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JEL Classification: M52, J33, G32, G34
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Swinging for the Fences: Executive Reactions to Quasi-Random Option Grants*

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1 Introduction

> *Stock options had potentially unlimited upside, while the downside was simply to receive nothing if the stock didn't rise to the predetermined price. The same applied to plans that tied pay to return on equity: they meant that executives could win more than they could lose. These pay structures had the unintended consequence of creating incentives to increase both risk and leverage.*
>
> –Financial Crisis Inquiry Commission

The use of stock options in executive compensation packages surged in the last 30 years. During the 1990s, stock options became the largest component of executive pay, and by the year 2000, options accounted for 49% of total compensation for CEOs of S&P 500 companies (Frydman and Jenter, 2010). Today, options continue to be prevalent, accounting for 25 percent of total compensation for these CEOs. Moreover, performance vesting shares, which have option-like payoff structures, have grown increasingly popular in the 2000s, representing over 30 percent of equity-linked pay (Bettis, Bizjak, Coles, and Kalpathy, 2012). Options can affect risk taking in at least two ways. Because options have convex payoffs, the expected compensation from options increases with volatility. After the recent financial crisis, many pointed to this effect to argue that options induced firms to take excessive risk. However, replacing a fixed component of compensation with options also increases an executive's exposure to the firm's volatility. This exposure effect pushes risk-averse executives to reduce their firm's volatility. We seek to measure the net effect of these two competing forces. The endogeneity of option pay complicates the task, making it difficult to determine the direction of any causal relation. We exploit quasi-exogenous variation in option compensation that results from institutional features of multi-year compensation cycles to resolve the endogeneity problem.

The common intuition that stock options cause executives to take more risk stems from the fact that the Black-Scholes value of an option increases in the volatility of the underlying stock (see, e.g., Haugen and Senbet, 1981; Smith Jr. and Watts, 1982; Smith and Stulz, 1985). However, for an undiversified and risk-averse executive, it is not necessarily utility maximizing to increase risk in response to option pay. For example, Ross (2004) shows that, because they can make an executive's wealth more sensitive to the underlying stock price, options (and convex fee schedules more generally) have an ambiguous effect on risk taking incentives. If the executive is risk-averse, this can then lead to what Ross refers to as a "magnification effect, " which can outweigh the conventional "convexity effect." This has also been noted by Lambert, Larcker, and Verrecchia (1991), Carpenter (2000), and Lewellen (2006). Thus, it is theoretically unclear whether options should increase or decrease risk taking in practice.

There is a large empirical literature that explores the relationship between executive stock options and various measures of risk taking behavior. The evidence remains mixed. For example, Agrawal and Mandelker (1987) find that firms with higher stock and option ownership make more variance-increasing acquisitions. DeFusco, Johnson, and Zorn (1990) find that firms that approve stock option plans exhibit an increase in volatility.[1] Subsequent research has focused on the relation between a manager's "vega" (the sensitivity of the total Black-Scholes value of all unexercised options to volatility) and risk taking. Several papers find a small positive cross-sectional association between vega and leverage (Cohen, Hall, and Viceira, 2000) as well as stock return volatility (Guay, 1999; Cohen, Hall, and Viceira, 2000). As Guay (1999) notes, however, vega does not take risk aversion into account. To address this, Lewellen (2006) assumes that managers have a power utility function and measures the

[1]For more work along these lines, see Saunders, Strock, and Travlos (1990); Mehran (1992); May (1995); Tufano (1996); Berger, Ofek, and Yermack (1997); Denis, Denis, and Sarin (1997); Esty (1997); Schrand and Unal (1998); Aggarwal and Samwick (1999); Core and Guay (1999); Knopf, Nam, and Thornton (2002)

sensitivity of the certainty equivalent of a manager's compensation package to volatility and leverage. She finds that the more a manager's certainty equivalent decreases with volatility, the more likely the manager is to issue equity rather than debt.

