

Pay-performance sensitivities of CEO stock option grants

Australian pay-performance sensitivities relate to several pre-grant firm characteristics, including financial leverage, stock beta, potential financial distress, market-to-book, Top 200 and CEO share ownership. All are positively related to pay-performance sensitivity, except for the stock beta. **JEAN CANIL SF Fin** and **BRUCE ROSSER SF Fin** explain these relationships.



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Growth in stock option compensation for CEOs is now on the wane relative to restricted shares, but much of this decline can be attributed to the expensing requirements of International Accounting Standards.¹

Stock options remain an important component of at-risk executive pay. In this paper, we examine the determinants of the pay-to-performance sensitivity of Australian option grants (as distinct from that of the total of all units of stock and unexercised stock options). Pay-performance sensitivity is defined as the option delta (i.e. incentive) multiplied by the number of granted options, which yields a dollar measure specific to the grant.² The option delta is calculated from the dividend-adjusted Black-Scholes model and is reduced to account for CEO risk aversion.³

Higher pay-performance sensitivity is widely believed to benefit shareholders through (a) increasing the take-up of new investment opportunities, and (b) increasing the profitability of existing assets.

However, pay-performance sensitivity should not necessarily be maximised, because other factors may

influence its effectiveness.⁴ Pay-performance sensitivity (as defined here) can be increased by either increasing the number of granted options, or increasing the option delta.

The option delta is higher when stock volatility is higher, but can be increased by granting options at a discount to market. However, increasing delta does not necessarily increase CEOs' risk-taking incentive. To see this, a CEO who is granted discounted options has less incentive to take more risks because the option is already in the money. A deep in-the-money option grant would have similar incentive to a unit of stock. Whereas, granting premium options creates risk-taking behaviour because this is the only way to produce a positive payoff for the CEO.⁵

Hence, shareholders wishing to maximise risk-taking incentive should consider granting premium options to their CEO. However, shareholders need to limit the premium because a high premium may create no incentive if the CEO considers the extra effort unrewarding. Other things equal, incentive is linear in relation to grant size: doubling the grant doubles incentive.

Shareholders have an incentive to

increase the pay-performance sensitivity of option grants when the granting company has valuable growth opportunities, so pay-performance sensitivity is expected to be positively correlated with pre-grant growth opportunities.

Higher pay-performance sensitivity is also predicated when debt is high and growth is low. With this combination, agency costs of equity are higher because risk-averse management is more likely to choose low-risk investments. Shareholders therefore stand to benefit from increasing pay-performance sensitivity to induce managers to invest in higher-risk projects. However, since higher risk-taking lowers debt value, shareholders limit the increase in pay-performance sensitivity. The net result is an expected positive correlation between pay-performance sensitivity and leverage.

SAMPLE DESCRIPTORS

Our sample comprises 168 stock option grants made to 65 CEOs made by 51 listed Australian companies during the period 1987–2000. Both industrial and resource stocks are represented. Since no Australian executive compensation databases are available, all grant data were obtained from an 'options' keyword search of all ASX-listed companies included in Huntleys' DatAnalysis service. Deletions were made for companies with quoted options, foreign companies, data inadequacies or inconsistencies and grants within three days of other major announcements.

Table 1 describes the firm characteristics of granting companies. Median CEO share ownership (0.036%) is quite small, which is not unusual in Australian companies. However, 17 grants (to 10 CEOs) were large enough to exceed 5% of the number of outstanding shares, resulting in a higher mean value. Median stock volatility (9.90%) is comparatively low given that average market volatility hovers around 20%. The median stock beta of 1.08 is almost the market average. Median financial leverage is a modest 18.0% and interest coverage (which is logged to accommodate extreme values) on average is more than adequate.⁶ Thus, across the sample there is no suggestion of financial distress. However, the median market-to-book of assets is below one (0.96), suggesting investors have reservations about future growth opportunities. Firm size is measured by total assets.

The overall impression is that the sample represents with indifferent growth opportunities, ample interest coverage and moderate leverage. There is no suggestion of above-average risk.

Table 2 documents the characteristics of CEO stock option grants. It is interesting to note that 65/168 of grants are discounted on issue and that 48/168 are awarded at a premium.

