

CEO INCENTIVE COMPENSATION AND STOCK RETURNS: EVIDENCE FROM AUSTRALIA

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Abstract

We investigate the relation between CEO compensation and stock returns in Australia and find evidence that firms managed by CEOs with higher incentive pay earn higher returns in a period up to three years. The relation is more pronounced for firms led by younger CEOs and firms operating in research-intensive industries. In addition, we find some evidence indicating that innovation serves as a channel through which incentive pay affects stock returns. In particular, higher incentive pay induces CEOs to take more risk by investing more in risky projects, such as innovative activities which consequently make firms riskier and have higher expected stock returns.

Keywords: Corporate governance, CEO compensation, Stock returns

JEL classification: G11, G12

1. INTRODUCTION

Chief executive officer (CEO) compensation has long attracted scrutiny from the public and comments from the media. Many have increasingly argued that CEOs are paid too much (Cooper, Gulen, and Rau, 2014). However, according to agency theory, CEO compensation is viewed as an efficient incentive to align the interests of managers with those of shareholders. The notion is that effective compensation policies, particularly incentive-based pay, induce managers to exert costly effort to increase their firms' value (Benmelech, Kandel, and Veronesi, 2010). In addition, closely linking firm performance with CEO rewards by granting stock options should address the risk aversion of managers and incentivize them to undertake risky and shareholder-wealth-increasing investments they would otherwise avoid (Goergen and Renneboog, 2011). According to this view, CEO compensation should therefore be positively associated with future shareholder returns.

Nonetheless, the academic evidence on compensation and future firm performance is mixed. Some papers (see for example, Brickley, Bhagat, and Lease, 1985; Abowd, 1990; and Mehran, 1995) find a positive relationship between pay and future stock returns. However, other papers document an equally strong negative relationship between executive pay and future returns (see for example, Core, Holthausen, and Larcker, 1999; Benmelech, Kandel, and Veronesi, 2010; Brick, Palmon, and Wald, 2012; Cooper, Gulen, and Rau, 2014). The former set of papers, based on agency theory, attribute the positive relationship between executive compensation and future performance to incentive alignment between shareholders and executives. Conversely, the latter set of papers, based on the managerial power approach, argues that executive compensation is not only a potential

instrument for addressing the agency problem but also a part of the agency problem itself (Bebchuk and Fried, 2003). For instance, high compensation could lead to managerial risk-aversion (Beatty and Zajac, 1994) or could induce managers to hide bad news about firms' growth options (Benmelech et al., 2010).

Previous research on CEO compensation has largely focused on the US market. Research on Australian firms has been relatively scant. The Australian market offers a unique and interesting environment to test the effect of CEO compensation on stock performance. It shares many characteristics with the US market. For example, both are common law countries. In terms of corporate governance system, Australian firms have board structures and mechanisms that are similar in design to Anglo-Saxon boards (Pham, Suchard, and Zein, 2011). However, there are also significant differences between the two countries. First, differences are observed in how CEOs are compensated; whereas the remuneration of US CEOs is more heavily weighted toward shares and options. The base salaries paid to Australian CEOs account for a higher proportion of their overall salaries (see, for example, Hill, Masulis and Thomas, 2011; Fernandes, Ferreira, Matos and Murphy, 2013). Second, stock-option features differ substantially across countries. For instance, performance-based vesting conditions have traditionally been uncommon in the US, although they are more widespread in Australia (Hill et al., 2011).

To date, as far as we know, there is only one study, conducted by Matolcsy and Wright (2011), that examines the relationship between the CEO's compensation structures and firm performance in Australia. Matolcsy and Wright estimate a model of 'efficient' compensation structures (cash only vs cash and stock) based on firm characteristics. Then, they show that firms with CEO compensation

structures that are different from the 'efficient' structure have lower (accounting and market-based) performance than those firms with efficient CEO compensation structures. Hence, they argue that, depending upon a firm's characteristics, an efficient CEO compensation structure could be either cash-only or a mix of cash and stock-based. However, if inclusion of stock-based compensation improves firm performance, then would firms with higher (or lower) CEO incentive pay be more likely to increase (or decrease) firm value? Our study aims to answer this question. In other words, we examine the effect of CEO incentive pay on stock performance and the channel(s) through which this effect occurs.

Our sample consists of 1976 firm-year observations for 431 companies listed on the Australian Stock Exchange (ASX) over the period 2001-2011. Following Cooper et al. (2014), we measure incentive component as payment of restricted stock grants, option grants, long-term incentive payouts and other annual noncash compensation. Cash pay included salary and bonus. We define excess incentive pay (cash pay) as incentive (cash) payment above the industry median¹ of CEO incentive (cash) pay. Using panel data analysis and controlling for variables that have been shown to explain the cross-section of returns such as firm size, book-to-market, momentum and profitability, we find evidence of a positive relation between excess incentive pay and future returns for a period of 3 years. This relation is more pronounced for firms led by younger CEOs and firms operating in research-intensive industries. The results are robust for variety of tests, different measures of excess incentive pay, and after controlling for endogeneity issue. By contrast, the level of excess cash compensation is unrelated to future returns.

This study contributes to a growing body of research on the ex-post shareholder value consequences of CEO pay in several ways. First, we find that the higher the excess incentive pay, the better stock performance in the following 3 years. This lends support to using incentive pay as a potential instrument for addressing the conflict of interests between managers and shareholders. Second, we contribute to the literature by incorporating the impact of CEO age on the relation incentive pay and stock returns, something not done in previous studies. In particular, we find that firms with higher incentive pay related to younger CEOs tend to engage more in risky investment such as innovation, which in turn leads to outperformance of these firms in the future. Moreover, we find the incentive pay effect is more pronounced for firms operating in research-intensive industries. This is possibly because innovation is more important for firms to survive and compete in such industries. Finally, we find some evidence indicating that innovation serves as a mechanism through which incentive pay affects stock returns. Innovation is a high-risk activity and therefore requires commitment of a firm's resources and managerial talent (Holmstrom, 1989). Schumpeter (1934) argues that exploration and development of new products and processes help firms reduce production costs, improve productivity, and access new markets and resources of value and thus lead to higher future firm performance. We find evidence that firms managed by higher incentive pay CEOs invest more

in innovations. Such firms are expected to be riskier, hence, would have higher expected returns.

The remainder of the paper is organized as follows. A brief overview of the literature on executive compensation and hypothesis development are presented in section 2. Section 3 describes our data and methodology. Section 4 discusses the empirical results and robustness tests. Section 5 concludes the paper.

2. RELATED RESEARCH AND HYPOTHESIS DEVELOPMENT

2.1. Literature review

Jensen and Meckling (1976) assume that if both parties, principal and agent, are rational utility maximizers, then the agent will not always act in the best interests of the principal. Managers prefer less risk than owners do because owners have the ability to diversify their risk across a large portfolio of shares. Managers, however, have a significant amount of undiversified human capital invested in the corporation.

One approach to mitigating the conflict of interests between the managers and the shareholders is to make executive pay sensitive to firm performance via equity-based compensation such as share ownership, stock options, and long-term incentive pay (Bebchuk and Fried, 2003). Many good reasons exist that justify equity-based compensation as an effective pay component. First, it provides the most direct link between firm performance and executive pay. Therefore, it may incentivize managers to make more effort and encourage them to make decisions that enhance firm value. Second, stock options may enable the firm to attract highly talented managers and ensure the loyalty of the incumbent management (Bryan, Hwang, Klein, and Lilien, 2000). Third, granting stock options may address the risk aversion problem of managers and incentivize them to exert costly effort and undertake risky and shareholder-wealth-increasing investments that they would otherwise avoid (Goergen and Renneboog, 2011).