While these studies have grown increasingly sophisticated in terms of measuring the sensitivity of option value to changes in risk, the direction of causality is ambiguous. For example, it is easy to imagine that the long-duration investment projects of growth firms are volatile and these firms tend to compensate managers with stock options to manage the agency problems that often accompany such projects. Similarly, overconfident CEOs may prefer unusually risky projects and to be paid in options. Thus, omitted variables may bias simple cross-sectional estimates of the impact of option-like payoffs on volatility. Moreover, even within-firm or within-executive analysis suffers from dynamic versions of these concerns; periods in which a firm or executive chooses high option compensation may also be periods in which the firm or executive wishes to take high risk. Similarly, changes in compensation may be accompanied by unobservable changes in governance or strategy that directly affect firm strategy and risk taking.

A handful of recent studies attempt to address these endogeneity issues by examining firm behavior during periods surrounding changes to accounting rules that made options less advantageous. These studies deliver mixed results: Chava and Purnanandam (2010) find that options increase risk taking while Hayes, Lemmon, and Qiu (2012) find that options do not affect risk taking. Moreover, changes in accounting rules affected all firms simultaneously, so changes in firm policies may be attributed to the changes in options when they are in fact due to other changes in the business environment. For example, the period coinciding with the rule changes overlaps with a period of rapid growth in the use of performance vesting shares, which have many option-like features but are not technically options. Furthermore, the rule changes were discussed in advance and likely anticipated by many firms. Using

a different strategy, Gormley, Matsa, and Milbourn (2012) examine how executives that endogenously differ in their unexercised option holdings respond to an exogenous increase in firm risk that stems from the discovery of carcinogens that were used by the firm. The exogenous nature of the shock helps to rule out reverse causality, but again a firm or manager with more unexercised options may also have a different optimal or preferred response to increased risk. To identify a causal effect of option pay on risk taking, the ideal test would utilize exogenous variation in option-pay rather than in the risk environment.

In this paper, we exploit two distinct sources of variation in option grants induced by institutional features of multi-year compensation plans. As noted by Hall (1999), many firms award options according to plans in which executives receive a fixed number or fixed value of options. These plans generally last two to five years, after which a new cycle begins. On a fixed number plan, an executive receives the same number of options each year within a cycle. On a fixed value plan, an executive receives the same value of options each year within a cycle. We find that multi-year grant plans are pervasive. More than 40 percent of executive-firm-years are on fixed number or fixed value plans, conditional on options being paid.

Our first instrument for option compensation uses only executives on fixed value plans. In general, compensation drifts upward steadily over time. Under a fixed value plan, however, option compensation is held constant for several years within a cycle. To adjust for this, on average, there tends to be a discrete increase in option compensation coinciding with the start of a new fixed value cycle. This allows us to use whether a given year is a new cycle start year as an instrument for increases in option compensation. We then examine whether the increases in options induced by these start years have an effect on risk taking behavior.

A potential concern with this instrument is that the length of fixed value cycles may be renegotiated mid-way through a cycle, perhaps in response to changes in the business

environment. In particular, if plan cycles are terminated early during periods in which managers find it desirable to change risk for reasons unrelated to compensation, the exclusion restriction will be violated. To address this concern, we exploit the fact that firms tend to use repeated fixed value cycles of equal length. Rather than use actual cycle start years as our instrument, we use predicted cycle start years based on the length of a manager's previous cycles. For example, if a firm starts new fixed value cycles in 1990 and 1992, we predict it starts new fixed value cycles in 1994, 1996, and so on. A second potential concern is that years coinciding with the start of new fixed value cycles may be special in other ways. For example, cycle start years may coincide with periods of decreased turnover which may directly affect firm risk. Empirically, we show that this is not the case. However, to rule out other unobservable differences in cycle start years we use a separate instrument that is robust to these concerns.