CEO gain at grant is the stock price at grant minus the exercise price, divided by the stock price at grant. A grant is classified as a premium grant when the stock price on the grant date exceeds the exercise price by 5 or more per cent, while a discounted grant requires the exercise price on the grant date to exceed the stock price by 5 or more per cent. The spread boundaries of $\pm 5\%$ are considered wide enough

TABLE 1 FIRM CHARACTERISTICS OF GRANTING COMPANIES

	Whole sample
Number of grants	168
Number of companies	51
Number of CEOs	65
Percentage of subsequently exercised grants	60.7
CEO share ownership (%)	
mean	1.96
median	0.04
minimum	0.00
maximum	40.56
Stock volatility (%)	
mean	12.33
median	9.90
minimum	4.20
maximum	46.40
Stock beta	
mean	1.22
median	1.08
minimum	-1.74
maximum	4.29
Financial leverage (%)	
mean	19.0
median	18.0
minimum	0.0
maximum	71.8
$\ln(\text{Interest coverage})$	
mean	1.61
median	1.68
minimum	-9.25
maximum	7.44
Market-to-book of assets	
mean	1.20
median	0.96
minimum	0.11
maximum	6.00
Firm size (total assets) \$m	
mean	1,224.2
median	382.6
minimum	0.783
maximum	7,065.2

CEO stock ownership is pre-grant and expressed as a percentage of the number of outstanding ordinary shares. Stock volatility is measured by the annualised standard deviation of pre-award monthly stock returns (in percentage terms) over a minimum of 36 months prior to grant. The stock beta is determined by estimating the market model over a minimum of 36 months prior to award. Financial leverage is the ratio of total debt to total assets, all at book. Interest coverage is the ratio of earnings before interest and tax (EBIT) to interest paid. Market-to-book of assets is the sum of the market value of equity 180 days prior to grant plus the book value of debt, both divided by total assets of book.

TABLE 2 CHARACTERISTICS OF CEO STOCK OPTION GRANTS

	Whole sample
Number of grants	168
Number of discount options	65
Number of ATM options	55
Number of premium options	48
Adjusted option value/Stock price at grant (%)	
mean	44.60
median	45.79
minimum	7.13
maximum	54.05
Incentive	
mean	0.595
median	0.600
minimum	0.449
maximum	0.685
Pay-performance sensitivity (\$m)	
mean	0.321
median	0.128
minimum	0.000
maximum	3.769
CEO gain at grant (%)	
mean	1.52
median	1.34
minimum	-54.0
maximum	45.0

The adjusted value of a granted option is the Black-Scholes call value adjusted for dividends and CEO risk-aversion consistent with the scale reported by Meulbroek (2001). Incentive is the partial derivative of the adjusted Black-Scholes option value with respect to the stock price. Pay-performance sensitivity is incentive multiplied by the number of granted options. CEO gain at grant is the stock price minus the exercise price, divided by the stock price at grant. A premium grant (OTM) occurs when the stock price on the grant date exceeds the exercise price by 5 or more per cent; a discount grant (ITM) occurs when exercise price on the grant date exceeds the stock price by 5 or more per cent.

to minimise capture of unintended discounts and premiums.

The adjusted value of a CEO granted option is arrived at by calculating the Black-Scholes call value adjusted for dividends and CEO risk-aversion consistent with the scale reported by Meulbroek (2001). Both the mean and median values are close to 45%, reflecting the preponderance of near-the-money grants. Incentive is the partial derivative of the adjusted Black-Scholes option value with respect to the stock price (i.e., delta adjusted for risk aversion). Again, the mean and median incentive values are very close. The median value of 0.60 (on a 0–1 scale) shows that the sampled options retain substantial incentive-creation potential.

Pay-performance sensitivity is incentive multiplied by the

number of granted options, providing a dollar measure. In other words, CEOs are argued to be more responsive to the dollar value of the incentive contract than its size relative to outstanding capital. Finally, the CEO gain at grant (measured by stock price at grant minus the exercise price, divided by the stock price at grant) is shown positive (median 1.34%), implying a small discount on average. However, this measure is affected by offsetting effect of discounts and premiums and masks the underlying dispersion of grant pricing, as indicated by the maximum and minimum values.

ANALYSIS

In order to identify empirically the drivers of pay-performance sensitivity, the latter is regressed on a range of pre-grant firm characteristics which recur in the literature. The results are presented in Table 3. All regression parameters are satisfactory and all coefficients on the explanatory variables achieve statistical significance. The R² value indicates that nearly 20% of the variation in the pay-performance sensitivity is explained by the six explanatory variables.

Financial leverage is the ratio of total debt to total assets, all at book. The stock beta is determined from estimating the market model over a minimum of 36 months prior to award. Potential financial distress is indicated when interest coverage ≥2 and is logged to moderate outliers; interest coverage is the ratio of earnings before interest and tax (EBIT) to interest paid.

Market-to-book of assets is the sum of the market value of equity 180 days prior to grant plus the book value of debt, both divided by total assets of book. 180 days prior to grant is considered sufficiently early to avoid investor anticipation of the option grant and/or related growth opportunities.