The literature reports some evidence of a positive relationship between high equity-based pay levels and future stock-price performance. Brickley et al. (1985) document positive abnormal returns for firms adopting stock-based compensation plans for a sample of firms listed on the NYSE from 1979-1982. Similarly, Abowd (1990) also finds that firms with above-median pay-performance sensitivity had a higher probability of above-median future performance in both accounting and market returns for a sample of 250 large corporations from 1981-1986 in the US. In line with the above studies, using a set of 153 randomly selected manufacturing firms in 1979-1980, Mehran (1995) provides evidence supporting advocates of incentive compensation. He suggests that the form rather than the level of compensation is what motivates managers to increase firm value. He finds firm performance is positively related to the percentage of equity held by managers and to the percentage of their compensation that is equity-based.

In contrast, some recent papers find that high pay leads to poor future stock-price performance. Linking a manager's compensation too closely to firm performance may lead to risk-avoiding behavior on the part of the manager (Beatty and Zajac, 1994). Similarly, Brick et al. (2012) argue that if CEOs

¹ We also use raw incentive level and industry and size-adjusted incentive level and obtained similar results.

cannot hedge their exposures to the company stock, then they have incentives to lower firm risk, and this may result in lower returns. The underlying assumption is that managers, unlike owners, have already invested most of their non-diversifiable and non-tradable human capital in the firm and that the agent is relatively risk averse, whereas the principal remains risk neutral (Fama, 1991). Benmelech et al. (2010) show that in a dynamic rational expectations model with asymmetric information, stock-based compensation not only induces managers to exert costly effort but also induces them to conceal bad news about future growth options and to choose suboptimal investment policies to support the pretense. This leads to a severe overvaluation and a subsequent crash in the stock price. In addition, Cooper et al. (2014) argue that high pay related to CEO overconfidence leads to shareholder wealth losses from activities such as overinvestment and value-destroying mergers and acquisitions.

Our study is closely related to Cooper et al. (2014). They find evidence that the level of CEO pay is negatively related to future stock returns for periods up to three years after sorting on pay for a sample of US listed firms from 1994-2011. For example, firms that pay their CEOs in the top ten percent of excess pay earn negative abnormal returns over the next three years of approximately -8%. The effect is stronger for CEOs who receive higher incentive pay relative to their peers and stronger for CEOs with longer tenure. They argue that results are driven by high pay related to CEO overconfidence that leads to shareholder wealth losses from activities such as overinvestment and value-destroying mergers and acquisitions.

2.2. Hypothesis development

Given different arguments on the role of CEO remuneration, whether the positive incentive alignment effect associated with CEO equity incentives dominates the dysfunctional effect is an open empirical question. Hence, we do not predict the sign of the relationship between excess CEO equity incentives and subsequent stock performance. Stated in the null form, our hypothesis is as follows:

H1: *There is no significant relationship between excess CEO incentive pay and subsequent stock returns.*

3. DATA AND METHODOLOGY

3.1. Data

Our sample consists of 1,976 firm-year observations for 431 listed companies across nine industry sectors in the ASX from January 2001 to October 2012. Consistent with prior studies, we also exclude firms in the financial industry² (e.g., banks, financial services, and insurance) and firms with a negative book value of equity. The information on firms, such as total assets, debts, sales, capital expenditure, stock price, daily trading volume, and shares outstanding, is sourced from COMPUSTAT Global. The market index is obtained from DATASTREAM, and the risk-free rate is from the Reserve Bank of

Australia (RBA)³. CEO total compensation, its components, and other corporate governance variables are obtained from SIRCA and those data are available only from 2001. Most firms in Australia have their financial year-end in June. Similar to Fama and French (1992), we use the firm characteristics as of June-end this year to predict the future stock return for the next calendar year. All of our analyses use data available at year t to forecast stock performance at year $t + 1$, $t + 2$ and $t + 3$, so there is no look-ahead bias induced by our statistical procedures.

Following Cooper et al. (2014), we use two measures of compensation: (i) cash compensation (CASH), which includes salary and bonus, and (ii) incentive compensation (INCENTIVE), which is computed as the difference between total compensation⁴ and cash compensation and is meant to capture the incentive component of total compensation. At the end of calendar year t , firms are allocated into nine industries based on the Standard and Poor's Global Industrial Classification Standard (GICS) sectors. Excess incentive (cash) compensation for each firm is measured as the difference between the natural logarithm of incentive (cash) compensation for firm i and the median natural logarithm of incentive (cash) compensation of the firms in the same industry for that year⁵.

Figure 1 presents the evolution of CEO compensation and its components in the Australian listed firms from 2001-2011. Prior to October 1986, firms were required to disclose only the total remuneration paid to all executives earning over \$0.1 m in that year. In 1987, these regulations were superseded. In their annual reports, listed firms must now disclose the remuneration packages of all directors and the five highest-paid executives. Figure 1 shows that CEO compensation was increasing from an average of \$0.892 m (million) in 2001 to as nearly double as \$1.606 m in 2011. The average annual growth rate of executive remuneration is 6.5% during the sample period. On average, Australian firms pay their CEOs \$1.127 m, in which cash-pay is \$0.739 m (65% of the total) and incentive-pay is only \$0.375 m (35% of the total). These figures indicate that the cash-pay component is the major component in Australia. This pattern is in stark contrast to the United States, where these two components account for 48% and 52% of total compensation, respectively⁶ (Cooper et al. 2014). These numbers also vary by industry⁷. The highest level of compensation on average belongs to those who work in the consumer

² Financial firms often have high leverage, which does not necessarily mean that those firms are in financial distress, as it does with non-financial firms.

³ Some prior studies on the Australian market, such as Braisford, Gaunt and O'Brien (2012), used the monthly return on the 13-week Treasury note as a proxy for the risk-free rate. However, these data have not been available from the RBA since 2006.

⁴ Total compensation includes salary, bonus, restricted stocks, stock options, and other forms of long-term compensation.

⁵ We also use industry and size-adjusted incentive pay as an alternative and find similar results with those of industry-adjusted incentive pay with same conclusion.

⁶ Murphy (forthcoming) argues US firms' relative aversion to cash-based remuneration stem from tax policies placing a \$1 million cap on deductible cash compensation and stock exchange listing rules that promoted broad-based grants.

⁷ The highest proportion of incentive compensation is in the energy industry with the average of 46% of total pay in the form of incentive compensation, followed by mining, healthcare, consumer staples, and communication technology with the average of levels of incentive compensation is 43%, 38%, 36%, and 31%, respectively. Other industries have the average level in the range from 22%-29%. In term of dollars, the highest CEO compensation belongs to those who work in the consumer staples.

