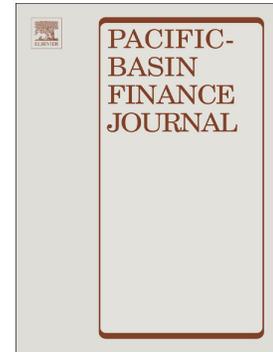


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Effect of say on pay on CEO compensation and spill-over effect on
corporate cash holdings: Evidence from Australia

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Abstract

We examine the impact of Australia's *Remuneration Amendment Act 2011* on CEO compensation and its spill-over effect on cash holdings to better understand how the new legislation affects the principal–agent relationship. Using a sample of ASX top 300 firms from 2004 to 2015, we find that the *Act* leads to more use of equity-based compensation. We also document that, after the introduction of the *Act*, CEO equity-based and total compensations are negatively related with cash holdings, i.e., more equity and total compensations lead to lower cash holdings (a spill-over effect), indicating alignment of the principal–agent interests. We praise the *Act* for the achievements. Our results are robust to different estimation techniques. Our findings provide important insights for the discussion on compensation regulations.

Keywords: corporate governance; say on pay; CEO compensation; cash holdings

JEL Classification: G34, G38, M42, M48

1 Introduction

Australia introduced a new shareholder ‘say on pay’ legislation, *Corporations Amendment (Improving Accountability on Director and Executive Remuneration) Act 2011* (the *Remuneration Amendment Act* or the *Act*, hereafter), which took effect on 1 July 2011. The *Remuneration Amendment Act* sets out unique requirements that enable shareholders to register their dissenting votes more effectually against CEO remuneration plans at the Annual General Meetings (AGMs)¹ and that force firms to face potentially severe consequences if shareholder concerns are not adequately addressed (Monem and Ng, 2013; Grosse et al., 2017). Due to its unique requirements, the *Act* has undoubtedly the capacity to influence firms’ CEO compensation policies directly and other related policies indirectly (Walker, 2010; Grosse et al., 2017). This study examines two related research questions arising from the *Act*: (1) what impact does the *Act* have on CEO compensation, in total and in composition? (2) how does CEO compensation relate, after the *Act*, to corporate cash holdings – a key firm policy?

The *Remuneration Amendment Act*, widely known as the ‘two-strikes’ rule, provides shareholders, especially the dispersed and minority groups, with a more effective mechanism to register their dissent on CEO remuneration plans with a low cut-off point (i.e., a minimum 25% of votes) to trigger a ‘strike’ against the firm. If a firm receives a strike at two consecutive AGMs, shareholders can vote at the second AGM to decide whether the board should be put up for re-election: if approved, a re-election of the board will take place. The *Act* also sets out clear process and actions for corporate boards to undertake to address shareholder concerns, and explains the consequences if shareholder concerns are not adequately mitigated. The requirements are specific and the consequences are predictable and potentially severe: dissolution and re-election of boards (Monem and Ng, 2013; Grosse et al., 2017). With the rigorous requirements of

¹ Although the *Act* governs director and executive remuneration, our focus is on CEO remuneration, as the latter is the main concern of excessive pay.

the *Act*, shareholders can expect to obtain their preferred ways to remunerate executives more easily, and firms will amend and implement remuneration policies to satisfy shareholder demands.

Since the two-strikes rule was enacted, a few studies have investigated the effect of the *Act* on CEO compensation from different perspectives. For instance, Monem and Ng (2013) and Bugeja et al. (2016) examine the impact of receiving a strike on the pay–performance link, and Faghani et al. (2015) and Grosse et al. (2017) investigate the association between CEO pay and the incidence of receiving a strike. These studies employ strike data and matched-pair design: they identify firms that receive strike (either ‘first strike’ only or ‘first strike’ and ‘second strike’) and match each strike firm with a ‘non-strike’ firm to examine the impact of the *Act*.

While these studies provide useful insight into shareholder dissent votes, they have not examined the intended influence of the *Act* on CEO pay (in total and in composition) in all the firms under the *Act*, given that the firms are obliged to implement the regulatory requirements. It is reasonable to expect that, after the *Act* became effective, all firms (both strike and non-strike firms) would endeavor to review CEO compensation and adjust, if needed, to meet the *Act*’s requirements and the shareholders’ expectations, to avoid receiving dissent votes. The analysis of only strike firms, matched with non-strike firms, in these studies does not preclude the possibility that the *Act* has impacted the CEO compensation of the firms that are not examined.² Consequently, the question regarding the impact the *Act* has on CEO compensation across the market remains unanswered (Shan and Walter, 2016). We are motivated to fill this research gap by investigating the impact of the *Act* on CEO compensation in terms of the total pay and three main pay components: stock options, equity-based

² Monem and Ng (2013) observe that their sample includes mostly small and less profitable firms, indicating that the strike data may not be representative of the market.

(including stock options and shares) compensation and cash bonuses.³ We find that, after the *Act*, Australian firms use fewer cash bonuses and more equity-based compensation, resulting in an increase in total compensation.

Corporations worldwide have considerably increased their cash holdings over the past two decades (Iskandar-Datta and Jia, 2012; Amess et al., 2015) and Australian firms show similar patterns (La Cava and Windsor, 2016). As excess cash holdings are considered detrimental to shareholder wealth (Jensen and Meckling, 1976; Dittmar and Mahrt-Smith, 2007; Tong, 2010), the phenomenon has attracted enormous research interest in investigating the causes and consequences of cash holdings (Amess et al., 2015). The causes are linked to the management motive for holding cash, while the consequences are examined through different measures, such as the value of cash holdings and firm performance. The management motive for holding excess cash is in turn associated with CEO compensation incentives (Opler et al., 1999; Tong, 2010; Liu and Mauer, 2011).

Excess cash holdings are said to be an agency problem due to managerial opportunism (Jensen and Meckling, 1976). Prior studies have examined how CEO compensation incentives (as an internal governance mechanism) influence corporate cash holding decisions: an efficient CEO pay structure that aligns the interests of managers and shareholders can limit a firm's investment in non-operational cash (e.g., Tong, 2010; Liu and Mauer, 2011). Equity-based compensation (e.g., options and shares) can help overcome managers' aversion to risk, aligning their interests with those of shareholders (Jensen and Meckling, 1976; Jensen and Murphy, 1990; Clarkson et al., 2011). With increased equity components in total compensation, managers would be motivated to pursue profitable investment projects to maximize shareholder value rather than to hold cash. Prior studies, which investigate the relationship between CEO

³ In Australia, CEO compensation usually reports these components: base salary, cash bonus (short term incentives), non-monetary benefits, superannuation benefits, termination benefits, equity-based payments and total remuneration (Grosse et al., 2017). In this study, we focus on cash bonus, options, equity-based compensation and total compensation.

compensation incentives and cash holdings, document that equity-based incentives can limit firms' investment in cash (e.g., Tong, 2010).

The *Act*'s capacity to influence CEO pay composition (resulting in fewer cash bonuses and more equity-based pay) leads to changes in CEO compensation incentives. Knowing that CEO's equity-based compensation better aligns management incentives with shareholders' interests, we expect firms to adopt cash policies that maximize firm value and shareholder wealth. Furthermore, shareholders may also take the opportunity of a dissenting vote to express their concerns over other firm policies such as dividend and leverage (Grosse et al., 2017). Consequently, we expect the *Act* (as an external governance mechanism) has a spill-over effect on corporate cash holdings. To date, however, no empirical study examines this important relationship. Our study fills this research gap by investigating the interaction effect of the *Act* and CEO compensation on cash holdings.

Our sample consists of the top 300 capitalized firms listed on the Australian Stock Exchange (ASX) for the period 2004 to 2015, yielding 3,064 firm-year observations. We conduct an empirical analysis using several multivariate tests. We find the *Act* impacts CEO compensation structure, in that Australian firms now use more equity-based incentives (i.e., options and shares) and fewer cash bonuses to remunerate CEOs, which also results in higher total compensation. We also find, after the *Act*, that CEO's equity-based and total pay incentives are negatively related to cash holdings, a key corporate policy, suggesting that higher CEO equity (thus risk) incentives lead to lower cash holdings. Further, we report a positive relationship between CEO incentives and the value of cash holdings after the *Act*. Overall, our results indicate that the *Act* has caused positive changes to CEO equity compensation and has a spill-over effect on cash holdings. Our results are robust to several econometrical techniques including the ordinary least square (OLS), and fixed effect (FE). Our results are consistent and robust

to narrow samples, the two-step system generalized method of moments (GMM), and the propensity score matching (PSM) estimators.

