



**October 25-26, 2007**  
**Accounting For Stock Based Compensation,**  
**FAS123R Valuation**



# Agenda

- Valuation Models
  - "Closed-end" option pricing model (Black-Scholes)
  - Binomial or "lattice-based" option pricing model
- Critical Assumptions
  - Expected term considerations: vesting period, contractual term, historical exercise, stock price patterns, peer group information
  - Expected volatility: historical volatility as a starting point, market implied, peer group, mean reversion tendencies
- Aggregated Data
- Valuation of Market Conditions



# Option Pricing Assumptions

Paragraph A18 of FAS 123(R) states that any valuation technique or model must take into account, at a minimum:

- The exercise price of the option;
- The expected term of the option, taking into account both the contractual term of the option and the effects of employees' expected exercise and post-vesting employee termination behavior;
- The current price of the underlying share;
- The expected volatility of the underlying share of the expected term of the option;
- The expected dividends of the underlying share of the expected term of the option; and
- The risk-free interest rate(s) for the expected term of the option

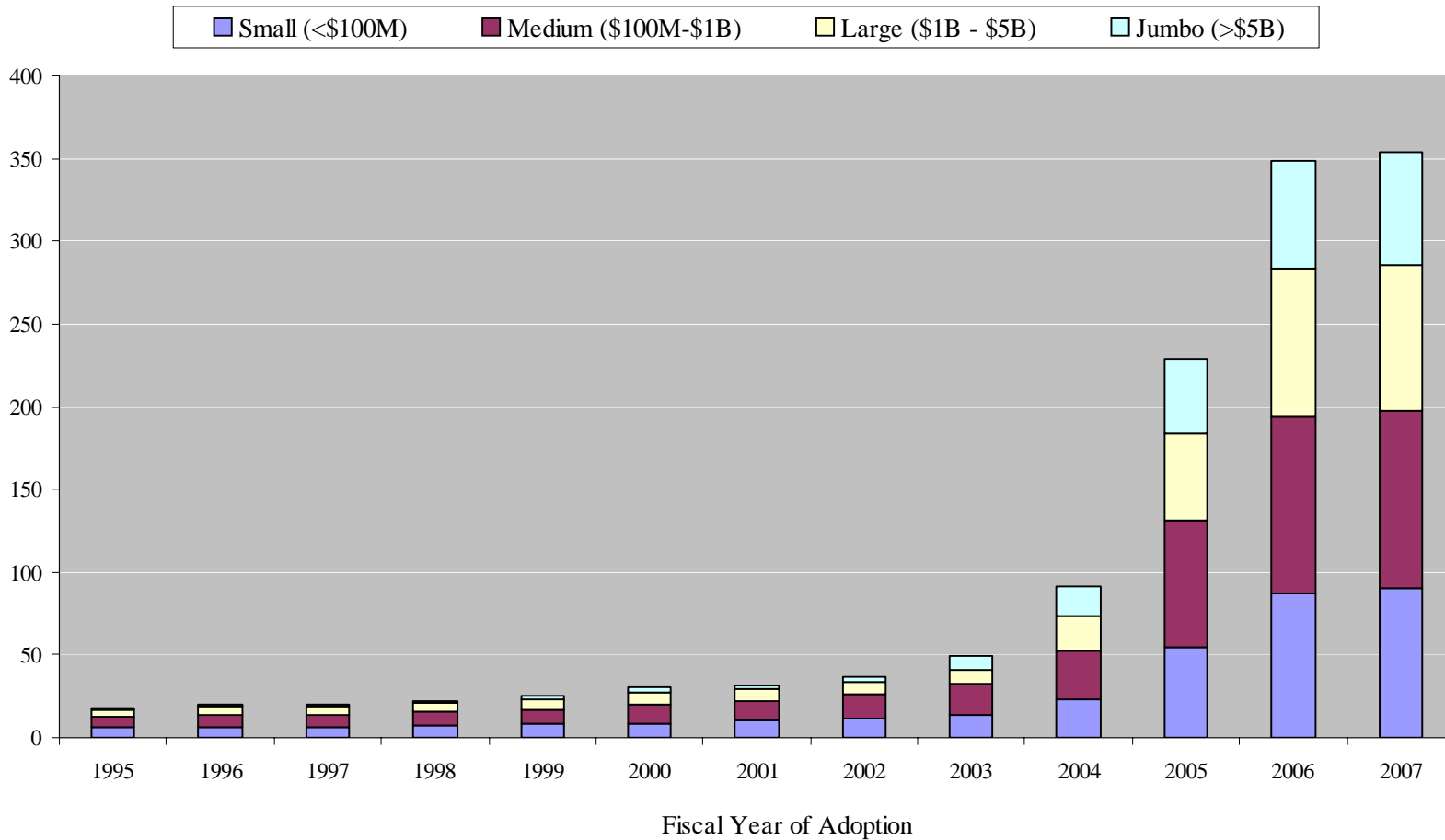


# FAS123R Valuation: The Model

- FAS123 - Valuation guidance requires use of the Black-Scholes or a binomial model
  - As of 2002, 5 companies of the S&P 500 used a binomial model
  - Black-Scholes was generally perceived to overstate the value
  - Companies ignored the error term because it didn't affect earnings
- FAS123(R) - Allows both Black-Scholes or binomial models, however states that the design of a lattice model more fully reflects the characteristics of an ESO
  - As of September 10, 2007, 402 companies have publicly disclosed the use of a binomial model (see Appendix A)
  - 80 of those 402 companies that now use a binomial model are components of the S&P 500



# FAS123R Valuation: Binomial Adoption Year





# Black-Scholes and the Traditional Binomial Model

Illustration comparing closed-form Black-Scholes model with a traditional binomial model (present value of future cash flows)

<u>Black-Scholes</u>	<u>Traditional Binomial Model</u>	Probability *
$C = e^{-\delta t} S N(d_1) + X e^{-rt} N(d_2)$ $d_1 = \frac{\left[ \ln(S / X) + \left( r - \delta + \frac{\sigma^2}{2} \right) t \right]}{\sigma \sqrt{t}}$ $d_2 = d_1 - \sigma \sqrt{t}$		<p style="text-align: right;">3.125%</p> <p style="text-align: right;">15.625%</p> <p style="text-align: right;">31.25%</p> <p style="text-align: right;">31.25%</p> <p style="text-align: right;">15.625%</p> <p style="text-align: right;">3.125%</p>

\* Simplification such that there is an equal probability of downward and upward movements. This is generally not the case as the probability of upward and downward movements are governed by the volatility, the dividend yield, and the discount rate.



# Benefits of a Binomial Model

- Presents much greater transparency to the users of financial information
  - Upward/downward stock movements are governed by underlying stock's volatility
  - Assumptions used can easily be examined
  - Model is conceptually easier to understand than Black-Scholes
- Allows greater flexibility in modeling
  - Calculate option values during each distinct measurement period
  - Can use a term structure of volatility, a different volatility during each distinct measurement period (i.e. implied volatility during first 3 months and long-term volatility thereafter)
  - Ability to use a different risk-free rate of return during each distinct measurement period
  - Allows for the use of different assumptions, such as probability of exercise, termination, and mortality



# Alternative: Multiple-Point Black-Scholes Improves Accuracy

- The fundamental inaccuracy of traditional Black-Scholes is the use of a single-point expected life
  - Collapses all expected exercise activity to one date
  - Paragraph A30 – “estimating the fair value of an option based on a single expected term that effectively averages the differing exercise and post-vesting employment termination behaviors of identifiable groups of employees will potentially misstate the value of the entire award”
- A multiple-point approach overcomes this problem
  - Utilizes actual historical exercise option data by individual
  - Can incorporate historical unexercised option data
- A distribution of exercise activity is created
  - Each option is valued as a European option at its actual or assumed exercise date
  - Creates weighting of results based on number of shares
  - Results are summed and averaged
- Fair value will **always** be lower than traditional (i.e. single-point) Black-Scholes, as the marginal value of the option gets smaller with time