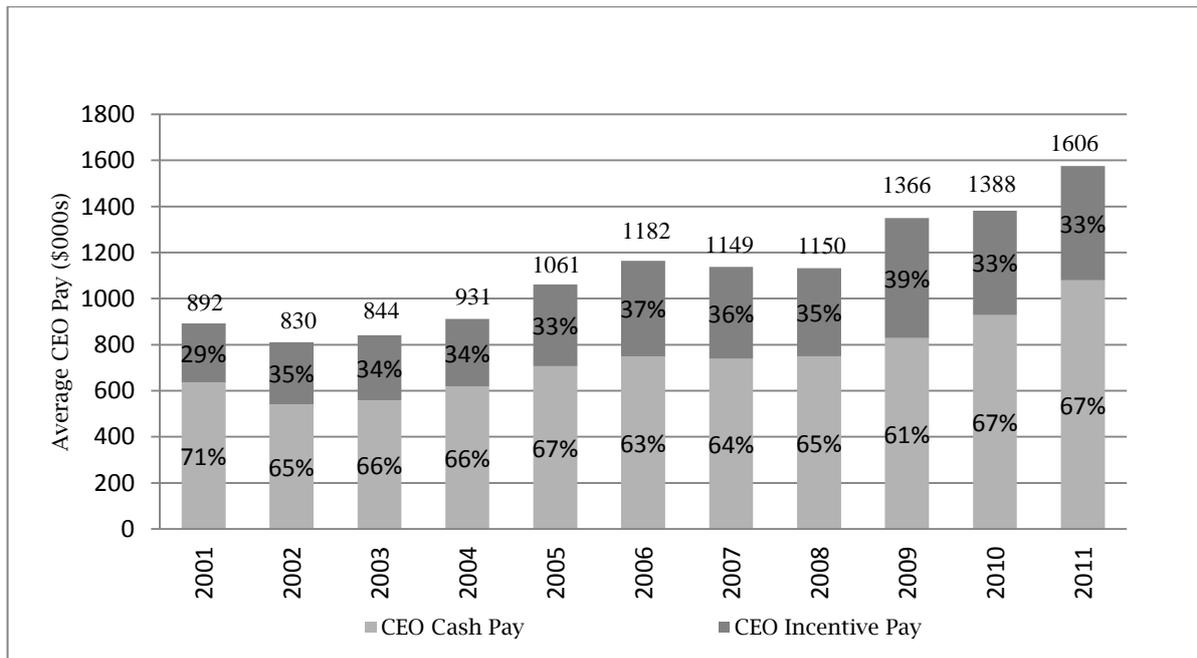
staples industry with total pay of \$1.884m (in which, cash pay of \$ 1.197 m and incentive pay of \$0.667m). Figure 1 indicates that, on average, incentive pay has been increasingly important since 2001; it reached its highest level of 39% in 2009. This increasing trend is partly explained by the effect of globalization; Australian firms might follow their counterparts, particularly firms in the US, where the major part of compensation that firms pay their CEOs is in the form of restricted stocks, stock options, or other non-cash components. However, we observe a reversed trend after 2009 because the proportion of incentive pay sharply dropped to approximately 33% in 2010 and 2011. This might be partly due to the effect of the introduction of a new tax policy that came into effect in 2009 in which equity-based compensation is subject to tax in the same year it is granted. Before 2009, an equity-based component granted in a financial year was allowed to defer paying taxes until it was actually exercised. Because of the new tax policy, firms tend to pay their CEOs more in cash and less in non-cash components.

Panel A of Table 1 presents descriptive statistics for the variables on the full sample and median levels by portfolios formed on industry and sales-adjusted incentive pay. The average (median) firm has annual return (R) of 0.5% (-5%). These almost zero average and negative median for the

whole sample may be due to bad performance of loss firms in this period. Some prior research (e.g., Balkrishna, Coulton, and Taylor, 2007; Anderson, Woodhouse, Ramsay, and Faff, 2009; Clinch, Fuller, Govendir, Wells, 2012) also document that reported losses are relatively common and persistent in Australia. In particular, our sample consists of 695 loss firm-year observations (out of 1976 observations, or approximately 35%) which earn the average (median) return of -20% (-33%) during the period 2001-2011. Since most of these loss firms are small, we also compute the value-weighted return for the full sample. The average (median) value-weighted return is 16.5% (9.1%) during this 2001-2011 period, implying that the close zero equally average returns are primarily driven by small firms.

On average, firms have a market capitalization (SIZE) of \$2,550 million, the natural logarithm of book-to-market (B/M) of -1.01, leverage (LEV) of 10%, ROA (return on assets) of -5%, and LIQ (trading volume to shares outstanding) of 59% per annum. On average, the CEO owns 4.4% of total share outstanding. Appendix A provides the formulae for constructing the variables used in our tests. Panel B of Table 1 presents correlation coefficients between our variables. The highest correlation coefficient of -0.44 is between firm size and book-to-market, but the other coefficients are low.

Figure 1. Average CEO Compensation, 2001-2011



This figure presents the average of total compensation and the proportion of cash and incentive components of CEO compensation in Australian firms from 2001-2011. CEO total compensation includes salary, bonus, restricted stock grants, option grants, and other forms of long-term compensation. CEO cash pay is the sum of salary and bonus. CEO incentive pay is measured as the difference between CEO total pay and CEO cash pay.

Table 1. Descriptive statistics and correlation coefficients

Panel A: Descriptive Statistics						
	All firms				Median by portfolio	
	Obvs	Mean	Std	Median	Low	High
CEO Compensation						
Total compensation (in \$000s) (Total_COMP)	1976	1,114	1,476	545	329	1,038
Total cash compensation (in \$000s)(CASH)	1976	728	893	383	275	617
Total incentive compensation (in \$000s) (INCENTIVE)	1976	374	699	112	34	322
Cash proportion		65%		80%	84%	59%
Incentive proportion		35%		20%	16%	41%
Firm characteristics						
Annual return (R)	1976	0.005	0.60	-0.05	-0.13	0.03
Firm market cap (in \$ millions) (SIZE)	1976	2,550	7,013	242	100	638
Book-to-market ratio (B/M)	1976	-1.01	0.89	-0.99	-0.84	-1.16
Leverage (LEV)	1976	0.10	0.14	0.04	0.01	0.06
Return on Equity (ROA)	1976	-0.05	0.37	0.04	0.02	0.05
Liquidity (LIQ)	1976	0.59	0.52	0.45	0.31	0.64
R&D expenditure	1976	3.75	27.01	0.00	0.00	0.00
CEO ownership (CEOOWN)	1976	0.044	0.102	0.002	0.004	0.002

Panel B: Correlation coefficients								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) One-year future returns								
(2) Industry adjusted incentive pay	0.11 (0)							
(3) Industry adjusted cash pay	0.05 (0.03)	0.11 (0)						
(4) CEO ownership (CEOOWN)	0.01 (0.59)	-0.10 (0)	-0.09 (0)					
(5) Firm size (lnSIZE)	0.11 (0)	0.43 (0)	0.37 (0)	-0.19 (0)				
(6) Book to market (B/M)	-0.01 (0.73)	-0.15 (0)	-0.11 (0)	0.09 (0)	-0.44 (0)			
(7) Leverage (LEV)	0.05 (0.03)	0.07 (0)	0.07 (0)	0.06 (0)	0.02 (0.38)	0.32 (0)		
(8) Return on assets (ROA)	0.12 (0)	0.20 (0)	0.09 (0.0)	0.04 (0.06)	0.33 (0)	0.04 (0.09)	0.09 (0)	
(9) Liquidity (LIQ)	-0.03 (0.26)	0.20 (0)	0.13 (0)	-0.18 (0)	0.34 (0)	-0.13 (0)	-0.02 (0.36)	-0.08 (0)

This table presents descriptive statistics on the full sample data for non-financial listed firms on the ASX from 2001-2011. Panel A shows the summary statistics and panel B the correlation coefficients of the variables. CEO total pay includes salary, bonus, restricted stock grants, option grants, and other forms of long-term compensation. CEO cash pay is the sum of salary and bonus. CEO incentive pay is measured as the difference between CEO total pay and CEO cash pay. Excess incentive pay (cash pay) is the natural logarithm of incentive pay (cash pay) in excess of the median natural logarithm of incentive pay (cash pay) for firms in the same industry. R is annual return earned by individual stock, calculated as compounded daily return within a year. SIZE is the natural logarithm of market value of equity. B/M is the natural logarithm of the ratio of book value to market value of equity, measured at the end of financial year t . LEV is firm leverage, measured as the ratio between book value of long-term debts to the sum of book value of long-term debts and market value of equity. ROA is return on assets, measured as net income over total assets. LIQ is calculated as the total of the ratios of daily trading volume to shares outstanding over year t . CEOOWN is the percentage of shares outstanding held by a firm's CEO. To avoid biased results caused by outliers, all variables are winsorized at the 1% and 99% levels. p-values are in parentheses.

