



Chapter 12: Options and Executive Pay

Economics 136

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Note: You are not responsible for the
appendix.



Key Questions

1. How Do Employee Stock Options Work?
2. Should Firms Grant Stock Options?
3. Viewing Options as a Form of Incentive Pay
4. Do Firms Give CEO's Performance Pay, and Does it Affect Firm Performance?

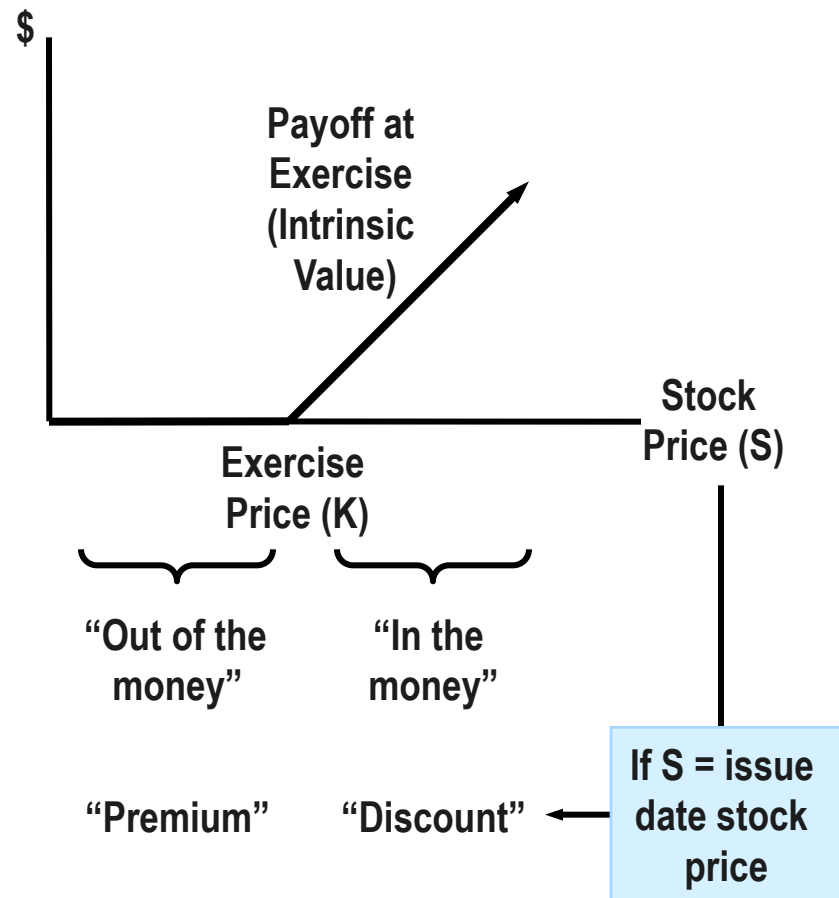


1. How Do Employee Stock Options (ESO's) Work?

- Sometimes firms will grant stock as reward but more typically grant stock options
- Useful only for senior employees who feel that their efforts could move stock price
- Stock call option: gives holder option to buy 1 share of company stock at “strike price” or “exercise price” K .
- Will grant “out of money” call option where current stock price $X < K$.
- Gives incentive to work hard: if profit rises, stock price may rise until $X > K$. Then an option to buy one share at $\$K$ is worth $\$(X-K)$

Introduction

- Employee options differ from traditional options
 - can't trade
 - can't hedge
 - Undiversified
- An option allows holder to buy shares at an "exercise price" K
- Regular Stock = option with $K = 0$





Firms Can Grant Bonus in Variety of Ways

- Suppose stock price has equal chance of equaling \$90 and \$110 next year.
- Firm can grant call options to worker with expected value of \$1000 in infinite number of ways. Two examples:
 - 1000 call options at strike price of \$108
 - 100 call options at strike price of \$90
 - (In second case expected profit to worker is equal to $100\{ \frac{1}{2}*\$0 + \frac{1}{2}*\$20 \}$)



Firms Should Set High Strike Price to Create Biggest Incentive

- Suppose worker can increase effort such that stock price has equal chance of equaling \$91 and \$111 next year instead of \$90 or \$110.
- If firm sets higher strike price and grants more options, the worker will capture greater share of the profit she contributed:
 - 1000 options at strike price of \$108