We contribute to the CEO compensation literature in the following ways. First, our findings suggest that the *Act* is effective in changing the CEO compensation structure, leading to more equity-based incentives and fewer cash bonuses to remunerate CEOs. This change is observed across the market of large and established Australian firms, not just in firms that receive strikes (which are small and less profitable, according to Monem and Ng, 2013), and is consistent with shareholders' preferences. Second, the *Act* leads to an increase in CEO total compensation, as a result of the increase in equity incentives more than the reduction in cash bonuses, due to the risk associated with equity compensation. This finding implies that shareholders do not use the two-strikes rule to target CEO total compensation (consistent with Grosse et al., 2017) as long as CEO pay structure meets their expectations. Third, we demonstrate in a novel piece of evidence that, after the *Act*, the relationship between CEO equity (as well as total) incentives and cash holdings is negative, indicating that the *Act* has a spill-over effect on cash holdings. This negative relationship indicates that the *Act* has the capacity to drive the alignment of the principal–agent interests through its influence on CEO compensation policies. In this regard, we praise the *Act* for its achievements. Our study, therefore, provides useful insight into this unique legislation and contributes to the global discussion on compensation regulations.

The remainder of the paper is organized as follows: Section 2 reviews related literature and develops the hypotheses; Section 3 describes the research design and models; Section 4 presents the empirical results; and Section 5 concludes this paper.

2 Related literature and hypothesis development

2.1 Background of say on pay regulations

In response to public outrage over CEO excessive pay, many countries have introduced say on pay regulations to enable shareholders to voice their dissent on CEO remuneration plans at AGMs. For instance, the UK enacted a mandatory non-binding shareholder vote on executive pay through the *Directors' Remuneration Report Regulations 2002*, and the US enacted the *Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act)* in 2010. Australia enacted its first non-binding say on pay reforms through the *Corporate Law Economic Reform (Audit Reform & Corporate Disclosure) Act 2004 (CLERP 9)*, which took effect on 1 July 2004.⁴ The non-binding nature means that firms are not required to act on shareholder concerns about the executive pay, even if the majority of the votes are dissenting (Monem and Ng, 2013). The evidence from the UK and Australia suggests that the non-binding votes are largely ignored by firms and are not effective in curbing excessive executive pay (Clarkson et al., 2011; Bugeja et al., 2016). To further empower shareholder say on pay, Australia introduced the *Remuneration Amendment Act 2011* (the two-strikes rule), effective from 1 July 2011.

Compared to the non-binding say on pay regulations, the two-strikes rule has a number of unique features that enable shareholders to register their dissent over CEO remuneration plans more easily and effectively. The *Act* requires only a minimum of 25% of 'no' votes to trigger a strike against the firm. If a firm receives a strike at two consecutive AGMs, shareholders can vote at the second AGM to decide whether the board (all directors except the CEO) should be put up for re-election within 90 days of the AGM (a 'spill vote'). If 50% or more of the eligible votes cast support director re-election, then re-election (a 'spill' meeting) will occur following the normal 50%

⁴ See, Clarkson, Walker, and Nicholls (2011) for a summary that outlines the important regulatory events in relation to executive remuneration disclosure and practice in Australia from 1998 to 2005.

majority voting rule. The *Act* also sets out clear actions for boards to undertake to address shareholder concerns over pay resolutions or to face consequences if the concerns are not adequately addressed. The requirements are specific and the consequences are potentially severe: dissolution and re-election of boards (see, Monem and Ng, 2013 and Grosse et al., 2017 for further explanation of the *Act*).

According to Monem and Ng (2013), the *Act* is the most significant corporate governance reform that Australian firms have observed since the implementation of the ASX corporate governance principles in 2003. Moreover, compared to other countries, the *Act* is regarded as “an internationally competitive system of executive remuneration that is transparent and accountable to shareholders” (a statement made by David Bradbury, Parliamentary Secretary to the Federal Treasurer, cited in Monem and Ng, 2013, p. 240). Given the rigorous requirements of the *Act*, Australia’s two-strikes rule provides a strong external governance mechanism on executive pay through which shareholders can expect to obtain their preferred ways to remunerate executives more easily, and firms will need to amend and implement remuneration policies to satisfy shareholder demands.

2.2 Remuneration Amendment Act and CEO compensation

Since the inception of the *Act*, a few studies that have examined its effect on CEO compensation from different perspectives have reported mixed results. Monem and Ng (2013), using strike data for 2011–2012 and matching strike firms with non-strike (control) firms, investigate the impact of receiving a strike on the pay–performance link. They find no relation between CEO pay changes and firm performance (using stock returns) for strike and control firms in 2011; however, there is a significant positive relation for both strike and control firms in 2012. In addition, they find the pay–performance link for the first-strike firms of 2011 (but avoided second-strike in 2012) strengthened in 2012 with lagged shareholder dissent. Their findings lend some support

for the positive effect of the *Act* on the pay–performance link. In contrast, Bugeja et al. (2016), who analyze strike data for 2011–2014, find no improvement in the pay–performance link after the first strike, but find that the pay–performance link becomes worse after the second strike. They confirm, when examining responses to a strike, that firms are likely to make changes to the growth and mix of CEO pay.

Faghani et al. (2015), using strike data for 2011–2013, examine the relation between shareholder dissent votes and the level and composition of CEO remuneration. Their finding, that first strike firms avoiding a second strike reduce CEO total pay, which is associated with a lower level of shareholder dissenting votes on the following remuneration report. They also report that first strike firms increase the proportion of CEO’s performance-based pay. Grosse et al. (2017), using strike data for 2011 and 2012, report no association between CEO pay (including various components and total, normal and excess pay) and the incidence of receiving a strike. They conclude that shareholder dissenting votes are not used to target CEO excess pay. However, they find strike firms have a 57.10% greater decrease in the CEO’s cash bonus in the following year than non-strike firms have, suggesting that shareholder say on pay can change CEO compensation structures.

To date, we are unaware of any study that examines the intended influence of the *Act* on CEO pay (in total and in composition) in all the firms that are obliged under the *Act* to implement the regulatory requirements. Murphy (2013) asserts that any compensation policy ignoring the government regulatory requirements is likely to ignore an important aspect of executive pay. The intended purposes of the *Act* are obviously to restrain CEO total pay and to achieve an efficient pay structure (that is, the use of various components of CEO pay, such as cash bonus and equity-based pay) that serves the best interests of shareholders. Therefore, it is reasonable to expect that, after the *Act* became effective, all firms (both strike and non-strike firms) would endeavor to

review CEO compensation and adjust, if needed, to meet the *Act*'s requirements and the shareholders' expectations, to avoid receiving dissent votes.

We focus on the key CEO pay components (i.e., cash bonus, equity-based and total compensation) that have theoretical significance in the literature (Walker, 2010; Ferri and Maber, 2013; Grosse, et al., 2017). We expect firms would respond to the two-strikes rule by amending these components in accordance with shareholders' expectations. Firms use cash bonus to reward managers for achieving specific performance targets, usually written in accounting-based measures such as profitability. As such, cash bonuses have two main features: (1) they reward management for past performance and are not related to future performance of firms; (2) they are certain money paid to managers in the present and are not affected by firm risk in the future. Because of these features, cash bonuses have been criticized for inducing reckless short-term managerial decision-making (e.g., window dressing, earnings manipulation), thereby sacrificing firms' long-term value (Walker, 2010), and have been labelled 'rewards for failure' (Ferri et al., 2008). Therefore, cash bonuses would not be the preferred way of pay for CEOs by shareholders.

Equity-based compensation (options and shares), on the other hand, is long-term oriented and ties CEO pay to the firm's future performance and value. To maximize the value of equity compensation, managers must maximize firm performance and value, consistent with the interests of shareholders. Therefore, we expect that shareholders, empowered by the *Act*, will want boards to remunerate CEOs with fewer cash bonuses and more equity compensation. The say on pay legislations in the UK, US, and EU countries observe the decline of cash bonuses in favor of equity-based compensation (Bushman and Smith, 2001; Dittmann et al., 2011; Ferri and Maber, 2013). Australian firms are also following the trend by enhancing the equity compensation in exchange for cash compensation (Matolcsy and Wright, 2007, 2011).

Total compensation, an all-inclusive measure, is expected to increase under the *Act*. When firms pay managers with more equity compensation in exchange for fewer cash bonuses, managers do not equate the market value (price) of equity compensation to the nominal value of cash bonuses. This is because cash is certain money and risk free whereas equity compensation (options and shares) is tied to the firm's future performance and value, which is risky. Meulbroek (2001) argues that managers are exposed to the firm's total risk, but are rewarded (through expected returns) for only the systematic portion of that risk; hence managers value stock or option-based compensation at less than its market value. Meulbroek (2001) finds that managers who, at the average NYSE firm have their entire wealth invested in the firm, value their options at 70% of their market value. Therefore, firms must compensate managers with a higher market value of equity compensation in exchange for a lower amount of cash bonuses, leading to an increase in total compensation. This discussion leads to H1:

H1: The Remuneration Amendment Act impacts CEO equity and total compensations positively, and cash bonus negatively.

2.3 Remuneration Amendment Act, CEO compensation and corporate cash holdings

Corporations worldwide have increased their cash holdings (in amount and in cash-to-asset ratio) considerably over the past two decades (Amess et al., 2015; La Cava and Windsor, 2016). Bates et al. (2009) document that the average cash-to-asset ratio for the US firms more than doubles over their sample period, from 10.5% in 1980 to 23.2% in 2006. Large cash holdings are also observed in the UK, Continental Europe, Japan, South Korea, and China (Iskandar-Datta and Jia, 2012; Amess et al., 2015; La Cava and Windsor, 2016). In Australia, La Cava and Windsor (2016) report that the average cash-to-asset ratio of listed companies between 1990 and 2014 is ranked among the top five in the OECD countries and exceeds that of their US counterparts.