# Examples: Multiple-Point Black-Scholes

Company	Fixed Point Black-Scholes	Aon Multiple-Point Black-Scholes	Error Term	Expected Life	Contractual Term	Volatility	Dividend Yield	Standard Deviation	Kurtosis
Company A	13.28%	12.26%	-7.65%	4.29	10.00	16.11%	3.36%	2.3590	(0.3778)
Company B	36.33%	35.14%	-3.28%	5.84	10.00	35.04%	1.00%	2.3883	(0.9050)
Company C	44.89%	43.29%	-3.57%	4.89	10.00	46.46%	0.00%	2.2066	(1.0080)
Company D	20.30%	19.19%	-5.50%	4.77	10.00	25.11%	3.23%	2.4140	(1.0919)
Company E	55.82%	54.28%	-2.76%	5.05	10.00	61.06%	0.00%	1.8318	0.0940
Company F	31.02%	30.30%	-2.33%	6.19	10.00	22.98%	0.59%	1.8428	(0.5975)
Company G	42.39%	40.53%	-4.38%	4.07	10.00	47.19%	0.00%	2.1376	(0.6557)
Company H	59.50%	56.28%	-5.40%	5.26	10.00	64.71%	0.00%	2.4881	2.0704
Company I	55.99%	53.77%	-3.95%	4.74	10.00	63.45%	0.00%	2.0822	2.4096
Company J	37.19%	36.80%	-1.04%	3.61	5.00	43.00%	0.00%	1.0037	7.2713
Company K	49.44%	48.02%	-2.87%	3.91	7.00	60.78%	0.00%	1.5042	3.0813
Company L	62.34%	59.27%	-4.92%	5.11	10.00	70.77%	0.00%	2.1348	2.7479
Company M	56.73%	54.31%	-4.26%	5.81	10.00	56.44%	0.00%	1.9833	2.3470
Company N	48.78%	44.90%	-7.96%	3.81	10.00	59.95%	0.00%	2.4418	1.5674
Company O	29.83%	29.38%	-1.50%	4.93	6.00	29.38%	1.20%	0.8175	5.7420
Company P	54.23%	52.06%	-4.00%	5.30	10.00	57.30%	0.00%	2.2993	2.2516
Company Q	43.17%	42.31%	-1.99%	5.69	10.00	38.55%	0.00%	1.9894	2.6006
Company R	67.55%	64.43%	-4.61%	5.17	10.00	79.74%	0.00%	2.1908	2.6212
Company S	17.02%	16.37%	-3.87%	4.23	10.00	21.34%	3.20%	1.8860	2.5333
Company T	28.65%	27.88%	-2.67%	5.31	10.00	28.56%	1.65%	1.9172	2.3716
Average	42.72%	41.04%	-3.93%	4.90	9.40	46.40%	0.71%	1.9959	1.7537



## Results: Multiple-Point Black-Scholes

- Of the 20 companies observed, the fixed point Black-Scholes had an approximate 4% error term
- Aon has observed that a fixed point Black-Scholes model creates the greatest error for companies that have the following characteristics:
  - High Dividend Yields
  - Short Historical Average Lives
  - Large Standard Deviations of Exercise Behavior
  - Small or Negative Kurtosis



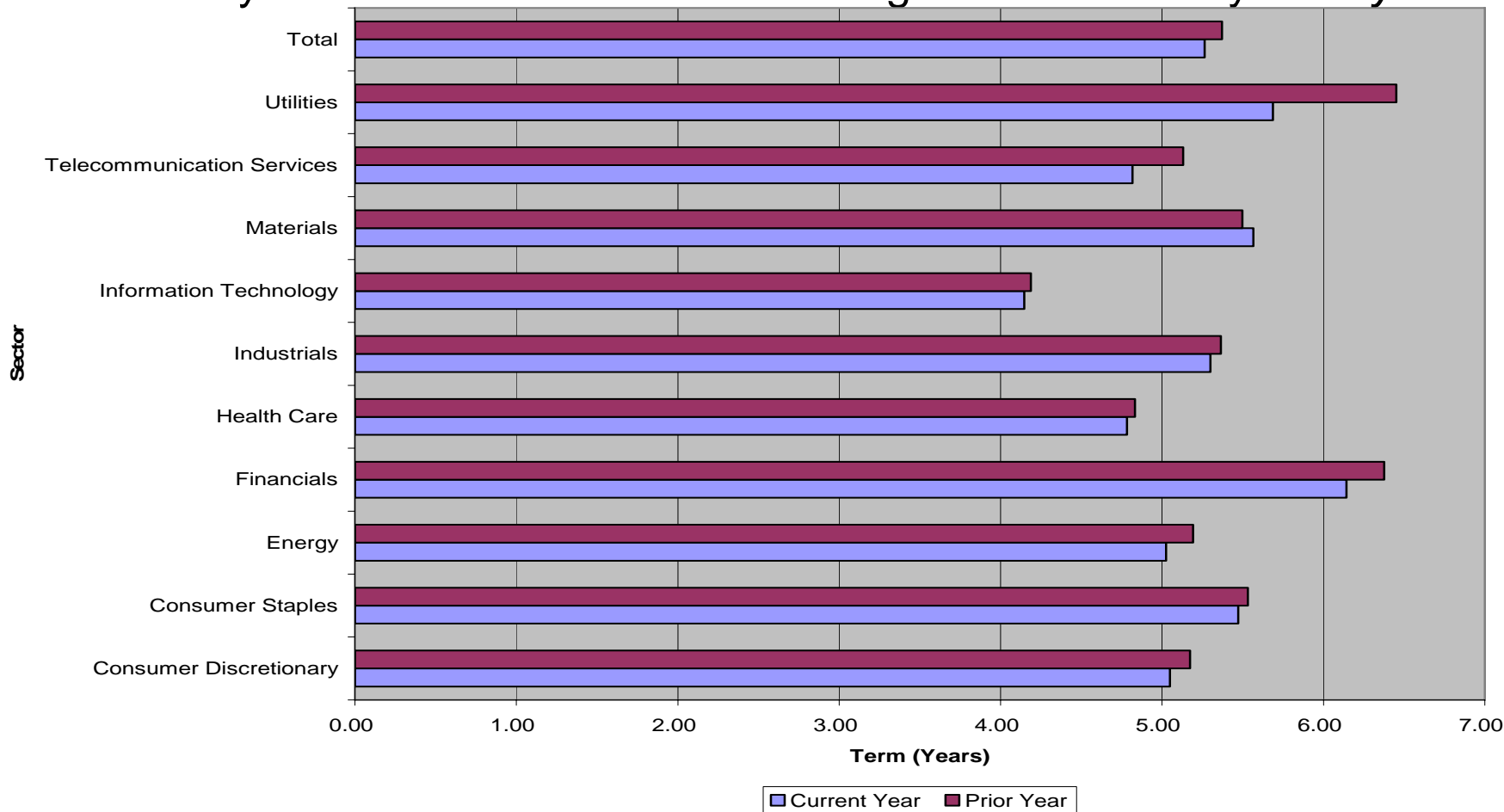
# FAS123R Valuation: Expected Life Considerations

- Factors to consider include:
  - Simplified Approach from SAB 107 -sunset December, 2007
  - Vesting period and contractual term
  - Historical patterns of exercise and post-vesting termination
  - Changes in option characteristics (i.e. vesting or term)
  - Expected volatility
  - Optionee demographics
    - Age/Gender/Country/Job Level
    - Stratification
  - Peer companies
  - Censored data and assumptions about outstanding options
    - Minimum at Vesting
    - Maximum at Term
    - Most likely may be the midpoint of future remaining term
    - Alternative: standard tables?



# Expected Life – Emerging Best Practice

- Courtesy of FAS123R Data in SEC Filings as Provided by *Salary.com*





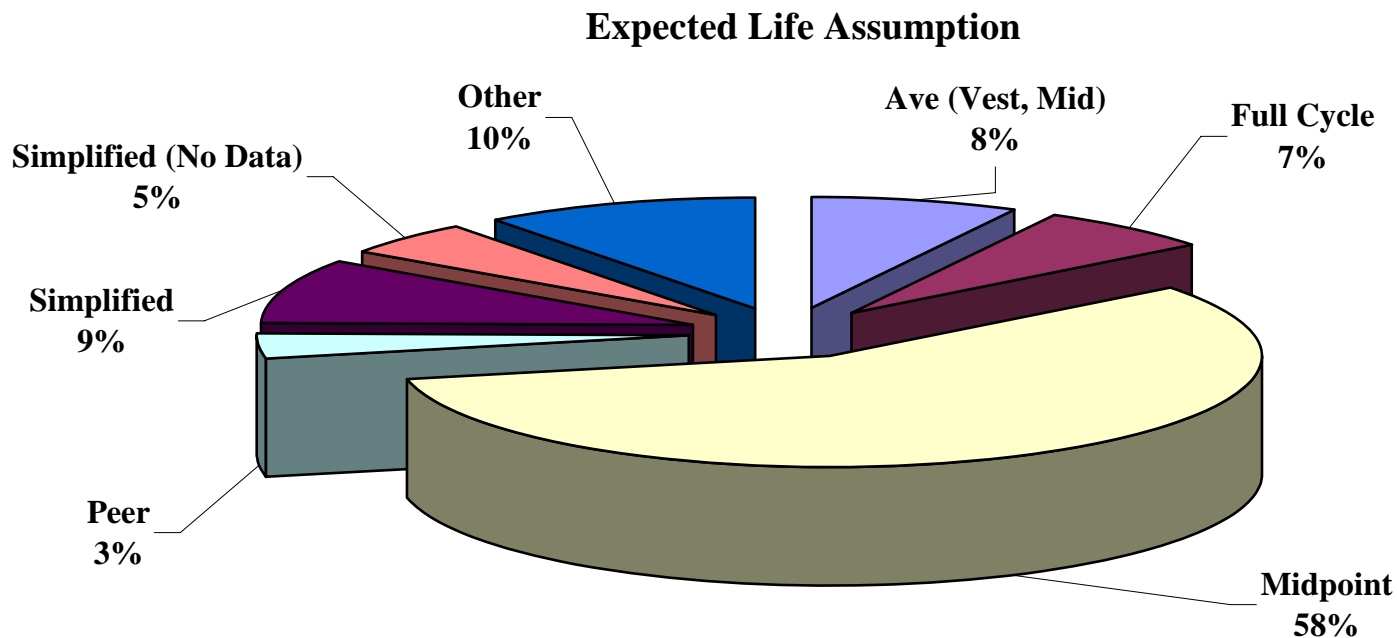
# Expected Life – Emerging Best Practice

