foreign promoters (*pro_for*) (Columns 2 and 3, Table 5). Promoters seem to consider operating cash flows as an important indicator of the firm performance, and hence are likely to manipulate it to give a good impression of the firm to the stakeholders. This tendency may also be driven by their need to hide their private benefits (Leuz et al., 2003).

/Table 5/

We also find that cash flow manipulation is likely to increase with the size of the board of directors (*b_size*). Our finding complements that of Santiago and Brown (2009), who find a positive association between board size and earnings management. Since family firms and controlling shareholders dominate the functioning of Indian firms, these may be unduly influencing the boards.

Board diligence, attendance of directors (*att*) being the proxy, is positive and significant. This suggests that cash flow manipulation is likely to increase as directors become more diligent. As discussed earlier, given that diligent directors constrain earnings

management in India (Sarkar et al., 2008); the explanation for this finding is that the directors are too focused on earnings management. They do not pay much attention to cash flow manipulation, thinking that cash flows are not prone to manipulation.^{ix} Managers then manipulate cash flows as they are unable to manage earnings.^x

We do not find board independence (*ind*) to be curbing cash flow manipulation, similar to its effect on earnings management (Sarkar et al., 2008). Coefficients on directors' other chairpersonships (*chp*) or directorships (*dir*), and CEO duality (*ceo_chair*) are also insignificant. Again, board busyness and CEO duality lead to more earnings management (Sarkar et al., 2008) but not cash flow manipulation. Institutional shareholding (*inst*) is also insignificantly associated with the likelihood of cash flow manipulation.

6.3. Impact of audit by a Big 4 auditor

We find the coefficients on *big4* to be statistically insignificant in Table 5. However, this coefficient becomes positive and significant in Table 6. This suggests that cash flow manipulation is more likely to be prevalent in the firms audited by Big 4 auditors. It seems that Big 4 auditors consider such manipulation insignificant enough to constrain.

/Table 6/

In Table 6, we also test the joint effect of governance and audit on cash flow manipulation. We find that the coefficient on *big4*ind* is negative and statistically insignificant. This indicates that Big 4 auditors curb this manipulation in those firms where boards comprise of more independent directors. Thus, better governance and strict audit does well in curbing the cash flow manipulation *jointly*.

^{ix} Directors can also selectively allocate their attention. For example, Tuggle et al. (2010) suggest that while positive deviation from prior performance reduces directors' attention to monitoring, negative deviation from prior performance increases it.

^x In untabulated results, we do find that earnings management (*dacc*) decreases with an increase in *b_size*, *att*, *chp* and *dir*.

6.4. Impact of the reforms pursuant to the fraud at Satyam

As discussed earlier, there have been several positive changes in the corporate governance environment in India after the fraud at Satyam. We test whether there has been any change in the magnitude of cash flow manipulation after this event. The results are given in Table 7. We find that post-Satyam (*sat*), cash flow manipulation is likely to have gone down. This finding is in support of our hypothesis five and in consonance with the trend in unexpected cash flows (Table 4), where we find that unexpected cash flows are lower in the recent years. Thus, steps taken by the Union Government of India in the aftermath of Satyam scandal seem to have worked, at least in terms of curbing cash flow manipulation.

/Table 7/

Results with respect to our final hypothesis are also given in Table 7. We observe that post-2009, better board attendance (*sat*att*) seems to be controlling the cash flow manipulation activities of the managers. This finding suggests that the directors have become more alert now, are aware of such manipulation practices and take steps to curb these. Off-course a stronger institutional environment now aids them. Also, a CEO who is Chairman of the board, seems to control such cash flow manipulation now (*sat*ceo_chair*). Notably, the incentives of promoters to manipulate cash flows do not seem to have changed post-2009. The coefficient on *sat*pro* is statistically insignificant suggesting that cash flow manipulation is likely to increase with the promoters' shareholding even after the recent reforms.

6.5. Robustness tests

Endogeneity has been identified as a serious issue in the empirical studies concerned with corporate governance (Schultz et al., 2010; Wintoki et al., 2012). In our study, it is possible that the corporate governance mechanisms and unexpected cash flows are simultaneously determined. Further, there may be omitted variables which may bias our

findings. In order to address this issue, we run our regressions with one year lagged values of all governance variables. This helps us in examining the effect of governance in the year $t-1$ on cash flow manipulation in the year t . We also include industry and time fixed effects. We continue to find qualitatively similar results as in the paper except that board attendance no longer seems to curb cash flow manipulation post the fraud at Satyam. We find that Big 4 auditors curb cash flow manipulation also in the presence of institutional investors.

