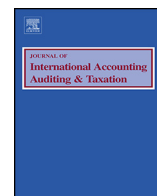




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The impact of equity incentive plans on analysts' earnings forecasts and stock recommendations for Chinese listed firms: An empirical study



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ABSTRACT

Using a sample of 932 listed firms and 2492 firm-year observations during the period of 2008–2014, this paper investigates the impact of equity incentive plans (EIPs) on the information environment of financial analysts, as reflected in the prominent analysts' outputs – earnings forecasts and stock recommendations, in China's unique corporate setting. It finds that analysts' forecast accuracy is noticeably higher for listed firms with higher levels of management compensation in the form of EIPs. In addition, financial analysts are more likely to issue favourable stock recommendations for listed firms granting management stock options. Moreover, analysts' forecast accuracy (dispersion/bias) appears to be considerably improved (reduced) when listed firms choose to use restricted stock units (RSUs), instead of stock options, in their EIPs, suggesting that the two types of equity incentives – stock options or RSUs – have different impacts on analysts' earnings forecasts. Overall, the empirical results of this study are consistent with the alignment view of managerial incentives. This study also shows that not all equity incentives have the same alignment effect. Indeed, compared to RSUs, the alignment effect of stock options is likely to be offset by managers' short-term opportunity behaviours.

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1. Introduction

Under the separation of ownership and control, the owner (principal) delegates his/her decision-making authority to the manager (agent) who is expected to act in the best interests of the principal (Jensen & Meckling, 1976). However, delegation of a task to the manager who has different objectives to the owner is problematic if the manager's action/effort is difficult to observe and verify (Laffont & Martimort, 2002). Therefore, the owner may use equity incentives to motivate the manager by offering an opportunity to participate in the business future performance through the grant of awards. There are two competing views on the effect of equity incentives. The incentive-alignment hypothesis suggests that managerial incentives can help to mitigate the agency costs by aligning the interests of managers and shareholders (Jensen & Meckling, 1976). Conversely, the management-entrenchment hypothesis argues that given excessive managerial ownership, managers may entrench their positions and then indulge their preferences for non-value-maximising behaviours (Shleifer & Vishny, 1989). Early empirical studies on the association between managerial ownership and firm value/performance as well as various aspects of corporate reporting quality (e.g. earnings management and analysts' forecast accuracy) provide rather mixed

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results (Cheng & Warfield, 2005; Erickson, Hanlon, & Maydew, 2006; García-Meca & Sánchez-Ballesta, 2011; Sánchez-Ballesta & García-Meca, 2007). Moreover, there is little research on how managerial incentives affect the information environment of financial analysts who act as information intermediaries to generate valuable information in emerging markets.

China is an interesting case because of its unique institutional environment. For example, listed Chinese firms typically have a more complex ownership structure than in the West, and a considerable number of listed firms' shares are held by the government. Concentrated state ownership can impede corporate information transparency and trigger the interest conflicts between the state and minority shareholders (Su, Xu, & Phan, 2008). Also, listed Chinese firms design the managerial remuneration contracts mainly on the basis of accounting performance measures. If a listed firm's performance is poor, managers are likely to suppress unfavourable information and/or to cook the accounting books, in order to secure their emoluments (Liu & Lu, 2007; Yang, Chi, & Young, 2012). The government therefore has issued a series of regulations on equity incentive plans (EIPs) for listed firms during the period of 2005–2008 with the aim of bringing the interests of managers and shareholders into line. This new development provides a research opportunity to investigate the impact of EIPs on the information environment of financial analysts, as reflected in analysts' earnings forecasts and stock recommendations, in Chinese stock markets.

Using a sample of 932 listed firms and 2492 firm-year observations for the period of 2008–2014, this study finds that analysts' forecast accuracy tends to be higher for listed firms with higher levels of management compensation in the form of EIPs. In addition, financial analysts are more likely to issue favourable stock recommendations for listed firms granting management stock options, rather than restricted stock units (RSUs). Interestingly, analysts' forecast accuracy (dispersion/bias) tends to be considerably improved (reduced) if listed firms use RSUs, instead of stock options, in their management compensation plans. The findings suggest that the two types of equity incentives – stock options and RSUs – appear to have different impacts on analyst's earnings forecasts. In additional tests, the empirical results are robust when using individual analysts' earnings forecast data and controlling for potential endogeneity.

This study contributes to corporate governance and disclosure literature in the following ways. First, it reconciles and expands the ongoing research on the impact of managerial ownership on the information environment of financial analysts (Ang & Ma, 1999; Barniv & Bao, 2009; Cheng & Warfield, 2005; Chen & Matsumoto, 2006; García-Meca & Sánchez-Ballesta, 2011; Han, Jin, Kang, & Lobo, 2014; Kanagaretnam, Lobo, & Mathieu, 2012; Nagar, Nanda, & Wysocki, 2003; Sengupta & Zhang, 2015). Particularly, to the best of the author's knowledge, this is the first empirical study that examines the impact of management equity incentives on a range of analysts' outputs, including forecast accuracy, forecast dispersion, forecast bias and stock recommendation, in a large emerging market. Different from previous developed market studies (Cheng & Warfield, 2005; Kanagaretnam et al., 2012), this research provides some new evidence that higher levels of management equity incentives tend to improve the information environment of financial analysts, resulting in more accurate analysts' forecasts for Chinese listed firms. Second, it contributes to the current debate on the costs and benefits of management equity incentives. Unlike most early studies solely focusing on one type of equity incentive—stock options (Bhat, Hope, & Kang, 2006; Byard, Li, & Weintrop, 2006; Cheng & Warfield, 2005; Karamanou & Vafeas, 2005; Kanagaretnam et al., 2012), this study empirically investigates whether stock options and RSUs have the same alignment effects, and its findings provide a better understanding of the impacts of different types of equity incentives on alleviating information asymmetry, as reflected in the prominent analysts' outputs. Third, given that financial analysts act as information intermediaries by generating earnings forecasts and stock recommendations that considerably affect investment decision-making, this study offers investors and policymakers some insight on how analyst's earnings forecasts and stock recommendations might be shaped by ownership and control characteristics, such as managerial ownership.

The remainder of this study is organised as follows. The next section provides an overview of China's corporate governance regulations, the recent development of equity incentive policies, and the roles of financial analysts in Chinese stock markets. Section 3 reviews earlier literature on the impact of managerial incentives on corporate information disclosure, and develops the hypothesis. The sample selection and research methodology are presented in Section 4, and Section 5 reports the empirical findings and analysis. The final section summarises and concludes the study.