- 100 options at strike price of \$90

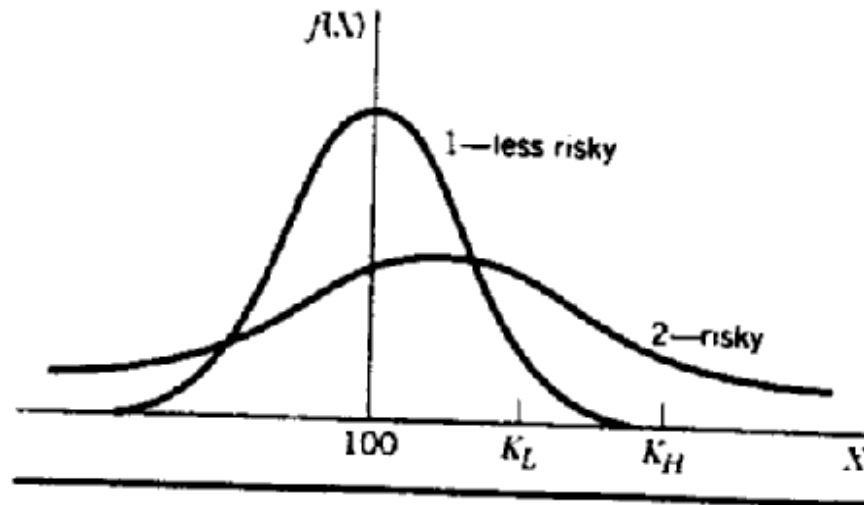
Setting Higher Strike Price Can Also Encourage Managers to Take More Risky Decisions



- Intuition: If you hold an option, you want to undertake risky strategy.
- If the price next year was completely certain not to change, and your company granted you an out of money option, it will remain out of money

If set strike price at K_H , manager will opt for riskier choice

FIGURE 12.5
PROBABILITY DISTRIBUTIONS OF
RETURNS FOR TWO
MANAGERIAL STRATEGIES





Could also force workers to accept put options

- Instead of reward for increase in stock price, could punish senior execs by forcing them to go “short” on a put option.
- If price of stock falls below exercise price, company can exercise put option, forcing manager to buy stock at price above current market price.
- Risk of loss for managers means that firm has to increase their base pay to keep their expected utility high enough

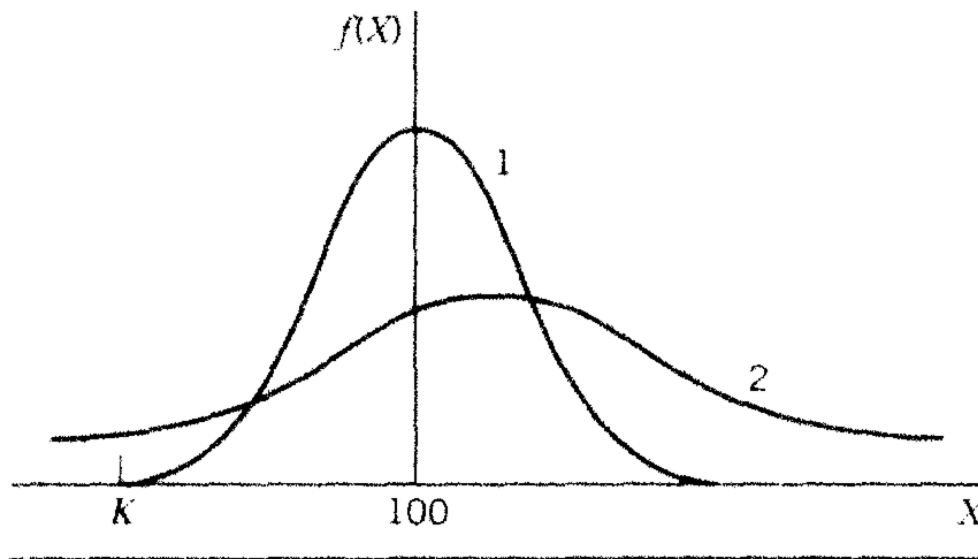


Managers short on put options would become more risk averse

- Perhaps this is why firms almost NEVER use this put option strategy
 - (Owners want managers to take more, not less, risk.)