- Courtesy of FAS123R Data in SEC Filings as Provided by *Salary.com*

<b>Sector</b>	<b>Current Year</b>			<b>Prior Year</b>		
	<b><u>Total Companies</u></b>	<b><u>Standard Deviation</u></b>	<b><u>Average</u></b>	<b><u>Total Companies</u></b>	<b><u>Standard Deviation</u></b>	<b><u>Average</u></b>
Consumer Discretionary	411	1.59	5.05	466	1.72	5.17
Consumer Staples	77	1.88	5.47	89	1.99	5.53
Energy	110	1.99	5.03	128	2.11	5.19
Financials	632	2.17	6.14	671	2.23	6.38
Health Care	345	1.71	4.78	393	1.73	4.83
Industrials	273	1.70	5.30	322	1.77	5.36
Information Technology	462	1.58	4.15	518	1.66	4.19
Materials	93	2.12	5.57	103	2.10	5.50
Telecommunication Services	38	1.92	4.82	44	1.80	5.13
Utilities	44	2.26	5.69	68	2.21	6.45
<b>Total</b>	<b>2,485</b>	<b>2.00</b>	<b>5.26</b>	<b>2,802</b>	<b>2.07</b>	<b>5.37</b>



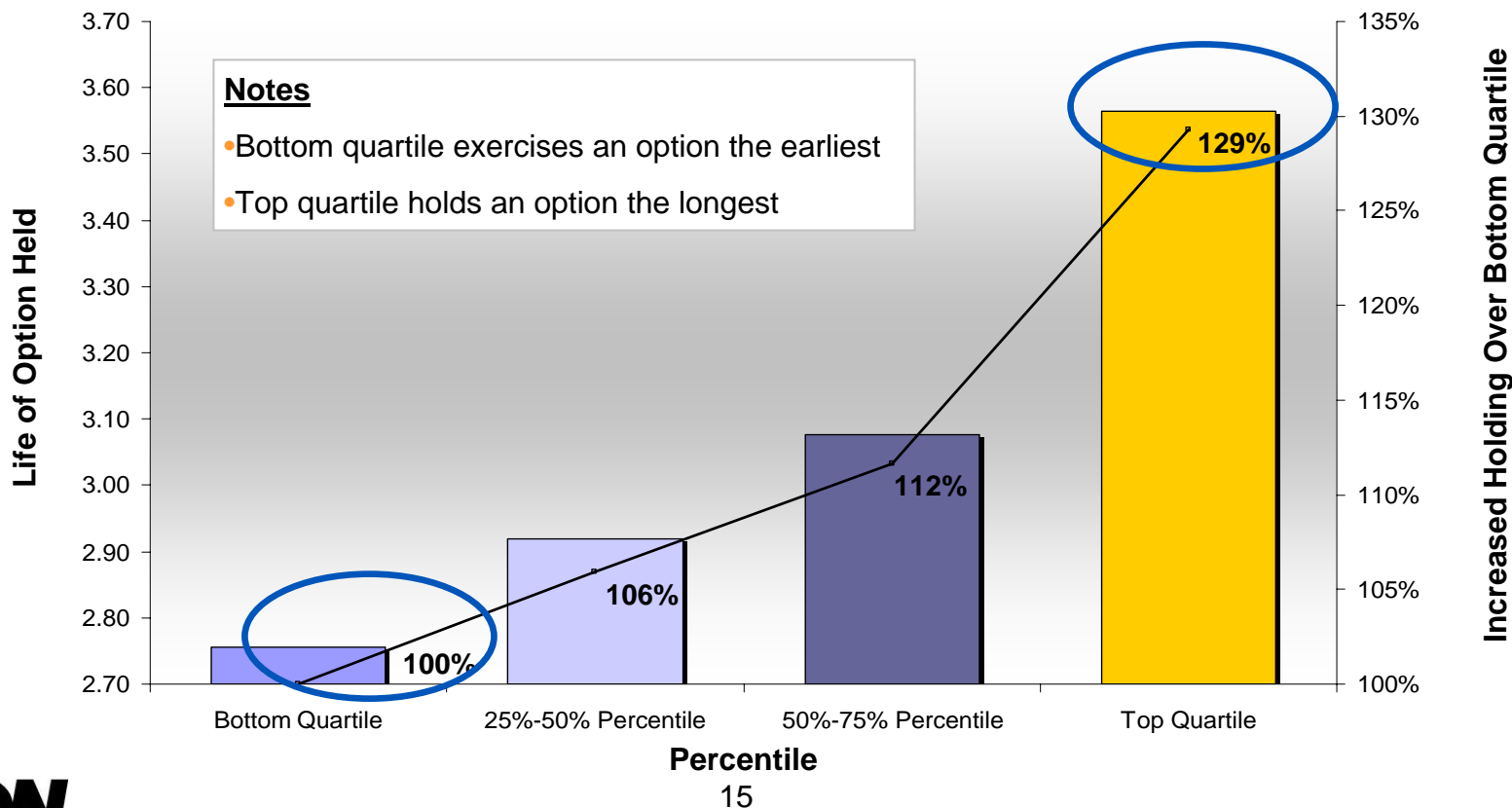
# Expected Life – Emerging Best Practice



- The most common approach (67/117) is to assume currently outstanding options will be exercised at the midpoint of the future remaining term.
- The “Simplified Approach” as outlined in SAB #107 is also popular. It can be calculated from historical data or, in the absence of historical data, can be calculated using the vesting schedule and the full contractual term.

# Study of Exercise Behavior - Example

- Grant and exercise practices for 20 companies were aggregated - involving more than 700 million option exercises
- Employees were categorized by the percent of the annual grant received and put into quartiles





# FAS123R Valuation: Expected Volatility Considerations

- Factors to consider include:
  - Historical Volatility
    - Period of measurement (short term vs. mid-term vs. theory of mean reversion)
    - Removal of data?
  - Implied Volatility
    - Liquidity – Open Contract vs. Trading Volume?
    - Historical implied volatilities?
  - Peer Companies - especially for companies with very little or no history
  - Blended Volatilities – developing supportable weights



# Expected Volatility – Emerging Best Practice

- Courtesy of FAS123R Data in SEC Filings as Provided by *Salary.com*

	Current Year			Prior Year		
	<u>Total Companies</u>	<u>Standard Deviation</u>	<u>Average</u>	<u>Total Companies</u>	<u>Standard Deviation</u>	<u>Average</u>
Consumer Discretionary	411	17.74%	43.54%	466	20.21%	47.42%
Consumer Staples	77	18.33%	37.78%	89	20.83%	39.81%
Energy	110	16.51%	43.64%	128	19.75%	45.51%
Financials	632	12.10%	27.47%	671	14.05%	28.32%
Health Care	345	23.25%	56.53%	393	26.52%	61.64%
Industrials	273	23.23%	43.10%	322	32.10%	46.15%
Information Technology	462	21.66%	60.83%	518	26.76%	71.25%
Materials	93	15.26%	37.76%	103	15.73%	39.42%
Telecommunication Services	38	32.26%	57.50%	44	33.90%	62.33%
Utilities	44	16.84%	27.81%	68	16.37%	30.69%
Total	2,485	22.67%	43.61%	2,802	27.53%	47.80%