Our second instrumental variables strategy does not rely on the timing of cycle start years. Rather, it focuses on variation in the value of options granted *within* fixed number and fixed value cycles. Our instrument exploits the fact that the Black-Scholes value of an at-the-money option increases proportionally with its strike price. As noted by Hall (1999), this means that executives on fixed number plans receive new grants with higher value when their firm's stock price increases. In contrast, executives on fixed value plans receive new grants with the same value (and thus a lower number of options) when their firm's stock price increases. Thus, the value of new option grants is fundamentally more sensitive to stock price movements for executives on fixed number plans than for executives on fixed value plans. Of course stock price movements are partially driven by market and industry shocks which are beyond the control of the executive. Thus, our second instrument for the change in the value of options granted is the interaction between plan type and aggregate returns.

Given that the instrument is an interaction term, the exclusion restriction is somewhat subtle. While Hall (1999) suggests that plan type is determined somewhat randomly, we do not rely on this. That is, our identifying assumption is not that plan type is unrelated to the level of risk an executive would choose absent compensation effects. For example, it may be the case that firms with fixed-number plans tend to systematically differ from fixed value firms in ways that affect their optimal level of risk. Here the exclusion restriction requires the weaker assumption that fixed number firms do not differ from fixed value firms in how their (non-compensation-related) risk taking moves with aggregate returns. We provide evidence that supports this assumption through a placebo test that compares how firm risk taking moves with aggregate returns for firms that are not on either type of plan, but at some point used fixed number or fixed value plans. We find no differences in this case. In addition, our first instrumental variables strategy does not rely on this assumption.

As others have done before us, we use realized equity volatility as our primary measure of risk taking. We find a significant positive effect of option compensation on this measure of risk. In particular, a 10 percent increase in the value of new options granted leads to a 3-6 percent increase in realized volatility. We further find that the increase in equity volatility is driven by increases in leverage. That is, an increase in option compensation leads to increases in leverage ratios that are large enough to account for most of the increased volatility. We also find that options have a positive effect on investment, but results here are less robust and more subject to interpretation issues. In theory, investing in riskier projects may significantly contribute to firm risk. However, it is difficult to discern from accounting data whether investment actually represents investment in riskier projects. Therefore, we present suggestive results that options increase overall investment but do not draw strong conclusions.

Additionally, we examine dividend payouts. Here, the theoretical prediction is unam-

Table 4
IV1 - Volatility & Leverage

Panel A shows the IV and reduced form results for volatility, where ΔLog B-S Value is instrumented for by the Predicted First indicator, as defined in Table 3. Observations are at the executive-year level. The sample is limited to executives on fixed value cycles. We measure volatility in two ways: the annualized volatility of monthly returns in the 12 months following the grant date and the annualized volatility of daily returns in the 120 trading days following the grant date (approximately half of one year). Panel B shows the IV and reduced form results for leverage.

Panel A: Volatility

	Δ 12 Month Volatility		Δ 120 TD Volatility	
	(1)	(2)	(3)	(4)
Δ Log B-S Value	0.211***	0.247***	0.192***	0.218***
	[5.10]	[4.38]	[5.00]	[4.34]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
CEO/CFO Sample	No	Yes	No	Yes
N	36558	14950	36562	14961
F-stat	65.87	40.12	66.04	41.07

	Δ 12 Month Volatility		Δ 120 TD Volatility	
	(1)	(2)	(3)	(4)
Predicted First	0.0155***	0.0181***	0.0149***	0.0173***
	[6.41]	[5.56]	[6.72]	[5.88]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
CEO/CFO Sample	No	Yes	No	Yes
N	41268	16542	41248	16543
R^2	0.257	0.225	0.267	0.231

Table 4
(Continued)

Panel B: Leverage

	Δ Debt/Capital		Δ Debt/Assets	
	(1)	(2)	(3)	(4)
Δ Log B-S Value	0.0719***	0.0739**	0.0580***	0.0599**
	[2.61]	[2.10]	[2.79]	[2.29]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	30196	12476	30201	12477
F-stat	54.70	34.20	54.61	34.20