2. Research background

2.1. China's Corporate Governance System and the development of policies on EIPs for listed firms

In accordance with the economic liberalisation and reform policy introduced by the Chinese government in the late 1970s, the Shanghai and Shenzhen Stock Exchanges were established in the early 1990s, aiming to modernise ailing state-owned enterprises (SOEs). As such, many listed Chinese firms were historically created by carving out part of the assets of SOEs for listing, while the rest of the assets were left in unlisted parent firms. After the listing, the unlisted parent firm and listed subsidiary continued to trade with each other as a group, and the corporate structure of such a group normally has multiple layers and many firms in each layer (Piotroski & Wong, 2013). In this way, the government still retained its control over 'large and important' listed firms. However, such complex ownership structures can result in interest conflicts between the controlling shareholder (the state and its agencies) and outsider investors (Su et al., 2008). Moreover, although La Porta et al. (2008) classify China's legal system as being of German-civil-law origin, a unique feature of China's legal tradition is that the judicial system is not independent from the government's administrative system, and politics and adjudication are often mixed (Chen, 2003). Indeed, private property rights were recognised by China's legislative system for the first time in March

2004. However, the definition and explanation of private property rights within listed Chinese firms remain 'fuzzy', and violation of private property rights by the government, especially at the local government level, remains relatively common (Deng, 2009; Sanders & Chen, 2005). Given concentrated state ownership, unclear laws governing private property rights, and a lack of judicial independence, China's political institutional norm is in favour of protecting state interests instead of the rights of individuals. Corporate managers and auditors therefore have little incentive to actively communicate with minority or individual investors (Chen, 2003).

In line with the government's economic policy, new corporate governance rules were also introduced by 'transplanting the basic structures of corporate governance from the external market based model found in Anglo-American systems' (Tam, 2000; p. 53). However, while the corporate governance rules were introduced, the system of related laws and regulations that ensure the efficiency of the corporate governance model has not been effectively established (Li, 2008). For example, unlike Western enterprises widely using EIPs to bring the management and shareholders' interests into line, for most listed Chinese firms, managers' compensation is more closely linked to accounting results, such as sales or profits, instead of stock price (Su et al., 2008). Managers therefore are tempted to engage in opportunist earnings and disclosure management, in order to secure their emoluments, but at the expense of shareholders' interests (Liu & Lu, 2007). As a result, in 2006, the Chinese government issued various equity incentive policies aimed at aligning the interests of managers and shareholders. By the end of 2012, 400 listed firms or 18% of listed firms had implemented equity incentive plans. The majority of them are non-state-owned or controlled enterprises, and stock options have become the most widely used equity incentive by these firms (Yian & Qiao, 2012). For example, in 2011, 117 listed firms adopted EIPs; only 14 of these were state-controlled. Moreover, 79 of these firms used stock options, whilst 38 of these used RSUs as equity incentives.

2.2. The role of financial analysts in Chinese stock markets

The corporate reporting practices of listed firms appear to be shaped by the dominant characteristics of China's institutional environment, which include limited protection of property and individual investor rights, concentrated state-ownership in listed firms, importance of relationship-based contracting and related party transactions, heavy reliance on state-owned bank financing, and politicised access to external capital and investment opportunities (Piotroski, 2014). In such an environment, listed firms, especially SOEs and politically connected firms, have few incentives to support strong corporate reporting practices, as they benefit little from corporate transparency. Corporate disclosure of many Chinese listed firms therefore is of low quality, and there is a high demand for reliable information by investors (Su et al., 2008). Early studies document that information generated by financial analysts, such as earnings forecasts and stock recommendations, can be very useful for investment decision making (Brown, Beeks, & Verhoeven, 2011; Byard et al., 2006; Lang & Lundholm, 1996). In China, financial analysts have provided earnings forecasts and stock recommendations for H-shares (listed on the Hong Kong Stock Exchange) and B-shares (exclusively for foreign investors) since 1993, and more than 300 analysts were forecasting at least one-year-ahead earnings for 127 H-share and B-share firms by the end of 2000 (Barniv & Bao, 2009). Since the implementation of the Qualified Foreign Institutional Investors (QFII) programme in December 2002, the number of financial analysts and listed firms with analyst coverage has increased considerably. For example, in 2003, financial analysts initiated earnings forecasts for 73 A-share (exclusively for Chinese investors) firms not followed before the QFII (Barniv & Bao, 2009). By the end of 2011, there were 5433 financial analysts who provided earnings forecasts and stock recommendations for 1986 A-share firms (Luo, 2012). In addition, early studies suggest that Chinese analysts appear to serve as external monitoring mechanisms and then, help to reduce information asymmetry between managers and investors. For example, Ang and Ma (1999) report a positive relationship between information transparency and analysts' forecast accuracy for H-share and B-share firms. Also, Barniv (2009) finds that the analysts' forecast efforts and expertise increase with the level of foreign ownership, indicating that financial analysts respond to demands for corporate information by less-informed investors (e.g. foreign investors) in China.

3. Literature review and hypothesis development

Given the separation of ownership and control, it could be difficult for the owner to specify the manager's effort in the contract, and the manager may never be interested in revealing private information he/she processed if he/she could take advantage of it (Macho-Stadler, Pérez-Castrillo, & Watt, 2001). As such, the owner offers a contract contingent upon the results (e.g. earnings) and establishes EIPs to bring the manager's interests in line with those of the owner. However, not all incentives are created equal and the rewards that one party finds motivating may not be enough to inspire others to take action. Indeed, the value of an incentive can change over time and in different situations (Franzoi, 2011). Applying incentive theories into the principal-agent model, Laffont and Martimort (2002) and Macho-Stadler et al. (2001) demonstrate that the alignment effect of EIPs can be determined by the manager's preferences and asymmetric information.

In addition, corporate information transparency can be reflected in the analysts' outputs, such as earnings forecasts accuracy and dispersion, because financial analysts play a vital role as information intermediaries by collecting and processing financial data for the purpose of generating forecast reports on an individual company's performance, and corporate disclosure is one of their primary information sources (Brown et al., 2011; Lang & Lundholm, 1996). Furthermore, financial analysts can engage in private information production to uncover any manager misuse of firm resources (Healy & Palepu, 2001). Therefore, if the interests of owners and managers are effectively aligned, managers are less likely to engage in earn-

ings and disclosure management, resulting in a lower degree of information asymmetry and more accurate analyst earnings forecast (Han et al., 2014; Kanagaretnam et al., 2012).