3.2. Methodology

We use panel data analysis to examine an association between excess incentive pay and future stock returns using the ordinary least squares (OLS) model. Hill et al. (2011) document that performance-based vested conditions such as ones based on total stock return or accounting performance are widely

used among Australian firms. Given the performance conditions met, options will be vested and exercised in several years after the date of grant. We therefore expect that the incentive effect should be present not only in year 1, but may persist in following some years. The model is specified as follows:

$$R_i = +\beta_1 * Excess\ incentive_{i,t} + \sum \gamma_{i,j} * Control\ variables_{i,j,t} + industry\ dummies + year\ dummies + \varepsilon_i \quad (1)$$

where, R is the annual return on stock i in each year, from $t+1$ to $t+3$. Excess incentive (cash) is industry-adjusted incentive pay (cash pay). Control variables include the following. SIZE is the natural logarithm of market capitalization, measured at December of year t . B/M is the natural logarithm of book value to market value, measured at the end of financial year t . Similar to Fama and French (1992) we use SIZE and B/M to capture firm size effect and value effect, respectively. Fama and French (2008)

document that firms with higher profitability outperform firms with lower profitability. Therefore, we use ROA (return on total assets) as a proxy for profitability and expect it to be positively associated with stock returns. Bhandari (1988) noted a leverage effect; that is, firms with higher leverage subsequently performed better than did firms with lower leverage. We use LEV (leverage) as an explanatory variable, measured as the ratio between book value of long-term debt to the sum of book

value of long-term debt and market value of equity at December year t . In addition, prior research finds that liquidity plays a role in explaining stock returns (see Amihud and Mendelson, 1986; Chordia, Subrahmanyam and Anshuman, 2001), and in the Australian market (see Chan and Faff, 2003). Thus, we would expect that market liquidity is an important explanatory variable in our model. We use LIQ, calculated as the total of ratios of trading volume to shares outstanding over a year, as a proxy for market liquidity and expect it to be negatively related to stock returns.

One of the main purposes of using equity-based compensation is to encourage CEOs, especially risk-averse ones, to take more risky investment to enhance firm value. Prior research (e.g., Vroom and Pahl, 1971; Serfling, 2014) studying risk taking by managers find that older managers tend to prefer

less risk and are more risk averse than younger managers. Younger managers have substantial career concern since they will potentially stay in the managerial positions for many years (Zhang, 2010). However, as CEO aging (e.g., they are approaching the conventional retirement age), their concern on career probably decreases as they will no longer stay in the active managerial labor market. Hence, older CEOs may be less willing to invest aggressively into risky projects relative to younger CEOs. We would expect to see a stronger relation excess incentive compensation for younger CEOs than that for older CEOs. The conventional retirement age is 60 in Australia, so we use this number as the cut-off age to assign CEOs into 2 groups: younger and older. OLDER takes the value of 1 if a firm's CEO is equal to or older than 60, 0 otherwise. Model specification is as follows:

$$R_i = \alpha + \beta_1 * Excess\ incentive_{i,t} + \beta_2 * Excess\ incentive_{i,t} * OlderCEO_{i,t} + \beta_3 * OlderCEO_{i,t} + \sum_j \gamma_{i,j} * Control\ variables_{i,j,t} + industry\ dummies + year\ dummies + \varepsilon_i \quad (2)$$

4. EMPIRICAL RESULTS

4.1. Panel data analysis

4.1.1. Full sample

In this section, we examine the effect of excess CEO incentive pay on future stock returns using panel data analysis. Table 2 reports our regression results for the full sample. As can be observed, the coefficients on excess incentive pay in all models are positive and statistically significant: 0.011 (t -value=2.47), 0.015 (t -value=3.00), 0.013 (t -value=2.64), for year 1, 2, and 3, respectively. This indicates a positive association between excess incentive pay and future stock performance. The higher the level of incentive paid to a firm's CEO, the better the stock performance in following 3 years. This period is consistent with the finding in Qu, Percy, Hu, and Steward (2014) in which they document that in their sample of 250 largest Australian firms over 2003-2007 period, the median of vesting period of the first tranche in the grant (last tranche) is 2 years (3 years). In terms of economic magnitude, on average, 100% increase in excess incentive pay leads to an increase by 1.1% in returns in year 1; 1.5% in year 2; and 1.3% in year 3. In our sample, the average firm with market value of \$2,250m pays its CEO \$0.36m under equity-based compensation over the sample period. If the average firm paid a double level of incentive compensation to its CEO, the firm value would increase by \$28.05m in year 1; \$38.67m in year 2; and \$34.02m in year 3⁸.

Turning to the CEO age effect, it is worth noting that the coefficients on the interaction term of incentive and older CEOs are negative and statistically significant in years 1 and 3. This negative number implies that the market perceives lower firm risk associated with incentive pay for older CEOs relative to younger CEOs. This is possibly due to a reason that older CEOs is more likely to be conservative; they would invest less in risky projects. Barker and Mueller (2002) suggest that the level of R&D expenditure is higher in firms with younger CEO, and lower in firms with older CEO. In our sample, on average, an older CEO (who is equal

to or older than 60) receives \$0.42m under the form of incentive pay and his firm invests only \$1.61m in R&D. By contrast, a younger CEO receives a less amount of incentive pay of \$0.36m, but his firm invests a much higher number of R&D expenditure of \$2.60m.

We also employ value-weighted OLS regression as an alternative method for our equal-weighted OLS regressions above. Using the market capitalization as the weight for regression from (1) to (3), unreported results are very similar to those in Table 2 with the same conclusion.

Overall, our finding is in line with finding in Brickley et al. (1985), Abowd (1990) and Mehran (1995). This is consistent with agency theory because CEO incentive compensation works as a solution to minimize agency costs and maximize firm value. This is, however, inconsistent with the findings in Cooper et al. (2014), in which they find higher incentive pay to be associated with lower returns in the following three years. The difference in results between Cooper et al. (2014) and our study might be explained in part by some differences between the US's and Australian markets as mentioned in the introduction section. First, the remuneration of US CEOs is more heavily weighted toward shares and options. Very high level of incentive associated with overconfident CEOs may lead to shareholder wealth losses from activities such as overinvestment and value-destroying mergers and acquisitions (Cooper et al., 2014). In addition, stock-option features differ substantially across countries. For instance, performance-based vesting conditions have traditionally been uncommon in the US, although they are widespread in Australia (Hill et al. 2011)⁹. These performance thresholds might encourage CEOs to work harder to meet conditions, such as those related to total share return or accounting performance, and be able to realize options granted.

Is the relationship non-linear? We check for the existence of a non-linear effect of the incentive on

⁸ Year 1: \$28.05m=\$2,550m*1.1%; year 2: \$38.67m=\$2,550m*(1+1.1%)*1.5%; year 3: \$34.02m=\$2,550m*(1+1.1%)*(1+1.5%)*1.3%

⁹ Performance-based vesting conditions are conditions that must be met for awards to be vested. Such conditions could result from accounting performance or market-based performance. For example, in its 2014 annual report, BHP Billiton stated, "for the whole of either portion of the award to vest, BHP Billiton's TSR (total stock returns) must exceed the Peer Group TSR or the Index TSR by an average of 5.5 per cent per annum." This equates to exceeding average TSR over the five-year performance period by 30.7 per cent. Threshold vesting of each portion of the award occurs where BHP Billiton's TSR equals the Peer Group TSR or Index TSR.

stock performance by including squared values of excess incentive pay as an explanatory variable. Unreported results show that the coefficient on squared excess incentive pay is insignificant, suggesting there is no significant non-linear relationship between incentive pay and stock returns.

Concerning cash pay, as seen in models (1) to (3), the coefficients on excess cash component are

not significant, indicating that the level of excess cash is unrelated to future firm performance. This is consistent with the findings in Cooper et al. (2014) as they argue that because the cash component of an executive incentive contract in the US is typically temporally invariant and unrelated to the evolution of the firm's stock price, it is less likely to incentivize the CEO to increase the stock price.

