# Executive compensation and firm performance: Evidence from Indian firms

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**Abstract**   The study examines the relationship between executive compensation and firm performance among Indian firms. The evidence suggests that firm performance measured by accounting, as well as market-based measures, significantly affects executive compensation. We also test for the presence of persistence in executive compensation by employing the system-generalised methods of moments (GMM) estimator. We find significant persistence in executive compensation among the sample firms. Further, we report the absence of pay–performance relationship among the smaller sample firms and business group affiliated firms. Thus, our findings cast doubts over the performance-based executive compensation practices of Indian business group affiliated firms.

## Introduction

The relationship between executive pay and firm performance has been one of the most widely studied questions in the corporate governance literature (Frye, 2004; Jensen & Murphy, 1990; Murphy, 1999; Rosen, 1992). Over the past two decades, the academic literature on agency theory and executive compensation has argued that CEO compensation should be aligned to firm performance (Holmstrom, 1979, Grossman & Hart, 1983, and Jensen & Murphy, 1990). The relation between pay and performance is derived from agency theory (Holmstrom, 1979, or Grossman & Hart, 1983). According to agency theory, compensation contracts should be designed to align the interests of managers (agents) with those

of shareholders (principals). A stronger relationship between executive pay and performance also results in the selection and retention of more productive managers. Since these factors are difficult to observe while selecting managers, providing top executives with performance related compensation can reduce the adverse selection problems (Arya & Mittendorf, 2005; Darrough & Melumad, 1995).

The problem of how best to compensate executives is a classic application of the principal–agent theory. In such a framework, the principal (the shareholder) desires the agent (the manager) to maximise shareholder value, but cannot accurately evaluate the executive's reaction function. The goals of the executives may be different from that of the shareholders. For instance, a manager may be more interested in amassing and defending personal power rather than pursuing profit maximising strategies (Bebchuk & Fried, 2003).

While the literature on pay–performance has been largely focussed on the Anglo-Saxon economies, limited research has

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been carried out in the context of emerging markets. In the Indian context, studies focussing on the managerial labour market and executive compensation have been a recent phenomenon. The effect of economic liberalisation along with changes in the market for managerial talent has resulted in significant changes in the compensation policies adopted by Indian companies. In this paper, we examine the relationship between pay and performance among Indian firms. We select India as it reflects the characteristics of an emerging market economy, such as underdeveloped regulatory and institutional mechanisms, and weak investor activism (Balasubramanian, Black, & Khanna, 2010; Khanna & Palepu, 2010; Narayanaswamy, Raghunandan, & Rama, 2012). Our findings are expected to have applicability elsewhere in other emerging markets.

Sen and Sarkar (1996), from their cross sectional examination of large Indian firms, reported the existence of increasing pay differentials across hierarchies. Ghosh (2006), studying Indian firms, reported that CEO compensation is positively affected by firm performance. However, Indian firms are mandated to disclose compensation information only from 2002, implementing the recommendations of the Kumar Mangalam Birla committee.[1] Hence, studies examining Indian firms' compensation information prior to 2002 may tend to offer inappropriate conclusions. Parthasarathy, Menon, and Bhattacharjee (2006), utilising the cross-sectional data for the year 2005, reported that the promoter-CEOs receive higher pay among Indian firms. In the present paper, we empirically examine the pay–performance relationship among Indian firms, using firm level information from the years 2002 to 2012.

Our study contributes to the literature in at least three ways. First, we examine the relationship between pay and performance from the year 2002 to 2012. From the year 2002, disclosure of executive compensation became mandatory for Indian firms following the recommendations of the Birla committee as mentioned. We have now information on firm level compensation for the period of at least one decade. Such a dataset allows us to carry out rigorous statistical analysis in examining the pay–performance relationship among Indian firms. Second, we focus on emerging markets, as the research thus far focussed on firms operating in Anglo-Saxon economies. The managerial market in India is still in the developing stage and there are also business group interventions as a large number of companies in India are controlled by family owned business groups. In this scenario, our study would possibly provide better insights on pay–performance relationship in India. Finally, we contribute to the discussion on the persistence in executive compensation practices as we attempt to examine the impact of past compensation on the current executive compensation. We employ the system-generalised methods of moments (GMM) estimator to account for the potential endogeneity (between pay and performance) problem in examining the pay–performance relationship among the sample firms. Thus, to the best of our knowledge, ours is an attempt for the first time to comprehensively examine the pay–performance relationship among Indian firms, using the wider firm level dataset.

We organise the rest of the paper as follows. The second section outlines the existing literature. The third section dis-

cusses corporate governance and executive compensation disclosure practices among Indian firms. The fourth section describes the sample selection and its characteristics. The fifth section discusses the estimation procedure and the findings. The sixth section provides the concluding remarks.

## Review of literature

In this section, we present a brief review of existing studies that have examined the relationship between executive compensation and firm performance. We further emphasise the potential contribution from the present study.