In China, managerial ownership falls into the category of employee shares, and the overall level of managerial ownership in listed Chinese firms is relatively low. For example, prior to 2005, a listed Chinese firm was only allowed to allocate up to 2.5% of its total outstanding shares to its employees when going public, and managers could not be granted company shares in any other ways, although they could purchase shares on the stock market using their personal funds (Hu & Zhou, 2008; Wei, Xie, & Zhang, 2005). Also, given China's weak institutional environment and inefficient corporate government system, corporate disclosure by Chinese listed firms is of low quality, and managers are tempted to engage in opportunistic earnings and disclosure management (Chen & Yuan, 2004; Hu, Li, Liu, Qi, & Tian, 2012; Hou, Jin, Yang, Yuan, & Zhang, 2015; Liu & Lu, 2007; Su et al., 2008). The government therefore has issued a series of policies on EIPs in recent years, aiming to mitigate the agency costs by effectively aligning the interests of insiders (managers) and outsiders (especially minority shareholders). When the agency costs that arise from the separation of ownership and control are reduced, insiders are less likely to withhold private information (Armstrong, Guay, & Weber, 2010; Firth, Fung, & Rui, 2007). Nagar et al. (2003) support this view by documenting that stock price-based incentives in the form of stock-based compensation and share ownership mitigate the managerial disclosure agency problem. Also, Sengupta and Zhang (2015) document that firms paying a higher proportion of outside directors' compensation in the form of equity enjoy better quality of disclosure and lower cost of equity capital. Better quality of corporate disclosure, in turn, would result in more accurate and less biased analysts' earnings forecasts (Bhat et al., 2006). Indeed, Ang and Ma (1999) report that improved corporate disclosure would result in more accurate analysts' earnings forecasts for H-share and B-share firms in China. Furthermore, Fang et al. (2015) find that Chinese listed firms adopting employee stock option plans out-perform matched non-adopting firms.

However, another stream of studies argue that excessive managerial ownership can be counterproductive, because high levels of managerial ownership can allow managers to entrench their positions and then to indulge their preferences for non-value-maximising behaviours (Morck, Shleifer, & Vishny, 1988; Shleifer & Vishny, 1989). As a result, managers are more likely to engage in opportunistic earnings and disclosure management to conceal their expropriation of other shareholders' interests. Such opportunistic behaviours contribute to an increase in analysts' forecast complexity, which may be associated with less forecast accuracy and high forecast bias (Cheng & Warfield, 2005; Kanagaretnam et al., 2012).

As discussed above, the impact of managerial ownership on the corporate information environment, as reflected in the analysts' outputs (e.g. earnings forecasts), could go either way. However, given China's unique institutional environment and the role of financial analysts in Chinese stock markets, it is predicted that:

H1. There is a positive (negative) relationship between analyst forecast accuracy (dispersion) and the level of management compensation in the form of EIPs.

Moreover, although the Chinese government have issued a series of policies on EIPs for listed firms, a relatively small proportion of firms adopted such a plan by the end of 2012. The majority of these firms used stock options as equity incentives (Yian & Qiao, 2012). However, due to the recent world financial crisis, Chinese stock markets plunged significantly in 2008. The Shanghai Stock Exchange lost 65% of its market value in that year, showing its worst performance over two decades. Accordingly, Chinese stock markets have become very volatile during the downturn. For instance, Zhang et al. (2011) reported that the volatility of Chinese stock markets increased by more than 200% during 2008–2009. Given low stock prices and high market volatility, stock options have become less attractive to managers, as the exercise price of these stock options is regularly higher than market price. Some firms therefore have started to issue RSUs as the alternative to stock options (Yian & Qiao, 2012).

Compared to stock options, RSUs are arguably a better motivating tool, because unlike stock options that may become worthless in market downturns, RSUs retain some intrinsic value. Furthermore, from a management perspective, when RSUs are vested, managers who received these RSUs have become owners of the company. In contrast, stock options do little to install a sense of ownership, because they are viewed by managers as a high risk gamble that has a potentially great reward (Dodonova & Khoroshilov, 2006; Frank, Shiva, & Terry, 2009; Irving, Landsman, & Lindsey, 2011; Steven, Wei, & Bo, 2014). Managers who received stock options therefore may be induced to engage in earnings and disclosure management, in order to secure their compensation pay. These opportunistic behaviours by managers would increase the complexity of analysts' forecasts (Bartov & Mohanram, 2004; Kanagaretnam et al., 2012). It is therefore expected that:

H2. The accuracy (dispersion) of analysts' forecasts for listed firms issuing stock options is significantly lower (higher) than that for listed firms issuing RSUs.

4. Data and research design

4.1. Data collection

The sample for this study is drawn from all Chinese listed firms on the I/B/E/S database with consensus estimates based on forecasts from at least three analysts for the period 2008–2014. Some researchers argue that financial analysts appear not to be completely independent and unbiased, and individual analyst's competence/expertise can also affect the accuracy of his/her forecasts (Firth, Lin, Liu, & Xuan, 2013; Xu, Chan, Jiang, & Yi, 2013). However, the market consensus estimate is

a figure based on the combined estimates of a group of analysts covering one listed firm, and it should be less affected by individual analyst's personal attributes. In addition, this study deleted any market consensus estimates made by less than three analysts to further control the impact of individual analyst's personal attributes.

Financial and EIPs data were obtained from the China Stock Market and Accounting Research (CSMAR) database. This yielded an initial sample of 932 firms and 2492 firm-year observations. When firms without an EIP were eliminated, the reduced sample consisted of 357 firms and 558 firm-year observations.

4.2. Measuring analysts' output variables

Early studies document that forecast environment, especially information asymmetry, plays a vital role in determining the accuracy of analyst earnings forecasts (Hope, 2003a, 2003b; Kanagaretnam et al., 2012; Lang & Lundholm, 1996; Weiss, 2010). Moreover, the disagreement among financial analysts regarding a firm's expected earnings can also result from a lack of publicly available information or information asymmetry (Krishnaswami & Subramaniam, 1999; Ramnath, Rock, & Shane, 2008). Therefore, following previous studies (Hope, 2003a, 2003b; Kanagaretnam et al., 2012; Weiss, 2010), this research employs two analysts' output variables – forecast accuracy (FACC) and forecast dispersion (FDISP) – which are computed as follow:

$$FACC_{i,t} = (-1) * \frac{|FEPS_{i,t-1} - AEPS_{i,t}|}{P_{i,t-1}} * 100\% \quad (1)$$

$$FDISP_{i,t} = \frac{SD_FEPS_{i,t}}{P_{i,t-1}} * 100\% \quad (2)$$

Where: $FEPS_{i,t-1}$ = the mean earnings per share (EPS) forecast one year ahead for year t;

$AEPS_{i,t}$ = the actual EPS for year t;

$P_{i,t-1}$ = the stock price at the beginning of year t;

$SD_FEPS_{i,t}$ = the standard deviation of all EPS forecasts for year t.