*Note: We believe the reduction in volatility is due to current market conditions and a refinement of assumption selection*



# Expected Volatility – Emerging Best Practice

Of Non-Blended Volatility Selections	
Type of Volatility	Count
Forward Looking Volatility - Implied Volatility	1
Short Term Historical (less than Expected Life)	0
Mid Term Historical (commensurate with Expected Life)	5
Long-Term Historical (longer than Expected Life)	5
Peers	2
Total Surveyed Companies	13

- Only a handful of companies surveyed, 13 out of 122, rely on one volatility estimate
- The most common of the non-blended techniques include reliance on historical volatility for periods greater than or equal to the expected life



# Expected Volatility – Emerging Best Practice

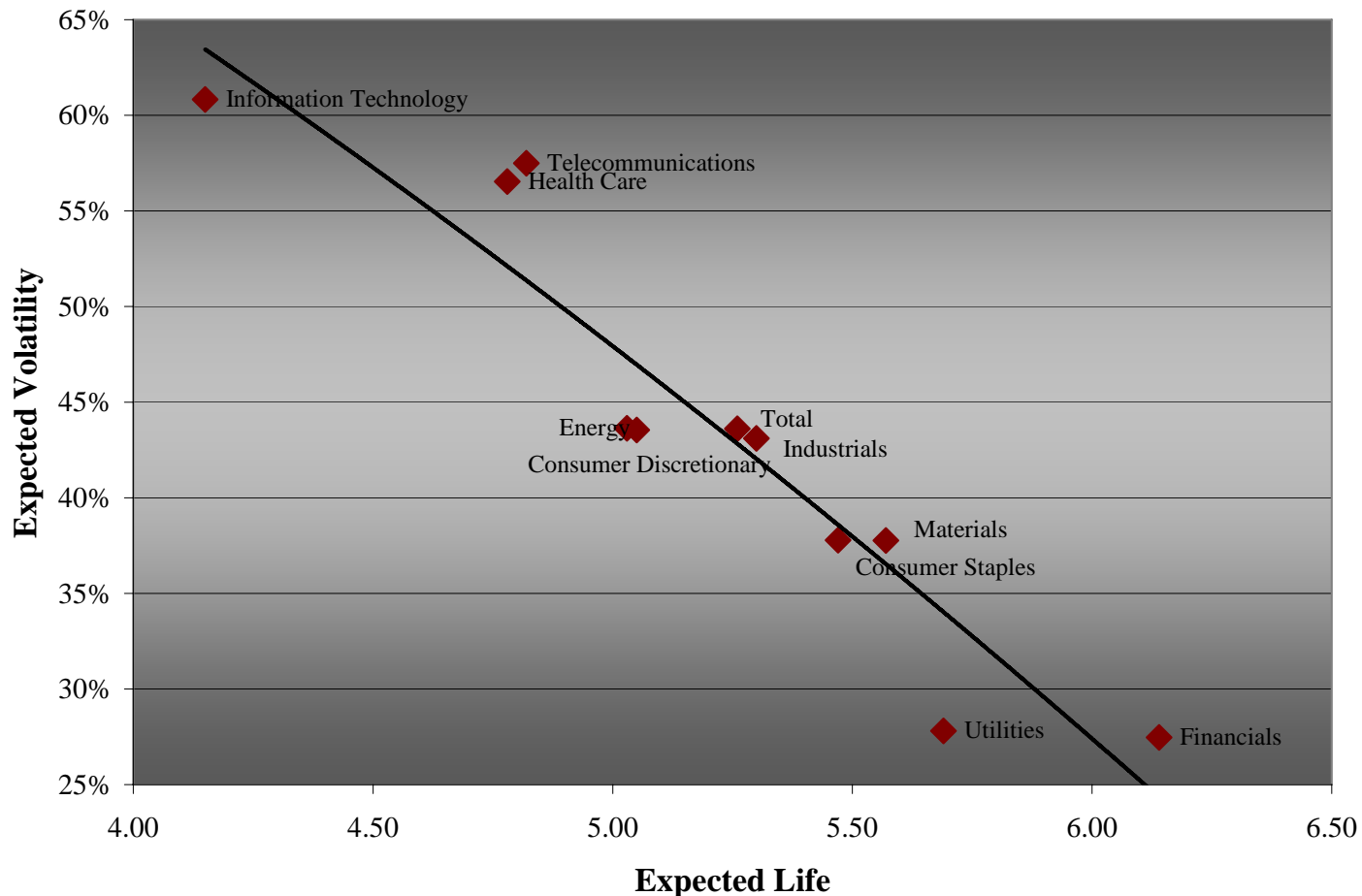
Blended Selections	Count	% of Blended	Of those applying a weight			
			25%	Average	Median	75%
Forward Looking Volatility - Implied Volatility	84	77%	11.98%	33.23%	33.33%	50.00%
Short Term Historical (less than Expected Life)	35	32%	18.10%	23.02%	20.16%	25.00%
Mid Term Historical (commensurate with Expected Life)	56	51%	36.42%	52.41%	50.00%	50.00%
Long-Term Historical (longer than Expected Life)	80	73%	36.95%	55.35%	50.00%	72.25%
Peers (Either Implied or Historical in some way)	21	19%	33.33%	61.68%	52.57%	100.00%

- The majority of companies, 109 out of 122, blend multiple volatility estimates
- The most popular blend combines mid to long-term historical with forward looking implied volatilities
- Weighted blends offer the best balance



# Setting Assumptions: The Efficient Frontier

- Courtesy of FAS123R Data in SEC Filings as Provided by *Salary.com*





# Aggregated Data

- Benefits of Aggregated Data
  - Valuing options not “at-the-money”
    - Purchase accounting valuations
    - Award modifications
  - For companies with very little or no historical data, or that have made significant changes in their option terms
  - Better comparability of financial statements
  - Ease and simplicity



# Aggregated Data

- Aon has developed the tables shown on the following pages via the use of hazard rate and Monte-Carlo modeling.
- Hazard Rate modeling is commonly used to quantify probabilities of “Death” based upon data that has many right censored observations. Specifically Aon uses the Nelson-Aalen cumulative hazard rate model. The model is calibrated based upon historical exercise behavior using time after grant and S/K ratios as the primary drivers of exercise.
- Monte-Carlo modeling is used to project future stock price paths based upon the expected return and volatility of the underlying company stock using Geometric Brownian motion. We use the Capital Asset Pricing Model to determine the expected return and volatility of the underlying stock since a risk-neutral stock price model is inappropriate to use for expected life calculations.
- Within the Monte-Carlo modeling framework, the hazard rate model is used to determine the expected number of exercises for each simulated price path. The final output of the model is a table of expected remaining lives.
- The tables on the following pages were created by aggregating the simulation results of 5 companies for each volatility level. In practice, more companies will have to be aggregated to produce tables that are reliable for use in option expensing exercises. Each company has 4 year graded vesting with a 10 year contractual term.



# Aggregated Data

Sum of Simulated Remaining Lives - Volatility Less Than 50%										
S/K Ratio	Life to Date (Years)									
	.01-1.00	1.01-2.00	2.01 - 3.00	3.01 - 4.00	4.01 - 5.00	5.01 - 6.00	6.01 - 7.00	7.01 - 8.00	8.01 - 9.00	9.01 - 10.00
500% -999.99%							1.14	0.68	0.32	0.08
480% -499.99%							1.15	0.70	0.33	0.09
460% -479.99%							1.15	0.75	0.34	0.09
440% -459.99%							1.16	0.75	0.35	0.09
420% -439.99%							1.20	0.75	0.36	0.10
400% -419.99%						1.74	1.24	0.77	0.37	0.10
380% -399.99%						1.75	1.25	0.78	0.39	0.10
360% -379.99%					2.39	1.76	1.26	0.80	0.40	0.11
340% -359.99%					2.38	1.80	1.27	0.80	0.40	0.11
320% -239.99%				3.09	2.42	1.80	1.29	0.82	0.42	0.12
300% -319.99%				3.08	2.44	1.82	1.31	0.84	0.43	0.12
280% -299.99%			3.92	3.17	2.46	1.85	1.32	0.85	0.44	0.12
260% - 279.99%			3.97	3.22	2.48	1.88	1.34	0.87	0.45	0.13
240% - 259.99%			3.96	3.21	2.51	1.90	1.36	0.88	0.47	0.13
220% - 239.99%			3.98	3.23	2.54	1.92	1.38	0.90	0.48	0.14
200% - 219.99%			4.04	3.27	2.57	1.95	1.40	0.92	0.49	0.14
180% - 199.99%		4.91	4.13	3.35	2.62	1.99	1.43	0.94	0.51	0.15
160% - 179.99%	5.77	5.01	4.21	3.41	2.67	2.02	1.46	0.97	0.53	0.15
140% - 159.99%	5.86	5.12	4.28	3.45	2.70	2.05	1.48	0.98	0.54	0.16
120% - 139.99%	6.00	5.25	4.35	3.50	2.73	2.07	1.50	1.00	0.55	0.16
100% - 119.99%	6.31	5.37	4.43	3.55	2.78	2.11	1.53	1.02	0.57	0.17
80% - 99.99%	6.40	5.46	4.56	3.72	2.96	2.28	1.68	1.14	0.66	0.23
60% - 79.99%	6.26	5.57	4.78	4.02	3.32	2.65	2.01	1.40	0.83	0.29
40% - 59.99%		5.63	5.00	4.20	3.55	2.85	2.16	1.50	0.88	0.30
20% - 39.99%										