At exercise price of K or less, put option would induce manager to prefer less risky option 1

FIGURE 12.6
TWO DISTRIBUTIONS OF INCOME



Manager is short put options at price K . Below $\$K$, these are “in the money” and cost manager money

2. Should Firms Grant Stock Options?

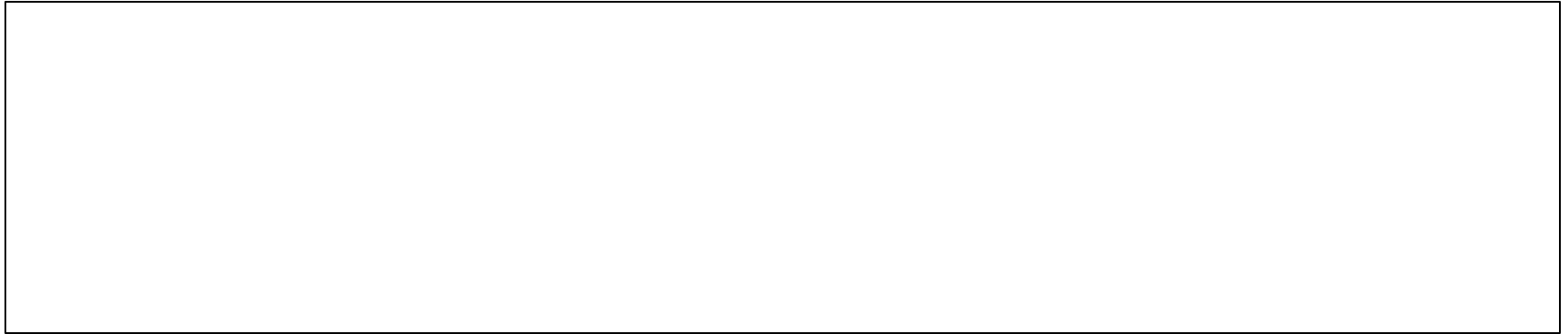


- Options are the most “expensive” common form of pay
- ... in terms of risk premium that must be paid to the employee
 - If a substantial part of my expected income came from stock options I would be very risk averse, and so company needs to give me more of them to compensate than if just paid me a wage
 - See p. 333.

2. Should Firms Grant Stock Options?



- Another disadvantage of ESO's:



- Yet one more reason to avoid them except for key employees



But are potential advantages:

- Workers most optimistic about the firm's future will stay
- May induce workers to take more risks because if the stock price never changes and option is out of the money, worthless
 - But haven't some firms recently taken TOO MUCH?
- ESO's are paid to worker (or vest) gradually (in part to allow for price drops). This discourages turnover.

3. Viewing Options as a Form of Incentive Pay



- Useless for most workers who have no control over stock price – use for senior executives only!
- Not as good as piece rate or tournaments in that....

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- This is why firms sometimes reprice options after stock price falls. Read p. 332

Repricing Options

	1998	1999	2000
% Underwater			
NASDAQ	34	29	37
NASDAQ (value weighted)	35	46	35
NYSE	19	10	46
NYSE (value weighted)	21	34	35
% 25% Underwater			
NASDAQ	17	14	23
NASDAQ (value weighted)	14	20	17
NYSE	8	4	27
NYSE (value weighted)	6	12	14
% 50% Underwater			
NASDAQ	7	6	12
NASDAQ (value weighted)	4	6	7
NYSE	3	1	20
NYSE (value weighted)	1	2	5

Source: Hall & Knox 2002

- Suppose a stock price drop puts employee options deep out of the money. Should they be repriced?
- Yes: or little incentive
 - refinance at the money
 - adjust # of options so zero cost to firm
- No: does it *really* increase incentives...?
 - why did the stock price fall...?



Incentive Pay Issues

- Might be better to grant a few options each year rather than a bunch when hired
 - Less susceptible to loss in incentive effect if stock price falls
 - But then this lowers the initial incentive at date of hire
 - Firms can offer a fixed value of options each year, or a fixed number. Latter creates more risk


But with risk-taking, manipulation?