### Executive compensation and firm performance

In one of the earliest studies, Jensen and Murphy (1990) empirically examined the relationship between CEO compensation and firm performance. They considered a large sample of US firms during the period of 1974–1986. They computed an estimate of the pay for performance sensitivity (PPS) and reported that firm performance positively influences CEO compensation. Hall and Liebman (1998) found a significant positive relationship between firm performance and CEO compensation. They observed that such a relationship has been the result of changes in the value of CEO holdings of stock and stock options.

Boschen and Smith (1995) examined the relationship between executive compensation and a firm's past as well as contemporaneous performance. The study measured the performance of sample firms, using their stock market returns. They examined 16 US firms over the period of 1948–1990. They concluded that past performance has a significant influence on current compensation, but the effect is not permanent. Their study also reports changes in pay–performance sensitivity over the four decades of their study period. Current as well as previous year firm performance has a positive effect on the compensation of the CEO (Core, Holthausen, & Larcker, 1999; Rose & Shepard, 1997). In line with the previous studies, we study the impact of contemporaneous as well as past performance on executive pay among Indian firms.

### Persistence in executive compensation

Main, Bruce, and Buck (1996) examined the relation between total board compensation and company performance among UK based companies. They considered past pay as lagged dependent variable in their model to capture dynamic aspects of compensation contracts and found it significant. Boschen and Smith (1995) also estimated complete dynamic response of CEO pay to firm performance by considering persistence of pay. They found that cumulative response of pay to performance is more than contemporaneous and also that compensation arrangements have shifted towards greater performance sensitivity and long term pay arrangements. Bender (2003) reported that remuneration committees of UK firms often consider past pay as reference point while fixing current pay. Doucouliagos, Graham, and Haman (2012) in their recent study investigated the dynamics and convergence in CEO pay among Australia's large corporations over an 18 year

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[1] http://www.sebi.gov.in/commreport/corpgov.html (accessed on 11th July 2016).

period. Utilising dynamic panel estimators, they reported the persistence in executive compensation and found that CEO pay is driven by dynamic adjustments, firm size, board size, CEO tenure, and firm performance. Among the dynamic adjustments, they considered past pay as one of the explanatory variables in their model. Considering the persistence nature of executive compensation, we attempt to examine the impact of past pay along with firm performance on current compensation.

## Executive compensation and firm specific characteristics

Firm specific characteristics such as size, leverage, and risk are expected to influence executive compensation. Rosen (1992) provides a theoretical justification for the positive relation between executive pay and firm size. Empirical studies such as Murphy (1985), Zhou (2000), and Ryan and Wiggins (2001) reported that firms' size positively influences their executive compensation. Murphy (1999), on the contrary, reported that pay–performance sensitivity is weaker among the larger US firms. In the light of this mixed evidence on the relationship between executive compensation and firm size, we empirically examine the relationship among our sample firms. Further, we classify our sample firms into small as well as large sub-samples and investigate the pay–performance sensitivity separately.

Jensen (1986) argues that debt financing with its fixed contractual obligations acts as a disciplining device for managers and mitigates the agency problems. If the firms consider debt as a disciplining mechanism, they need not solely depend on compensation to incentivise their executives. Hence, firms with higher leverage ratios are expected to have lower executive compensation practices. Studies such as Palepu and Healy (2007) and Penman (2007) empirically support the argument as they report negative association between firms' leverage ratios and their executive compensation. Firm specific risk is another potential determinant of executive compensation. We consider beta as a measure of risk for the firm with respect to market. Brick, Palmon, and Wald (2002) find that cash flow risk has significant negative association with cash compensation of the CEO. It is expected that the risk of the firm has an inverse relationship with the executive compensation.

## Studies focussing on Indian firms

As mentioned earlier, studies focussing on the managerial labour market and executive compensation among Indian firms have been a recent phenomenon. Sen and Sarkar (1996) examined the intra- and inter-firm differences in managerial characteristics (such as age, experience, qualification and remuneration) among large Indian firms. They reported the existence of a tournament structure (increasing pay differentials in hierarchies) of salaries among their sample firms. The study, however, was confined to a small number of large firms for the year 1990–91 with limited empirical implications. Ramaswamy, Veliyath, and Gomez (2000), in their examination of 150 large Indian firms, reported that firm performance as measured by return on assets (ROA) as a significant variable along with other governance variables. Ghosh (2006),

studying 462 Indian firms for the period of 1997–2002, reported that there is a positive association between CEO compensation and firm performance. He also found that executive board compensation is influenced by firms' current as well as past performance. Parthasarathy et al. (2006) in their cross sectional study of 500 Indian firms examined the influence of firm performance and firm specific characteristics including corporate governance factors on executive compensation. They reported that executive compensation is not influenced by firm performance. However, the study reported that firm specific factors such as size significantly influence executive compensation. In the light of the above inconclusive evidence on the pay–performance relationship among Indian firms, we comprehensively examine the relationship between firms' performance and their executive compensation in the present study.