Cash flows can be manipulated using real activities too viz. increase or decrease in discretionary spending and/or overproduction (Roychowdhury, 2006). We re-run our regressions controlling for such real activities. Specifically, we use abnormal discretionary expenditure and abnormal production (estimated as in Roychowdhury, 2006) as additional controls in our regression equations. This enables us to separate cash flow manipulation through shifting and timing from that through real activities manipulation. Our primary findings do not change except that we do not find any association between cash flow manipulation and the shareholding of foreign promoters; board attendance no longer seems to curb cash flow manipulation post the fraud at Satyam. As earlier, we find that Big4 auditors curb cash flow manipulation also in the presence of institutional investors.

7. Conclusion

In this paper, we examine whether the firm level corporate governance measures and regulatory reforms constrain cash flow manipulation. We focus on an emerging market, India which is known for weaker regulation and corporate governance as compared to the United States, and the dominance of business groups and controlling owners.

We find that cash flow manipulation in the Indian firms is likely to increase with an increase in the shareholding of promoters. Board diligence and better audit fail to curb such manipulation. The results suggest that good governance and audit, although constrain

earnings management (Sarkar et al., 2008), but prompt managers to manipulate and show better operating cash flows. We do find that better governance and audit are jointly effective in curbing the manipulation of cash flows. We also find that such manipulation has gone down in the recent years, and diligent boards constrain it, possibly due to the recent steps taken by the Indian Government for improving the corporate governance environment in India.

Our paper adds to the growing literature on earnings and cash flow manipulation and the effectiveness of corporate governance and regulatory reforms in constraining such practices. This can act as feedback for the regulators and policy makers. Potential investors and analysts may also benefit from our study; since they can be more vigilant about the firms' cash flow manipulation practices and demand better governance.

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Appendix

Variable Definitions

at	Total assets.
att	Percentage of board meetings attended by the directors.
b_size	Number of directors in the Board of Directors.
big4	If the auditor is one of the Big 4 auditors (Pricewaterhouse Coopers, Ernst & Young, Arthur Anderson and Deloitte) then 1, else 0.
ceo_chair	If CEO is the chairperson of the Board of Directors then 1, else 0.
cfo	Net cash flow from operating activities.
chp	Number of other companies where directors are chairpersons of the Board of Directors.
dacc	Discretionary accruals estimated using cross-sectional version of Jones's (1991) model.
def_cfo	Net cash flow from operating activities in year t , scaled by total assets in year $t-1$.
dir	Number of other companies where directors are members of the Board of Directors.
ind	Percentage of independent directors in the Board of Directors.
inst	Percentage of equity shareholding of the institutional investors.
inst_dom	Percentage of equity shareholding of the Indian institutional investors.
inst_for	Percentage of equity shareholding of the foreign institutional investors.
mtb	Market-to-book ratio. $((\text{Common shares outstanding}_t * \text{Fiscal year-end closing stock price}_t) / \text{Common Equity}_t)$.
pro	Percentage of equity shareholding of the promoters.
pro_dom	Percentage of equity shareholding of the Indian promoters.
pro_for	Percentage of equity shareholding of the foreign promoters.
roa	Profit after tax in year t , scaled by total assets in year $t-1$.
sale	Net sales.
sat	If financial year is 2010 or 2011 then 1, else 0.
size	Natural logarithm of total assets.
ue_cfo	Unexpected operating cash flows, estimated using equation one.

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Table 1
Sample Selection

	No. of firms	No. of firm-years
Initial Prowess sample with non-missing company code or National Industrial Classification code	2,729	19,103
<i>Less:</i> Firm-years with negative sales or assets	19	498
	2,710	18,605
<i>Less:</i> Firm-years with missing values of variables used in the model for measuring unexpected operating cash flows	381	4,513
	2,329	14,092
<i>Less:</i> Firm-years in industry-years with observations less than 10 (minimum requirement for running industry-year regressions for estimating unexpected operating cash flows)	86	634
	2,243	13,458
<i>Less:</i> Firm-years with missing values of corporate governance variables	143	1,635
	2,100	11,823
<i>Less:</i> Firm-years with missing values of control variables	123	828
	1,977	10,995
<i>Less:</i> Firm-years in financial services industries (National Industrial Classification Codes: 64, 65 and 66)	3	18
Final sample (March 2005-March 2011)	1,974	10,977