	Δ Debt/Capital		Δ Debt/Assets	
	(1)	(2)	(3)	(4)
Predicted First	0.00548***	0.00528**	0.00452***	0.00425**
	[2.95]	[2.08]	[3.33]	[2.31]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	34408	13920	34413	13922
R^2	0.106	0.0620	0.0986	0.0550

Table 5

IV1 - Investment, Dividends, and Firm Performance

Panel A shows the IV and reduced form results for investment and dividends, where ΔLog B-S Value is instrumented for by the Predicted First indicator, as defined in Table 3. Observations are at the executive-year level. The sample is limited to executives on fixed value cycles. Investment is defined as capital expenditures or as total investment, which is the sum of capital expenditures, R&D, acquisitions, and advertising expenses. Panel B shows the IV and reduced form results for performance, which is measured using the stock return in the 12 months following the grant date, the return on assets and the cash flow-to-assets ratio.

Panel A: Investments and Dividends

	Log CapX	Log Total Inv	Δ Log Dividends	Δ Dividend Payer
	(1)	(2)	(3)	(4)
Δ Log B-S Value	0.171*	0.295**	-0.171**	-0.0113
	[1.80]	[2.26]	[-2.23]	[-0.31]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	29707	29996	16774	30304
F-stat	54.76	57.27	48.78	55.21

	Log CapX	Log Total Inv	Δ Log Dividends	Δ Dividend Payer
	(1)	(2)	(3)	(4)
Predicted First	0.0161**	0.0275***	-0.0130**	-0.000850
	[2.28]	[2.93]	[-2.12]	[-0.33]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	33855	34234	18773	34533
R^2	0.924	0.856	0.261	0.0872

Table 5
(Continued)

Panel B: Firm Performance

	12 Month Return	ROA	Cash Flow/Assets
	(1)	(2)	(3)
Δ Log B-S Value	-0.0910	-0.0535***	-0.0548***
	[-1.01]	[-3.14]	[-2.81]
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
CEO/CFO Sample	No	No	No
N	36763	30148	27623
F-stat	63.56	54.78	40.36
	12 Month Return	ROA	Cash Flow/Assets
	(1)	(2)	(3)
Predicted First	-0.00470	-0.00335***	-0.00292***
	[-0.72]	[-3.05]	[-2.63]
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
CEO/CFO Sample	No	No	No
N	41822	34404	31453
R^2	0.250	0.667	0.689

Table 6

IV2 - Differential Sensitivity to Industry Returns

This table shows the differential sensitivity of the compensation of fixed number and fixed value executives to industry returns. Observations are at the executive-year level. The sample is limited to executives that are either on fixed number of fixed value plans (not in their first year). The variable FN is an indicator equal to one if the executive is on a fixed number plan. Industry returns are defined the Fama-French (49) industry return of the executives' firm in the 12 months preceding the option grant associated with the cycle. Other variables are defined as in Table 3. Main effects are included in the regressions but not shown. Standard errors are clustered by firm.

	Δ Log B-S Value	Δ Log Delta	Δ Log Vega
	(1)	(2)	(3)
FN × Ind Return	0.482***	0.512***	0.452***
	[14.11]	[15.50]	[8.33]
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	23352	22860	22860
R^2	0.249	0.233	0.292

Table 7
IV2 - Volatility and Leverage

This table shows the IV and reduced form results for volatility and leverage, where ΔLog B-S Value is instrumented for by FN × Ind Return as defined in Table 6. Observations are at the executive-year level. The sample is limited to executives that are either on fixed number of fixed value plans (not in their first year). All other variables are as define in Table 4.