## Corporate governance and executive compensation disclosures in India

The thrust for better corporate governance practices has been an integral part of the Indian regulatory environment. Indian companies have been largely governed by the Indian Companies Act, 1956, which provides detailed guidelines on the formation and functioning of the companies. Although there have been several provisions under the Companies Act about board structure and composition and managerial remuneration, the act does not deal with corporate governance directly. The guidelines for corporate governance and executive compensation in India mainly come from Securities Exchange Board of India (SEBI) in the form of corporate governance directives and the Indian Companies Act(s).

### Evolution of corporate governance practices in India

The Indian Companies Act 1956 contains provisions for managerial and executive remuneration for listed companies. Section 198 of the act provides for a ceiling on the overall remuneration payable to managerial personnel. It mandates that the total remuneration payable to executive personnel of a public company or subsidiary private company should not exceed 11% of the net profits of the company in a financial year. It also prohibits payment of remuneration (except sitting fees) in a year when the company has incurred severe losses or has garnered inadequate profits. Section 309 supplements the provisions contained in Section 198 and states that the remuneration of all whole-time or managing directors taken together shall not exceed 10% of the net profits of the company in a financial year except with prior approval from the Government of India. These requirements made the management of the companies accountable and provided regulations to control executive compensation. However, the failure in the effective implementation of corporate governance provisions led to the collapse of certain well established firms like Satyam Computer Services Ltd (2009), similar to the cases reported across the globe such as Xerox, Enron, and World Com. These failures highlighted the need for better laws and regulations to oversee the corporate governance practices including executive

compensation. In 1991, the Indian Government enacted a series of reforms aimed at general economic liberalisation. The Securities and Exchange Board of India has been established as per the SEBI act in 1992 to nurture, monitor and regulate the growth of capital markets in India. The focus on better corporate governance practices has become essential mainly due to the opening up of the economy which led to increased competition and also increased requirement of external capital. The first major initiative to have structured corporate governance norms was undertaken by the Confederation of Indian Industry (CII), India's largest industry and business association. The Confederation of Indian Industry suggested the first voluntary code of corporate governance in 1998 while drawing on the parlance of the Anglo-Saxon model of corporate governance. It suggested the payment of executive compensation, not exceeding 1% of net profits (if the company has a managing director), or 3% (if there is no managing director) to non-executive directors for offering their professional advice. It also supported the idea of offering stock options to the executives.

The second major corporate governance initiative was undertaken by SEBI by setting up a committee headed by Kumar Mangalam Birla[2] (1999), to promote and improve the standards of corporate governance practices. The committee suggested separate disclosures relating to executive compensation in the form of remuneration package (salary, benefits, bonus etc.), fixed and performance linked incentives, and stock options. The Securities and Exchange Board of India accepted the recommendations of the Birla Committee in 2002 and made it a statutory requirement under clause 49 of the Listing Agreement of the stock exchanges. Further, SEBI appointed the Naresh Chandra Committee (2002) and the Narayan Murthy Committee (2004) to examine various corporate governance issues. These committees offered crucial recommendations related to corporate governance issues such as audit committee, related party disclosures, risk management policy, and the like. However, there were no major changes to the recommendations of the Birla Committee with respect to executive compensation disclosures.

## Data sources and sample characteristics

The primary data source for the present study is the PROWESS database maintained by the Centre for Monitoring Indian Economy (CMIE). The PROWESS database provides information for over 20,000 firms belonging to manufacturing, services and other utilities. The dataset provides comprehensive firm level information about financial statements such as balance sheet (total assets, current assets, total debt and liabilities), income statement (sales, expenditures and taxes), and cash flow statements. The information is mainly drawn from the annual reports of the firms. This database was previously employed by Gopalan, Nanda, and Seru (2007), and Khanna and Palepu (2000) to examine the relationship between firm performance and business group affiliation, Ghosh (2006) to investigate into the determinants of executive compen-

sation, and Gopalan and Gormley (2013) to examine the impact of financial markets' failure on firm financing choices.

## Sample selection

We consider all Indian listed firms, for our empirical analysis. The study period is from 2002 to 2012. Following the Kumar Mangalam Birla recommendations (2002), Indian firms are required to disclose executive compensation details in their annual reports from 2002 onwards. We exclude all financial services firms[3] as they are subject to intense regulation and supervision by the apex bank. We also exclude firms controlled by the state and joint sector firms as their executive compensation practices are most often not driven by economic considerations. Further, we exclude firm year observations whose net worth is negative[4] as they are considered bankrupt and guided by the Board of Industrial and Financial Reconstruction (BIFR) regulations. Our final sample consists of 21,834 firm year observations, consisting of 3,100 firms with an average of 7.04 years each. It is an unbalanced panel dataset with gaps, as some firms were observed to be delisting and re-entering the market after a few years for various reasons such as acquisitions and bankruptcies. Of the sample firms, 36.37% are business group affiliated firms and the remaining 63.63% are stand-alone firms.