Excess cash holdings are considered detrimental to firm value and shareholder wealth for two main reasons. First, cash holdings are a negative net present value (NPV) project, from the investment perspective, because interest incomes from cash deposit earn a return less than the firm's cost of capital (Tong, 2010) and are subject to double taxation (Opler et al., 1999). Second, cash holdings are easily accessible by managers, with little outside scrutiny, and are subject to managerial discretion in deployment (Dittmar and Mahrt-Smith, 2007; Bates et al., 2009). Self-interested managers keep excess cash for their private gains (e.g., perquisite consumptions) at the expense of shareholders.

Management motive for holding excess cash is said to be an agency problem (Jensen and Meckling, 1976; Amess et al., 2015). Since managers have undiversified interest in the firm, risk-eschewing managers would reduce firm risk to reduce their own risk (Jensen and Meckling, 1976; Tong, 2010; Liu and Mauer, 2011) and cash holdings are risk-free assets. Consequently, the agency theory asserts that managers keep high cash holdings to lower the firm (thus their own) risk, sacrificing firm (thus shareholder) value (Jensen and Meckling, 1976; Tong, 2010).

The agency motive for holding excess cash (due to managers' lower risk preference or perquisite consumptions) is constrained by a system of good corporate governance (Jensen, 1986; Amess et al., 2015), which includes internal mechanisms (e.g., board independence and CEO compensation incentives) and external mechanisms (e.g., debt and regulations). A good internal governance mechanism can alleviate agency conflict through monitoring managers and designing CEO pay packages that lead to alignment of managers' interests with those of shareholders (Jensen and Meckling, 1976; Dittmar and Mahrt-Smith, 2007; Clarkson et al., 2011). With the alignment of interests, the agency theory predicts that managers would act in the best

interests of shareholders by reducing cash holdings and engaging in positive investment projects (Jensen, 1986; Coles et al., 2006; Amess et al., 2015).

The relationship between CEO compensation incentives and cash holdings is an important issue from both theoretical and practical perspectives, as it helps to design a more efficient CEO pay structure that aligns the interests of managers with those of shareholders. Prior research, which investigates the question of how CEO compensation incentives influence corporate cash holdings (e.g., Tong, 2010; Liu and Mauer, 2011), documents that an efficient pay structure inducing interest alignment can limit firms' investment in cash needed only to support operations (Rajgopal and Shevlin, 2002; Coles et al., 2006). Prior research further argues that the equity component of compensation ties the managers' wealth with that of the firm (that is, risk-taking, or vega, incentives) and motivates managers to pursue riskier and more profitable investment projects to maximize shareholder value. Therefore, the relationship between CEO equity compensation and cash holdings is predicted to be negative (Jensen and Meckling, 1976; Coles et al., 2006; Tong, 2010; Amess et al., 2015).⁵

The *Act*, a significant piece of legislation, provides a strong external governance mechanism to oversee corporates in Australia (Monem and Ng, 2013). It has the capacity to change CEO pay composition through empowering shareholder say on pay. More specifically, prior research finds that strike firms amend their remuneration policies by using fewer cash bonuses and more equity-based pay for CEOs (Faghani et al., 2015; Bugeja et al., 2016; Grosse et al., 2017). The change in the CEO compensation structure (in particular, the increase in equity-based pay, also resulting in the increase in total pay) alters CEO compensation incentives, which leads to changes in related firm policies. Furthermore, the exercise of the two-strikes rule by shareholders is

⁵ Tong (2010) finds that firms with higher CEO risk incentives have lower cash holdings. Similarly, Coles et al. (2006), Core and Guay (1999), Rajgopal and Shevlin (2002), and Williams and Rao (2006) find that higher CEO risk incentives are associated with riskier investment and financing policy choices.

unlikely to be limited to CEO remuneration plans. Shareholders may also take the opportunity provided by the *Act* to express their concerns over other firm policies such as dividend and leverage (Grosse et al., 2017), as well as cash holdings. Prior research also concurs that shareholders target those firm policies indirectly associated with remuneration when expressing their dissent (Gillan and Starks, 2000; Ertimur et al., 2010; Grosse et al., 2017). Given the anticipated impact of the *Act* on CEO compensation and the likelihood of shareholders targeting other policies, it is expected that the *Act* (as an external governance mechanism) has a spill-over effect on corporate cash holdings. This spill-over effect, in turn, transfers some of the risk on the part of shareholders (related to high cash holdings) to risk-averse managers, thus aligning the interests between shareholders and managers (Tosi et al., 2000). We investigate the spill-over effect of the *Act* on corporate cash holdings through CEO compensation incentives, forming the second hypothesis:⁶

H2: CEO equity and total compensations are negatively related to corporate cash holdings after the Remuneration Amendment Act.

3 Research design

3.1 Sample

Our sample, obtained from Connect4, consists of the top 300 capitalized firms listed in the ASX from 2004 to 2015. The year 2004, the first year that Connect4 reports executive compensation information, includes items such as base salary, cash bonuses, share and option grants, and total compensation. The database divides the compensation into two sets: executives and directors. We collect compensation data for the “CEO/MD” position. We collect financial data of the sample firms from Morningstar DatAnalysis Premium.

⁶ The relation between cash bonus and cash holdings is not modelled as we see little theoretical significance in it.

We match the ASX codes reported in the Morningstar DatAnalysis Premium database with the compensation data before combining the data from the two sources. The initial sample consists of 3,600 firm-year observations. We exclude the firm-years with missing observations for accounting and compensation variables. We also drop financial and utility firms due to their industry-specific liquidity requirements following prior studies (e.g., Ozkan and Ozkan, 2004; Liu and Mauer, 2011). Finally, to be unbiased, we only allow firms to be part of the final sample if they are present in both the pre- and post-*Act* periods. The final sample consists of 3,064 firm-year observations. We classify firms on the basis of two-digit codes of the Global Industry Classification System (GICS). All the variables (dollar amounts) are inflation adjusted to 2015 dollars using the consumer price index.

3.2 Variables description

Table 1 provides the name, measurement, and data sources of the independent, dependent, and control variables. The independent variables are the *Remuneration Amendment Act* and CEO compensation incentives (as dependent variables in H1) including options, equity compensation, total compensation and cash bonus. We model the *Act* as a dummy variable, equaling 0 before and 1 after the *Act*. Cash holdings (*Cash*), the dependent variable (in H2), is measured as a ratio of cash and marketable securities to total assets, where total assets are defined as the book value of total assets, following prior studies (Bates et al., 2009; Nikolov and Whited, 2014; Liu et al., 2015).

CEO compensation incentives are measured using the four variables. First, options compensation (*Ln options*) is a natural log of the sum of the total value of options granted to CEOs in a year. Second, equity compensation (*Ln equity comp*) is a natural log of the sum of the total value of shares and stock options granted to CEOs each year. Equity compensation measures the overall risk arising out of executives' holdings in firms. Third, following prior literature, total compensation (*Ln total comp*)

is all-inclusive pay including salary, bonus, superannuation, LTIP and allowance, and equity incentives offered to CEOs in accordance with certain performance indicators during the year (see, Graham et al., 2012; Grosse et al., 2017). Fourth, cash bonus (*Ln bonus*) is the performance bonus granted to CEOs each year.

Following prior studies (e.g., Bates et al., 2009), we control the firm characteristics for their effects: market-to-book ratio (*MTB*), capital expenditure (*Capex*), leverage ratio (*Lev*), dividend payout (*Div*), firm size (*Size*), cash flow (*CF*), CEO tenure (*CEO tenure*), remuneration committee size (*Rem com size*) and remuneration committee independence (*Rem com ind*) (see, Table 1 for definitions and measurements).

3.3 Descriptive statistics

Table 2 reports the summary statistics of the variables for the full sample and for before and after the *Act* sub-samples. Panel A shows the statistics of the dependent variable cash holdings (*cash*) with mean, 1st quartile, median and 3rd quartile values, while Panels B and C show the statistics of the independent and control variables respectively.⁷ Panel A reports that cash holdings have a mean (median) of 18.333% (9.380%) to total assets, based on the full sample; however, after the *Act*, cash holdings decrease to 15.080% from 19.960%. Panel B reports the *Act* as a dummy variable. In log values, in the full sample, the means (medians) for options, equity compensation, total compensation and cash bonus are 12.575% (12.712%), 12.714% (12.822%), 14.107% (14.044%) and 12.867% (12.916%), respectively. Moreover, mean values for options, equity, and total compensation (cash bonus) increase (decreases) after the *Act*.