Table 2
Descriptive Statistics

	N	Mean	p25	Median	p75	Std Dev
<i>sale</i>	10977	8299.371	403.900	1518.400	5217.200	25705.128
<i>at</i>	10977	11511.403	567.700	1851.400	6459.700	35515.497
<i>cfo</i>	10977	860.087	-0.200	66.100	380.100	3432.922
<i>def_cfo</i>	10977	0.061	-0.001	0.064	0.133	0.141
<i>ue_cfo</i>	10977	0.002	-0.063	0.003	0.068	0.135
<i>roa</i>	10977	0.068	0.013	0.049	0.107	0.185
<i>size</i>	10977	7.597	6.342	7.524	8.773	1.844
<i>mtb</i>	10977	1.693	0.467	0.969	1.960	2.741
<i>dacc</i>	10977	-0.003	-0.070	-0.006	0.060	0.148
<i>b_size</i>	10977	7.932	6.000	8.000	10.000	2.715
<i>ind</i>	10977	48.500	40.000	50.000	60.000	0.194
<i>att</i>	10977	74.300	64.000	75.000	85.000	0.148
<i>chp</i>	10977	0.049	0.000	0.000	0.000	0.274
<i>dir</i>	10977	2.959	1.000	2.400	4.290	2.615
<i>ceo_chair</i>	10977	0.008	0.000	0.000	0.000	0.088
<i>big4</i>	10977	0.083	0.000	0.000	0.000	0.276
<i>pro</i>	10977	51.160	39.650	51.760	64.660	18.440
<i>pro_dom</i>	10977	42.731	27.620	44.820	58.380	22.143
<i>pro_for</i>	10977	6.386	0.000	0.000	0.000	17.105
<i>inst</i>	10977	9.319	0.050	2.820	13.660	14.467
<i>inst_dom</i>	10977	5.530	0.010	1.000	7.210	11.169
<i>inst_for</i>	10977	3.788	0.000	0.010	4.150	7.520
<i>sat</i>	10977	0.310	0.000	0.000	1.000	0.462

sale, *at* and *cfo* are in INR million. Variable definitions are given in the appendix.

Table 3
Pearson (Spearman) Correlations above (below) the diagonal

variable	sale	at	def_cfo	ue_cfo	roa	size	mtb	dacc	b_size
sale	1	0.845***	0.100***	0.057***	0.064***	0.540***	0.117***	-0.010	0.340***
at	0.903***	1	0.066***	0.035***	0.040***	0.585***	0.079***	0.011	0.356***
def_cfo	0.205***	0.130***	1	0.819***	0.200***	0.111***	0.103***	-0.563***	0.125***
ue_cfo	0.080***	0.049***	0.803***	1	0.175***	0.039***	0.099***	-0.630***	0.060***
roa	0.326***	0.242***	0.357***	0.254***	1	0.102***	0.113***	0.255***	0.071***
size	0.903***	1.000***	0.130***	0.049***	0.242***	1	0.158***	0.058***	0.519***
mtb	0.276***	0.266***	0.161***	0.117***	0.348***	0.266***	1	-0.011	0.108***
dacc	0.031***	0.059***	-0.519***	-0.609***	0.221***	0.059***	0.031***	1	0.026***
b_size	0.492***	0.498***	0.156***	0.068***	0.200***	0.498***	0.211***	0.031***	1
ind	0.003	0.022**	-0.025***	-0.014	-0.035***	0.022**	-0.043***	0.008	-0.091***
att	-0.065***	-0.090***	0.027***	0.043***	0.006	-0.090***	-0.044***	-0.024**	-0.320***
chp	0.120***	0.115***	0.047***	0.022**	0.028***	0.115***	0.045***	-0.012	0.111***
dir	0.433***	0.478***	0.120***	0.068***	0.120***	0.478***	0.185***	-0.003	0.277***
ceo_chair	0.019**	0.027***	-0.003	-0.005	0.010	0.027***	0.006	-0.001	-0.008
big4	0.241***	0.250***	0.094***	0.063***	0.122***	0.250***	0.151***	0.001	0.134***
pro	0.176***	0.145***	0.113***	0.061***	0.140***	0.145***	0.137***	0.019**	0.101***
inst	0.574***	0.654***	0.114***	0.051***	0.217***	0.654***	0.228***	0.059***	0.356***
sat	0.116***	0.140***	-0.017*	0.008	-0.028***	0.140***	0.100***	-0.007	0.001