## Selection of variables

As we examine the relationship between pay and performance, we consider consolidated executive compensation as the proxy for pay. We consider both accounting measures as well as market performance measures to represent firm performance (Antle & Smith, 1986; Lambert & Larcker, 1987; and Sloan, 1993). Following Murphy (1985), Jensen and Murphy (1990), Gibbons and Murphy (1990), Barro and Barro (1990), and Hubbard and Palia (1994), we use return on equity (ROE) and ROA as the accounting based measures of firm performance. Tobin's Q and annual stock return (RET) are considered as the market based measures of firm performance. Annual stock return is a forward-looking measure and reflects investors' future expectations. Further, we consider firm specific variables such as size, leverage, and risk as they could influence the pay–performance relationship. The description of the variables is provided in Table 1.

## Summary statistics

Table 2 presents the summary statistics of the relevant variables. We winsorize all the variables included at one and ninety nine percentile of their empirical distribution to eliminate the effect of outliers.

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[2] Kumar Mangalam Birla is an Indian industrialist and the Chairman of the Aditya Birla Group, one of the largest conglomerate corporations in India.

[3] Firms offering financial services (including banking) as their main economic activity are classified as per National Industrial Classification (NIC) three digit codes 641 to 663.

[4] Firms, as and when they experience negative net worth, file for bankruptcy and seek protection from BIFR under Sick Industrial Company's act (1985).

**Table 1**  Description of variables considered in the study.

| Variables | Description |
| --- | --- |
| ROA | Ratio of earnings before interest and taxes to total assets |
| ROE | Ratio of profit after tax to book value of equity |
| Q | Ratio of total assets minus book value of equity plus market value of equity to book value of total assets |
| RET | Annual stock return |
| SIZE | Natural logarithm of total assets |
| LEV | Ratio of total borrowings to total assets |
| RISK | It refers to company's beta calculated considering BSE Sensex as the market index |

**Table 2**  Summary statistics.

| Variables | No. of observations | Mean | STDEV | P25 | P50 | P75 | Max |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ROA | 19,879 | 0.1074 | 0.1084 | 0.0403 | 0.0924 | 0.1552 | 0.5277 |
| ROE | 21,830 | 0.0531 | 0.3154 | 0.0107 | 0.0804 | 0.1725 | 0.7115 |
| Q | 21,834 | 1.2788 | 1.0367 | 0.7822 | 0.9720 | 1.3471 | 6.9023 |
| LEV | 19,873 | 0.2906 | 0.1913 | 0.1307 | 0.2843 | 0.4278 | 0.7518 |
| SIZE | 21,834 | 4.6860 | 1.9184 | 3.2245 | 4.5942 | 6.0452 | 9.3617 |
| Market cap | 21,834 | 1047.61 | 7987.67 | 6.55 | 31.74 | 200.53 | 351385.40 |
| Borrowings | 19,873 | 277.41 | 1548.29 | 4.88 | 25.09 | 125.93 | 73904.48 |
| RET | 19,787 | 0.4195 | 1.2099 | -0.2930 | 0.0500 | 0.6814 | 6.5547 |
| Exec's remuneration | 13,943 | 1.2482 | 3.9428 | 0.1000 | 0.3000 | 0.9500 | 128.8000 |

Table reports the summary statistics of the sample firms. All the variables included are winsorized at one as well as at ninety nine percentile to eliminate the effect of extreme values. The definition of variables is provided in Table 1.

Table 2 summarises the sample firms' characteristics in terms of their size (market capitalisation and total assets), profitability (ROE and ROA), leverage, and market performance (Tobin's Q). Sample firms represent the broad spectrum of universe in terms of their size, as sample firms with their market capitalisation range from Rs 6.55 crore[5] to 351,385.4 crore. Average return on assets for the sample firms is 10.74% as compared to 14.5% reported by Parthasarathy et al. (2006), 14.2% by Ghosh (2006) for Indian sample firms, and 3.15% by Canarella and Nourayi (2008) for a sample of US firms. Mean sales for the sample firms is Rs 599.34 crore as compared to $3516.02 million by Canarella and Nourayi (2008) for 594 US firms. We submit that our sample represents listed firms from emerging markets that are relatively small in size but offer higher market returns.

## Estimation procedure and discussion

In this section, we describe the estimation procedure employed, and present our discussion of the findings.