⁷ We perform the univariate test using the non-parametric *t*-test for cash holdings with respect to CEO compensation incentives before and after the *Remuneration Amendment Act 2011*. The two-tailed test of mean differences shows significant differences between compensation incentives before and after the *Act* at the 1% level. We run correlation among dependent and independent variables. We also perform the VIF test; it turns out to be 3.360, which is below 5, meaning that our results are not biased. However, we use compensation variables separately in our models to avoid spurious results. For brevity, we do not report the results in the paper, but they are available if required.

Panel C presents the control variables with mean values including average market to book value (*MTB*, 3.674), capital expenditure (*Capex*, -0.079), leverage (*Lev*, 0.173), dividend payment (*Div*, 0.714), firm size (*Size*, 20.327), and cash flow (*CF*, -0.012). Corporate governance characteristics include *CEO tenure*, which is 7.940 years on average. The remuneration committee, an important feature in the current unique setting, consists of 3 members on average, with a 69.300% independence level compared with board size.

3.4 Econometric specification

First, we model the effect of the *Remuneration Amendment Act* on CEO compensation incentives. As the *Act* is expected to affect CEO compensation structure, our model examines the *Act*, as an independent variable, on the key components of CEO pay: stock options (*Ln options*), equity (options and shares) compensation (*Ln equity comp*), total compensation (*Ln total comp*) and cash bonuses (*Ln bonus*). The model investigating *H1* is shown in equation (1):

$$\text{Compensation incentives}_{it} = \alpha + \beta_1(\text{Act})_{it} + \delta_2(\text{Controls})_{it-1} + \delta_3\sum(\text{Industry effect})_i + \delta_4\sum(\text{Year effect})_t + \varepsilon_{it} \quad (1)$$

Second, we model the spill-over effect of the *Act* on corporate cash holdings by interacting the *Act* and CEO compensation incentives. The model investigating *H2* is:

$$\text{Cash}_{it} = \alpha + \beta_1(\text{Compensation incentives})_{it} + \beta_2(\text{Act} * \text{Compensation incentives})_{it} + \delta_3(\text{Controls})_{it-1} + \delta_4\sum(\text{Industry effect})_i + \delta_5\sum(\text{Year effect})_t + \varepsilon_{it} \quad (2)$$

All the variables in equations 1 and 2 are defined in Table 1 and are measured for firm *i*. Control variables in both equations are measured at year *t-1*, α , β and δ represent model parameters, and ε represents error term.

We use ordinary least square (OLS) regression to analyze the relationship of the *Act*, the CEO compensation incentives and the cash holdings in time-series and cross-sectional differences, while controlling for industry (GICS) and year effects.⁸ To choose between the fixed effect and the random effect, we perform a Hausman test and the untabulated results confirm the suitability of fixed effect (FE)⁹ to explore the time-series variation and to avoid misspecification of the model due to omitted variable bias. We use one-year lagged variables (controls) to avoid the simultaneity bias, following Harford et al. (2008). The standard errors are corrected for clustering of residuals at the firm level to control for heteroscedasticity (Petersen, 2009).

3.5 Robustness check

Our results may suffer from trending effect of the long sample period due to confounding factors and also CEO compensation incentives may be jointly determined by unknown factors after the *Act* (Grosse et al., 2017). In addition, our independent variables may not be systematically associated with the dependent variable (cash holdings) due to a causality issue. To mitigate potential endogeneity concerns in our findings, we use several sensitivity tests: for instance, stacking data in narrow samples, the two-step system generalized method of moments (GMM) (e.g., Harford et al., 2008), and the propensity score matching (PSM) estimators, as explained in Section 4.

4 Empirical results

4.1 *Remuneration Amendment Act* and CEO compensation

Table 3 presents the results of equation (1), which analyzes the effect of the *Act* on CEO options, equity, total compensation and cash bonus using 12 years of data. The regression models are statistically well fitted, as depicted by the R-squares ranging from 0.286 to 0.484. For each dependent variable proxy, we run regressions using OLS and

⁸ For instance, CEOs in the financial services industry earn higher pay while CEOs in electric utility companies receive lower pay, compared to their counterparts in other industries (Murphy, 1999). Controlling for industry complexity, CEOs can demand higher compensation due to talent and industry (Aggarwal, 1981).

⁹ The technique is commonly suggested for panel data estimation (see, Wooldridge, 2002 for details).

FE. Columns 1–6 report the effects of the *Act* on CEO options incentives (*Ln options*), equity incentives (*Ln equity comp*) and total compensation (*Ln total comp*), respectively, and all the coefficients are positive and significant ($p < 1\%$). Columns 7–8 show the effect of the *Act* on the CEO cash bonus (*Ln bonus*): the results are insignificant, although both OLS and FE show a negative sign. We find that the control variables of market-to-book ratio, capital expenditure, leverage and firm size have varying levels of significance. The economic significance of the findings: the effect of the *Act* on CEO compensation incentives, is also important. For example, one standard deviation in the *Act* (Table 2) increases (decreases) *Ln options*, *Ln equity comp*, *Ln total comp* (*Ln bonus*) by approximately 0.87%, 0.95%, 0.84% (-0.36%), respectively in the OLS (e.g., $Act\ 0.471 \times 0.234 / Ln\ options\ 12.575 = 0.0087$).

To examine the impact of the *Act* on CEO compensation more closely and to minimize the trending effect of data, we re-run our equation (1) using a narrow sample with six years of data, three years (2008–2010) before and three years (2012–2014) after the *Act* (2011). We choose a narrow sample of six years, following Ferri and Maber (2013), who examine the impact of the UK say on pay legislation on CEO pay using three years of pre- and post-legislation data. Ferri and Maber (2013) also argue that a long-period sample may have a trending effect where many confounding factors that are not investigated may come into play.

Table 4 presents the results of the impact of the *Act* on CEO compensation using the 6-year window. Overall, we find that the *Act*'s effects on CEO options, equity and total compensation are positive and significant at varying levels of significance, consistent with the Table 3 results. Importantly, the narrow sample shows that the *Act* impacts the performance-based cash bonus (*Ln bonus*) negatively, significant at 10% level (using OLS). This outcome is interesting as it indicates the use of cash bonus by

firms to remunerate CEOs is decreased after the *Act*.¹⁰ The economic significance estimations of the narrow sample findings show that one standard deviation in the *Act* (Table 2) increases (decreases) *Ln options*, *Ln equity comp*, *Ln total comp* (*Ln bonus*) by approximately 0.90%, 0.62%, 0.34% (-0.40%), respectively in the OLS (e.g., $Act \times 0.471 \times 0.241 / Ln\ options\ 12.575 = 0.0090$).

Results in Tables 3 and 4 show that the *Act* impacts equity (options and shares) and total compensation positively and cash bonus negatively, supporting *H1*. The findings suggest that, after the *Act*, firms have changed their CEO compensation structure by using more equity-based compensation, which is preferred by shareholders and which enables alignment of interests between managers and shareholders, and fewer performance-based bonuses, which reward past performance.

4.2 Robustness

In this section, we conduct a set of sensitivity tests to check the robustness of our results. Our sensitivity tests employ a narrow sample analysis, the two-step system GMM, and propensity score matching estimators. We report the results of two-step system GMM and propensity score matching estimators (PSM) only, for the purpose of brevity. The result of the remaining test is available in the online appendix A.

We re-estimate equation (1) using the two-step system GMM (Arellano and Bover, 1995; Blundell and Bond, 1998) to test the robustness of the results. This system GMM uses first-differenced variables as instruments for the equations in levels and the estimates are robust to undetected heterogeneity, causality problems and dynamic endogeneity (if present) in model.¹¹ The stability of the system GMM depends on two major conditions. First, the serial independence of the residuals is that the first difference residuals (*ARI*) should be serially correlated by the means of structure, and

¹⁰ We also use a 4-year window, two years before and two years after the *Act* and the results are statistically similar.

¹¹ The system GMM estimations are based on Roodman (2006) using Stata module '*xtabond2*'. Refer to Roodman (2006) for details on dynamic panel data estimations.

the second difference residuals ($AR2$) should not be serially correlated. Second, the validity of instruments should be used in the dynamic estimation. The *Hansen J-statistics* of over-identifying restrictions tests the null hypothesis of the instrument validity. In Table 5, the insignificance of the *Hansen J-statistics* confirms the validity of the instruments in their respective estimations. Moreover, the number of instruments (i.e., 28) used in the model is less than the panel (i.e., 917), which adds to the reliability of the *Hansen J-statistics*.

The diagnostic test in Table 5 shows that the model is statistically well-fitted for the first order autocorrelation ($AR1$), but is insignificant for the second order autocorrelation ($AR2$), and for the *Hansen J-statistics* of over-identifying restrictions. The interpretations of the parameters on the *Act* and the CEO compensation incentives quantitatively remain the same as in Table 3. For instance, the *Act* positively affects *Ln options*, *Ln equity comp*, and *Ln total comp*. Hence, the system GMM estimate supports our results, even after controlling for undetected heterogeneity, simultaneity bias and dynamic endogeneity.