	Δ 12 Month Vol	Δ 120 TD Vol	Δ Debt/Capital	Δ Debt/Assets
	(1)	(2)	(3)	(4)
Δ Log B-S Value	0.0672**	0.0657**	0.0609***	0.0311**
	[2.04]	[2.05]	[3.12]	[2.19]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	22592	22565	18784	18788
F-stat	192.2	192.3	188.3	188.1
	Δ 12 Month Vol	Δ 120 TD Vol	Δ Debt/Capital	Δ Debt/Assets
	(1)	(2)	(3)	(4)
FN x Ind Return	0.0317**	0.0307**	0.0304***	0.0159**
	[2.02]	[2.04]	[3.14]	[2.23]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	23144	23114	19262	19266
R^2	0.323	0.339	0.181	0.188

Table 8
IV2 - Investment, Dividends and Performance

This table shows the IV and reduced form results for Investment, Dividends and Performance, where ΔLog B-S Value is instrumented for by FN × Ind Return as defined in Table 6. Observations are at the executive-year level. The sample is limited to executives that are either on fixed number of fixed value plans (not in their first year). All other variables are as define in Table 5.

Panel A: Investment and Dividends

	Log CapX	Log Total Inv	Δ Log Dividends	Δ Dividend Payer
	(1)	(2)	(3)	(4)
Δ Log B-S Value	0.184*	-0.00325	-0.239**	-0.0484
	[1.72]	[-0.03]	[-2.00]	[-1.63]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	18492	18673	10023	18855
F-stat	185.1	184.2	59.28	186.4
	Log CapX	Log Total Inv	Δ Log Dividends	Δ Dividend Payer
	(1)	(2)	(3)	(4)
FN x Ind Return	0.0877	-0.00718	-0.0860**	-0.0253*
	[1.64]	[-0.12]	[-2.16]	[-1.73]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	18965	19153	10211	19331
R^2	0.922	0.855	0.329	0.167

Table 8
(Continued)

Panel B: Firm Performance

	12 Month Ret	ROA	Cash Flow/Assets
	(1)	(2)	(3)
Δ Log B-S Value	-0.175*	-0.00926	-0.0136
	[-1.93]	[-0.70]	[-0.94]
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	22709	18776	17173
F-stat	196.6	184.6	171.5

	12 Month Ret	ROA	Cash Flow/Assets
	(1)	(2)	(3)
FN x Ind Return	-0.0826*	-0.00604	-0.00855
	[-1.86]	[-0.92]	[-1.18]
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	23304	19252	17618
R^2	0.298	0.716	0.731

Table 9
Placebo Test

This table shows the reduced form results for outcomes from Tables 6-8 using a placebo sample of executive-years that were not on a fixed number or fixed value plan, but were associated with firms that at some point used (or would use in the future) one (but not both) of those types of plans. FN Placebo is an indicator variable equal to one of the the firm at some point used (or would use in the future) a fixed number plan, but was not currently.

	Δ Log B-S Value	Δ 12 Month Volatility	12 Month Return
	(1)	(2)	(3)
FN Placebo x Ind Return	-0.0497	0.0110	-0.0261
	[-0.70]	[0.72]	[-0.61]
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	14006	19400	22617
R^2	0.0917	0.278	0.240

	Log Total Inv	Δ Debt/Capital	Δ Log Dividends
	(1)	(2)	(3)
FN Placebo x Ind Return	0.00733	0.00104	-0.0247
	[0.16]	[0.11]	[-0.62]
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	19005	16686	8149
R^2	0.842	0.136	0.320

Table 10
New vs. Existing Options

This table shows that the effect of new option grants on firm volatility is greater in cases in which the value of new at-the-money option grants is a large fraction of the value of the total stock of unexercised options held by the executive. We re-estimate the reduced form specifications from Tables 4 and 7, interacting our instruments with indicator variables for whether the observation corresponds to the top half or top two terciles in terms of the value of new options as a fraction of the value of all unexercised options. For brevity, we present the coefficients for the main interaction terms of interest. All direct and two-way interaction terms are included as controls.