Executive compensation is influenced by the firm's contemporaneous performance. We empirically investigate the presence of contemporaneous relationship between executive compensation and firm performance employing the generic executive pay equation (Eq. (1))

$$Ln(ExcPay)_{it} = \alpha_0 + \beta_1 Y_{it} + \gamma Z_{it} + \tau_t + \varepsilon_{it} \quad (1)$$

where $Ln(ExcPay)$ is the natural logarithm of executive compensation. $Y_{it}$ is a measure of performance of the $i^{th}$ firm in $t^{th}$ year. $Z$ is a vector of other firm specific variables that affect executive compensation. $\tau$ refers to time dummies and $\varepsilon$ is a white noise term. We estimate Eq. (1) using pooled ordinary least squares (POLS) and panel fixed effects (FE) estimators. The FE estimator effectively controls the sample firms' unobservable fixed effects. We consider both firm's accounting (ROE) as well as market performance measures (Tobin's Q). Other firm specific variables are firm size, leverage, and market risk. In addition to the contemporaneous relationship, there might be a long term relationship between executive compensation and firm performance as the compensation contracts may contain the elements of deferred pay. A strong case can be made that the current executive compensation is not only influenced by the firm's contemporaneous performance but also its past performance. Hence, we augment Eq. (1) by including firms' lagged performance as one of the independent variables.

$$Ln(ExcPay)_{it} = \alpha_0 + \beta_1 Y_{it} + \beta_2 Y_{it-1} + \gamma Z_{it} + \tau_t + \varepsilon_{it} \quad (2)$$

We estimate Eq. (2) using POLS and FE estimators. The findings are reported in Table 3.

Table 3 reports the findings of Eq. (2), estimated using the pooled least squares and panel fixed effects estimators. It is observed that firms' size positively influences their executive compensation irrespective of the model specification and estimators. Such a finding is consistent with those reported by Rosen (1992), Murphy (1985), Zhou (2000), and Ryan and Wiggins (2001) (from the US market). As expected, other

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[5] Rs 1 Crore refers to Rs 10 million.

**Table 3** Contemporaneous estimation of relationship between executive compensation and firm performance.

| | Ordinary least squares (OLS) | | | | Panel fixed effects (FE) | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| ROE_t | 0.4010*** | 0.2997*** | | | 0.1707*** | 0.1378*** | | |
| | (0.0000) | (0.0000) | | | (0.0000) | (0.0000) | | |
| ROE_t-1 | | 0.3418*** | | | | 0.2059*** | | |
| | | (0.0000) | | | | (0.0000) | | |
| Q_t | | | 0.1499*** | 0.1415*** | | | 0.0876*** | 0.0741*** |
| | | | (0.0000) | (0.0000) | | | (0.0000) | (0.0000) |
| Q_t-1 | | | | 0.0331* | | | | 0.0376*** |
| | | | | (0.0860) | | | | (0.0040) |
| Size_t | 0.6129*** | 0.6070*** | 0.6055*** | 0.6017*** | 0.4976*** | 0.4669*** | 0.5101*** | 0.4880*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Lev_t | −0.4329*** | −0.3818*** | −0.4679*** | −0.4338*** | −0.6286*** | −0.5257*** | −0.7313*** | −0.6872*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Risk_t | 0.1112*** | 0.1020*** | 0.1200*** | 0.1185*** | 0.0593*** | 0.0416** | 0.0599*** | 0.0475** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0020) | (0.0390) | (0.0010) | (0.0190) |
| Time | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| R-square | 0.5975 | 0.5947 | 0.5980 | 0.5941 | 0.4850 | 0.4561 | 0.4857 | 0.4547 |
| N | 12799 | 11317 | 12799 | 11317 | 12799 | 11317 | 12799 | 11317 |

***, **, and * refer to 1%, 5%, and 10% significance level, respectively.
Table presents the findings from estimating Eq. (2) using pooled ordinary least squares (POLS) and panel fixed effects (FE) estimators. The numbers in parenthesis are corresponding p-values. The definition of variables is provided in Table 1.

control variables such as sample firms' leverage and market risk report the significant negative and positive influence on their executive compensation respectively. From specifications 1 and 5, it is evident that executive compensation is positively influenced by the firm's contemporaneous performance. When we consider contemporaneous as well as past performance in the same model, we find that they significantly influence executive compensation (specifications 2 and 6).

With respect to the market based performance measure (Tobin Q), we report positive and significant relationship with executive compensation (specifications 3 and 7). When we consider contemporaneous as well as past market based performance, we find that they significantly influence the executive compensation (specifications 4 and 8) once the firm fixed effects are controlled. The influence of past performance along with current performance on executive compensation may be because of the information revealed by the firm's past performance about the agents' (managers') future ability. It further reduces the severity of the firm's adverse selection problems. When past performance is high, the principals (shareholders) can provide the continuing agents with a higher compensation (Banker, Darrough, Huang, & Plehn-Dujowich, 2013).