# Aggregated Data

Sum of Simulated Remaining Lives - Volatility Greater Than 50%										
S/K Ratio	Life to Date (Years)									
	.01-1.00	1.01-2.00	2.01 - 3.00	3.01 - 4.00	4.01 - 5.00	5.01 - 6.00	6.01 - 7.00	7.01 - 8.00	8.01 - 9.00	9.01 - 10.00
500% -999.99%						0.86	0.60	0.37	0.20	0.06
480% -499.99%						0.89	0.63	0.40	0.21	0.06
460% -479.99%						0.91	0.64	0.41	0.23	0.06
440% -459.99%						0.93	0.66	0.43	0.24	0.06
420% -439.99%						0.96	0.68	0.45	0.25	0.07
400% -419.99%				1.29	0.99	0.70	0.47	0.26	0.07	
380% -399.99%				1.33	1.03	0.73	0.49	0.28	0.07	
360% -379.99%				1.40	1.07	0.76	0.51	0.29	0.08	
340% -359.99%				1.46	1.10	0.79	0.53	0.30	0.08	
320% -239.99%			1.97	1.51	1.15	0.83	0.56	0.32	0.08	
300% -319.99%			2.07	1.58	1.20	0.86	0.59	0.33	0.08	
280% -299.99%		2.59	2.13	1.64	1.24	0.90	0.61	0.35	0.09	
260% -279.99%		2.82	2.20	1.70	1.29	0.94	0.64	0.36	0.09	
240% -259.99%		2.88	2.28	1.78	1.35	0.98	0.67	0.38	0.09	
220% -239.99%	3.51	3.00	2.39	1.86	1.41	1.03	0.70	0.39	0.10	
200% -219.99%	3.76	3.11	2.49	1.94	1.47	1.07	0.73	0.40	0.10	
180% -199.99%	4.04	3.36	2.69	2.09	1.58	1.14	0.77	0.42	0.11	
160% -179.99%	4.90	4.26	3.55	2.85	2.22	1.67	1.21	0.81	0.44	0.11
140% -159.99%	5.15	4.48	3.72	2.98	2.31	1.74	1.25	0.83	0.45	0.11
120% -139.99%	5.44	4.73	3.89	3.11	2.41	1.80	1.29	0.85	0.46	0.12
100% -119.99%	5.87	4.97	4.08	3.25	2.51	1.86	1.32	0.87	0.47	0.12
80% -99.99%	6.06	5.20	4.33	3.51	2.76	2.08	1.49	1.00	0.57	0.20
60% -79.99%	6.08	5.42	4.63	3.89	3.19	2.54	1.92	1.34	0.79	0.28
40% -59.99%		5.66	4.94	4.18	3.49	2.81	2.14	1.49	0.88	0.30
20% -39.99%						2.82	2.12	1.52	0.84	0.31



# Common Types of Performance Plans with Market Conditions

- Absolute Performance Plans
  - Contingent vesting
    - At the service period, if market condition is achieved at or before the service period
    - At the later of achieving the market condition and a specified service period
    - At the earlier of achieving the market condition and a specified service period
- Relative Performance Plans
  - Relative vesting (based on percentile rank of Index)
  - Indexed exercise price



# Sample Valuations of Absolute Performance with Contingent Vesting

- The following charts depict the reduction in fair value of a hypothetical restricted share grant that contains a market condition. The market condition stipulates that the share price must be greater than the grant price on the fourth anniversary of the grant in order for the shares to vest. In the event of terminations prior to the fourth anniversary, the shares would be considered forfeited and the FAS123(R) expense would be reversed. A 5% risk-free rate was assumed.

30% Volatility	
Dividend Yield	Reduction in Fair Value
0.00%	-26.34%
1.00%	-31.40%
2.00%	-36.18%
3.00%	-40.61%
4.00%	-44.91%

40% Volatility	
Dividend Yield	Reduction in Fair Value
0.00%	-26.28%
1.00%	-30.04%
2.00%	-34.42%
3.00%	-38.46%
4.00%	-42.20%

50% Volatility	
Dividend Yield	Reduction in Fair Value
0.00%	-24.30%
1.00%	-28.15%
2.00%	-32.55%
3.00%	-36.26%
4.00%	-39.67%

60% Volatility	
Dividend Yield	Reduction in Fair Value
0.00%	-21.68%
1.00%	-25.95%
2.00%	-29.25%
3.00%	-33.58%
4.00%	-36.13%

70% Volatility	
Dividend Yield	Reduction in Fair Value
0.00%	-19.61%
1.00%	-22.96%
2.00%	-26.97%
3.00%	-30.61%
4.00%	-34.05%

80% Volatility	
Dividend Yield	Reduction in Fair Value
0.00%	-18.64%
1.00%	-21.33%
2.00%	-24.57%
3.00%	-28.17%
4.00%	-31.43%



## Going Forward – Valuation Issues

- Expensing impact on financial statements will take on more importance
- Industry- and/or company size-based FAS 123(R) assumptions will become the norm
- Performance-based cash compensation strategies will also be evaluated for their impact on earnings
- Study of data in understanding drivers of exercise behavior will become more important in designing plans



# Appendix A: Binomial Companies

For Filings Through  
November 16, 2006

## 1995 Fiscal Year

BNL Financial Corp.  
[Boeing Corp.](#)  
[Cincinnati Financial Corp.](#)  
Covanta Energy Corp.  
CRT Properties Inc.  
Enterprise Bancorp Inc.  
First Keystone Corp.  
Harsco Corp.  
Hawaiian Electric Co. Inc.  
Mocon Inc.  
MultiColor Corp.  
Pulitzer Inc.  
Reptron Electronics Inc.  
Sandy Spring Bancorp Inc.  
SRI Surgical Express Inc.  
Trans Lux Corp.  
[Vornado Realty Trust](#)  
Weider Nutrition International Inc.

## 1996 Fiscal Year

Applica Inc.  
Ferrellgas Partners LLP

## 1998 Fiscal Year

Brightstar Information Technology Group  
Harbor Florida Bancshares

## 1999 Fiscal Year

Bank of Commerce Holdings  
ISPAT Inland Inc.  
[Washington Mutual, Inc.](#)

## 2000 Fiscal Year

Cedar Fair LP  
Diamond Offshore Drilling  
Idacorp Inc.  
[MeadwestVaco Corp.](#)  
Sonoco Products

## 2001 Fiscal Year

Dreams Inc.  
Mexco Energy Corp.

## 2002 Fiscal Year

First Keystone Financial Inc.  
Harris Preferred Capital  
Newcastle Investment Corp.  
Pacific Capital Bancorp  
UIL Holdings Corp

## 2003 Fiscal Year

[American International Group Inc.](#)  
[Anheuser-Busch Companies Inc.](#)  
Brooke Corp  
[Citigroup, Inc](#)  
Global Preferred Holdings  
IMAX Corp  
Maguire Properties Inc.  
Marlin Business Services  
[Prudential Financial Inc.](#)  
[UnitedHealth Group](#)  
WestCorp  
Worldspan L P

## 2004 Fiscal Year

1st Centennial Bancorp  
Acadia Realty Trust  
Alliance Data Systems  
American Home Mortgage Investment Corp.  
[Becton Dickinson and Co.](#)  
Bucyrus International Corp.  
[Caterpillar Inc.](#)  
[Charles Schwab Corp](#)  
Cheesecake Factory Incorporated  
Choicepoint Inc.  
CitiCorp  
DeVry, Inc.  
Digene Corp.  
[E W Scripps](#)  
Fedders Corp  
[Fiserv Inc.](#)  
General Growth Properties  
[Hartford Financial Services Group, Inc.](#)  
Hartford Life Inc.  
Hartford Life Insurance Co.  
Hillenbrand Industries  
[Illinois Tool Works Inc.](#)  
Integra Lifesciences Holdings  
[ITT Corporation](#)  
Kellogg Co.  
[McCormick & Co. Inc.](#)  
Metro-Goldwyn-Mayer Inc.  
[MGIC Investment Corp.](#)  
New York Mortgage Trust Inc.  
Origen Financial Inc.  
Private Bancorp Inc.  
Rainier Pacific Financial Group, Inc.

