



Stock Option Valuations: Stories from the Front

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Plan Sponsor Challenges – Hot Issues

- FAS 123R Accounting
- 409A Compliance
- SEC Proxy Disclosure of Executive Compensation
- Media scrutiny of executive compensation practices and levels
 - Back-dating and spring-loading options
 - Excessive compensation
- Long-term incentive design
 - Consideration of wealth accumulation
 - Portfolio approach

Plan Sponsor Challenges - Ongoing

Plan Design	<ul style="list-style-type: none"> ▪ Aligning incentives with shareholder objectives ▪ Attraction and retention
Compensation	<ul style="list-style-type: none"> ▪ How many options do we give? To whom? ▪ What's the right mix of options and stock?
Record Keeping	<ul style="list-style-type: none"> ▪ Should we outsource stock plan administration? ▪ How are new rules affecting record keeping needs?
Taxation	<ul style="list-style-type: none"> ▪ Qualified vs. nonqualified stock options ▪ Exemption from 162(m) deductible compensation limit
Valuation	<ul style="list-style-type: none"> ▪ Assumptions used to value options ▪ Models used to value options
Accounting	<ul style="list-style-type: none"> ▪ How will our plans affect our bottom line? ▪ How does 123R affect deferred taxes and EPS dilution?
Disclosure	<ul style="list-style-type: none"> ▪ FAS 123R – Valuation and accounting methodologies ▪ Proxy disclosure of executive compensation

PART I: Introduction to Plan Design

Plan Design – Grant Type

- Stock options
- Restricted stock
- Restricted stock units (RSU's)
- Stock appreciation rights (SAR's)

Plan Design - Vesting

- Service Conditions
 - Cliff vesting: 100% after 3 years
 - Graded vesting: 25% per year over the next 4 years

- Performance Condition
 - Vesting conditioned on an internal metric (EPS, FDA approval, etc.)
 - Performance period may be specified

- Market Condition
 - Vesting conditioned on a metric related to stock performance
 - Performance period may be specified
 - Performance may be measured relative to a peer group

- Awards may have multiple vesting conditions
 - Service condition + performance-related acceleration
 - Tiered performance conditions

Emerging Trend: Performance-Based Equity Awards

- Awards with additional provisions related to performance
 - Individual performance
 - Company performance
 - Stock price performance

- Advantages
 - 162(m) qualified: Not subject to \$1m deductible compensation limit
 - Performance objectives tailored to reward various outcomes
 - Specific performance objective communicated to participants
 - May result in less FAS 123R expense than a more plain-vanilla plan

Accounting for Performance Based Equity Awards

- “Performance Condition”: Internal company metric or event
 - EPS, Net Income, ROIC, FDA approval
 - Management may have input as to the likely future outcome
 - May require forecasting or regression based on historical performance
 - If performance target is not met, expense will be reversed

- “Market Condition”: Metric related to company share price
 - Absolute performance: Stock price level, total shareholder return
 - Relative performance: Stock price or return compared to peer group
 - If performance target is not met, expense will *not* be reversed

Valuation of Performance Based Equity Awards

- Award of full-value shares
 - Internal performance metric: Determine if target will be met. If so, must expense entire grant date market value
 - Market-based performance model: Lattice model or simulation
 - TSR-based awards: simulation
 - Stock price threshold for vesting: lattice model or simulation

- Award of options
 - Internal performance metric: Apply discount to grant date fair value of plain-vanilla award
 - Market-based performance model: Lattice model or simulation

PART II: Monte Carlo Simulation

Model for Stock Price Behavior

- Stochastic process: geometric Brownian motion
 - Change in stock price $\frac{\delta S}{S} = \mu\delta t + \sigma\varepsilon\sqrt{\delta t}$
 - μ is the constant expected rate of return per unit of time
 - σ is the constant annual volatility of the stock return
 - ε is a random drawing from a Standard Normal (0,1) distribution

- Monte Carlo Simulation: Iterative generation of stock price paths
 - Sample from the Standard Normal (0,1) distribution
 - Substitute sample in for ε , along with estimates of μ and σ
 - $S_n = S_{n-1} * \exp(\delta S/S - \text{dividend yield})$

FAS 123R Valuation

- Valuation should be risk-neutral
 - μ = risk-free rate
 - Volatility and dividend assumption drive stock return
 - Consistent with assumptions underlying the Black-Scholes model

- Valuation must reflect all substantive characteristics of the plan
 - Build plan provisions on top of stock price simulation
 - Examples: Averaging periods, performance targets, rank among peers

- Consider model risk
 - More moving parts than the Black-Scholes and Lattice models
 - Engage in rigorous testing and documentation

Sample Stock Price Distribution



Stock Price: \$24

Dividend Yield: 1.7%

Volatility: 28%

Risk-Free Rate: 4.6%

Number of Trials: 5,000

Simulation Model Inputs

- Stock price – starting point for stock price simulation
- Strike price – needed if equity award is an option
- Dividend yield
- Risk-free rate
- Volatility – based on historical data, market-traded options, or peers
- Behavioral assumptions, if applicable
 - Exercise rate
 - Termination rate