Further, we understand that the current executive compensation is also influenced by the past compensation, along with the firm's past as well as contemporaneous performance. Remuneration committees often consider the previous year's pay as the starting point before deciding on the current year's compensation (Bender, 2003). The current year's compensation is then influenced by the previous year's compensation. Consideration of the past compensation as one of the explanatory variables makes our estimation equation a dynamic one. It may also be argued that the firm's performance is also influenced by the previous executive compensation. The potential simultaneous relationship between

executive compensation and firm performance may cause the endogeneity problem in our estimating equation.

$$Ln(ExcPay)_{it} = \alpha_0 + \delta Ln(ExcPay)_{it-1} + \beta_1 Y_{it} + \beta_2 Y_{it-1} + \gamma Z_{it} + \tau_t + \varepsilon_{it}$$
(3)

Estimating Eq. (3) using the traditionally established panel fixed effects estimator may eliminate the firm fixed effects but it provides unreliable estimates due to finite sample bias (Baltagi, 2008; Nickell, 1981). The traditional instrumental variable estimator can address the issue of finite sample bias, if we can identify the perfect external instruments which are correlated with the endogenous explanatory variables but not with the residuals. The external instruments for performance and agency variables are difficult to identify. In order to effectively eliminate the firm fixed effects and address the issue of simultaneous bias (endogeneity), we choose dynamic panel estimator to estimate the Eq. (3). We employ the system-GMM estimator (Blundell & Bond, 1998). The system-GMM estimator estimates equation 3 simultaneously at levels (original equation) as well as at first differences. The estimator first differences the data to eliminate firm fixed effects and uses the differenced variables as instruments in the level equation. Thus, the system-GMM estimator, using the internally generated instruments, is poised to address the endogeneity problem effectively and eliminate the firm fixed effects (Wooldridge, 2002).

We primarily estimate Eq. (3), using one step system GMM and consider lagged levels (t-2 to t-4) of all independent variables as instruments for the regression in differences and lagged differences (t-2 to t-4) as instruments for the regression in levels. The estimated standard errors are robust to the potential heteroskedasticity problem. To assess the presence of second order serial correlation in first differenced

**Table 4** Estimation of relationship between executive compensation and firm performance using dynamic panel estimator.

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| ExPay_t-1 | 0.3490*** | 0.3446*** | 0.3468*** | 0.3387*** |
|  | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| ROE_t | 0.2822** | 0.2831** |  |  |
|  | (0.0370) | (0.0350) |  |  |
| ROE_t-1 |  | 0.0950 |  |  |
|  |  | (0.3050) |  |  |
| Q_t |  |  | 0.0529 | 0.0494 |
|  |  |  | (0.1340) | (0.1590) |
| Q_t-1 |  |  |  | 0.0340 |
|  |  |  |  | (0.1960) |
| Size_t | 0.3201*** | 0.3348*** | 0.2182** | 0.2417** |
|  | (0.0010) | (0.0010) | (0.0410) | (0.0250) |
| Lev_t | −0.6293* | −0.6160* | −0.0329 | −0.0644 |
|  | (0.0550) | (0.0600) | (0.9290) | (0.8610) |
| Risk_t | −0.1028 | −0.0946 | −0.0752 | −0.0538 |
|  | (0.3220) | (0.3590) | (0.4290) | (0.5750) |
| Time | Yes | Yes | Yes | Yes |
| M1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| M2 | 0.3260 | 0.3140 | 0.2700 | 0.2770 |
| Hansen test (p-value) | 0.3490 | 0.4720 | 0.0210 | 0.2790 |
| Observations | 7529 | 7529 | 7529 | 7529 |

***, **, and * refer to 1%, 5%, and 10% significance level, respectively.
Table presents the findings from estimating Eq. (3) using one step system-GMM. We consider lagged levels (t-2 to t-4) of all independent variables as instruments for the regression in differences and lagged differences (t-2 to t-4) as instruments for the regression in levels. The numbers in parenthesis are corresponding p-values. The definition of variables is provided in Table 1.

residuals, we report p-value of M2 with the null hypothesis of no serial correlation. Further, we report p-values of Hansen test to investigate the joint validity of instruments. Table 4 reports the findings of estimating Eq. (3).

Table 4 reports the findings of Eq. 3, estimated using the system-GMM estimator. Our results suggest that past pay has positive and significant influence on current pay irrespective of model specifications (specifications 1–4). This may be due to the fact that the remuneration committees consider past pay as the reference while setting current compensation (Bender, 2003). The firm performance, particularly accounting performance, continued to have significant positive influence on the executive compensation, even in the presence of past compensation as an additional variable.

### Sample splits

It is clear from the literature that the relationship between pay and performance is influenced by the firms' governance which in turn is influenced by the type of ownership and firm size. Such an influence is more apparent among the firms operating in emerging markets. For instance, firms with larger size, given their market reputation, are expected to have greater diligence in their compensation practices when compared to the smaller firms. We attempt to empirically validate the heterogeneity in the magnitude of pay–performance relationship by classifying the firm year observations based on the firms' size and their type of ownership.