## 2004 Fiscal Year (cont.)

[Rockwell Collins Inc.](#)  
Scotts Miracle Grow  
SFBC International, Inc.  
Specialty Underwriters Alliance, Inc.  
Sun Communities Inc.  
Telesource International Inc.  
[Travelers Insurance Co.](#)  
United Bankshares  
Viskase Companies Inc.  
Western Digital Corp

## 2005 Fiscal Year

Abington Community Bancorp  
Actuant Corp  
Advanced Cell Technology, Inc.  
Aethlon Medical Inc.  
[Alcoa Inc.](#)  
[Allstate Corp](#)  
[Ameren Corporation](#)  
American Physician Capital Inc.  
[Amerisourcebergen Corp](#)  
Atlantic Tele Network Inc.  
Atlas America Inc.  
[Automatic Data Processing Inc.](#)  
[Avaya Inc.](#)  
Bancwest Corp  
[Bank of New York Co., Inc.](#)  
Battle Mountain Gold Exploration Corp.  
Bioanalytical Systems Inc.  
Biosite Inc.  
[BJ Services Co.](#)  
Brand Intermediate Holdings, Inc.

**Note: Companies in blue font are in the S&P 500**



# Appendix A: Binomial Companies

For Filings Through  
November 16, 2006

## 2005 Fiscal Year (cont.)

Brown Shoe Co.  
Calavo Growers Inc.  
[Cardinal Health Inc.](#)  
Cardiogenesis Corp.  
Catcher Holdings, Inc.  
CBeyond Communication Inc.  
CBOT Holdings Inc  
CBRL Group Inc.  
CDW Corp  
Central Illinois Light Co.  
Central Illinois Public Service Co.  
Central Vermont Public Service Corp.  
Chordiant Software Inc.  
CilCorp Inc.  
Coast Distribution System Inc.  
Cognos Inc.  
[Comerica Inc.](#)  
Commercial Federal Group  
Cooper Companies Inc.  
Crescent Real Estate Equities Co.  
Crown Media Holdings Inc.  
Cytec Industries  
Dana Corp  
Danka Business Systems  
Datascension Inc.  
Doral Financial Corp  
[Dow Chemical Co.](#)  
[Ecolab Inc.](#)  
Energy Exploration Technologies Inc.  
[EOG Resources Inc.](#)  
[Equifax Inc.](#)  
Equity One Inc.

## 2005 Fiscal Year (cont.)

Factset Research Systems  
Genesis Healthcare Corp  
[Goldman Sachs Group Inc.](#)  
Guitar Center Inc.  
Hampton Roads Bancshares  
Hawaiian Electric Industries Inc.  
Healthextras Inc.  
Healthways, Inc.  
Hercules Offshore, Inc.  
Hiland Partners LP  
Hologic Inc.  
Idaho Power Co.  
Illinois Power Co.  
International Securities Exchange  
Intersil Corp.  
Ivillage Inc.  
Jack in the Box, Inc.  
[JC Penney Co. Inc.](#)  
Keynote Systems Inc.  
[Keyspan Corp.](#)  
Knoll Inc.  
Laclede Group Inc.  
Liberty Global Inc.  
[Lilly Eli & Co.](#)  
[Liz Claiborne Inc.](#)  
LTX Corp  
[Marriott International Inc.](#)  
Matthews International Corp  
[McGraw-Hill Companies Inc.](#)  
[Medimmune Inc.](#)  
[Metlife Inc.](#)  
Middleby Group

## 2005 Fiscal Year (cont.)

Myers Industries  
National Fuel Gas Co  
National Medical Health Card Systems  
National Retail Properties Inc.  
Nationwide Health Properties Inc.  
[NVIDIA Corp.](#)  
Oakley Inc  
ON Semiconductor Corp.  
Orbit International Corp  
Pemco Aviation Group Inc.  
Pinnacle Foods Group Inc  
[PMC Sierra Inc.](#)  
Precision Auto Care Inc.  
[Procter & Gamble Co.](#)  
ProxyMed Inc.  
[QualComm Inc.](#)  
RCN Corp  
[Sabre Holdings Corp.](#)  
SafeTek International Inc  
Schiff Nutrition International, Inc.  
Scientigo, Inc.  
Searchlight Minerals Corp  
SGS International, Inc.  
Siricom Inc.  
Sivault Systems, Inc.  
[Smith International Inc.](#)  
Socket Communications Inc.  
Spark Network PLC  
[Staples Inc.](#)  
[Starwood Hotel & Resorts Worldwide Inc.](#)  
SVB Financial Group  
Sybron Dental Specialties Inc.

## 2005 Fiscal Year (cont.)

Systems Evolution, Inc  
Teledyne Technologies  
[Tenet Healthcare Corp.](#)  
Tidelands Bancshares Inc.  
Toll Brothers Inc.  
Transatlantic Holdings Inc.  
Trimble Navigation Ltd.  
[Tyson Foods Inc.](#)  
U S Physical Therapy Inc.  
Union Electric Co.  
[United Technologies Corp](#)  
Valley National Bancorp  
Valmont Industries Inc.  
Warner Music Group  
WCI Communities Inc  
[WellPoint Inc.](#)  
Westbank Corp  
Westfield Financial Inc  
Williams Scotsman International Inc.  
Wisconsin Energy Corp  
WMG Acquisition Corp  
Zebra Technologies

## 2006 Fiscal Year

Acunetx, Inc.  
[Advanced Micro Devices Inc.](#)  
ADVO Inc.  
Alcan Inc.  
Alliance Fiber Optic Products Inc.  
[Aon Corporation](#)  
Applebee's International, Inc  
Argon St, Inc.



# Appendix A: Binomial Companies

For Filings Through  
November 16, 2006

## 2006 Fiscal Year (cont.)

Autobytel, Inc.  
[Bank of America Corp.](#)  
[Best Buy Co Inc.](#)  
[Big Lots Inc.](#)  
Boston Beer Co. Inc.  
Bovie Medical Corp  
Brand Energy & Infrastructure Services, Inc.  
[Bristol-Myers Squibb Company](#)  
Business Objects S.A.  
Cabot Oil & Gas Corp.  
CapitalSource, Inc.  
Cerner Corp.  
Chattem Inc.  
Cognex Corp.  
Colony Resorts Acquisitions  
[Corning Inc.](#)  
Corporate Executive Board Co.  
Covance Inc.  
[CR Bard Inc.](#)  
CRC Health Corp  
Crystal River Capital, Inc.  
Curis Inc.  
D&E Communications Inc.  
Davey Tree Expert Co.  
[Deere & Co.](#)  
Deltic Timber Corp.  
Digital Music Group, Inc.  
DSP Group Inc.  
Federal Mogul Corp.  
First Advantage Corp.  
First American Corp.  
Gabriel Technologies Corporation

## 2006 Fiscal Year (cont.)

Glenborough Realty Trust Inc.  
[Grainger W W Inc.](#)  
Graphon Corp.  
GTECH Holdings Corp.  
Harland John H Co  
Harleysville Savings Financial Corp.  
HealthMarkets, Inc.  
Hiland Holdings GP, LP  
HSBC Finance Corp.  
HSBC USA Inc.  
ICAD Inc  
IDEX Corp.  
Imperial Sugar Co  
Indymac Bancorp Inc.  
Innova Holdings  
[International Flavors & Fragrances Inc.](#)  
[Intuit Inc](#)  
ITT Educations Services  
[Jabil Circuit Inc.](#)  
JetBlue Airways Corp.  
Kerr McGee Corp.  
Kforce Inc  
Kitty Hawk Inc.  
Kyphon Inc.  
Legend International Holdings Inc  
Lifepoint Hospitals, Inc.  
[LSI Logic Corp.](#)  
Makemusic Inc.  
Mannatech Inc.  
[Marshall & Ilsley Corp.](#)  
Martin Marietta Materials Inc.  
McAfee, Inc.