Table 2. Impact of CEO incentive pay on future stock returns

All independent variables in year <i>t</i>	Dependent variable: annual return in year		
	<i>t</i> +1 (1)	<i>t</i> +2 (2)	<i>t</i> +3 (3)
Excess incentive pay	0.011** (2.477)	0.015*** (3.007)	0.013*** (2.639)
Excess incentive pay *older CEOs	-0.023* (-1.806)	-0.018 (-1.495)	-0.028** (-2.231)
Older CEOs	-0.059** (-2.071)	-0.067* (-1.919)	-0.043 (-1.084)
Excess Cash pay	0.006 (1.102)	-0.004 (-0.631)	0.004 (0.625)
CEO ownership (CEOOWN)	0.080 (0.636)	-0.126 (-0.962)	-0.240** (-2.076)
Firm size (lnSIZE)	0.021** (2.382)	0.033*** (3.918)	0.021** (2.284)
Book-to-market (B/M)	0.003 (0.198)	-0.010 (-0.576)	0.013 (0.653)
Leverage (LEV)	0.092 (0.912)	0.116 (0.980)	0.097 (0.831)
Return on Assets (ROA)	0.140** (2.528)	0.125** (2.368)	0.109* (1.899)
Liquidity (TURNOVER)	-0.057** (-2.121)	-0.116*** (-4.238)	-0.077** (-2.390)
Lagged annual returns (R)	0.122*** (4.884)	0.046* (1.916)	0.106*** (3.575)
Constant	-0.486** (-2.396)	-0.582*** (-3.244)	-0.242 (-1.296)
Industry and year fixed effects	yes	yes	yes
Adj. Rsq	0.23	0.23	0.23
N	1976	1780	1522

This table reports OLS regression results of annual stock returns on excess CEO incentive pay and other variables. Dependent variable is annual return, *R*, earned by individual stock and calculated as compounded daily return within a year. CEO total pay includes salary, bonus, restricted stock grants, option grants, and other of long-term compensation. CEO cash pay is the sum of salary and bonus. CEO incentive pay measured as the difference between CEO total pay and CEO cash pay. Excess incentive pay (cash pay) is incentive pay (cash pay) in excess of the median incentive pay (cash pay) for firms in the same industry. Older CEO is a dummy variable that is equal to 1 if CEO is equal to or older than 60, 0 otherwise. SIZE is the natural logarithm of sales. B/M is the natural logarithm of the ratio of book value to market value of equity, measured at the end of financial year *t*. LEV is firm leverage, measured as the ratio between book value of long term debts to the sum of book value of long term debts and market value of equity. ROA is return on assets, measured as net income over total assets. LIQ is calculated as the total of daily trading volume to shares outstanding over year *t*. CEOOWN is the percentage of shares outstanding held by firm's CEO. To avoid biased results caused by outliers, all variables are winsorized at the 1% and 99% levels. *t*-statistics adjusting for clustering within firms are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

4.1.2. Industry analysis

The purpose of this section is to see whether the relationship between incentive pay and returns varies across industries. Table 3 shows that the coefficients for the level of excess incentive pay in years 1, 2 and 3 are positive in most of the industries and statistically significant in the materials, consumer staples and healthcare industries. It is also worth noting that R&D expenditure in these industries is high relative to other industries. For example, healthcare is a very R&D-intensive industry; its research and development expenditure was highest in the market¹⁰. Similarly, mining firms have also spent heavily in their search and exploration activities.

Regarding the consumer staple industry, the average firm in this industry pays the highest level of incentive compensation compared to that of other industries¹¹. Two companies dominate the industry: Woolworths and Coles, and the keen competition between these companies may explain why the incentive pay is so high relative to other industries. They have also been spending heavily on developing their online shopping to increase profit. The strong positive relationship among these industries suggests that higher incentive pay may encourage CEOs to invest more in risky projects such as innovations, and consequently lead to higher returns. The finding provides a hint of a possible channel for how incentive pay can affect future

¹⁰ R&D expenditure is \$9.45m, \$3.05m, and \$1.08m for health care, materials, and the rest market on average, respectively.

¹¹ On average, a firm operating in the consumer staples industry (or supermarket) pays its CEO with incentive compensation of \$0.66 m in comparison to that of \$0.37 m in the overall market.

stock return: higher incentive pay leads to more innovations, and hence higher stock returns. We will examine this possible channel in detail in the next section (section 4.2).

Table 3. Impact of CEO incentive pay on future stock returns by industry

All independent variables in year t	Energy	Materials	Industrials	Consumer discretiona ry	Consumer staples	Health care	Info tech
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Dependent variable is annual returns in year t+1							
Excess incentive pay	0.012 (0.870)	0.020** (2.601)	0.011 (0.628)	-0.004 (-0.388)	0.025*** (3.617)	0.030*** (4.453)	0.020 (0.887)
Excess incentive pay*older CEOs	-0.049* (-1.890)	-0.033 (-1.191)	0.027 (1.155)	-0.059** (-2.045)	-0.002 (-0.067)	-0.056*** (-2.950)	-0.026 (-0.785)
Control variables and year fixed effect	yes	yes	yes	yes	yes	yes	yes
Adj_Rsq	0.26	0.27	0.29	0.37	0.27	0.19	0.21
N	188	481	397	292	176	208	139
Panel B: Dependent variable is annual returns in year t+2							
Excess incentive pay	0.009 (0.732)	0.024** (2.374)	0.021* (1.984)	0.002 (0.148)	0.026** (2.257)	0.019 (1.484)	-0.010 (-0.350)
Excess incentive pay*older CEOs	0.001 (0.025)	-0.032 (-1.620)	0.015 (1.005)	-0.031 (-0.910)	-0.019 (-0.590)	-0.028 (-1.049)	-0.082* (-1.775)
Control variables and year fixed effect	yes	yes	yes	yes	yes	yes	yes
Adj_Rsq	0.28	0.27	0.24	0.34	0.34	0.22	0.26
N	168	430	356	266	158	192	124
Panel C: Dependent variable is annual returns in year t+3							
Excess incentive pay	0.016 (0.971)	0.008 (0.729)	0.029** (2.573)	-0.001 (-0.132)	0.023 (1.546)	0.019* (1.808)	0.001 (0.089)
Excess incentive pay*older CEOs	-0.067 (-1.600)	-0.051* (-1.687)	-0.002 (-0.148)	0.009 (0.295)	0.002 (0.055)	-0.034*** (-2.782)	0.161** (2.387)
Control variables and year fixed effect	yes	yes	yes	yes	yes	yes	yes
Adj_Rsq	0.20	0.29	0.24	0.25	0.38	0.23	0.35
N	139	370	305	230	133	170	106

This table reports OLS regression results of annual stock returns on excess CEO incentive-pay and other variables. Dependent variable is annual return, R, earned by individual stock and calculated as compounded daily return within a year. CEO total pay includes salary, bonus, restricted stock grants, option grants, and other of long-term compensation. CEO cash pay is the sum of salary and bonus. CEO incentive pay measured as the difference between CEO total pay and CEO cash pay. Excess incentive pay (cash pay) is incentive pay (cash pay) in excess of the median incentive pay (cash pay) for firms in the same industry. Older CEO is a dummy variable that is equal to 1 if CEO is equal to or older than 60, 0 otherwise. SIZE is the natural logarithm of sales. B/M is the natural logarithm of the ratio of book value to market value of equity, measured at the end of financial year t. LEV is firm leverage, measured as the ratio between book value of long term debts to the sum of book value of long term debts and market value of equity. ROA is return on assets, measured as net income over total assets. LIQ is calculated as the total of ratios of daily trading volume to shares outstanding over year t. An industry's HHI is measured by first calculating the sum of squared sales-based market shares of all firms in that industry in a given year and then averaging it over the past 3 years. CEOOWN is the percentage of shares outstanding held by firm's CEO. The control variables include SIZE, B/M, LEV, ROA, CEOOWN, LIQ, HHI. We have not reported the results for the control variables for the sake of brevity. We do not estimate for the communication technology and utilities industries because there are less than 100 observations for each industry. Insufficient observations might lead to biased regression results. To avoid biased results caused by outliers, all variables are winsorized at the 1% and 99% levels. *t*-statistics adjusting for clustering within firms are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

4.2. Incentive pay, innovations, and stock returns

We examine the role of innovation in the link between incentive pay and returns in this section. Specifically, we test whether high incentives encourage CEOs to undertake more-innovative projects and whether incentive-led innovation is reflected in higher stock returns in the future. Because information on number of patents or patent citations are not available, we use research and development expenditures as a proxy for the firm's innovation. Our tests are conducted through two stages. In the first stage, we regress R&D on incentive pay and obtain the predicted R&D, which we then use as a proxy for incentive-led innovation. In the second stage, one, two and three-year-ahead annual stock returns are regressed against the

predicted values of R&D from stage 1 to ascertain the incentive pay effect on stock performance.