Moreover, we use PSM (Lennox et al., 2011) to examine whether our prior analyses concerning the effect of compensation incentives after the *Act* (an exogenous shock) on cash holdings are robust. PSM exploits the assumption of ‘parallel trends’, that is, two similar firms are expected to follow the same trend without any treatment. In case the treatment occurs, the impact should be reflected in the difference between the changes of outcome treatment and control firms (Roberts and Whited, 2011). We compare the changes in cash holdings for the two groups of firms, which are similar in characteristics but which experienced different changes in compensation incentives around the time of the *Act*. Following prior studies (e.g., Brogaard et al., 2017), we focus on a narrow sample because it reduces the concerns of reverse causality and offers

better control over the impact of unobserved factors. We use three years before and three years after the *Act* to form our treatment and control groups.

We follow Fang et al. (2014) and Brogaard et al. (2017) to construct our treatment and control groups. The sample firms are ranked on the basis of changes in their compensation incentives (*Ln options*, *Ln equity comp*, and *Ln total comp*) around the *Act* (3 years before and after), and we retain and assign firms into the first and third terciles. We create three dummy variables (*options_dummy*, *equity_dummy*, and *total_dummy*), equaling 1 for firms in the top tercile (the treatment group) and 0 for the firms in the bottom tercile (the control group). The treatment (control) group consists of firms with the highest (lowest) increase in compensation incentives. The rationale is that the *Act* encourages firms to use equity incentives that lead to shareholders' wealth maximization.

First, we run the logistic regression for these dummy variables with other explanatory variables. The firms in the treatment group are matched to the firms in the control group with the closest propensity score matching within 0.01.¹² In case of multiple matching, we retain the pairs for which the propensity score is the smallest. This criterion yields a treatment and a control group with similar firm characteristics and compensation incentives prior to the *Act* but with different degrees of change in compensation incentives (*Ln options*, *Ln equity comp* and *Ln total comp*) after the *Act*. The results of the pre-match logistic regression are reported in Panel A of Table 6 (Columns 1–3). The pseudo R-square is high for the regressions (0.148, 0.141, and 0.251, respectively).

To further verify that the firms in the treatment and control groups are indistinguishable in terms of observable characteristics, we conduct two diagnostic tests

¹² Our results (un-tabulated) hold if we increase the permissible difference in propensity scores (1.0% and 0.5% in value).

following Chen et al. (2017). The first test re-estimates the logit model for the post-match sample. The results in Panel A of Table 6 (Columns 4–6) suggest that all the variables are insignificant, indicating that there are no distinguishable trends in the treatment and control groups. The magnitude of coefficients in the post-match regression are smaller and insignificant, suggesting a decline in the degree of freedom in the restricted sample. Moreover, the pseudo R-squares decline for post-match regressions. This suggests that propensity score matching removes all observable differences in the two groups. The second diagnostic test examines the differences in the mean of each observable characteristic between the treatment and the control firms. Panel B of Table 6 shows that between the treatment and control groups there are no statistically significant differences in the pre-*Act* period.¹³ Moreover, the two groups have identical levels of compensation prior to the *Act*, even if the *Act* affects them differently. Overall, the diagnostic tests suggest that propensity score matching removes all of the observable differences known to affect the dependent variable (cash holdings).

Panel C of Table 6 shows a significant difference (post-*Act*) in the treatment and control firms' compensation incentives, suggesting the effect of the *Act*.¹⁴ Panel D shows the regression results based on the matched sample. We report coefficients of variables of interest (for the sake of brevity) that show the treatment firms experience a positive change in compensation incentives after the *Act*.¹⁵ These findings are consistent with our main results.

4.3 *Remuneration Amendment Act, CEO compensation and cash holdings*

Table 7 presents the results based on equation (2), which examines the spill-over effect of the *Act* on cash holdings using interaction between the *Act* and CEO

¹³ Mean difference between the treatment and the control group is based on the average treatment effect on the treated (ATT).

¹⁴ We report differences for main independent variables for the purpose of brevity.

¹⁵ We also perform propensity score matching analysis that shows a significant difference in cash holdings between the treatment and control firms after the *Act*. These findings suggest that the decrease in cash holdings is attributable to compensation incentives after the *Act*.

compensation incentives.¹⁶ Columns 1–6 show the interaction effect of $\ln options \times Act$, $\ln equity comp \times Act$ and $\ln total comp \times Act$ on cash holdings. Interestingly, the three pairs of relationships – CEO options and cash holdings, equity compensation and cash holdings, total compensation and cash holdings – are negative after the introduction of the *Act*.¹⁷ Columns 1 and 2 show the interaction effect of $\ln options \times Act$: the coefficients are negative for OLS (-0.011) and FE (-0.013), both at $p < 1\%$. Columns 3 and 4 show the interaction effect of $\ln equity comp \times Act$: the coefficients are negative for OLS (-0.012) and FE (-0.011), significant at $p < 1\%$ and $p < 5\%$, respectively. Columns 5 and 6 show the interaction effect of $\ln total comp \times Act$: the coefficients are negative for OLS (-0.001) and FE (-0.001), significant at $p < 1\%$ and $p < 5\%$, respectively.¹⁸

The economic significance estimations also show an important aspect: one standard deviation increase in CEO options award and equity compensation after the implementation of the *Act* would result in decreasing the cash level by 9.30% ($\ln 1.549 \times -0.011 / \ln 0.183 = -0.093$) and 10.50% ($\ln 1.579 \times -0.0122 / \ln 0.183 = -0.105$), respectively. Total compensation, an important aspect which also significantly decreases cash holdings, in addition to equity-based incentives, is often overlooked in the literature (e.g., Tong, 2010; Liu and Mauer, 2011).

The negative effect of the interaction of the *Act* and CEO compensation incentives on cash holdings indicates that, after the *Act*, higher CEO compensation incentives lead to lower corporate cash holdings. These negative relations are mainly driven by equity-based incentives (i.e., options and shares) as hypothesized, whereas the total

¹⁶ We also test the relationship between CEO compensation incentives and cash holdings in Australian firms. Detailed results are available in the online appendix A.

¹⁷ As shown in the online appendix A, the relationships between CEO compensation incentives and cash holdings are positive without the *Act* in the model. The results, without the *Act* mean that higher compensation incentives lead to higher cash holdings, indicating an agency problem.

¹⁸ To check for any trending effect, we re-run our models using a 6-year narrow window, 3 years before and 3 years after the *Act*, to examine the interaction of the *Act* and CEO compensation incentives. The results are statistically similar to those reported in the Table 7.

compensation follows the direction of equity compensation. The findings suggest that CEOs who are rewarded with more equity-based incentives are more inclined to invest in positive net present value projects rather than to hold cash. This move of executives enhances firm value and is consistent with shareholders' interests. This result that the *Act* through its influence on CEO compensation incentives leads to lower cash holdings, supports *H2*. Three reasons explain the CEOs' adoption of the alignment motive: (1) Equity-based incentives tie CEO's wealth with that of shareholders and the *Act* also prohibits managers from hedging their equity; (2) CEOs are likely to avoid shareholder dissent votes on remuneration resolutions; (3) CEOs are likely to avoid shareholder dissent votes targeting firm cash holding policy (see, Grosse et al., 2017).

Further, we examine the effect of CEO compensation incentives after the *Act* on the value of cash holdings in line with the argument that CEO incentives help reduce the agency cost and align the interests of managers and shareholders by lowering cash holdings. We follow the Faulkender and Wang's (2006) approach to investigate the value of cash holdings (further detail on methodology is available in the online appendix A). This approach is widely used in literature to examine the value of cash holdings (e.g., Tong, 2010). We report results in Table 8. We find that the coefficients of interaction between CEO compensation incentives, the *Act*, and change in cash holdings (across the three Columns 1–3) are positively associated with the dependent variable (excess return). These findings are consistent and further support our *H2* that after the *Act* CEO compensation incentives are positively associated with the value of cash holdings.

5 Conclusion

This study contributes to the compensation literature by investigating the effect of the *Remuneration Amendment Act* on CEO compensation incentives and a spill-over

effect on cash holdings in Australian firms. We find that the *Act* has affected the CEO compensation practices of Australian firms, indicating that firms now use more equity-based incentives (i.e. options and shares) and fewer cash bonuses to remunerate CEOs; this also results in increases in total compensation due to inequality in values between cash and equity remunerations. This change in the compensation structure and the increased use of equity incentives after the *Act* links CEO's pay more closely to the firm's future operations, and is in line with international (e.g., US and UK) trends and with the recommendations of the ASX Corporate Governance Council (ASX Corporate Governance Principles and Recommendations 2014) that encourage the use of equity incentives. Our results are robust to different estimation techniques.

Moreover, after the introduction of the *Act*, CEO compensation incentives are negatively related to cash holdings, indicating that higher CEO equity (thus risk) incentives lead to lower cash holdings. Rewarded with more equity-based incentives after the *Act*, CEOs are inclined to take risks by investing cash holdings in profitable investment projects to maximize firm value, which aligns the interests of managers with those of shareholders. CEO compensation incentives after the *Act* are positively associated with the value of cash holdings. We conclude that the *Act* has the effects of making positive changes to CEO compensation structure and having a spill-over effect on cash holdings. For these achievements, we praise the *Act*. Our findings provide important insights for the discussion on compensation regulations.