## 2006 Fiscal Year (cont.)

MCF Corp.  
Media General Inc.  
Medialink Worldwide Inc.  
[Monsanto Co.](#)  
Municipal Mortgage & Equity LLC  
Nashua Corp.  
National Mercantile Bancorp  
Navteq Corp.  
Net 1 UEPS Technologies Inc.  
New Century Financial Corp.  
Newpage Corp.  
[Nordstrom Inc](#)  
Northwest Natural Gas Co.  
[Novell Inc.](#)  
OmniComm Systems Inc.  
Opinion Research Corp.  
Payless Shoesource Inc  
Petsmart Inc  
Playboy Enterprises Inc.  
Possis Medical Inc.  
Precis Inc.  
[Raytheon Company](#)  
Regis Corp.  
Rent-A-Center Inc.  
Replidyne Inc  
Republic Services Inc.  
Serologicals Corp  
Shoe Pavilion Inc  
Smurfit Stone Container Corp.  
Sonic Foundry Inc.  
Standard Drilling, Inc.  
Standard Pacific Corp

## 2006 Fiscal Year (cont.)

Stein Mart Inc  
Tech Data Corp  
Thomas Group Inc.  
Toys R US Inc  
U S Gold Corp  
[V F Corp.](#)  
Vyteris Holdings (Nevada), Inc.  
VYYO Inc.  
Wabash National Corp  
[Walt Disney Co.](#)  
Wausau Paper Corp.  
W-H Energy Services Inc.  
Wisconsin Electric Power Co  
Wisconsin Public Service Corp.  
WPS Resources Corp.  
[XTO Energy Inc.](#)

## 2007 Fiscal Year

CarMax, Inc.  
Firearms Training Systems Inc.  
First Investors Financial Services Group, Inc.  
Kelly Services Inc.  
Techprecision Corp



# Appendix A: Binomial Companies

For Filings Through  
September 10, 2007

## 1995 Fiscal Year

BNL Financial Corp.  
**Boeing Corp.**  
**Cincinnati Financial Corp.**  
Covanta Energy Corp.  
CRT Properties Inc.  
Enterprise Bancorp Inc.  
First Keystone Corp.  
Harsco Corp.  
Hawaiian Electric Co. Inc.  
Mocon Inc.  
MultiColor Corp.  
Pulitzer Inc.  
Reptron Electronics Inc.  
Sandy Spring Bancorp Inc.  
Schiff Nutrition International, Inc.  
SRI Surgical Express Inc.  
**Trans Lux Corp.**  
Vornado Realty Trust

## 1996 Fiscal Year

Applica Inc.  
Ferrellgas Partners LLP

## 1998 Fiscal Year

Brightstar Information Technology Group  
Harbor Florida Bancshares

## 1999 Fiscal Year

Bank of Commerce Holdings  
ISPAT Inland Inc.  
**Washington Mutual, Inc.**

## 2000 Fiscal Year

Cedar Fair LP  
Diamond Offshore Drilling  
Idacorp Inc.  
**MeadwestVaco Corp.**  
Sonoco Products

## 2001 Fiscal Year

Dreams Inc.  
Mexco Energy Corp.

## 2002 Fiscal Year

First Keystone Financial Inc.  
Harris Preferred Capital  
Newcastle Investment Corp.  
Pacific Capital Bancorp  
UIL Holdings Corp

## 2003 Fiscal Year

**American International Group Inc.**  
**Anheuser-Busch Companies Inc.**  
Brooke Corp  
**Citigroup, Inc**  
Global Preferred Holdings  
IMAX Corp  
Maguire Properties Inc.  
Marlin Business Services  
**Prudential Financial Inc.**  
**UnitedHealth Group**  
Vornado Realty LP  
WestCorp  
Worldspan L P

## 2004 Fiscal Year

1st Centennial Bancorp  
Acadia Realty Trust  
Alliance Data Systems  
American Home Mortgage Investment Corp.  
**Becton Dickinson and Co.**  
Bucyrus International Corp.  
**Caterpillar Inc.**  
**Charles Schwab Corp**  
Cheesecake Factory Incorporated  
Choicepoint Inc.  
CitiCorp  
DeVry, Inc.  
Digene Corp.  
**E W Scripps**  
Fedders Corp  
**Fiserv Inc.**  
General Growth Properties  
**Hartford Financial Services Group, Inc.**  
Hartford Life Inc.  
Hartford Life Insurance Co.  
Hillenbrand Industries  
**Illinois Tool Works Inc.**  
Integra Lifesciences Holdings  
**ITT Corporation**  
**Kellogg Co.**  
Laclede Gas Co  
**McCormick & Co. Inc.**  
Metro-Goldwyn-Mayer Inc.  
**MGIC Investment Corp.**  
New York Mortgage Trust Inc.  
Origen Financial Inc.  
Private Bancorp Inc.

## 2004 Fiscal Year

Rainier Pacific Financial Group, Inc.  
**Rockwell Collins Inc.**  
Scotts Miracle Grow  
SFBC International, Inc.  
Specialty Underwriters Alliance, Inc.  
Sun Communities Inc.  
Telesource International Inc.  
**The Travelers Companies, Inc.**  
United Bankshares  
Viskase Companies Inc.  
Western Digital Corp

## 2005 Fiscal Year

Abington Community Bancorp  
Actuant Corp  
Advanced Cell Technology, Inc.  
Aethlon Medical Inc.  
**Alcoa Inc.**  
**Allstate Corp**  
**Ameren Corporation**  
American Physician Capital Inc.  
**Amerisourcebergen Corp**  
Atlantic Tele Network Inc.  
Atlas America Inc.  
**Automatic Data Processing Inc.**  
**Avaya Inc.**  
Bancwest Corp  
**Bank of New York Co., Inc.**  
Battle Mountain Gold Exploration Corp.  
Bioanalytical Systems Inc.  
Biosite Inc.  
**BJ Services Co.**

**Note: Companies in bold font are in the S&P 500**



# Appendix A: Binomial Companies

For Filings Through  
September 10, 2007

## 2005 Fiscal Year (cont.)

Brand Intermediate Holdings, Inc.  
Brown Shoe Co.  
Calavo Growers Inc.  
**Cardinal Health Inc.**  
Cardiogenesis Corp.  
Catcher Holdings, Inc.  
CBeyond Communication Inc.  
CBOT Holdings Inc  
CBRL Group Inc.  
CDW Corp  
Central Illinois Light Co.  
Central Illinois Public Service Co.  
Central Vermont Public Service Corp.  
CilCorp Inc.  
Coast Distribution System Inc.  
Cognos Inc.  
**Comerica Inc.**  
Commercial Federal Group  
Cooper Companies Inc.  
Crescent Real Estate Equities Co.  
Crown Media Holdings Inc.  
Cytec Industries  
Dana Corp  
Danka Business Systems  
Datascension Inc.  
Doral Financial Corp  
**Dow Chemical Co.**  
**Ecolab Inc.**  
Energy Exploration Technologies Inc.  
**EOG Resources Inc.**  
**Equifax Inc.**  
Equity One Inc.

## 2005 Fiscal Year (cont.)

Factset Research Systems  
Genesis Healthcare Corp  
**Goldman Sachs Group Inc.**  
Guitar Center Inc.  
Hampton Roads Bancshares  
Hawaiian Electric Industries Inc.  
Healthextras Inc.  
Healthways, Inc.  
Hercules Offshore, Inc.  
Hiland Partners LP  
Hologic Inc.  
Idaho Power Co.  
Illinois Power Co.  
International Securities Exchange  
Intersil Corp.  
Ivillage Inc.  
**J C Penney Co. Inc.**  
Jack in the Box, Inc.  
Keynote Systems Inc.  
**Keyspan Corp.**  
Knoll Inc.  
Laclede Group Inc.  
Liberty Global Inc.  
**Lilly Eli & Co.**  
**Liz Claiborne Inc.**  
LTX Corp  
**Marriott International Inc.**  
Matthews International Corp  
**McGraw-Hill Companies Inc.**  
Medimmune Inc.  
**Metlife Inc.**  
Middleby Group

## 2005 Fiscal Year (cont.)

Myers Industries  
National Fuel Gas Co  
National Medical Health Card Systems  
National Retail Properties Inc.  
**NVIDIA Corp.**  
Oakley Inc  
ON Semiconductor Corp.  
Orbit International Corp  
Pemco Aviation Group Inc.  
Pinnacle Foods Group Inc  
**PMC Sierra Inc.**  
Precision Auto Care Inc.  
**Procter & Gamble Co.**  
ProxyMed Inc.  
**QualComm Inc.**  
RCN Corp  
Sabre Holdings Corp.  
SafeTek International Inc  
Scientigo, Inc.  
Searchlight Minerals Corp  
SGS International, Inc.  
Siricom Inc.  
Sivault Systems, Inc.  
**Smith International Inc.**  
Socket Communications Inc.  
Spark Network PLC  
**Staples Inc.**  
**Starwood Hotel & Resorts Worldwide Inc.**  
SVB Financial Group  
Sybron Dental Specialties Inc.  
Systems Evolution, Inc  
Teledyne Technologies