#### Sample splits based on ownership classification
As in the case of various previous studies (Gopalan et al., 2007 and Khanna & Palepu, 2000), 39.95% of our sample firms are

affiliated to business groups. In India, business groups with their internal capital markets assist their affiliates to navigate the underdeveloped financial markets and regulatory mechanisms. In the literature, there is no consensus on the role of business groups and there have been various arguments about this. Business groups facilitate funds appropriation by the dominant owners. This has been empirically validated in the funds appropriation or tunnelling argument by Rajan and Zingales (2003). Business groups help their affiliated firms in smoothening the distress periods by way of internal fund transfers. It is famously known as risk sharing argument (Gopalan et al., 2007). Business groups are also argued to be more prudent in their dealings with the other stakeholders, as it otherwise could have negative implications on the other affiliates (Gopalan & Jayaraman, 2012). In line with the reputation argument, we expect that the pay–performance relationship would be stronger among the business group affiliated firms than their standalone counterparts. However, the operation of internal capital markets may ameliorate the business group firms from market dynamics and may potentially hamper the market determined pay–performance relationship. On the other hand, standalone firms with their necessity to deal with the financial markets are expected to be more cautious and prudent in their executive compensation practices. Table 5 reports findings for sample splits based on ownership classification.

It is clear from Table 5 that the current executive compensation is significantly influenced by the past compensation across both the stand-alone and business group affiliated firms. We find that pay–performance relationship is significant only among stand-alone firms. Executive compensation is not influenced by firm performance among the business

**Table 5** Ownership classification and relationship between executive compensation and firm performance.

|  | Business group affiliated firms | | | | Stand-alone firms | | | |
|---|---|---|---|---|---|---|---|---|
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| ExPay_t-1 | 0.2426*** | 0.2414*** | 0.1950*** | 0.1870*** | 0.3152*** | 0.3170*** | 0.2834*** | 0.2839*** |
|  | (0.0000) | (0.0000) | (0.0040) | (0.0060) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| ROE_t | −0.1219 | −0.1062 |  |  | 0.2153** | 0.2162** |  |  |
|  | (0.2810) | (0.3810) |  |  | (0.0430) | (0.0410) |  |  |
| ROE_t-1 |  | 0.0673 |  |  |  | −0.0172 |  |  |
|  |  | (0.5820) |  |  |  | (0.8050) |  |  |
| Q_t |  |  | 0.0671 | 0.0656 |  |  | 0.0441 | 0.0381 |
|  |  |  | (0.2200) | (0.2280) |  |  | (0.2700) | (0.3300) |
| Q_t-1 |  |  |  | 0.0521 |  |  |  | 0.0200 |
|  |  |  |  | (0.2870) |  |  |  | (0.4440) |
| Size_t | 0.5476*** | 0.5526*** | 0.9144*** | 0.9309*** | 0.2701*** | 0.2670*** | 0.1603 | 0.1657* |
|  | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0060 | (0.0070) | (0.1070) | (0.0930) |
| Lev_t | −0.6389 | −0.6085 | −0.4193 | −0.4223 | −0.3344 | −0.3381 | −0.2972 | −0.3222 |
|  | (0.2300) | (0.2650) | (0.4140 | (0.4160) | (0.2680) | (0.2620) | (0.3690) | (0.3290) |
| Risk_t | 0.1948* | 0.1949* | 0.1932 | 0.2090 | −0.1763 | −0.1762 | −0.2180** | −0.2059** |
|  | (0.0960) | (0.0940) | (0.1450 | (0.1180) | (0.1040) | (0.1050) | (0.0170) | (0.0250) |
| Time | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| M1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| M2 | 0.1050 | 0.1120 | 0.1310 | 0.1130 | 0.7520 | 0.7560 | 0.6750 | 0.7470 |
| Hansen test (p-value) | 0.9600 | 0.9660 | 0.9060 | 0.9310 | 0.7610 | 0.6850 | 0.0520 | 0.0000 |
| Observations | 2484 | 2484 | 2484 | 2484 | 5045 | 5045 | 5045 | 5045 |

***, **, and * refer to 1%, 5%, and 10% significance level, respectively.
Table presents the findings from estimating Eq. (3) using one step system GMM. We consider the PROWESS classification of firms into business group affiliated, and stand-alone firms. The numbers in parenthesis are corresponding p-values. The definition of variables is provided in Table 1.

group affiliated firms. Such evidence may be attributed to the prevalent owner–manager practices among Indian business group firms (Khanna and Palepu 2000). It could also be argued that business group firms address the agency problems through alternative mechanisms such as debt financing (Jensen, 1986) rather than performance based executive compensation. However, the absence of pay–performance relationship among business group firms throws bleak light on the performance based executive compensation practices of Indian business group affiliated firms.