4.3. Empirical model

Multiple regression models are employed to examine the impact of EIPs on the analysts' outputs. Therefore, FACC and FDISP are used as dependent variables, while the level of management equity incentives (L.EIP) is employed as the explanatory variable. Moreover, previously identified determinants of analysts' forecast accuracy and dispersion, including ownership concentration, foreign ownership, state ownership, firm size, leverage, growth opportunity, numbers of analysts following, accounting losses, earnings volatility, earnings surprise, independent directors, dual role of board chairman and CEO, and equity exercise indicator, were added as control variables (Barniv, 2009; Brown, 2001; Byard et al., 2006; Duru & Reeb, 2002; Firth et al., 2013; García-Meca & Sánchez-Ballesta, 2011; Gu & Wu, 2003; Haw, Ho, Hu, & Wu, 2010; Lev, 2001; Lang & Lundholm, 1996; Leung & Srinidhi, 2006). Also, following Gow et al. (2010) and Thompson (2011), this study employs two-way cluster-robust standard errors (CL-2) to control for both year (time-series) and industry (cross-sectional) effects. The multivariate regressions are presented below:

$$\begin{aligned} FACC_{i,t}/FDISP_{i,t} = & \beta_0 + \beta_1 L.EIP_{i,t-1} + \beta_2 SO_{i,t-1} + \beta_3 OC_{i,t-1} + \beta_4 FO_{i,t-1} + \beta_5 IND_{i,t-1} + \beta_6 ESTS_{i,t} \\ & + \beta_7 EX_{i,t} + \beta_8 M/B_{i,t-1} + \beta_9 LnTA_{i,t-1} + \beta_{10} LOSS_{i,t} + \beta_{11} DUAL_{i,t-1} + \beta_{12} EV_{i,t} + \beta_{13} ESUP_{i,t} \\ & + \beta_{14} LEV_{i,t-1} + \varepsilon \end{aligned} \quad (3)$$

Definitions of equity incentive variables and control variables in Eq. (3) are presented in Appendix A.

One may criticise that the two different types of equity incentives – stock options and RSUs – are treated as the same in Eq. (3). This study therefore employs the dummy coding approach to distinguish the impact of stock options with that of RSUs on FACC and FDISP. More specifically, two dummy coding categorical variables were used: one is a stock option indicator (OP), which is defined as 1 for stock options being granted to managers and 0 otherwise; while another is an RSU indicator (RSU), which equals 1 for RSUs granted to managers and 0 otherwise. Listed firms without an EIP were used as the reference group. The multivariate regressions are shown below:

$$\begin{aligned} FACC_{i,t}/FDISP_{i,t} = & \beta_0 + \beta_1 OP_{i,t-1} + \beta_2 RSU_{i,t-1} + \beta_3 SO_{i,t-1} + \beta_3 OC_{i,t-1} + \beta_4 FO_{i,t-1} + \beta_5 IND_{i,t-1} \\ & + \beta_6 ESTS_{i,t} + \beta_7 EX_{i,t} + \beta_8 M/B_{i,t-1} + \beta_9 LnTA_{i,t-1} + \beta_{10} LOSS_{i,t} + \beta_{11} DUAL_{i,t-1} + \beta_{12} EV_{i,t} \\ & + \beta_{13} ESUP_{i,t} + \beta_{14} LEV_{i,t-1} + \varepsilon \end{aligned} \quad (4)$$

In addition, a smaller size of sample that only includes firms with an EIP is used to test Hypothesis 2. A stock option dummy (OPTION), which equals 1 if stock options used in the EIPs and 0 otherwise, is therefore served as the explanatory variable in the multivariate regression model, which is presented as:

Table 1
Summary Statistics.

Panel A: the full sample (n = 2492)							
Variables	Mean	St. Dev	Mini.	Q1	Median	Q3	Max.
FACC	-2.62	2.20	-29.79	-3.73	-1.99	-0.91	0.00
FDISP	1.43	1.89	0.03	0.53	0.95	1.78	21.16
L.EIP	0.57	1.49	0.00	0.00	0.00	0.00	13.44
OP	0.09	0.29	0.00	0.00	0.00	0.00	1.00
RSU	0.13	0.37	0.00	0.00	0.00	0.00	1.00
SO	30.56	24.94	0.00	13.58	28.16	46.69	84.71
OC	62.49	14.46	14.79	52.87	63.57	73.09	100.00
FO	2.41	8.35	0.00	0.00	0.00	0.00	73.63
IND	0.37	0.05	0.09	0.33	0.33	0.38	0.67
ESTS	15.70	10.42	3.00	7.00	13.00	22.00	57.00
EX	0.04	0.18	0.00	0.00	0.00	0.00	1.00
M/B	1.93	1.17	0.21	1.23	1.57	2.18	15.06
LnTA	22.58	1.60	19.69	21.42	22.25	23.42	30.14
LOSS	0.01	0.12	0.00	0.00	0.00	0.00	1.00
DUAL	0.21	0.41	0.00	0.00	0.00	0.00	1.00
EV	0.03	0.03	0.00	0.01	0.02	0.04	0.39
ESUP	8.87	22.81	0.00	5.76	8.72	10.22	390.61
LEV	13.42	17.24	0.00	3.15	4.68	23.07	89.92

Panel B: the smaller sample only consisting of listed firms with an EIP (n = 558)							
Variables	Mean	St. Dev	Mini.	Q1	Median	Q3	Max.
FACC	-2.95	2.75	-26.95	-3.94	-2.19	-1.07	-0.03
FDISP	1.58	1.81	0.08	0.48	1.02	2.05	17.89
OPTION	0.58	0.49	0.00	0.00	1.00	1.00	1.00
SO	7.54	16.324	0.00	0.00	0.00	4.612	83.68
OC	62.10	14.52	14.79	53.76	64.07	73.48	96.94
FO	2.78	9.39	0.00	0.00	0.00	0.00	71.31
IND	0.38	0.06	0.30	0.33	0.36	0.43	0.67
ESTS	13.52	10.14	3.00	6.00	10.00	19.00	51.00
EX	0.14	0.35	0.00	0.00	0.00	0.00	1.00
M/B	2.11	1.38	0.77	1.33	1.69	2.39	15.06
LnTA	21.88	1.26	19.85	21.02	21.55	22.54	27.20
LOSS	0.01	0.07	0.00	0.00	0.00	0.00	1.00
DUAL	0.35	0.48	0.00	0.00	0.00	1.00	1.00
EV	0.02	0.02	0.00	0.01	0.02	0.03	0.18
ESUP	6.53	7.27	0.00	2.14	5.78	8.71	30.13
LEV	7.46	13.10	0.00	0.00	0.23	8.10	78.43