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Table 1 Variable definition

Variables	Name	Measurement	Data Source
Cash	Cash holdings	Ratio of cash and marketable securities to book value of total assets	DatAnalysis
<i>Act</i>	<i>Remuneration Amendment Act</i>	Dummy variable post <i>Act</i> equals 1 and 0 otherwise	
Ln options	Executive equity incentives-Proxy 1	Natural log of sum of total value of options granted to CEO in each year	Connect 4
Ln equity comp	Executive equity incentives-Proxy 2	Natural log of sum of total value of options and shares granted to CEO in each year	Connect 4

Ln total comp	Executive incentives-Proxy 3	Natural log of total value of salary, bonus, super, options, shares, LTIP and allowance granted to CEO in each year	Connect 4
Ln bonus	Executive cash incentives-Proxy 4	Natural log of performance bonus granted to CEO in each year	Connect 4
<hr/>			
Control Variables			
<hr/>			
MTB	Market to book asset ratio	Calculated as market value equity plus book value of assets minus book value of equity divided by book value of assets	DatAnalysis
Capex	Capital expenditure	Capex is figured as capital expenditure divided by book value of assets	DatAnalysis
Lev	Leverage	Sum of long and short term debt divided by book value of assets	DatAnalysis
Div	Dividend	Dummy variable equal to one if dividend paid otherwise zero	DatAnalysis
Size	Firm size	Size is measured by log of total assets	DatAnalysis
CF	Cash flow	Free cash flow divided as book value of assets	DatAnalysis
CEO tenure	CEO tenure	Numbers of years being in position	Connect 4
Rem com size	Remuneration committee size	Percentage of member directors to board size	Connect 4
Rem com ind	Remuneration committee Independence	Dummy variable $0 \leq 50\%$ Independent directors otherwise $1 \geq 50\%$	Connect 4
<hr/>			

Table 2 Descriptive statistics

Variables	Full sample					Before <i>Act</i>	After <i>Act</i>
	Mean	1st Quartile	Median	3rd Quartile	Std. Dev.	Mean	Mean
Panel A: Dependent variable							
Cash	0.1833	0.0385	0.0938	0.2514	0.2132	0.1996	0.1508
Panel B: independent variables							
<i>Act</i>	0.3333	0.0000	0.0000	1.0000	0.4715	0.0000	1.0000
Ln options	12.5756	11.5923	12.7129	13.7134	1.5494	12.4093	12.8439
Ln equity comp	12.7142	11.7194	12.8225	13.8854	1.5793	12.5764	13.9398
Ln total comp	14.1078	13.4024	14.0446	14.8786	1.0993	13.9879	14.3474
Ln bonus	12.8675	12.0173	12.9167	13.8316	1.2505	13.8675	11.8675
Panel C: control variables							
MTB	3.6747	1.3005	2.2295	4.1288	5.8743	4.0796	2.8648
Capex	-0.0791	-0.1016	-0.0405	-0.0117	0.1072	-0.0847	-0.0679
Lev	0.1730	0.0028	0.1503	0.283	0.1676	0.1667	0.1856
Div	0.7147	0.0000	1.0000	1.0000	0.4516	0.6754	0.7933
Size	20.3277	18.8944	20.1511	21.6979	2.1409	20.0768	20.8295
CF	-0.0120	-0.0666	0.0257	0.0757	0.2037	-0.0229	0.0098
CEO tenure	7.9403	4.0000	6.0000	11.0000	5.9191	8.6771	6.4758
Rem com size	3.0161	2.0000	3.0000	4.0000	1.6399	2.9035	3.2408
Rem com ind	0.6930	0.5000	0.7500	1.0000	0.3205	0.6629	0.7488

Table 2 presents the summary statistics in different panels with mean, first quartile (1st quartile), median, third quartile (3rd quartile) and standard deviation (Std. Dev.). Panel A presents cash holdings and Panel B describes the *Act* and CEO compensation incentives based on full, before and after the *Act* samples. Panel C presents the firm characteristics and corporate governance variables. All the variables in dollar amounts are adjusted to inflation to 2015 dollars using the consumer price index. The sample period is 2004–2015. For variable definitions see Table 1.

Table 3 The effect of the *Act* on CEO compensation incentives

Variables	Ln options		Ln equity comp		Ln total comp		Ln bonus	
	(1) OLS	(2) FE	(3) OLS	(4) FE	(5) OLS	(6) FE	(7) OLS	(8) FE
<i>Act</i>	0.2340*** (3.21)	0.1309** *	0.2591*** (3.17)	0.1095*** (2.50)	0.2528*** (3.77)	0.1967*** (2.93)	-0.1019 (-1.69)	-0.0145 (-1.19)
MTB _{<i>t</i>-1}	0.0534*** (-4.95)	-0.0044* (-1.89)	-0.0230** (-2.15)	-0.0018*** (-2.60)	-0.0004*** (-2.24)	-0.0061*** (-3.05)	0.0027* (1.90)	0.0012 (1.06)
Capex _{<i>t</i>-1}	3.7109*** (-2.76)	-1.3911* (-1.81)	-3.1611** (-2.16)	-1.2712** (-2.40)	-1.5020 (-1.07)	-1.2552 (-1.05)	-1.6189 (-0.53)	-1.0302 (-0.87)
Lev _{<i>t</i>-1}	-0.1736 (-0.87)	-0.1140 (-0.65)	-0.1111 (-0.63)	-0.804* (-1.84)	-0.0447 (-1.15)	-0.0146 (-1.24)	0.3548*** (2.86)	0.2783*** (2.68)
Div _{<i>t</i>-1}	0.3582*** (-3.53)	-0.4517** (-4.23)	-0.5174*** (-2.52)	-0.2065** (-2.19)	0.0473 (1.22)	0.0396 (1.04)	0.2568*** (2.71)	0.1621*** (2.64)
Size _{<i>t</i>-1}	0.4111*** (9.17)	0.3434** *	0.4023*** (9.54)	0.3074*** (4.23)	0.3962*** (3.65)	0.3117*** (4.52)	0.4173*** (3.18)	0.3790*** (3.08)
CF _{<i>t</i>-1}	-1.2911* (-1.89)	-1.3512 (-0.47)	1.013 (0.79)	2.5912* (1.79)	-1.2750 (-0.77)	-1.2501 (-0.60)	-1.6132* (-1.89)	-1.7125 (-0.48)
CEO tenure _{<i>t</i>-1}	0.0034 (0.47)	0.0153* (1.99)	0.0013 (0.23)	0.0107* (1.82)	-0.0023 (-1.04)	0.0057* (1.98)	0.0146*** (3.90)	0.0265** (2.71)
Rem com size _{<i>t</i>-1}	0.0133 (0.44)	0.0091 (0.52)	0.0265 (1.03)	0.0175 (0.83)	0.0204 (1.73)	0.0093 (1.06)	0.0310 (1.71)	0.0205 (1.39)
Rem com ind _{<i>t</i>-1}	0.2644*** (2.49)	0.2575** (2.81)	0.1611* (1.85)	0.1535** (1.99)	0.0412* (1.89)	0.0262 (0.84)	0.1397** (2.09)	0.1000* (1.86)
Industry effect	Yes		Yes		Yes		Yes	
Year effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.2703*** (5.91)	5.5107** *	3.91488*** (6.18)	6.2999*** (9.82)	5.4601*** (4.81)	7.6540*** (3.87)	3.4147*** (6.78)	4.4494*** (2.90)
N	1541	1541	1999	1999	3064	3064	2105	2105

adjusted R ²	0.324	0.314	0.331	0.286	0.361	0.309	0.484	0.476
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Table 3 shows the regression of the Act on CEO compensation incentives with other control variables (at year $t-1$) based on equation 1. The dependent variables are CEO compensation incentives in a given year. Columns 1–8 show the impact of the Act on $Ln\ options$, $Ln\ equity\ comp$, $Ln\ total\ comp$ and $Ln\ bonus$ in year t , respectively. Industry effects are based on Global Industry Classification Standards (GICS) codes. The t -statistics are heteroskedastic consistent standard errors clustered at firm level and reported below the parameters in parentheses. Standardized beta coefficients are reported at 1%, 5% and 10% significance levels with ***, **, * respectively.