Variable definitions are given in the appendix. * p<0.10, ** p<0.05, *** p<0.01

Table 3 (Contd.)
Pearson (Spearman) Correlations above (below) the diagonal

variable	ind	att	chp	dir	ceo_chair	big4	pro	inst	sat
sale	-0.050***	-0.003	0.108***	0.149***	0.014	0.125***	0.063***	0.454***	0.072***
at	-0.026***	0	0.079***	0.189***	-0.002	0.134***	0.054***	0.497***	0.101***
def_cfo	-0.022**	0.030***	0.052***	0.079***	-0.011	0.082***	0.094***	0.076***	-0.017*
ue_cfo	-0.017*	0.038***	0.033***	0.052***	-0.011	0.055***	0.053***	0.036***	-0.005
roa	-0.009	0.001	0.030***	0.040***	0.010	0.050***	0.070***	0.071***	-0.017*
size	0.035***	-0.077***	0.122***	0.422***	0.021**	0.245***	0.172***	0.577***	0.144***
mtb	-0.042***	-0.039***	0.023**	0.100***	-0.004	0.109***	0.107***	0.154***	0.033***
dacc	0.020**	-0.036***	-0.015	-0.006	0.006	-0.006	0.012	0.035***	-0.008
b_size	-0.048***	-0.302***	0.086***	0.212***	-0.007	0.126***	0.112***	0.344***	0.004
ind	1	0.036***	-0.001	0.070***	0.034***	-0.014	-0.067***	-0.016*	0.086***
att	0.048***	1	-0.001	0.014	0.012	-0.037***	-0.014	-0.054***	0.086***
chp	-0.022**	-0.019**	1	0.070***	0.009	0.094***	-0.001	0.070***	0.001
dir	0.067***	-0.011	0.076***	1	-0.001	0.174***	0.137***	0.223***	0.020**
ceo_chair	0.031***	0.016*	0.029***	0.015	1	0.029***	-0.033***	0.014	-0.017*
big4	-0.038***	-0.042***	0.090***	0.184***	0.029***	1	0.037***	0.194***	0.033***
pro	-0.102***	-0.012	0.000	0.149***	-0.024**	0.034***	1	-0.073***	0.058***
inst	0.031***	-0.077***	0.088***	0.379***	0.027***	0.247***	-0.089***	1	0.017*
sat	0.081***	0.084***	-0.018*	0.019**	-0.017*	0.033***	0.063***	-0.019**	1

Variable definitions are given in the appendix. * p<0.10, ** p<0.05, *** p<0.01

Table 4
Trend of Unexpected Cash Flows and Corporate Governance variables

Year	No.	ue_cfo	b_size	ind	att	chp	dir	ceo_chair	big4	pro	inst
<i>All</i>	<i>10977</i>	<i>0.003</i>	<i>7.933</i>	<i>48.450</i>	<i>74.348</i>	<i>0.049</i>	<i>2.959</i>	<i>0.008</i>	<i>0.083</i>	<i>51.160</i>	<i>9.319</i>
2005	1264	0.002	7.883	45.442	72.401	0.088	2.822	0.009	0.063	51.121	7.412
2006	1410	0.002	7.933	44.596	71.513	0.049	2.896	0.010	0.065	49.899	8.632
2007	1488	0.002	7.922	46.292	73.950	0.047	2.943	0.008	0.070	49.692	8.572
2008	1686	0.009	7.941	48.680	74.162	0.032	2.964	0.009	0.084	50.149	10.842
2009	1730	0.001	7.936	50.506	74.864	0.036	2.969	0.008	0.097	51.308	9.694
2010	1764	0.001	7.879	50.914	75.819	0.043	2.946	0.006	0.094	52.105	9.351
2011	1635	0.000	8.026	50.993	76.717	0.055	3.132	0.005	0.100	53.479	10.063

Variable definitions are given in the appendix.