See Appendix A for definitions of variables.

$$\begin{aligned}
 FACC_{i,t}/FDISP_{i,t} = & \beta_0 + \beta_1 OPTION_{i,t-1} + \beta_2 SO_{i,t-1} + \beta_3 OC_{i,t-1} + \beta_4 FO_{i,t-1} + \beta_5 IND_{i,t-1} + \beta_6 ESTS_{i,t} \\
 & + \beta_7 EX_{i,t} + \beta_8 M/B_{i,t-1} + \beta_9 LnTA_{i,t-1} + \beta_{10} LOSS_{i,t} + \beta_{11} DUAL_{i,t-1} + \beta_{12} EV_{i,t} + \beta_{13} ESUP_{i,t} \\
 & + \beta_{14} LEV_{i,t-1} + \varepsilon
 \end{aligned} \tag{5}$$

5. Empirical results and analysis

5.1. Descriptive statistics

The descriptive statistics for the full sample and the smaller sample only consisting of listed firms issuing management equity incentives are presented in Table 1; Panel A and Panel B, respectively. From Panel A, the mean (median) values of FACC and FDISP are -2.62% (-1.99%) and 1.43% (0.95%) of stock price, respectively.

Consistent with Hu and Zhou (2008), the level of management compensation in the form of EIPs is rather low, as the mean and median of L.EIP are 0.57% and 0%, respectively. Also, the mean and median of SO are 30.56 and 28.16%, respectively, indicating that nearly one-third of Chinese listed firms' shares are held by the state, which is in line with the early Chinese stock market studies (e.g. SHSE Statistical Yearbook, 2008). Moreover, foreign ownership in selected firms is at a low level, as the mean and median of FO are 2.41% and 0%, respectively. On the contrary, stock ownership in Chinese listed firms is largely concentrated, as the mean and median of OC are 62.49% and 63.57%, respectively. Given that the mean and median of IND are 0.37 and 0.33, respectively, suggesting that most listed firms have complied with the CSRC's requirement that at least one-third of board members should be made up of independent directors. It also appears that most listed firms have

separated the roles of CEO and chairman of the board, as the median and third quartile of DUAL are 0. Furthermore, Panel B shows that the mean and median of OPTION are 0.58 and 1, respectively, indicating that more than half of listed firms adopting EIPs actually issued stock options, rather than RSUs, to management. In addition, the mean and median of SO in Panel B are 7.54% and 0%, respectively, which are considerably lower than those of SO reported in Panel A. These findings are largely in line with [Yian and Qiao's \(2012\)](#) view that the majority of Chinese listed firms adopting EIPs are non-state-owned or controlled enterprises, and stock options are the most widely used equity incentives by these firms.

5.2. Multivariate analysis

First, the variance inflation factor (VIF) was used to identify any potential multicollinearity among independent and control variables when running the multiple regression models. The results (unreported) show that the VIFs for all independent and control variables are lower than 3, suggesting that there is no evidence of a serious multicollinearity problem. Outliers are identified, and then all variables (excluding dummy variables) are winsorised at the 1% and 99% levels to reduce the effect of these extreme values in the data. The (unreported) results obtained using the winsorised data were qualitatively similar to those results (using the original/un-winsorised data) reported here.

[Table 2](#) Panel A (Panel B), reports the results of testing the impacts of equity incentive variables – L.EIP, OP, RUS, and OPTION – on FACC and FDISP. All forecast accuracy and forecast dispersion models use Ordinary Least Squares (OLS) with two-way cluster-robust standard errors (CL-2) to control for both year and industry effects. First, L.EIP is positively associated with FACC at a significance level of 5% for Model I, whilst the correlation between L.EIP and FDISP is not statistically significant. Hypothesis 1 therefore is partially supported. The finding is largely in line with the view that equity incentives can be a useful means to align the interests of the principal and the agent, and then managers are less likely to engage in earnings and disclosure management ([Bhat et al., 2006](#); [Brown et al., 2011](#); [Han et al., 2014](#); [Kanagaretnam et al., 2012](#)). As a result, the complexity of forecasting has been reduced, leading to more accurate analysts' forecasts. Moreover, the association between RSU and FACC (FDISP) is positive (negative) and significant at a level of 1% (5%) for Model II (Model IV); whereas OP is positively (negatively) related with FACC (FDISP), but not at any significance levels. The results suggest that: (1) the impact of RSUs on analysts' forecast accuracy appears to be the determining factor in the positive relationship between FACC and L.EIP, as reported in Model I; (2) compared to stock options, RSUs seem to be a more effective means to align the interests of managers and shareholders and then, to mitigate earnings and disclosure management, leading to less complexity of forecasting ([Bartov & Mohanram, 2004](#); [Dodonova & Khoroshilov, 2006](#); [Frank et al., 2009](#); [Irving et al., 2011](#); [Kanagaretnam et al., 2012](#)).

Moreover, as reported in [Table 2](#), Model III, OPTION is negatively associated with FACC at a significance level of 1%. This result is partially consistent with *hypothesis 2*, implying that compared to RSUs, the use of stock options is more likely to induce managers to engage in information and earnings management, in order to boost stock prices in the short-term. Such opportunistic behaviours result in the low corporate information environment of financial analysts, as reflected by less accurate analysts' forecasts ([Bartov & Mohanram, 2004](#); [Kanagaretnam et al., 2012](#)).

Turning to control variables, [Table 2](#) reports that ESTS (LOSS) is positively (negatively) related to FACC at a significance level of 1% for Model I and II (Models I–III). The findings are consistent with previous studies ([Duru & Reeb, 2002](#); [Gu & Wu, 2003](#); [Ho & Tsay, 2004](#); [Lang & Lundholm, 1996](#)) that forecast accuracy is higher (lower) for firms with more analysts following (suffering accounting losses). Also, DUAL is negatively correlated with FACC for Model I and II, suggesting that separating CEO and the chairman of the board can increase the board's independence from management, enhance the board's monitoring and oversight function, and then lead to high quality disclosure, as reflected by more accurate analyst forecasts. In addition, the association between M/B and FACC (FDISP) is positive (negative) and significant at a level of 1% (5%). The findings are in line with the view of [Lev \(2001\)](#) and [Leung and Srinidhi \(2006\)](#) that firms with greater growth opportunities tend to more actively communicate with investors, leading to more transparent corporate disclosure. Furthermore, consistent with [Zarzeski \(1996\)](#), LEV is negatively (positively) correlated with FACC (FDSIP) at a significance level of 5% for Model I and II (Model IV and V), suggesting that in countries with strong banking relationships, such as China, listed firms rely heavily on funding from banks and, then, banks become insiders who can directly obtain private information from the management. As such, there would be less demand for high quality public disclosure, and the information environment of companies with high leverage tends to be less transparent. However, the association between SO and FACC (FDISP) is positive (negative) and significant at a level of 5% for Model I and II (Model IV and V). The findings could be explained by that, as the controlling shareholder of many listed firms, the state may be willing to promote an information environment sufficiently transparent so as to monitor the firm's activities for its own ends, such as for attracting foreign investments and/or securing the safety of state assets ([Tian & Estrin, 2008](#); [Wang, Sewon, & Claiborne, 2008](#)). As a result, more transparent information environment leads to more accurate and less dispersed analysts' earnings forecasts.