PART III: Advanced Valuation Examples

Example 1: TSR Performance Shares

Performance Metric	Cumulative Total Shareholder Return percentile ranking within the S&P 500										
Performance Period	4 performance periods per grant: 1-year, 2-year, 3-year, and 4-year										
Payout Provisions	<table border="0"> <thead> <tr> <th><u>Percentile</u></th> <th><u>Payout</u></th> </tr> </thead> <tbody> <tr> <td>80th or greater</td> <td>100%</td> </tr> <tr> <td>60th</td> <td>50%</td> </tr> <tr> <td>50th</td> <td>25%</td> </tr> <tr> <td>Below 40th</td> <td>0%</td> </tr> </tbody> </table> <p>* Share payout is interpolated between payout percentages based on actual ranking. For example, if TSR is at the 70th percentile, payout is 75%.</p>	<u>Percentile</u>	<u>Payout</u>	80 th or greater	100%	60 th	50%	50 th	25%	Below 40 th	0%
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50 th	25%										
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Dividends	Performance shares will not be eligible for dividends until they vest.										

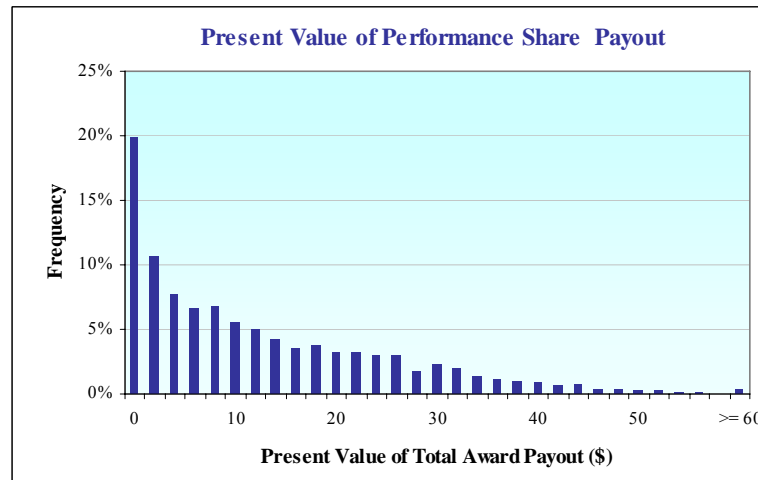
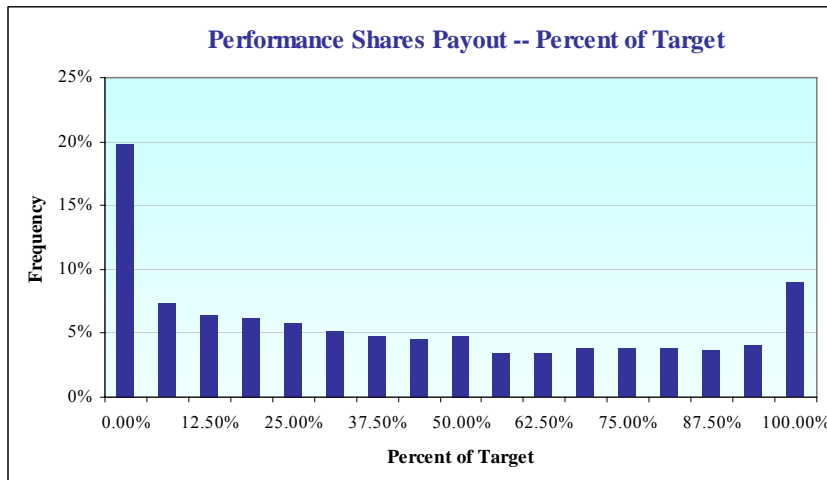
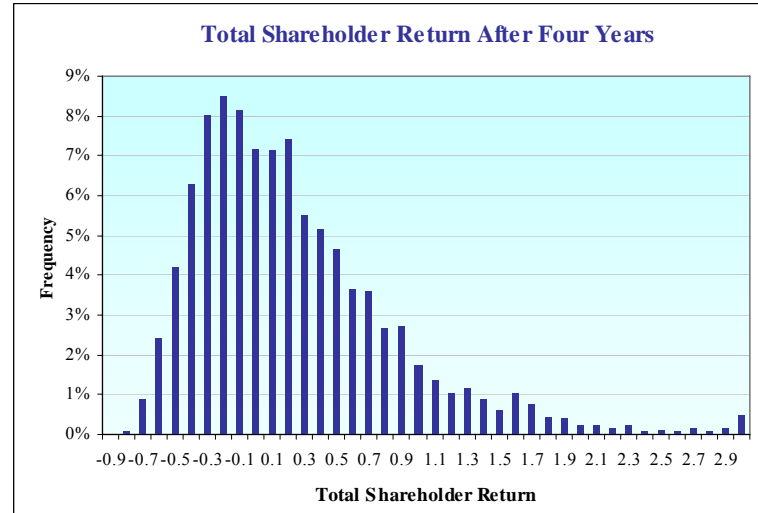
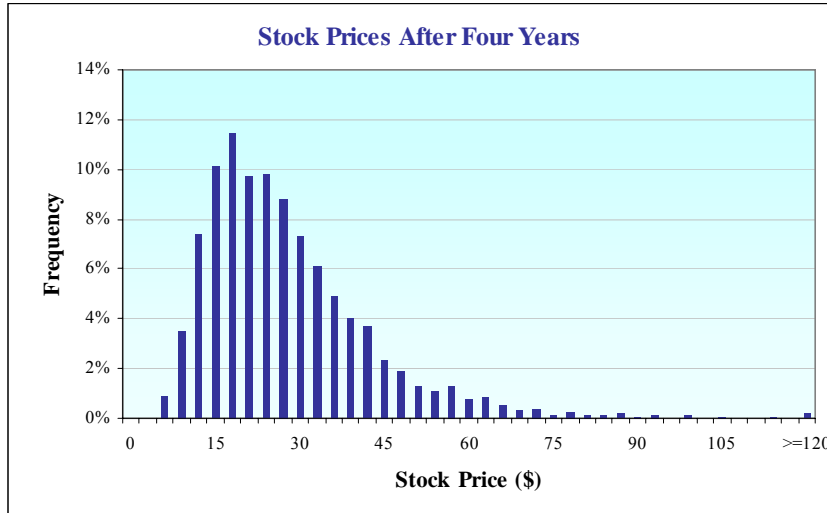
Example 1: TSR Performance Shares