	Δ 120 TD Volatility			
	(1)	(2)	(3)	(4)
Pred 1st Yr	0.0105***	0.0107***		
	[3.83]	[3.36]		
Pred 1st Yr x Top Half Frac B-S Value	0.0106**			
	[2.53]			
Pred 1st Yr x Middle Tercile Frac B-S Value		-0.000431		
		[-0.10]		
Pred 1st Yr x Top Tercile Frac B-S Value		0.0174***		
		[3.13]		
FN x Ind Return			-0.0167	-0.0367
			[-0.87]	[-1.53]
FN x Ind Ret x Top Half Frac B-S Value			0.100***	
			[3.69]	
FN x Ind Ret x Middle Tercile Frac B-S Value				0.0715**
				[2.41]
FN x Ind Ret x Top Tercile Frac B-S Value				0.130***
				[3.48]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	38189	38189	22508	22508
R^2	0.264	0.265	0.269	0.271

Table A.1
OLS Endogenous Correlations

This table shows the OLS results of regressing Δ Log B-S Value on various outcomes in the full sample of executives. Panel A includes firm fixed effects, while the bottom panel includes them.

Panel A: Firm Fixed Effects

	Δ 12M Vol	12M Return	Log Total Inv	Δ Debt/Capital	Δ Log Dividends
	(1)	(2)	(3)	(4)	(5)
Δ Log B-S Value	0.00306*	-0.0302***	0.0224***	-0.00574***	0.0274***
	[1.68]	[-6.17]	[3.56]	[-4.86]	[5.59]
Year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
N	65572	65940	54477	54964	28388
R^2	0.245	0.219	0.846	0.0873	0.232

Panel B: No Firm Fixed Effects

	Δ 12M Vol	12M Return	Log Total Inv	Δ Debt/Capital	Δ Log Dividends
	(1)	(2)	(3)	(4)	(5)
Δ Log B-S Value	-0.00277***	-0.0184***	0.608***	0.000141	0.0221***
	[-5.60]	[-8.30]	[33.83]	[0.29]	[7.98]
Year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	No	No
N	79886	88423	72430	66667	33854
R^2	0.212	0.122	0.248	0.0168	0.0482

Table A.2
Endogenous Renegotiation

In Panel A, we explore whether executives tend to switch between fixed number and fixed value plans (or depart from using any plan) depending on firm or industry returns. In Panel B we look at whether fixed value executives, in years when the industry return is high, tend to receive raises in their non-option compensation to compensate for the fact that their option compensation remains flat while other executives likely receive increases in options.

Panel A: Switching of Cycle Type and Returns

	FV to Non-Cycle	FV to FN	FN to Non-Cycle	FN to FV
	(1)	(2)	(3)	(4)
Firm Return	0.00568	-0.00211	0.00963	0.00710
	[0.58]	[-1.02]	[0.74]	[1.47]
Industry Return	-0.00397	0.00531	-0.00375	0.00621
	[-0.18]	[0.94]	[-0.13]	[0.50]
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	22772	22772	12102	12102
R^2	0.000150	0.0561	0.0411	0.0322

Panel B: Adjustment of Other Compensation for Fixed Value Executives

	Δ Log (Salary + Bonus)	Δ Log Non-Option Comp	Turnover Next Year
	(1)	(2)	(3)
FV x Ind Return	0.0414	0.0356	
	[1.62]	[0.86]	
Predicted Last Year			0.000254
			[1.11]
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	23127	23378	32168
R^2	0.192	0.0808	0.236

Table A.3

Sensitivity to New Grants to Stock Price: Fixed Value vs Fixed Number

This is an example adapted from Hall (1999). It shows how the value and number of options granted move with a firms stock price with a fixed number and fixed value plan.

		Stock price		
		Year 1 Grant	**Year 2 Grant**	**Year 3 Grant**
Plan		**100**	**120**	**144**
Fixed Value	Value of Options	$1,000,000	$1,000,000	$1,000,000
	Number of Options	28,128	23,440	18,752
Fixed Number	Value of Options	$1,000,000	$1,200,000	$1,440,000
	Number of Options	28,128	28,128	28,128

Note: The annual standard devation is assumed to be 32 percent, the risk-free rate is 6 percent, the dividend rate is 3 percent and the maturity is 10 years