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Table 4 The effect of the *Act* on CEO compensation incentives: narrow sample

Variables	Ln options		Ln equity comp		Ln total comp		Ln bonus	
	(1) OLS	(2) FE	(3) OLS	(4) FE	(5) OLS	(6) FE	(7) OLS	(8) FE
<i>Act</i>	0.2414*** (2.65)	0.2703** (2.09)	0.1697** (2.44)	0.2413** (2.06)	0.1045*** (3.02)	0.1102*** (2.74)	-0.1119* (-1.93)	-0.0870 (-1.75)
<i>MTB</i> _{<i>t-1</i>}	-0.0703*** (-2.75)	-0.0051* (-1.96)	-0.0879** (-2.02)	0.0220 (1.71)	-0.0124** (-2.17)	-0.0131* (-1.94)	0.0201* (1.96)	0.0149 (1.15)
<i>Capex</i> _{<i>t-1</i>}	-0.7901* (-1.94)	-2.0471** (-2.17)	-0.3948* (-1.93)	-1.4319* (-1.90)	-0.1281* (-1.93)	-0.1933 (-1.70)	-0.2301 (-1.77)	-0.6232 (-1.65)
<i>Lev</i> _{<i>t-1</i>}	-0.4753* (-1.89)	-0.2101 (-1.55)	0.2213 (1.27)	-0.7763* (-1.92)	0.0640 (1.45)	-0.2107 (-1.69)	-0.0342 (-1.19)	-0.1135* (-1.92)
<i>Div</i> _{<i>t-1</i>}	-0.1230* (-1.93)	-0.1947 (-1.70)	-0.0475 (-1.35)	-0.2324* (-1.97)	-0.1349* (-1.92)	0.0158 (1.61)	0.2012*** (2.14)	-0.0372 (-1.41)
<i>Size</i> _{<i>t-1</i>}	0.3833*** (5.16)	0.2304** (2.23)	0.3112*** (2.91)	0.2344** (2.24)	0.3019** (2.26)	0.3401*** (2.47)	0.2204*** (3.04)	0.3923*** (2.63)
<i>CF</i> _{<i>t-1</i>}	0.1920 (1.03)	0.2230 (1.57)	0.1027 (1.53)	0.3901 (1.76)	0.0234 (1.63)	0.1219 (1.01)	0.2405* (1.89)	0.0219 (1.09)
<i>CEO tenure</i> _{<i>t-1</i>}	0.0116 (1.22)	0.0032 (0.97)	0.1235 (1.49)	0.076 (1.06)	0.0204 (1.41)	0.0111 (1.20)	0.0273*** (2.74)	0.0324** (2.11)
<i>Rem com size</i> _{<i>t-1</i>}	0.0382 (1.76)	0.0159* (1.92)	0.3037 (1.74)	0.0372 (1.57)	0.0104** (2.11)	0.0230 (1.74)	-0.3244 (-1.68)	-0.0123 (-1.60)
<i>Rem com ind</i> _{<i>t-1</i>}	0.0331* (1.98)	0.0112* (1.89)	0.0329 (1.18)	0.1201* (1.90)	0.1143** (2.24)	0.0301* (1.95)	0.1234 (1.69)	-0.1625* (-1.88)
Industry effect	Yes		Yes		Yes		Yes	
Year effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.1042*** (3.19)	5.0657*** (2.98)	2.4498*** (3.87)	3.0392** (2.19)	3.0672*** (4.83)	5.5023*** (4.33)	3.2123*** (3.18)	3.2125** (2.77)
N	849	849	1112	1112	1597	1597	1110	1110
adjusted R ²	0.362	0.351	0.337	0.341	0.453	0.371	0.446	0.353

Table 4 shows the regression of the *Act* on CEO compensation incentives along with other control variables (year *t-1*) based on a narrow window of 6 years (3 years before and after the *Act*). The dependent variables are the CEO compensation incentives in a given year. Columns 1–8 show the impact of the *Act* on *Ln options*, *Ln equity comp*, *Ln total comp* and *Ln bonus* in year *t*, respectively. Industry effects are based on Global Industry Classification Standards (GICS) codes. The *t*-statistics are heteroskedastic consistent standard errors clustered at firm level and reported below the parameters in parentheses. Standardized beta coefficients are reported at 1%, 5% and 10% significance levels with ***, **, * respectively.

Table 5 Two-step system GMM regression

Variables	Ln options	Ln equity comp	Ln total comp
<i>Act</i>	0.0896** (2.07)	0.0264** (2.24)	0.0290*** (2.66)
MTB	0.0412 (1.00)	-0.0072 (-0.24)	0.0075 (0.53)
Capex	-2.3424** (-2.23)	-1.1931 (-1.41)	-1.0965*** (-2.59)
Lev	-0.0774 (-0.07)	0.5878 (0.59)	0.1333 (0.40)
Div	-1.0977 (-1.01)	-1.1522 (-1.08)	-0.1355 (-0.37)
Size	1.0533*** (5.29)	0.9424*** (3.70)	0.5315*** (6.03)
CF	-0.0000 (-0.54)	0.0000 (0.57)	0.0000 (0.70)
CEO tenure	0.0062 (0.09)	0.0018 (0.03)	0.0155 (0.61)
Rem com size	0.2731 (0.67)	0.6543** (2.44)	0.1699** (2.00)
Rem com ind	0.0172 (0.02)	-0.6838 (-0.91)	0.0546 (0.15)
Year effect	Yes	Yes	Yes
Constant	-9.7127** (-2.54)	-8.1887* (-1.76)	2.4590 (1.54)
Model fits			
Wald χ^2 -statistics	57.070***	36.150***	108.230***
Arellano-Bond AR (1)	-2.420*** [0.015]	-3.860*** [0.000]	-5.100*** [0.000]
Arellano-Bond AR (2)	-0.910 [0.363]	-1.360 [0.174]	-0.960 [0.335]
Hansen J-statistics	17.220 [0.440]	14.090 [0.660]	13.6700 [0.690]
No. of instruments	28	28	28

Table 5 shows the results of the two-step system Generalized Method of Moments (GMM). The dependent variables are CEO compensation incentives. The model fits include the system GMM reliability conditions: first order autocorrelation AR (1), second order autocorrelation AR (2), and Hansen *J*-statistics test for over-identifying restrictions. We used collapsed instruments to reduce the propagation and preserve the depth of sample. Figures in parentheses are *t*-statistics while brackets show the *p*-values. Coefficients are reported at 1%, 5% and 10% significance levels with ***, **, * respectively.

Table 6 Propensity score matching estimators

Panel A Variables	Pre-match			Post-match		
	(1) options_dummy	(2) equity_dummy	(3) total_dummy	(4) options_dummy	(5) equity_dummy	(6) total_dummy
MTB	-0.0049 (-0.54)	0.1004 (1.10)	-0.0375 (-1.21)	0.0000 (0.01)	0.0000 (0.02)	0.0057 (0.76)
Capex	-4.9922*** (-2.76)	-3.7746*** (-2.96)	1.5382* (1.92)	0.9893 (0.50)	0.4924 (0.31)	0.1946 (0.19)
Lev	-1.2481 (-1.46)	0.1791 (0.27)	-0.4119 (-0.95)	-0.1099 (-0.12)	0.4230 (0.57)	0.2176 (0.40)
Div	1.1146*** (2.63)	1.1769*** (3.42)	-0.0775 (-0.42)	0.2276 (0.50)	-0.3594 (-0.91)	0.0202 (0.09)
Size	0.0265 (0.20)	0.2425 (1.13)	0.1624*** (2.65)	0.0185 (0.15)	-0.0010 (-0.01)	-0.0662 (-0.85)
CF	-0.0908 (-0.67)	-0.0495 (-0.46)	0.0366 (0.63)	-0.0345 (-0.24)	-0.2087 (-0.83)	0.0588 (0.81)
CEO tenure	0.0120 (0.39)	0.0150 (0.61)	-0.0060 (-0.47)	-0.0057 (-0.17)	0.0278 (1.02)	0.0136 (0.83)
Rem com size	0.0547 (0.41)	-0.0504 (-0.48)	-0.0247 (-0.42)	0.0157 (0.10)	0.0906 (0.78)	0.0271 (0.38)
Rem com ind	0.4503 (0.97)	0.1408 (0.37)	-0.1786 (-0.81)	-0.2180 (-0.43)	0.0107 (0.03)	0.0413 (0.16)
Constant	-0.3121 (-0.20)	-0.3867 (-0.30)	-4.7735*** (-6.35)	0.1373 (0.08)	-1.7897 (-1.33)	0.2385 (0.25)
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
N	756	990	1,510	264	384	674
Pseudo R ²	0.148	0.141	0.251	0.015	0.028	0.011