5.3. Additional and robustness tests

5.3.1. Controlling for endogeneity issue

Early research documents that the level of equity incentives, such as stock options granted to management, is determined by certain firm-specific factors, such as firm size, profitability, growth opportunity, leverage, the dual role of board chairman and CEO, ownership and control features ([Aggarwal & Samwick, 1999](#); [Core, Holthausen, & Larcker, 1999](#); [Shleifer & Vishny,](#)

Table 2
Regression of Analysts' Forecast Accuracy (FACC) and Forecast Dispersion (FDISP) on Equity Incentive Variables.

		Panel A: Forecast Accuracy Models						Panel B: Forecast Dispersion Models							
		Model I: Equity Incentive Model		Model II: Dummy Coding Model		Model III: Stock Option Model		Expected Sign		Model IV: Equity Incentive Model		Model V: Dummy Coding Model		Model VI: Stock Option Model	
		Coeff.	CL-2 T-stat.	Coeff.	CL-2 T-stat.	Coeff.	CL-2 T-stat.			Coeff.	CL-2 T-stat.	Coeff.	CL-2 T-stat.	Coeff.	CL-2 T-stat.
LEIP	+	0.123	2.51*					–		–0.239	–2.28				
OP	+			0.172	1.01			–				–0.189	–1.14		
RSU	+			0.417	3.69**			–				–0.278	–2.90*		
OPTION	–					–0.321	–4.46**	+						0.260	1.34
SO	–	0.009	2.61*	0.009	2.63*	0.007	1.78	+		–0.005	–2.84*	–0.005	–2.83*	–0.003	–1.00
OC	–	0.004	0.81	0.004	0.80	–0.001	–0.11	+		–0.002	–0.53	–0.002	–0.52	–0.007	–0.76
FO	+	0.027	0.62	0.003	0.62	–0.009	–0.58	–		–0.007	–0.13	–0.004	–0.13	0.007	1.86
IND	+	–0.903	–1.16	–0.915	–1.11	–1.219	–0.72	–		–0.787	–1.77	–0.777	–1.75	0.388	0.20
ESTS	+	0.021	3.90**	0.021	3.93**	0.011	1.06	–		–0.013	–2.09	–0.012	–2.07	–0.014	–1.26
EX	+	0.205	0.65	0.262	0.78	0.215	0.59	–		–0.284	–2.04	–0.305	–2.05	–0.341	–1.96
M/B	+	0.511	5.17**	0.511	5.20**	0.520	4.60**	–		–0.302	–3.19*	–0.302	–3.19*	–0.304	–3.09*
LnTA	+	0.079	2.04	0.079	1.64	0.148	1.62	–		0.058	1.10	0.054	1.11	–0.093	–1.08
LOSS	–	–3.598	–6.51***	–3.592	–6.48**	–6.568	–14.37***	+		0.063	0.21	0.061	0.21	0.383	0.49
DUAL	–	–0.238	–3.04*	–0.235	–2.98*	–0.443	–2.43	+		0.034	0.52	0.033	0.50	0.113	0.76
EV	–	–7.657	–4.72**	–7.603	–4.69**	–14.569	–4.03**	+		5.741	2.95*	5.721	2.94*	12.960	2.44
ESUP	–	–0.006	–2.15	–0.007	–2.15	0.006	0.42	+		–0.001	–0.52	–0.004	–0.50	0.018	4.30**
LEV	–	–0.013	–3.43*	–0.014	–3.40*	–0.013	–0.90	+		0.011	2.71*	0.010	2.71*	0.014	1.71
R-square										22.3%		16.2%		17.1%	
N										2492		2492		2492	

***, **, * Significant at the 0.1%, 1%, and 5% levels (two-tailed test); see Appendix A for definitions of variables.

Table 3
Regression of Analysts' Forecast Bias (BIAS) on Equity Incentive Variables.

	Expected sign	Model I: Equity Incentive Model		Model II: Dummy Coding Model		Model III: Stock Option Model	
		Coeff.	CL-2 T-stat.	Coeff.	CL-2 T-stat.	Coeff.	CL-2 T-stat.
L.EIP	–	–0.092	–2.03				
OP	–			–0.181	–0.27		
RSU	–			–0.015	–2.68*		
OPTION	+					0.224	1.65
SKEW ^a	+	0.309	14.21***	0.306	13.64***	0.415	2.77*
SO	+	–0.004	–2.35	–0.004	–2.34	–0.002	–1.40
OC	+	–0.002	–0.48	–0.002	–0.49	–0.001	–0.03
FO	–	–0.002	–0.61	–0.001	–0.63	0.006	1.38
IND	–	1.214	2.44	1.208	2.40	1.079	1.19
ESTS	–	–0.009	–2.21	–0.008	–2.16	–0.003	–1.84
EX	–	–0.081	–0.69	–0.128	–1.03	–0.074	–0.96
M/B	–	–0.274	–5.66**	–0.273	–5.68**	–0.266	–5.58**
LnTA	–	–0.077	–2.05	–0.076	–2.03	–0.086	–1.36
LOSS	+	1.582	3.72**	1.586	3.75**	2.174	5.42**
DUAL	+	0.138	2.06	0.136	2.08	0.029	0.22
EV	+	3.014	2.78*	2.987	2.75*	1.913	2.63*
ESUP	+	0.006	3.50*	0.007	3.48*	0.003	0.03
LEV	+	0.005	3.28*	0.005	3.18*	–0.009	–0.22
R-square		24.4%		25.8%		15.2%	
N		2492		2492		558	

***, **, * Significant at the 0.1%, 1%, and 5% levels (two-tailed test).

^a SKEW = the difference between the mean and the median forecast divided by price at the beginning of year t; see Appendix A for definitions of other variables.