Table 4 reports the results of these stages for the full sample and by sector. As shown in column (1) for the full sample, the coefficient on incentive pay is 0.553 (*t*-value=7.62), implying that higher excess incentive pay is associated higher with R&D. If innovation risk is priced, firms that engage more in innovative activities would be riskier, and thus would command higher expected returns. Turning to the impact of incentive-led R&D on return, models (2) to (5) show that the coefficients of predicted R&D on stock returns in years 1, 2 and 3 are 0.020 (*t*-value=2.59), 0.030 (*t*-value=3.31) and 0.023 (*t*-value=2.64), respectively, for the whole sample. The results confirm our expectation that higher incentive pay leads to higher expenses in innovation, which in turn leads to higher return in subsequent years.

By industry, the untabulated results show a positive relation between incentive pay and R&D expenses for the materials, consumer staples, and health care sectors in which R&D expenses are high relative to the remaining industries. As noted in section 4.1.2, innovative activities such as development of new drugs, search and exploration of natural resources, creation of new methods for

online shopping are important for firms operating in these industries in order to compete and survive. We also find some evidence of a positive association between predicted R&D and returns in years $t+1$ to $t+3$ for these industries. This finding reinforces our explanation for the relation between incentive pay and returns and the mechanism by which incentive pay affects returns for the whole sample.

Table 4. Impact of excess incentive pay-led innovations on stock returns

All independent variables in year t	Full sample			
	Stage 1: dependent variable: R&D expenditure	Stage 2: dependent variable: annual return in year		
	t (1)	$t+1$ (2)	$t+2$ (3)	$t+3$ (4)
Excess incentive pay	0.553*** (7.620)			
Excess incentive pay *Older CEOs	-0.326* (-1.760)			
Older CEOs	-1.029* (-1.767)			
Predicted R&D		0.020*** (2.595)	0.030*** (3.317)	0.023*** (2.636)
Residual R&D		0.001 (1.034)	0.001 (0.846)	0.003* (1.849)
CEO ownership (CEOOWN)		0.065 (0.545)	-0.135 (-1.033)	-0.241** (-2.070)
Firm size (lnSIZE)		0.022*** (2.663)	0.028*** (3.431)	0.020*** (2.214)
Book-to-market (B/M)		0.005 (0.280)	-0.011 (-0.583)	0.016 (0.778)
Leverage (LEV)		0.088 (0.884)	0.100 (0.861)	0.089 (0.770)
Return on Assets (ROA)		0.136** (2.452)	0.128** (2.421)	0.105* (1.851)
Liquidity (TURNOVER)		-0.058** (-2.182)	-0.118*** (-4.239)	-0.084** (-2.578)
Lagged annual returns (R)		0.124*** (4.969)	0.050** (2.067)	0.112*** (3.688)
Constant	2.669* (1.825)	- (-4.758)	-0.719*** (-4.692)	-0.415** (-2.439)
Industry and year fixed effects	yes	yes	yes	yes
Adj_Rsq	0.10	0.23	0.23	0.23
N	1976	1976	1780	1522

This table reports the regression results of excess incentive pay-led R&D expenditures on one, two-year forward annual stock returns. In the first stage, log R&D is regressed against excess incentive pay. In the second stage, the dependent variable is annual return, R , earned by an individual stock and calculated as compounded daily return within a year. CEO total pay includes salary, bonus, restricted stock grants, option grants, and other forms of long-term compensation. CEO cash pay is the sum of salary and bonus. CEO incentive pay is measured as the difference between CEO total pay and CEO cash pay. Excess incentive pay (cash pay) is incentive pay (cash pay) in excess of the median incentive pay (cash pay) to firms in the same. Older CEO is a dummy variable that is equal to 1 if CEO is equal to or older than 60, 0 otherwise. SIZE is the natural logarithm of market value of equity. B/M is the natural logarithm of the ratio of book value to market value of equity, measured at the end of financial year t . ROA is return on assets, measured as net income over total assets. LIQ is calculated as the total of ratios of daily trading volume to shares outstanding over year t . CEOOWN is the percentage of shares outstanding held by a firm's CEO. To avoid biased results caused by outliers, all variables are winsorized at the 1% and 99% levels. t -statistics, adjusting for clustering within firms, are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

4.3. Robustness tests

4.3.1. Portfolio analysis

In this section, we use portfolio analysis to check robustness of results for panel data. We expect to see a significant difference between future performance of a portfolio of high excess incentive pay firms and of a portfolio of low excess incentive pay firms. In December of each year t , from 2001 to 2012, we rank all stocks in the sample by excess incentive pay in ascending order. We then assign stocks into two portfolios¹². The Low (High) portfolio

consists of firms with levels of excess incentive pay below (above) the median of the sample. All portfolios are held for 1 year, from January to December of year $t+1$. Median by portfolio in panel A of Table 1 indicates that firms that pay higher incentive compensation for their CEOs tend to be larger and more profitable.

Following prior research on stock return anomalies (e.g., Fama and French, 2008; Cooper, Gulen and Schill, 2008) we also employ the Fama

¹² Cooper et al. (2014) assign their sample of 22,013 observations over the period of 1994–2011 into decile portfolios. On average, each of their

portfolios consists of 122 stocks. However, our sample is much smaller than theirs, of 1976 firm-year observation over the period of 2001–2011. To keep a similar number of stocks in each portfolio as in Cooper et al. we therefore form two portfolios. There are approximately 90 stocks in each of our portfolios.

and French (1992) model (hereafter FF 3-factor) for our portfolio analysis. According to the models, in the absence of abnormal performance (i.e., Jensen's

alpha is zero), the excess return of a portfolio is attributable to factor-risk premiums. The model is estimated as follows:

$$EXCESS_{i,m} = \alpha + \beta_1 * MRP_m + \beta_2 * SMB_m + \beta_3 * HML_m + \varepsilon_{i,t} \quad (3)$$

where, EXCESS is the equal-weighted excess return (EXCESSEW) or value-weighted excess return (EXCESSVW) on the portfolio in month *m*, computed by subtracting the risk-free rate from the equally or value weighted return on the portfolio. The risk-free rate is measured as the 10-year government bond yield. MRP is the monthly market risk premium, measured by subtracting the risk-free rate from the value-weighted market return. SMB is a size factor, measured as the difference between the returns on a portfolio of small cap stocks and on a portfolio of large cap stocks. HML is a value factor, measured as the difference between the returns on a portfolio of high book-to-market stocks and on a portfolio of low book-to-market stocks (Please see the details of MRP, SMB, HML construction in Appendix B). We report results for both the full sample and profit firms. Because loss firms are likely to be unable to pay their CEOs as much as do profitable firms (In our sample, the profit firms pay their CEOs on average (median) of \$0.457 million (\$0.138 million), accounting for 32% (20%) the total CEO compensation. In contrast, the loss firms pay a corresponding number of \$0.218 million (\$0.061 million), accounting for 40% (20%) of the total CEO compensation), hence, the incentive effect would be weak in this group. In addition, the difference between performance of a portfolio of firms with high incentive pay and a portfolio of firms with low incentive pay could be mechanically affected by bad performance of loss firms. To avoid this loss effect

we also report results for the subsample of profit firms.