Panel B: Differences in firm characteristics
pre-Act

Variable	options_dummy				equity_dummy				total_dummy			
	Treatm ent	Contr ol	Differe nce	t-stat	Treatm ent	Contr ol	Differe nce	t-stat	Treatm ent	Contr ol	Differe nce	t-stat
Ln options	13.884 9	13.85 41	0.0307	0.160 0								
Ln equity comp					13.870 8	13.94 23	-0.0715	0.410 0				
Ln total comp									14.424 5	14.47 68	-0.0522	0.600 0
MTB	3.6294	3.221 9	0.4075	0.690 3	3.5145	3.121 7	0.3928	0.281 2	2.9494	2.238 6	0.7107	0.830 0
Capex	0.0846	0.078 3	-0.0062	0.420 0	0.0852	0.083 5	-0.0016	0.120 0	0.0629	0.061 4	-0.0015	0.210 0
Lev	0.1995	0.239 1	-0.0396	1.350 0	0.2165	0.198 0	0.0184	0.780 0	0.1915	0.190 5	0.0010	0.070 0
Div	0.8505	0.866 1	-0.1550	0.240 0	0.8696	0.869 5	0.0001	0.000 0	0.7967	0.838 7	-0.0419	1.210 0
Size	21.580 2	21.53 75	0.0426	0.120 0	21.682 4	21.40 85	0.2739	0.900 0	21.385 7	21.42 75	-0.0417	0.240 0
CF	18.963 1	18.72 02	0.2428	0.840 0	18.971 6	18.73 65	0.2351	0.850 0	18.500 7	18.48 09	0.0198	0.120 0
CEO tenure	6.6525	7.732 2	-1.0797	1.420 0	6.7221	6.201 0	0.5210	0.960 0	6.1370	6.401 0	-0.2640	1.120 0
Rem com size	3.7480	3.496 0	0.2519	1.440 0	3.6847	3.695 6	-0.0108	0.060 0	3.6870	3.696 7	-0.0096	0.090 0
Rem com ind	0.7572	0.791 2	-0.0339	0.700 0	0.7681	0.755 9	0.0121	0.270 0	0.7230	0.734 3	-0.0112	0.410 0

Panel C: Differences in CEO compensation incentives post-Act

Variable	Treatment	Control	Difference	t-stat
Ln options	14.3719	12.0180	2.3539***	4.6200

Ln equity comp	14.1838	12.0575	2.1263***	5.7100
Ln total comp	15.3271	13.4245	1.9026***	3.0700

Panel D: Regression

Variable	options_dummy	equity_dummy	total_dummy
<i>Act</i>	0.0071*** (2.72)	0.0161** (2.19)	0.0121*** (3.12)
Other controls	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes
Firm year fixed effect	Yes	Yes	Yes

Table 6 shows the results of propensity score matching estimators. Panel A shows the pre-match and post-match regression results. Panel B shows the differences in firm characteristics in the pre-*Act* period. Panel C shows the differences in CEO incentives only (for the purpose of brevity) in the post-*Act* period. Panel D shows the regression results based on the matched sample. Figures in parentheses are *t*-statistics. Coefficients are reported at 1%, 5% and 10% significance levels with ***, **, * respectively.

Table 7 The effect of the *Act* and CEO compensation incentives on cash holdings

Variables	Cash					
	(1) OLS	(2) FE	(3) OLS	(4) FE	(5) OLS	(6) FE
Ln options	0.0106*** (2.69)	0.0121*** (2.49)				
Ln options \times <i>Act</i>	-0.0119*** (-2.99)	-0.0132*** (-2.84)				
Ln equity comp			0.0126*** (3.40)	0.0141** (2.04)		
Ln equity comp \times <i>Act</i>			-0.0122*** (-2.41)	-0.0113** (-2.19)		
Ln total comp					0.0165* (1.89)	0.0145 (1.76)
Ln total comp \times <i>Act</i>					-0.0012*** (-2.74)	-0.0019** (-2.13)
MTB t_{-1}	-0.0119 (-1.36)	-0.0011 (-1.61)	0.0016 (1.62)	-0.0146 (-1.73)	0.0021* (1.99)	0.0012* (1.91)
Capex t_{-1}	1.4013*** (4.23)	0.2019** (2.15)	0.2101*** (3.16)	0.2192*** (2.90)	0.2173*** (3.12)	0.1982*** (2.70)
Lev t_{-1}	-0.3201** (-2.11)	-0.2606*** (-3.12)	-0.2109*** (-2.80)	-0.2328*** (-4.00)	-0.2736*** (-6.02)	-0.2192*** (-3.99)
Div t_{-1}	-0.1115*** (-2.89)	-0.0201 (-1.75)	-0.0837*** (-4.58)	-0.0133 (-1.32)	-0.0672*** (-2.98)	-0.0112 (-1.83)
Size t_{-1}	0.0125*** (2.82)	0.1240*** (2.69)	-0.0190*** (-3.18)	-0.0270*** (-3.09)	-0.0201*** (-2.85)	-0.0173*** (-2.68)
CF t_{-1}	-1.1323** (-2.19)	-0.0219 (-1.95)	-0.1122*** (-3.10)	-0.0431 (-1.41)	-0.1302*** (-2.01)	-1.0132 (-1.56)
CEO tenure t_{-1}	0.0019 (1.61)	-0.0181 (-1.13)	-0.0011 (-1.03)	-0.0140 (-1.19)	0.0011 (1.71)	-0.0014 (-1.52)
Rem com size t_{-1}	-0.0015 (-1.13)	-0.0112 (-1.09)	-0.0019 (-1.80)	-0.0141 (-1.42)	-0.0023 (-1.19)	-0.0043 (-1.61)
Rem com ind t_{-1}	0.0124 (1.19)	0.0141 (1.45)	-0.0110 (-1.09)	-0.0018 (-1.15)	0.0123 (1.76)	0.0043 (1.25)
Industry effect	Yes		Yes		Yes	
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	2.5075*** (4.58)	1.9906*** (3.07)	0.5124*** (4.03)	1.2012*** (3.66)	1.4053*** (6.11)	1.2637*** (3.65)
N	1498	1498	1945	1945	2992	2992
adjusted R ²	0.318	0.213	0.289	0.199	0.279	0.211

Table 7 shows the regression of CEO compensation incentives and the *Act* on cash holdings along with other control variables (year $t-1$). The dependent variable is cash holdings in a given year. Columns 1–6 show the impact of the interactions between *Ln options* \times *Act*, *Ln equity comp* \times *Act*, and *Ln total comp* \times *Act* impact on cash holdings in year t . Industry effects are based on Global Industry Classification Standards (GICS) codes. The *t*-statistics are heteroskedastic consistent standard errors clustered at firm level

and reported below the parameters in parentheses. Standardized beta coefficients are reported at 1%, 5% and 10% significance levels with ***, **, * respectively.

Table 8 The effect of the *Act* and CEO compensation incentives on the value of cash holdings

Variables	(1)	(2)	(3)
Ln options \times <i>Act</i>	0.0132*** (2.84)		
Ln options \times <i>Act</i> \times Δ cash	0.199** (2.19)		
Ln equity comp \times <i>Act</i>		0.0122*** (2.41)	
Ln equity comp \times <i>Act</i> \times Δ cash		0.212*** (2.65)	
Ln total comp \times <i>Act</i>			0.0012*** (2.54)
Ln total comp \times <i>Act</i> \times Δ cash			0.114** (2.21)
Δ cash	0.0141* (1.79)	0.0113 (1.64)	0.0113** (2.29)
Cash	0.0112 (1.01)	0.0142 (1.04)	0.0126* (1.99)
MTB $_{t-1}$	-0.0213 (-1.10)	-0.0016 (-1.23)	-0.0741* (-1.89)
Capex $_{t-1}$	1.0204*** (2.23)	0.1130*** (3.16)	0.1212*** (2.91)
Lev $_{t-1}$	-0.2021** (-2.21)	-0.2150*** (-2.80)	-0.2121*** (-2.46)
Div $_{t-1}$	-0.1325** (-2.19)	-0.0837*** (-2.58)	-0.0210* (-1.82)
Size $_{t-1}$	0.0121*** (2.69)	0.0141*** (2.28)	0.0190** (2.19)
CF $_{t-1}$	-1.0019** (-2.26)	-0.1051*** (-2.60)	-0.0125 (-2.11)
CEO tenure $_{t-1}$	0.0142* (1.96)	0.0314* (1.89)	0.0121* (1.79)
Rem com size $_{t-1}$	0.0125 (1.74)	0.0129* (1.81)	0.0123 (1.59)
Rem com ind $_{t-1}$	0.0112 (1.20)	0.0312 (1.21)	0.0127 (1.13)
Lev \times Δ cash $_{t-1}$	-0.0231 (0.43)	-0.1313 (1.43)	0.0318 (1.48)
Cash \times Δ cash $_{t-1}$	-0.0421 (1.60)	0.0511 (1.71)	0.1107 (1.63)
Constant	1.1035*** (3.58)	0.1320*** (4.25)	1.1932*** (3.12)
N	1498	1945	2992
adjusted R ²	0.291	0.201	0.255

Table 8 shows the regression of CEO compensation incentives and the *Act* on the value of cash holdings along with other control variables (year $t-1$). The dependent variable is excess return in a given year. Δ cash is the one year change in cash holdings. Columns 1–3 show the impact of the interactions between *Ln options* \times *Act* \times Δ cash, *Ln equity comp* \times *Act* \times Δ cash, and *Ln total comp* \times *Act* \times Δ cash impact on the value of cash holdings in year t . The t -statistics are heteroskedastic consistent standard errors clustered at firm level and reported below the parameters in parentheses. Standardized beta coefficients are reported at 1%, 5% and 10% significance levels with ***, **, * respectively.

Highlights

- We find the *Act* changes CEO compensation structure.
- We also find the *Act* has a spill-over effect on cash holdings.
- Our study provides insight to global discussion on say on pay legislations.

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