## 2005 Fiscal Year (cont.)

**Tenet Healthcare Corp.**  
Tidelands Bancshares Inc.  
Toll Brothers Inc.  
Transatlantic Holdings Inc.  
Trimble Navigation Ltd.  
**Tyson Foods Inc.**  
U S Physical Therapy Inc.  
Union Electric Co.  
**United Technologies Corp**  
Valley National Bancorp  
Valmont Industries Inc.  
Warner Music Group  
WCI Communities Inc  
**WellPoint Inc.**  
Westbank Corp  
Westfield Financial Inc  
Williams Scotsman International Inc.  
Wisconsin Energy Corp  
WMG Acquisition Corp  
Zebra Technologies



# Appendix A: Binomial Companies

For Filings Through  
September 10, 2007

## 2006 Fiscal Year

ACCESS PLANS USA, INC.  
Acunetx, Inc.  
**Advanced Micro Devices Inc.**  
ADVO Inc.  
Alcan Inc.  
Alliance Fiber Optic Products Inc.  
AMERIANA BANCORP  
**Aon Corporation**  
Applebee's International, Inc  
Argon St, Inc.  
Autobytel, Inc.  
**Bank of America Corp.**  
Berry Plastics Holding Corp  
**Best Buy Co Inc.**  
**Big Lots Inc.**  
Bioscrip, Inc.  
BNL FINANCIAL CORP  
Boston Beer Co. Inc.  
Bovie Medical Corp  
Brand Energy & Infrastructure Services, Inc.  
**Bristol-Myers Squibb Company**  
Broadridge Financial Solutions, Inc.  
Business Objects S.A.  
Cabot Oil & Gas Corp.  
CapitalSource, Inc.  
Central European Distribution Corp  
Cerner Corp.  
Chattem Inc.  
Chordiant Software Inc.  
Cognex Corp.  
Colony Resorts Acquisitions  
Communtiy Bankers Acquisition Corp.

## 2006 Fiscal Year (cont.)

**Corning Inc.**  
Corporate Executive Board Co.  
**Countrywide Financial Corp**  
Covance Inc.  
**CR Bard Inc.**  
CRC Health Corp  
Crystal River Capital, Inc.  
Cullen Frost Bankers Inc  
Curis Inc.  
D&E Communications Inc.  
Davey Tree Expert Co.  
**Deere & Co.**  
Deltic Timber Corp.  
Digital Music Group, Inc.  
DSP Group Inc.  
Federal Mogul Corp.  
First Advantage Corp.  
First American Corp.  
Gabriel Technologies Corporation  
Glenborough Realty Trust Inc.  
GLOBAL REALTY DEVELOPMENT CORP  
**Grainger W W Inc.**  
Graphon Corp.  
GTECH Holdings Corp.  
Harland John H Co  
Harleysville Savings Financial Corp.  
HealthMarkets, Inc.  
Hiland Holdings GP, LP  
HSBC Finance Corp.  
HSBC USA Inc.  
ICAD Inc  
IDEX Corp.

## 2006 Fiscal Year (cont.)

Imperial Sugar Co  
Indymac Bancorp Inc.  
Innova Holdings  
**Intergrys Energy Group, Inc.**  
**International Flavors & Fragrances Inc.**  
**Intuit Inc**  
ITT Educations Services  
**Jabil Circuit Inc.**  
JetBlue Airways Corp.  
JohnsonDiversey Inc  
Kerr McGee Corp.  
Kforce Inc  
Kitty Hawk Inc.  
Kyphon Inc.  
Legend International Holdings Inc  
Lifepoint Hospitals, Inc.  
Lincoln Bancorp /IN/  
**LSI Logic Corp.**  
Makemusic Inc.  
Mannatech Inc.  
**Marshall & Ilsley Corp.**  
Martin Marietta Materials Inc.  
McAfee, Inc.  
MCF Corp.  
Media General Inc.  
Medialink Worldwide Inc.  
Monroe Bancorp  
**Monsanto Co.**  
Municipal Mortgage & Equity LLC  
Nashua Corp.  
National Mercantile Bancorp  
Navteq Corp.

## 2006 Fiscal Year (cont.)

NB&T Financial Group Inc  
Net 1 UEPS Technologies Inc.  
New Century Financial Corp.  
Newpage Corp.  
Newpage Holding Corp  
**Nordstrom Inc**  
Northwest Natural Gas Co.  
**Novell Inc.**  
Old Second Bancorp Inc.  
OmniComm Systems Inc.  
Opinion Research Corp.  
OUTDOOR CHANNEL HOLDINGS INC  
Payless Shoesource Inc  
Petsmart Inc  
Playboy Enterprises Inc.  
Possis Medical Inc.  
Precis Inc.  
**Raytheon Company**  
Regis Corp.  
Rent-A-Center Inc.  
Replidyne Inc  
Republic Services Inc.  
River Valley Bancorp  
Rurban Financial Corp  
Sealy Corp  
SENETEK PLC /ENG/  
Serologicals Corp  
Shoe Pavilion Inc  
Smurfit Stone Container Corp.  
Sonic Foundry Inc.  
Standard Drilling, Inc.  
Standard Pacific Corp



# Appendix A: Binomial Companies

For Filings Through  
September 10, 2007

## 2006 Fiscal Year (cont.)

Stein Mart Inc  
Strategic Hotels & Resorts, Inc  
Tech Data Corp  
Thomas Group Inc.  
Toys R US Inc  
TRANS-INDIA ACQUISITION CORP  
U S Gold Corp  
United Western Bancorp, Inc.

### **V F Corp.**

Viacom, Inc.  
Vital Signs Inc  
Vyteris Holdings (Nevada), Inc.  
VYYO Inc.  
Wabash National Corp

### **Walt Disney Co.**

Wausau Paper Corp.  
W-H Energy Services Inc.  
Wisconsin Electric Power Co  
Wisconsin Public Service Corp.  
WPS Resources Corp.

### **XTO Energy Inc.**

## 2007 Fiscal Year

Axiom Corp  
American Oil & Gas, Inc  
CarMax, Inc.  
Danka Business Systems PLC  
Eastern Insurance Holdings, Inc  
Firearms Training Systems Inc.  
First Investors Financial Services Group, Inc.  
Golden Resources Corp  
Innova Robotics & Automation, Inc  
Insituform Technologies Inc.

## 2007 Fiscal Year (cont.)

Kelly Services Inc.  
Marshall Edwards Inc  
Middle Kingdom Alliance Corp  
Shanghai Century Acquisition Corp  
Techprecision Corp



# Terry Adamson Bio

Terry Adamson is a Vice President at Aon. He has over fourteen years of benefit and compensation consulting experience. Terry is involved with all phases of equity compensation valuations, including design of executive packages, valuation of compensatory arrangements for purposes of a change in control under IRC 280G, SERP design and valuation, and employee stock option valuations and employee stock purchase plans under FAS 123 and FAS 148. Additionally, Terry consults with clients on issues involving all aspects of a company's benefit and equity programs in mergers, acquisitions and divestitures.

As national practice leader for Aon's national employee stock option valuation practice and the lead project manager, Terry manages a team of valuation experts and is responsible for the completion of quarterly FAS 123R accounting valuations in addition to being the primary client contact. Terry also leads Aon's practice in valuing sabbatical liabilities under FAS43/EITF 06-2.

He has recently co-authored articles in the *Tax Management Compensation Planning Journal* entitled "Golden Parachutes – New Planning Opportunities" and "Executive Compensation Audits – Planning Now to Avoid Trouble Later", *Benefits Quarterly* "Employee Stock Options – New Valuation Responsibilities and Planning Opportunities", *Journal of Employee Ownership Law and Finance*, "A Technical Roadmap to Expense Allocation under FAS 123(R)", and *Compensation and Benefits Review*, "No Vacation on Sabbatical Accounting". Terry is a frequent speaker regarding stock option valuation at various conferences and seminars, more recently at The Conference Board in New York, the NASPP Conference, E-Trade's *Directions2007*, and with the Joint Board of Enrolled Actuaries. Terry was also on the FASB Round Table on Employee Share Options. Terry is the chair of the Society of Actuaries research project on stock option valuation.

Prior to joining Aon, Terry was employed as an Actuary at The Hay Group in New York City. Terry graduated from Georgetown University where he obtained a Bachelor of Science degree in Mathematics.

Contact Information

**Terry Adamson**

**terry\_adamson@aon.com**

**610.834.2280**