Panel A of Table 5 shows the average monthly raw returns. We define Hedge portfolio as a zero-cost portfolio that takes a long position in the High portfolio and a short position in the Low portfolio. The mean return on the equal- (value) weighted Hedge portfolio is positive and significant. This indicates that the equal- (value) weighted High portfolio outperforms the equal- (value) weighted Low portfolio in the subsequent year after the portfolio construction.

Panel B of Table 5 demonstrates the Fama-French 3-factor monthly alphas (FF). As observed, the alphas for Hedge portfolio all positive and statistically significant, suggesting the existence of abnormal returns. For instance, going long an equal (value)-weighted portfolio of stocks with excess incentive pay above sample median and short equal (value)-weighted portfolio of stocks with excess incentive pay below sample median earns an average of 7.2% (8.6%) per annum after adjusting for risk in the Fama-French 3-factors model. Since loss firms account for a large proportion of 35% of the sample we also check whether the abnormal returns of the Hedge portfolio are driven by bad performance of loss firms. To exclude an effect of loss firms we use a subsample of profitable firms only. The results for the profitable firms subsample exhibit a similar pattern as observed in the full sample.

Table 5. Raw return and Fama-French 3 factor model alpha

Panel A: Raw return						
Full sample	-0.011**	-0.002	0.009***	-0.005	0.005	0.011***
	(-2.37)	(-0.45)	(4.41)	(-1.14)	(1.47)	(3.61)
Profit firms	-0.001	0.004	0.005**	-0.002	0.006	0.007**
	(-0.36)	(0.86)	(2.28)	(-0.34)	(1.58)	(2.37)
Panel B: Fama-French monthly alpha						
Full sample						
Alpha	-0.004**	0.002	0.006**	-0.006**	0.002**	0.008***
	(-2.158)	(1.602)	(2.297)	(-2.481)	(2.020)	(4.000)
Market risk premium (MRP)	0.963***	1.102***	0.139***	1.147***	1.004***	-0.143**
	(15.329)	(17.895)	(2.779)	(14.424)	(25.721)	(-2.213)
Size premium (SMB)	0.681***	0.417***	-0.264***	0.143*	-0.077**	-0.220***
	(16.403)	(10.949)	(-7.023)	(1.746)	(-2.508)	(-2.621)
Value premium (HML)	0.340***	0.176***	-0.164**	0.124	-0.102	-0.226*
	(6.618)	(2.653)	(-2.510)	(1.150)	(-1.457)	(-1.974)
N	130	130	130	130	130	130
Profit firms subsample						
Alpha	0.003	0.005***	0.003	-0.004*	0.003**	0.007***
	(1.647)	(3.057)	(1.477)	(-1.712)	(2.611)	(3.098)
Market risk premium (MRP)	0.833***	1.046***	0.213***	1.005***	1.001***	-0.004
	(15.513)	(14.358)	(3.702)	(14.837)	(25.238)	(-0.078)
Size premium (SMB)	0.468***	0.227***	-0.241***	0.050	-0.084***	-0.134**
	(12.570)	(5.964)	(-5.521)	(0.788)	(-2.649)	(-2.201)
Value premium (HML)	0.288***	0.091*	-0.197***	0.144	-0.136*	-0.279**
	(4.458)	(1.979)	(-3.154)	(1.378)	(-1.954)	(-2.444)
N	130	130	130	130	130	130

Portfolios are formed from sorting firms on excess CEO incentive pay. This table shows the average monthly raw returns and FF 3-factor monthly alpha and *t*-statistics.

$$FF\ 3\text{-factor model is estimated as } EXCESS_{i,t} = \alpha + \beta_1 * MRP_t + \beta_2 * SMB_t + \beta_3 * HML_t + \varepsilon_t \quad (4)$$

where, EXCESS is the monthly excess return on portfolio, computed by subtracting the risk-free rate from

the return on portfolio. MRP is monthly risk premium, calculated as market return less risk-free rate. Risk-free rate is the 10-year government bond yield obtained from the Reserve Bank of Australia. MRP is monthly market risk premium, measured by subtracting the risk-free rate from monthly value-weighted market return. SMB is the size factor, measured by the difference between returns on a portfolio of stocks with small cap and a portfolio of stocks with large cap. HML is the value factor, measured as the difference between returns on a portfolio of stocks with high book-to-market and on a portfolio of stocks with low book-to-market. *t*-statistics in parentheses are computed based on standard errors, with Newey-West corrections of twelve lags. ***, **, * represent significance at the 1%, 5%, and 10% levels, respectively.

4.3.2. Fama-MacBeth regressions

In this section, we use Fama-MacBeth (1973) cross-sectional regressions as an alternative to a panel approach. The dependent variable is annual returns on individual stocks in the one and two-year ahead. Other independent variables are the same as those in the panel data regressions (described in Eq. (2)). The coefficients on the incentive pay are 0.015 (*t*-value=2.90), 0.017 (*t*-value=4.38), and 0.021 (*t*-value=3.73) for the following 1, 2 and 3 years, respectively. These results are similar to those reported in Table 2 using the panel data analysis with the same conclusion.

4.3.3. Alternative measures of incentive pay

We consider several alternative measures of excess incentive pay and estimate the model as described in Eq. (2) to check robustness of the incentive effect on future returns.

Raw incentive pay and industry and size adjusted incentive pay: To calculate industry and size adjusted incentive (cash) pay first firms in each industry are then allocated into two size groups (High or Low) based on the median sales of the firms in the industry for that year. Excess incentive (cash) compensation for each firm is measured as the difference between the natural logarithm of incentive (cash) compensation for firm *i* and the median natural logarithm of incentive (cash) compensation of the firms in the same industry and size portfolio for that year. We use raw and industry and size-adjusted incentive pay instead of industry-adjusted incentive pay to estimate Eq. (2). The coefficients on these measures for years 1, 2 and 3 are positive and significant.

Percentage incentive pay: Thus far, we have tested whether the level of incentive pay is associated with future stock returns. It could be argued that the form of CEO compensation (percentage incentive pay) is significantly associated with future returns. For a further test, the proportion of incentive pay is used as an alternative measure of excess incentive pay. Rerunning regression of Eq. (2) we find the coefficients on the proportion are positive but statistically significant in only year 2. This weak effect might be due to the following. There may be a threshold above which CEO incentive pay would be sufficient to motivate the manager to take a higher risk but on profitable projects. Otherwise, a small amount of incentive pay may not be effective at all. Hence, examining the relationship between percentage incentive pay and future stock returns may not yield significant results¹³.

4.3.4. Subsamples

To avoid a concern that our results are driven by performance of firms which pay their CEOs by cash only we remove all observations with zero incentive level. There are 113 such observations, accounting for 5% of the whole sample. We rerun regression for Eq. (2) and find the results for the subsample are in line with those from the whole sample. Further, Clinch, Fuller, Govendir and Wells (2012) document that the Australian market consists of many small cap firms. We also conduct regressions of Eq. (2) for sub-samples of big versus small firms to see whether small firms drive our findings. The positive relation between incentive pay and future returns holds for each of these subsamples except for small firms in year 1, indicating the prevalence of this alignment effect regardless of firm size.

4.3.5. The issue of endogeneity

Hayes and Schaefer (2000) argue that boards of directors use non-observable (to outsiders) information when they design executive remuneration, suggesting that there may be an endogeneity issue in our return regressions. That is, given the board's knowledge about future firm performance, the board may increase incentive compensation to ensure that managers have appropriate incentives. However, because we used lagged incentive pay to predict stock performance, the endogeneity issue should not be a major concern (Brick et al., 2012). Nevertheless, we attempt to address this issue by using the instrumental variable method.