As expected, financial leverage is positively signed, as is market-to-book along with Top 200 (=1) group membership. The latter result suggests a size effect, such that Top 200 (=1) firms exhibit higher pay-performance sensitivity than smaller firms.

Interestingly, pay-performance sensitivity is found decreasing in the stock beta: firms with low (high) betas tend to have high (low) sensitivities. Higher sensitivities for low-beta firms imply that shareholders are increasing pay-performance sensitivity to reward CEOs for market risk as captured by beta, consistent with maintenance of market share.

At the same time, pay-performance sensitivity is also found increasing in potential financial distress, so there is evidence of a distress-avoidance rationale as well. Finally, pay-performance sensitivity is found increasing in CEO share ownership and implies that stock option payoffs are adjusted upwards when CEO ownership is high.

This outcome is surprising because high CEO share ownership implies alignment with shareholder interest, yet pay-performance sensitivity which increases CEO awards is also high. A pure incentive argument would not predict high pay-performance sensitivity. Thus, a suggestion of higher pay-

performance sensitivity than necessary in cases of high pre-grant CEO share ownership cannot be ruled out.

Of the six explanatory variables, three (financial leverage, stock beta and Top 200) have relatively greater impact on pay-performance sensitivity than the remainder, as ascertained by reference to the underlying distributions. Thus, debt, market-related risk and large size appear to be dominant factors in setting pay-performance sensitivity. There is no reason to believe these factors have changed since the end of our sample period. Since a resource stock dummy variable fails to achieve significance (excluded from the regression), these underlying relationships are general across industrial and resource stocks.

SUMMARY AND CONCLUSION

To summarise, for a representative sample of Australian companies we find that pay-performance sensitivity, measured in dollar terms, is positively correlated with financial leverage, potential financial distress, market-to-book of assets, Top 200 and CEO share ownership. In contrast, an inverse relation with the granting company's stock beta is observed. Thus, we document evidence of considerable flexibility in the setting of pay-performance sensitivity targets according to pre-grant firm characteristics.

Shareholders seeking to maximise pay-performance sensitivity can do so by reducing debt levels (which also reduces the potential for financial distress) and/or increase CEO share ownership. Asset risk, market-to-book and Top 200 membership are exogenous in the sense that shareholders should not change their investment preferences for incentive purposes.

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Notes

1 See, for example, Coulton and Taylor (2002).

2 This definition follows Hall and Murphy (2000, 2002), and is explained on Hall's website: www-rcf.usc.edu/~kjmurphy/hallmurf.htm. Jensen and Murphy (1990) employ a broader

TABLE 3 OLS REGRESSION OF PAY-PERFORMANCE SENSITIVITY ON PRE-GRANT FIRM CHARACTERISTICS

$n = 168$	
R^2	0.189
F	6.257
Probability	0.000
Durbin-Watson d	1.843
Constant	0.007 (0.068)
Financial leverage	0.876*** (2.996)
Stock beta	-0.111*** (-2.912)
Potential financial distress (=1)	0.201** (2.163)
Market-to-book of assets	0.086** (2.009)
Top 200 (=1)	0.213*** (2.764)
CEO share ownership	0.012** (1.917)

*** denotes two-tailed significance at the 1% level or better.

** denotes two-tailed significance between 1% and 5%.

Pay-performance sensitivity is incentive multiplied by the number of granted options and divided by the number of outstanding ordinary shares prior to grant. Incentive is the partial derivative of the adjusted Black-Scholes option value with respect to the stock price. Financial leverage is the ratio of total debt to total assets, all at book. The stock beta is determined by estimating the market model over a minimum of 36 months prior to award. Potential financial distress is indicated when interest coverage ≥ 2 and is logged to moderate outliers; interest coverage is the ratio of earnings before interest and tax (EBIT) to interest paid. Market-to-book of assets is the sum of the market value of equity 180 days prior to grant plus the book value of debt, both divided by total assets of book. CEO share ownership is pre-grant and expressed as a percentage of the number of outstanding ordinary shares. t statistics are shown in parentheses.

definition of pay-performance sensitivity that relates the change in CEO wealth (all share holdings plus the equivalent value of option holdings) to a given change in shareholder wealth.

3 The risk aversion adjustment follows Meulbroek (2001), who suggests empirical adjustments: where the upper bound of CEO value is 70 per cent of Black-Scholes value (assuming zero CEO diversification) for firms with the lowest share price volatility and the lower bound is 53 per cent for the highest share price volatility. The adjustment makes little difference to the results because it is approximately uniform across the sample.

4 Matolcsy and Wright (2006) analyse the relationship between total compensation and firm characteristics. This paper focuses on one aspect of compensation; stock options and their pay-performance sensitivity.

5 See Hall (2003).

6 1.68 raised to the power of the natural number, e , is approximately 4. **■**