- Options may cause manipulation
 - very strong incentives when at-the-money, due to non-linear “shape” and leverage; very weak if too far out of the money

-
- difficult to “punish” manipulation ex post; by then options have been vested and possibly exercised

How Do Workers React to Stock Options?



- Investors in stock can act risk neutrally in part because they diversify
- An employee receiving a meaningful % of his/her income from stock options sees this as highly non-diversified
 - Also, options don't vest immediately, and can be exercised but not sold. Also loses the options if no longer employed
 - For these reasons firms must pay MORE to worker in expected value if use lots of options

4. Do Firms Give CEO's Performance Pay, and Does it Affect Firm Performance?

- Studies show that CEO pay rises with overall value of the firm on the stock market. "Commission rate" is about 0.4% in large firms, bigger in small firms.
- Why not 100%? Because the CEO's actions are only one contributor to changes in stock market value!
 - Side note: Larger firms pay CEO's more (more skilled gravitate to large firms?)



But the “commission rate” smaller in large firms

- Two explanations:
- 1) CEO's risk averse so at very large firms reduce volatility in pay by weakening incentives
- 2) In large firms the marginal effect of CEO effort e is BIGGER than in small firms!

$$\frac{\partial Pay}{\partial e} = \frac{\partial Pay}{\partial (StockValue)} \frac{\partial (StockValue)}{\partial e}$$



Other ways of incentivizing and controlling CEO's

- 1) Shareholders and outside pressure groups
- 2) Competition in the product market
- 3) Threat of hostile takeover
- 4) Oversight by board of directors
- 2) and 3) are probably the most effective forms of control
 - Shareholders have trouble coordinating actions; boards of directors often partial to CEO (who often places friends on the Board!!)



Why might CEO's effort have larger effect on stock value in larger firms?

- Text divides CEO decisions into operational vs. strategic.
 - Operational decisions...

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- Strategic decisions increase profits by fixed percentage, so CEO effort here, for example on product mix, may increase profits by 15% at both small and large company, but at the large company this is worth more!

Sample Problem from 2007

Final

- 2.(20) The Board of Directors of Giggle.com is trying to set up a stock option program that will align the interests of the Chief Executive Officer (CEO) of the company with the interests of shareholders. The problem is that the Board does not know as much as the CEO about the opportunities for new projects, and must rely on the CEO to make the right decisions. Board members know that typically expansion into a new market can be done in one of two ways:
 - i) Project A: a low-risk, low-expected-profit approach
 - ii) Project B: a higher-risk, high-expected profit approach
- a) The table below shows that both projects have an equal chance of a “low” outcome and a “high” outcome depending on whether the economy is in a recession or a boom. The table shows overall profits for the company as well as the stock price that will result

	Project A			Project B		
State of economy	Probability	Profits	Stock price	Probability	Profits	Stock price
Recession	$\frac{1}{2}$	-5 million	95	$\frac{1}{2}$	-10 million	90
Boom	$\frac{1}{2}$	+ 5 million	105	$\frac{1}{2}$	+ 15 million	115

Sample Problem from 2007

Final

- Use this information on profits in booms and recessions to calculate the expected profits to shareholders from each of the two projects. As always, show your work. (4)
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-
-
-
- b) The Board of Directors is thinking about offering the CEO compensation consisting of a salary of \$1000 as well as 1000 call options in the company's stock, with a strike price of \$103. Given the information above on the stock price, calculate expected earnings to the CEO if he or she adopts Project A. Do the same for Project B. Which project is the CEO likely to choose? (6)
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Sample Problem from 2007

Final

c) However, the Board of Directors is advised by a consulting firm that the firm should instead offer the CEO a salary of \$10,000, while making him or her grant 1000 put options to the firm, as a strike price of \$103. That is, if the stock price falls below \$103, the firm can sell stock to him or her at \$103 a share. Work out the expected earnings of the CEO if he or she adopts Project A, then do the same for project B. Which project would the CEO adopt if he or she was paid in this way? (6)

- d) Which stock option plan should the Board of Directors adopt in order to maximize the firm's expected profits? Why? (4)