- Iterative simulation process
 - Simulate a 4-year path for all stocks in the S&P 500, with dividends
 - Compute Total Shareholder Return for all stocks for each period
 - Determine the rank of company stock among all S&P 500 stocks
 - Determine the payout associated with that rank
 - Discount payout back to grant date

- Grant date fair value = Average over all trials

Initial Price	\$23.62			
	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
End of Year Average Price	\$24.20	\$24.94	\$25.57	\$26.37
Average Cumulative Total Shareholder Return	4.95%	9.72%	14.44%	19.70%
Average Rank Percentile	49.38	49.08	48.87	48.94
Award Average Payout	38.65%	37.87%	37.61%	37.88%
Average Present Value of Award Payout	\$10.87	\$11.37	\$11.74	\$12.23
Percent of Initial Price	46%	48%	50%	52%
Average Total Payout Percentage				38.00%
Total Average Present Value of Award Payout				\$11.56
Percent of Initial Price				49%
Average Present Value of Award Payout * Number of Shares Granted = Grant Date Fair Value				

Example 1: TSR Performance Shares



Example 2: Performance Options

- Company ABC grants options to employees which vest only if ABC's stock price appreciates 35% within 5 years of the grant date. This includes the event in which the stock price reaches the 35% threshold and then decreases

- To calculate the probability of the options vesting we will use the following assumptions:
 - Expected annual volatility (i.e. standard deviation) of stock returns: 40%
 - Measurement Period: Daily
 - Risk Free Rate: 4.9%
 - Current Stock Price: \$25.00

Example 2: Performance Options

- We use a spreadsheet that simulates future stock price paths based upon geometric Brownian motion.
- We perform these simulations from time zero until the expected life of the option.
- At every measurement period we check to see if the vesting condition is achieved.
- The fair value for each simulation is calculated by discounting the intrinsic value at end of the simulation process to time zero with the risk-free rate of return. If the option does not vest a zero is recorded as the fair value.

Example 2: Performance Options

- By calculating the random returns many times (i.e. 100,000) the vesting percentage converges to approximately 68%.

Trial		Time							
		0	1	2	3	4	5		
1	Stock Price	\$ 25.00	\$ 32.77	\$ 23.94	\$ 16.92	\$ 20.17	\$ 20.42		
	Option Vests	Yes	No	Yes					
	Fair Value	\$ -							
2	Stock Price	\$ 25.00	\$ 17.96	\$ 16.43	\$ 25.22	\$ 43.49	\$ 81.91		
	Option Vests	Yes	No	No	No	Yes			
	Fair Value	\$ 44.80							
3	Stock Price	\$ 25.00	\$ 15.37	\$ 9.57	\$ 8.03	\$ 5.07	\$ 3.06		
	Option Vests	No	No	No	No	No	No		
	Fair Value	\$ -							
4	Stock Price	\$ 25.00	\$ 33.39	\$ 39.98	\$ 36.84	\$ 32.14	\$ 27.03		
	Option Vests	Yes	No	Yes					
	Fair Value	\$ 1.60							
5	Stock Price	\$ 25.00	\$ 27.75	\$ 27.37	\$ 24.18	\$ 19.95	\$ 25.68		
	Option Vests	Yes	No	No	No	No	Yes		
	Fair Value	\$ 0.54							
Average Fair Value		\$ 9.39							

Resources

- Options, Futures, and Other Derivatives (5th Ed.), by John C. Hull
- National Association of Stock Plan Professionals
- FAS 123R and SEC SAB 107
- AAA Stock Options Task Force – Practice Note

Questions