To apply the instrumental variable approach, we must seek a set of instrumental variables for excess CEO incentive pay. We rely on prior studies and choose CEO tenure and age as instrumental variables explaining variance of excess incentive pay. As seen in models (2) to (4) in Table 6, the coefficient of the excess incentive is all positive and statistically significant. The relation still holds after we control for the endogeneity issue.

¹³ The median incentive pay for the Australian firms is \$ 0.112 million from 2001-2011, whereas that for the US firms is \$ 1.436 million from 1994-2011 (Cooper et al. 2014).

Table 6. Endogeneity issue

All independent variables in year t	Full sample			
	Stage 1: dependent variable: incentive pay	Stage 2: dependent variable: annual return in year		
	t (1)	$t+1$ (2)	$t+2$ (3)	$t+3$ (4)
CEO tenure	0.216** (2.067)			
CEO age	2.013*** (4.033)			
Predicted incentive pay		0.127** (2.512)	0.144*** (2.833)	0.092* (1.770)
Predicted incentive pay*older CEOs		-0.078 (-0.469)	-0.058 (-0.303)	-0.368 (-1.424)
Older CEOs		-0.100** (-2.257)	-0.112** (-2.118)	-0.002 (-0.033)
Constant	-8.641*** (-4.525)	-0.061 (-0.463)	0.155 (1.569)	0.181 (1.285)
Industry and year fixed effect	no	yes	yes	yes
Adj_Rsq	0.02	0.19	0.20	0.19
N	1914	1914	1723	1477

This table reports results of the instrumental variable approach (2SLS). Dependent variable is annual return (R), earned by individual stock in year $t+1$, calculated as compounded daily return within a year. Independent variables are predicted excess incentive pay, excess incentive pay and other control variables. CEO total pay includes salary, bonus, restricted stock grants, option grants, and other forms of long-term compensation. CEO cash pay is the sum of salary and bonus. CEO incentive pay measured as the difference between CEO total pay and CEO cash pay. Excess incentive pay (excess cash pay) is incentive pay (cash pay) in excess of the median incentive pay (cash pay) to peer firms in the same industry. The instruments for excess incentive pay are CEOTENURE and CEOAGE. CEOTENURE is the natural logarithm of number of years CEO has been with the firm. CEOAGE is the natural logarithm of age of CEO. SIZE is the logarithm of market value of equity. B/M is the natural logarithm of the ratio of book value to market value of equity, measured at the end of financial year t . ROA is return on assets, measured as net income over total assets. LIQ is calculated as the total of ratios of daily trading volume to shares outstanding over year t . An industry's HHI is measured by first calculating the sum of squared sales-based market shares of all firms in that industry in a given year and then averaging it over the past 3 years. CEOOWN is the percentage of shares outstanding held by firm's CEO. To avoid biased results caused by outliers, all variables are winsorized at the 1% and 99% levels. t -statistics adjusting for clustering within firms are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

5. CONCLUSION

Equity-based compensation for managers could be used as a potential instrument for addressing the conflict of interest between managers and shareholders in the corporate form of organization (Mehran, 1995), but also a part of the agency problem itself (Bebchuk and Fried, 2003). The purpose of this paper is to investigate the role of equity-based compensation in Australia. In particular, we examine the relationship between excess incentive pay and future stock returns. Excess incentive pay is measured as payment of restricted stock grants, option grants, long-term incentive payouts, and other annual noncash compensation in excess of the median incentive pay by firms in the same industry.

We find that excess CEO incentive pay is positively associated with future stock performance. This effect persists over a period up to three years. Moreover, we also find that the excess incentive pay effect is not subsumed by well-known factors such as size, book-to-market, momentum, profitability, and other determinants of returns. This result is robust to a variety of tests, the different measures of incentive pay and in various sub-samples.

The positive relation between excess incentive pay and stock returns is consistent with agency theory in which higher equity-based compensation motivates CEOs to work hard and make decisions that are in the best interests of shareholders. In addition, the innovation channel also plays an important role in this link. In particular, higher

incentive pay induces CEOs to engage more in research and development activities. Such firms would become more risky, and hence, command higher expected stock returns. We find that the impact of incentive pay on stock returns is stronger among firms operation in high competitive market and firms led by younger CEOs. In this study, we focus on the risk-based explanation story for the CEO incentive pay premium. However, there is alternative explanation that due to some biased behaviors, investors undervalue firms with high CEO incentive pay, leading to outperformance of these firms ex-post.

Our findings of a positive relation between incentive pay and stock returns lends support to using equity-based compensation as an effective component to align the interests of managers and those of shareholders. Because we cannot rule out the importance of other existing factors such as performance-based vesting conditions, we therefore propose that firms ought to keep in mind such conditions when granting equity-based compensation to their managers. In addition, policy-makers should carefully consider the implications of taxing equity-based compensation component. Such a policy could lead to reduction in the proportion of equity-based compensation component. The positive relationship between excess incentive compensation and stock returns also provides a signal to investors, such as fund managers, in their search for assets that can yield high returns. Finally, these results have implications for asset pricing theories: excess CEO incentive pay, at least in the Australian context, is a factor that can explain future returns.

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Appendix A

Table A1. Variable measurement

<i>Variables</i>	<i>Measurement</i>
<i>CEO Compensation</i>	
Total compensation (TOTAL_COMP)	Measured as the sum of salary, bonus, restricted stock grants, option grants, and other forms of long-term compensation
Total cash compensation (CASH)	Measured as the sum of salary and bonus
Total incentive compensation (INCENTIVE)	Measured as the difference between TOTAL_COMP and CASH
Excess incentive pay, Excess cash pay	At the end of calendar year t , firms are allocated into nine industries based on the Standard and Poor's Global Industrial Classification Standard (GICS) sectors. Excess incentive (cash) compensation for each firm is then measured as the difference between the natural logarithm of incentive (cash) compensation for firm i and the median natural logarithm of incentive (cash) compensation of the firms in the same industry.
<i>Firm characteristics</i>	
Annual return (R)	Annual return earned by an individual stock, calculated as compounded daily return within a year
Firm size (SIZE)	The natural logarithm of market value of equity, measured in December of year t
Book-to-market ratio (B/M)	The natural logarithm of the ratio of book value to market value of equity, measured at the end of financial year t
Leverage (LEV)	Measured as the ratio between book value of long-term debts to the sum of book value of long-term debts and market value of equity
Return on assets (ROA)	Measured as net income over total assets
Liquidity (LIQ)	Calculated as the total of ratios of daily trading volume to shares outstanding over year t
Research & Development (R&D)	Defined as the natural logarithm of research and development expenses
CEO ownership (CEOOWN)	The percentage of total shares owned by the CEO
<i>Risk premiums</i>	
Market risk premium (MRP)	Measured by subtracting the risk-free rate (10-year government bond yield) from the monthly value-weighted market return
Small-minus-Large (SMB)	The size factor, measured by the difference between returns on a portfolio of stocks with small cap and on a portfolio of stocks with large cap
High-minus-Low (HML)	The value factor, measured as the difference between returns on a portfolio of stocks with high book-to-market and on a portfolio of stocks with low book-to-market.

Appendix B: SMB, HML Construction

For the SMB (Small minus Large) and HML (High minus Low) factors, following Fama and French (1993), we form six portfolios from the intersections of two size and three book-to-market portfolios. At the end of December of year $t-1$, we first rank stocks according to their market capitalization, and the median market capitalization is used to split stocks into two groups – small and large. Similar to Braisford et al. (2012), the top 200 firms by market capitalization are ranked by their book-to-market ratios and separated based on the breakpoints for the bottom 30% (low), middle 40% (medium), and top 30% (high). These book-to-market breakpoints are recorded and used to assign all other firms outside the top 200 into the three book-to-market portfolios.

Monthly VW returns on the six portfolios are calculated from January to December of each year. The portfolios are reformed at the end of each December. SMB is the average return on the three small-size portfolios minus the average return on the three large-size portfolios. HML is the average return on the two high book-to-market portfolios minus the average return on the two low book-to-market portfolios.