1997). This study therefore needs to check and address the potential endogeneity issue. First, the Hausman specification test is employed to identify this issue, and the test results (unreported) show that the integrated residuals of the reduced-form regression are not significant in all multi-regressions. In addition, two-stage least squares (2SLS) regression analyses are applied, and the untabulated analysis results demonstrate that the association between L.EIP and FACC remains positively significant at a level of 5%. It therefore concludes that there is no indication of endogeneity in these test models, as shown in Table 2.

5.3.2. Additional measures of other analysts' output variables

In the above primary tests, this paper investigates the impacts of EIPs on analysts' forecast accuracy and dispersion. However, several early studies also use forecast bias and stock recommendation as analysts' output variables. These studies find that analysts' forecasts appear to be more optimistic/biased for firms with higher levels of management compensation (Kanagaretnam et al., 2012), and financial analysts may purposely bias their stock recommendations to achieve other objectives (Barniv, Hope, Myring, & Thomas, 2010). This paper therefore employs forecast bias and stock recommendation as additional variables to further examine the impacts of EIPs on the analysts' outputs.

First, following Kanagaretnam et al. (2012), forecast bias (BIAS) is defined as:

$$BIAS_{i,t} = \frac{FEPS_{i,t-1} - AEPS_{i,t}}{P_{i,t-1}} \quad (6)$$

Where: $FEPS_{i,t-1}$ = the mean earnings per share (EPS) forecast one year ahead for year t;

$AEPS_{i,t}$ = the actual EPS for year t;

$P_{i,t-1}$ = the stock price at the beginning of year t.

Then, BIAS is used as the dependent variable in Eqs. (3)–(5).

In order to measure another analysts' output – stock recommendations, this study downloaded individual analyst's stock recommendation data for all Chinese listed firms from the CSMAR database during the period of 2008–2014. It yields a sample of 857 firms and 22,217 firm-year observations. However, the sample size has been reduced to 324 firms and 5523 firm-year observations when eliminating firms without adopting an EIP. Following Barniv et al. (2010), analysts' stock recommendations (REC) are coded as –2 for “sell” recommendation, –1 for “reducing” recommendation, 0 for “hold” recommendation, 1 for “accumulating” recommendation, and 2 for “buy” recommendation. Next, this study employs ordered probit regression models to examine the impact of EIPs on REC.

Table 3 (Table 4) reports the association between BIAS (REC) and equity incentive variables. Based on Table 3, BIAS is negatively associated with RSU at a significance level of 5% for Model II, while the correlation between BIAS and OP is negative, but not at any significance levels. Also, BIAS and L.EIP are not significantly associated. Overall, the above findings are partially in line with the test results reported in Table 2, suggesting that the use of RSUs appears to considerably improve the information environment of financial analysts, leading to less biased analysts' forecasts. In addition, Table 3, Model III,

Table 4
Ordered Probit Regression of Analysts' Stock Recommendations (REC) on Equity Incentive Variables.

	Expected sign	Model I: Equity Incentive Model		Model II: Dummy Coding Model		Model III: Stock Option Model	
		Coeff.	CL-2 Z-stat.	Coeff.	CL-2 Z-stat.	Coeff.	CL-2 Z-stat.
L.EIP	+	0.203	4.07***				
OP	+			0.210	4.37***		
RSU	+			0.192	1.54		
OPTION	+					0.021	1.16
SO	–	–0.006	–0.89	–0.001	–0.88	–0.001	–0.75
OC	–	–0.004	–4.89***	–0.005	–4.80***	–0.004	–1.70
FO	+	0.001	0.44	0.001	0.45	0.001	0.55
IND	+	0.415	1.16	0.416	1.15	0.317	1.08
ESTS	+	0.001	2.06*	0.009	2.05*	–0.002	–1.16
EX	+	0.161	3.21**	0.167	4.32***	0.155	3.77***
M/B	+	0.002	0.08	0.002	0.07	0.003	0.01
LnTA	+	0.030	1.21	0.030	1.21	0.055	2.87*
LOSS	–	–0.484	–4.25***	–0.483	–4.55***	–0.904	–14.28***
DUAL	–	–0.014	–0.25	0.011	0.23	–0.064	–1.55
EV	–	–1.449	–3.95***	–1.448	–4.01***	0.065	0.08
ESUP	–	–0.004	–3.05**	–0.004	–3.04**	–0.017	–5.35***
LEV	–	0.001	0.91	0.001	0.89	–0.005	–2.18*
Pseudo R-square		16.1%		16.9%		11.2%	
N		22,217		22,217		5523	

***, **, * Significant at the 0.1%, 1%, and 5% levels (two-tailed test); see Appendix A for definitions of variables.

presents the test results when using the sub-sample that only consists of all listed firms that have adopted EIPs. BIAS is positively correlated with OPTION, but not at any significance levels.

As reported in Table 4, although there is no significant correlation between REC and RSU (OPTION), REC is positively associated with L.EIP (OP) at a significance level of 0.1% for Model I (Model II). The findings suggest that financial analysts are more likely to issue favourable stock recommendations for listed firms having a high level of management compensation in the form of EIPs in general, and for those firms granting stock options to managers in particular. These findings may be explained as follows: when a listed firm grants management stock options, managers could be induced to engage in earnings and disclosure management by highlighting good news and then issuing optimistic management guidance and earnings announcements, in order to secure their compensation pay (Bartov & Mohanram, 2004; Kanagaretnam et al., 2012). Moreover, private communication with management is one of the most important information sources for financial analysts to generate earnings forecasts and stock recommendations (Brown, Call, Clement, & Sharp, 2015; Chen & Matsumoto, 2006). Under such circumstances, financial analysts are likely under pressure from managers to issue favourable stock recommendations and/or not to issue recommendations downgrades, because managers may cut off the information flow to analysts who issue negative reports on the firm (Angwin & Peers, 2001; Soloman and Frank, 2003).

5.3.3. Using individual analyst earnings forecast data

This study uses analysts' forecast consensus data to measure forecast accuracy (FACC) in the primary tests. However, some previous studies also employed individual analyst's forecast data to measure forecast accuracy (Barniv, Myring, & Thomas, 2005; Clement, 1999; Firth et al., 2013; Jacob, Lys, & Neale, 1999; Xu et al., 2013). Following these studies, this research re-examined the impacts of equity incentives on forecast accuracy by using individual analyst's forecast data. First, the individual analyst's forecast data for all listed firms available in the CSMAR database during the period of 2008–2014 were downloaded, resulting in a test sample of 915 firms and 34,403 firm-year observations. Next, in order to test hypothesis 2, only listed firms adopting the EIPs were selected, and then, the sample size was reduced to 352 firms and 8361 firm-year observations. This study therefore re-ran the multiple linear regressions outlined in Section 4.3.