Table 5
Corporate Governance and Cash Flow Manipulation

	Predicted Sign	Dependent Variable		
		<i>ue_cfo</i>	<i>ue_cfo</i>	<i>ue_cfo</i>
b_size	?	0.0019*** (3.5543)	0.0020*** (3.5881)	0.0020*** (3.5895)
ind	?	0.0019 (0.2706)	0.0019 (0.2773)	0.0018 (0.2564)
att	?	0.0169*** (2.8627)	0.0179*** (3.1435)	0.0179*** (3.1338)
chp	?	0.0029 (0.8976)	0.0028 (0.8774)	0.0028 (0.8827)
dir	?	0.0002 (0.4465)	0.0002 (0.4692)	0.0002 (0.4322)
ceo_chair	?	-0.0009 (-0.0620)	-0.0014 (-0.0961)	-0.0014 (-0.1010)
big4	?	0.0048 (1.4828)	0.0041 (1.1479)	0.0039 (1.0540)
pro	+	0.0185*** (2.8031)		
inst	-	0.0084 (1.0233)	0.0081 (0.9181)	
roa	?	0.1595*** (4.3586)	0.1594*** (4.3563)	0.1593*** (4.3274)
size	?	-0.0013* (-1.8212)	-0.0014* (-1.8757)	-0.0015* (-1.9117)
mtb	?	0.0010 (1.6340)	0.0010 (1.5488)	0.0010 (1.5407)
dacc	?	-0.6809*** (-25.6507)	-0.6808*** (-25.6511)	-0.6809*** (-25.6420)
pro_dom	+		0.0153*** (2.9839)	0.0159*** (2.9286)
pro_for	+		0.0207*** (-3.4251)	0.0213*** -3.228
inst_dom	-			0.0059 (0.5750)
inst_for	-			0.0142 (0.6919)
Constant		-0.0420*** (-4.5957)	-0.0410*** (-5.0884)	-0.0408*** (-4.9822)
No. of observations		10977	10977	10977
Adjusted R-Square		60.95%	60.95%	60.95%
p-value		0.0000	0.0000	0.0000

The regression model is $ue_cfo_{i,t} = \alpha_0 + \alpha_1 b_size_{i,t} + \alpha_2 ind_{i,t} + \alpha_3 att_{i,t} + \alpha_4 chp_{i,t} + \alpha_5 dir_{i,t} + \alpha_6 ceo_chair_{i,t} + \alpha_7 big4_{i,t} + \alpha_8 pro_{i,t} + \alpha_9 inst_{i,t} + \alpha_{10} roa_{i,t} + \alpha_{11} size_{i,t} + \alpha_{12} mtb_{i,t} + \alpha_{13} dacc_{i,t} + \alpha_{14} pro_dom_{i,t} + \alpha_{15} pro_for_{i,t} + \alpha_{16} inst_dom_{i,t} + \alpha_{17} inst_for_{i,t} + \omega_{i,t}$. Amounts reported are means of coefficients from pooled regressions. t-statistics are given in parentheses. Standard errors are 2-way (firm and year) cluster-robust (Petersen, 2009). Variable definitions are given in the appendix. * p<0.10, ** p<0.05, *** p<0.01

Table 6
Big Four Auditors and Cash Flow Manipulation

	Predicted Sign	Dependent Variable
		<i>ue_cfo</i>
b_size	?	0.0020*** (3.4829)
ind	?	0.0047 (0.6643)
att	?	0.0164** (2.5468)
chp	?	0.0027 (0.6561)
dir	?	0.0002 (0.5261)
ceo_chair	?	-0.0035 (-0.2000)
big4	?	0.0408* (1.9522)
pro	+	0.0181*** (2.6185)
inst	-	0.0111 (1.2457)
big4*b_size	?	-0.0015 (-1.1151)
big4*ind	?	-0.0534*** (-5.5308)
big4*att	?	0.0269 (1.5402)
big4*chp	?	0.0008 (0.1146)
big4*dir	?	-0.0006 (-0.6698)
big4*ceo_chair	?	0.0239 (0.8481)
big4*pro	?	-0.0170 (-0.9225)
big4*inst	?	-0.0311 (-1.6345)
roa	?	0.1594*** (4.3499)
size	?	-0.0015* (-1.9434)
mtb	?	0.0009 (1.5222)
dacc	?	-0.6810*** (-25.5743)
Constant		-0.0431*** (-4.4981)
No. of observations		10977