**Sample splits based on firm size**
As previously mentioned, firms with larger size, given their opacity, are expected to have greater diligence in their compensation practices when compared to the smaller firms. In the current subsection, we attempt to empirically validate the heterogeneity in the magnitude of pay–performance relationship by classifying the firm year observations based on the firms' size. We classify the sample firms into quartile groups based on the value of firms' assets. We consider firms that fall in the first quartile as small,[6] and those that fall in the fourth quartile as large firms. We separately estimate Eq. (3) using both the small and large firms. Table 6 presents the findings.

From Table 6, it is clear that the persistence in executive compensation exists across the sample firms irrespec-

tive of their size as we report that current executive compensation is influenced by the past compensation. We find significant pay–performance relationship among the larger sample firms, and the pay–performance relationship seems to be absent among the smaller sample firms. These findings are consistent with those reported by Zhou (2000) among US firms; and C Joe Ueng, Wells, and Lilly (2000) from US firms. However, the magnitude of the estimates is relatively smaller among our sample firms. Such a finding could be attributed to the nature of emerging markets which fare worse than developed markets as far as investor activism is concerned. Only larger firms are actively followed by the analysts and only their corporate governance practices such as executive compensation are intensively monitored. The small firms do not attract adequate attention in emerging markets.

## Concluding remarks

In this study, we empirically examine the pay–performance relationship among Indian firms. The study reports significant persistence in executive compensation among the sample firms. The persistence in the executive compensation exists even among the sub-samples of firms, classified based on size and ownership. Findings also suggest the existence of significant pay–performance relationship among the sample firms. However, when performance is measured using market based measures, we do not find pay–performance relationship among the sample firms. It may be argued that sample firms determine their executive compensation based on the accounting

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[6] The small firms, here refer to the small firms in the context of the current sample firms, they may not be the small among the population of Indian firms.

**Table 6** Firm size and relationship between executive compensation and firm performance.

| | Small firms | | | | Large firms | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| ExPay_t-1 | 0.1541** | 0.1522** | 0.1504** | 0.1517** | 0.3717 | 0.3621 | 0.2537 | 0.2522 |
| | (0.0120) | (0.0120) | (0.0220) | (0.0200) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| ROE_t | −0.0837 | −0.0814 | | | 0.3531** | 0.3363** | | |
| | (0.4060) | (0.4370) | | | (0.0120) | (0.0160) | | |
| ROE_t-1 | | 0.0213 | | | | 0.1939 | | |
| | | (0.8100) | | | | (0.1330) | | |
| Q_t | | | 0.0469 | 0.0428 | | | 0.0508 | 0.0501 |
| | | | (0.1040) | (0.1240) | | | (0.3620) | (0.3670) |
| Q_t-1 | | | | 0.0203 | | | | 0.0095 |
| | | | | (0.5530) | | | | (0.8660) |
| Size_t | 0.2278** | 0.2280** | 0.2059** | 0.2035** | 0.4967*** | 0.5187*** | 0.7652*** | 0.7681*** |
| | (0.0280) | (0.0280) | (0.0280) | (0.0290) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Lev_t | 0.0384 | 0.0426 | 0.0794 | 0.0778 | −1.0896** | −1.0795** | −1.4219*** | −1.4168*** |
| | (0.8720) | (0.8560) | (0.7530) | (0.7580) | (0.0240) | (0.0300) | (0.0030) | (0.0030) |
| Risk_t | −0.1390* | −0.1396* | −0.1752** | −0.1796** | −0.0768 | −0.0839 | −0.1153 | −0.1127 |
| | (0.0970) | (0.0930) | (0.0320) | (0.0250) | (0.5780) | (0.5340) | (0.3890) | (0.4100) |
| Time | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| M1 | 0.0060 | 0.0060 | 0.0010 | 0.0010 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| M2 | 0.1900 | 0.1780 | 0.1680 | 0.1670 | 0.3240 | 0.3230 | 0.2840 | 0.2750 |
| Hansen test (p-value) | 0.9810 | 0.9750 | 0.9880 | 0.9880 | 0.9880 | 0.9850 | 0.0140 | 0.9710 |
| Observations | 1369 | 1369 | 1369 | 1369 | 1930 | 1930 | 1930 | 1930 |

***, **, and * refer to 1%, 5%, and 10% significance level, respectively.

Table presents the findings from estimating Eq. (3) using one step system GMM. We classify the sample firms into quartile groups based on the value of firms' assets and consider firms that fall into the first quartile as small firms and those that fall into the fourth quartile as large firms. The numbers in parenthesis are corresponding p-values. The definition of variables is provided in Table 1.

based measures of firm performance rather than market based measures. Further, we report the absence of pay–performance relationship among the business group affiliated firms, whereas their stand-alone counterparts report significant pay–performance relationship. Such an observation casts doubts over the performance based executive compensation practices of Indian business group affiliated firms. We also find that the pay–performance relationship is absent among the small sample firms, but the relationship is significant among the larger sample firms. We attribute such a contrast in our observation to the underdeveloped nature of institutional mechanisms and weak investor activism in India.

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