As reported in Table 5, the association between FACC and L.EIP (RSU) remains positively significant at a level of 5% for Model I (Model II). Also, FACC is still negatively correlated with OPTION at a significant level of 5%. Overall, the test results using individual analyst's forecast data are consistent with those using analysts' forecast consensus data, as reported in Table 2, Panel A.

6. Summary and conclusion

This paper examines the impact of EIPs on the prominent analysts' outputs – earnings forecasts and stock recommendations – in China's unique corporate setting. It finds that analysts' forecast accuracy is significantly higher for listed firms with a high level of management compensation in the form of EIPs. This finding is consistent with the alignment view of equity incentives (Han et al., 2014; Jensen & Meckling, 1976; Kanagaretnam et al., 2012). However, financial analysts tend to issue favourable stock recommendations for listed firms granting management stock options. Moreover, it appears that different types of equity incentives – stock options and RSUs – have different impacts on analysts' forecasts. Indeed, ana-

Table 5
Analysts' Forecast Accuracy Regression (FACC) on Equity Incentive Variables Individual Analyst's Forecast Data.

	Expected sign	Model I: Equity Incentive Model		Model II: Dummy Coding Model		Model III: Stock option Model	
		Coeff.	CL-2 T-stat.	Coeff.	CL-2 T-stat.	Coeff.	CL-2 T-stat.
L.EIP	+	0.039	2.70*				
OP	+			0.083	1.64		
RSU	+			0.166	2.95*		
OPTION	–					–0.174	–2.66*
STAR ^a	+	2.005	4.37**	2.001	4.36**	2.213	8.97***
SO	–	0.007	2.20	0.007	1.98	0.010	2.33
OC	–	0.002	1.52	0.002	1.63	–0.003	–0.57
FO	+	–0.005	–0.11	–0.006	–0.14	–0.006	–1.03
IND	+	–1.236	–0.96	–1.203	–1.02	–1.281	–0.77
ESTS	+	0.014	2.61*	0.013	2.54	0.007	2.39
EX	+	0.255	4.36**	0.283	4.44**	0.211	2.91*
M/B	+	0.527	4.82**	0.528	4.87**	0.350	7.11***
LnTA	+	0.072	1.18	0.072	1.16	0.195	3.00*
LOSS	–	–3.655	–5.42**	–3.656	–5.41**	–4.652	–8.82***
DUAL	–	–0.289	–4.49**	–0.298	–4.32**	–0.334	–2.38
EV	–	–9.110	–3.85**	–9.205	–3.97**	–4.201	–2.14
ESUP	–	–0.009	–2.40	–0.009	–2.37*	–0.015	–1.05
LEV	–	–0.017	–4.50**	–0.017	–4.54**	–0.001	–0.39
R-square		22.5%		25.1%		18.7%	
N		34,403		34,403		8361	

***, **, * Significant at the 0.1%, 1%, and 5% levels (two-tailed test).

^a STAR = 1 if earnings forecasts made by star analysts nominated by *The New Fortune* in year $t - 1$, and 0 otherwise; see Appendix A for definitions of other variables.

lysts forecast accuracy (dispersion/bias) tends to be lower (higher) for listed firms granting stock options, instead of RSUs, to management, suggesting that stock options appear to be a less effective means to align the interests of managers and shareholders. As a result, managers may be induced to engage in information and earnings management, resulting in low corporate transparency that increases the complexity of forecasting, and hence, less forecast accuracy (Frank et al., 2009; Irving et al., 2011).

There are several implications for the above results. First, the finding of a positive relationship between forecast accuracy and the level of management equity incentives suggests that the government's recently-issued policies on EIPs have an overall positive impact on the information environment of financial analysts, leading to more accurate earnings forecasts that could facilitate investment decision-making. Second, given the positive (negative) association between the categorical variable – RSU – and forecast accuracy (dispersion/bias), the government should revise the policies on EIPs to encourage listed firms to choose RSUs over stock options when designing their management compensation plans. Furthermore, the findings of this study can be of interest to investors. Given that earnings forecasts provided by financial analysts are vital for investment decision-making, the stocks of Chinese listed firms with higher levels of managerial ownership may become more attractive to investors.

Appendix A. Definition of Variables.

Variable names	Variable definitions
Analysts' forecast accuracy (FACC)	FACC = $[(-1) \times \text{absolute value of the difference between mean EPS forecast and actual EPS} / \text{the stock price at the beginning of the year}] \times 100\%$
Analysts' forecast dispersion (FDISP)	FDISP = $(\text{the standard deviation of all EPS forecasts for the year} / \text{the stock price at the beginning of the year})$
The level of management equity incentives (L.EIP)	L.EIP = $[\text{the number of all equity incentives (including new, existing exercisable and/or un-excisable equity incentives) held by managers} / \text{total number of shares outstanding}] \times 100\%$
Stock option categorical variable (OP)	OP = 1 if stock options grant to managers, and 0 otherwise
RSU categorical variable (RSU)	RSU = 1 if restricted stock units grant to managers, and 0 otherwise
Stock option dummy (OPTION)	OPTION = 1 for stock options being used in the EIPs, and 0 otherwise
State ownership (SO)	SO = $(\text{the number of state-owned shares} / \text{the total number of shares outstanding}) \times 100\%$
Ownership concentration (OC)	OC = $(\text{the number of shares held by top}_10 \text{ largest shareholders} / \text{the total number of shares outstanding}) \times 100\%$;
Foreign ownership (FO)	FO = $(\text{the number of shares held by foreign investors} / \text{the total number of shares outstanding}) \times 100\%$
Independent directors (IND)	IND = the proportion of independent directors to board size
Analysts following (ESTS)	ESTS = the number of analysts following the firm

Equity exercise indicator (EX)	EX = 1 for managers exercising their incentive shares, and 0 otherwise
Growth opportunity (M/B)	M/B = market-to-book value
Firm size (LnTA)	LnTA = natural logarithm of firms' total assets
Accounting loss indicator (LOSS)	LOSS = 1 for the firm reporting accounting loss in year t, and 0 otherwise
Dual role dummy (DUAL)	DUAL = 1 for the roles of CEO and chairman are combined, and 0 otherwise
Earnings volatility (EV)	EV = the standard deviation of return on assets for previous 5-year period
Earnings surprise (ESUP)	ESUP = (absolute value of the difference between current year's EPS and last year's EPS/price at the beginning of the year)*100%
Leverage (LEV)	LEV = (long-term liability/capital employed)*100%

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