Adjusted R-Square	60.98%
p-value	0.0000

The regression model is $ue_cfo_{i,t} = \alpha_0 + \alpha_1 b_size_{i,t} + \alpha_2 ind_{i,t} + \alpha_3 att_{i,t} + \alpha_4 chp_{i,t} + \alpha_5 dir_{i,t} + \alpha_6 ceo_chair_{i,t} + \alpha_7 big4_{i,t} + \alpha_8 pro_{i,t} + \alpha_9 inst_{i,t} + \alpha_{10} big4 * b_size_{i,t} + \alpha_{11} big4 * ind_{i,t} + \alpha_{12} big4 * att_{i,t} + \alpha_{13} big4 * chp_{i,t} + \alpha_{14} big4 * dir_{i,t} + \alpha_{15} big4 * ceo_chair_{i,t} + \alpha_{16} big4 * pro_{i,t} + \alpha_{17} big4 * inst_{i,t} + \alpha_{18} roa_{i,t} + \alpha_{19} size_{i,t} + \alpha_{20} mtb_{i,t} + \alpha_{21} dacc_{i,t} + \omega_{i,t}$. Amounts reported are means of coefficients from pooled regressions. t-statistics are given in parentheses. Standard errors are 2-way (firm and year) cluster-robust (Petersen, 2009). Variable definitions are given in the appendix. * p<0.10, ** p<0.05, *** p<0.01

Table 7
Cash Flow Manipulation before and after the
Fraud in Satyam

	Predicted Sign	Dependent Variable	
		<i>ue_cfo</i>	<i>ue_cfo</i>
b_size	?	0.0019*** (3.5563)	0.0019*** (2.6485)
ind	?	0.0027 (0.3874)	0.0004 (0.0431)
att	?	0.0180*** (3.0036)	0.0225*** (3.4820)
chp	?	0.0028 (0.8363)	0.0016 (0.3260)
dir	?	0.0001 (0.3145)	0.0001 (0.2791)
ceo_chair	?	-0.0014 (-0.0996)	0.0021 (0.1339)
big4	?	0.0049 (1.5060)	0.0068 (1.5355)
pro	+	0.0188*** (2.8365)	0.0171** (2.0046)
inst	-	0.0073 (0.9182)	0.0084 (0.8959)
sat	-	-0.0042** (-2.0984)	0.0011 (0.1008)
roa	?	0.1592*** (4.3547)	0.1591*** (4.3452)
size	?	-0.0011 (-1.6226)	-0.0011* (-1.6598)
mtb	?	0.0010 (1.6380)	0.0010 (1.6094)
dacc	?	-0.6811*** (-25.7873)	-0.6809*** (-25.8182)
sat*b_size	-		-0.0001 (-0.1245)
sat*ind	-		0.0092 (0.9021)
sat*att	-		-0.0154** (-2.1956)
sat*chp	-		0.0034 (0.6638)
sat*dir	-		-0.0000 (-0.0135)
sat*ceo_chair	-		-0.0159*** (-3.1534)
sat*big4	-		-0.0054 (-1.1168)
sat*pro	?		0.0060 (0.6302)

sat*inst	?	-0.0029 (-0.3856)
Constant		-0.0434*** (-4.7338)
		-0.0453*** (-3.7824)
No. of observations		10977
Adjusted R-Square		60.97%
p-value		0.0000

The regression model is $ue_cfo_{i,t} = \alpha_0 + \alpha_1 b_size_{i,t} + \alpha_2 ind_{i,t} + \alpha_3 att_{i,t} + \alpha_4 chp_{i,t} + \alpha_5 dir_{i,t} + \alpha_6 ceo_chair_{i,t} + \alpha_7 big4_{i,t} + \alpha_8 pro_{i,t} + \alpha_9 inst_{i,t} + \alpha_{10} sat_{i,t} + \alpha_{11} roa_{i,t} + \alpha_{12} size_{i,t} + \alpha_{13} mtb_{i,t} + \alpha_{14} dacc_{i,t} + \alpha_{15} sat * b_size_{i,t} + \alpha_{16} sat * ind_{i,t} + \alpha_{17} sat * att_{i,t} + \alpha_{18} sat * chp_{i,t} + \alpha_{19} sat * dir_{i,t} + \alpha_{20} sat * ceo_chair_{i,t} + \alpha_{21} sat * big4_{i,t} + \alpha_{22} sat * pro_{i,t} + \alpha_{23} sat * inst_{i,t} + \omega_{i,t}$. Amounts reported are means of coefficients from pooled regressions. t-statistics are given in parentheses. Standard errors are 2-way (firm and year) cluster-robust (Petersen, 2009). Variable definitions are given in the appendix.

* p<0.10, ** p<0.05, *** p<0.01