Employee Stock Options Valuation Toolkit 2011

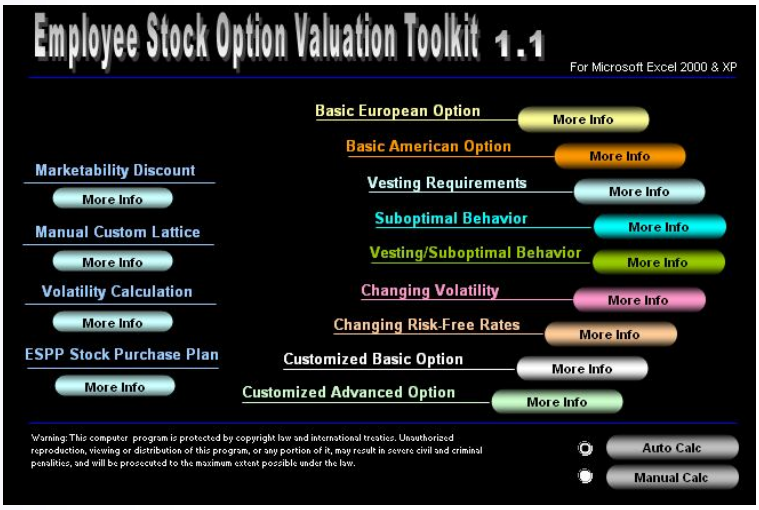
Reduce Employee Stock Option (ESO) expenses by millions of dollars by learning how a FAS 123R-preferred customized binomial lattice is calculated and how it compares to the naïve Black-Scholes. The software creator is an advisor to FASB, and a professor and consultant in financial analytics. The software was used by FASB to create the valuation examples in FAS 123R. See how by considering employee suboptimal exercise behavior, forfeiture rates, blackout periods, vesting, marketability discounts, and changing inputs over time (volatility, dividend yield, risk-free rate, forfeiture rate, and suboptimal behavior exercise multiple) can more accurately reflect reality, reduce expenses, conform to FAS 123R requirements, and pass an audit. See how ESO Valuations are done correctly!

Software and Consulting Highlights

- Software was developed by Dr. Johnathan Mun, advisor to FASB on FAS 123R.
- Use the same software FASB uses! Software was used by FASB to create the valuation example in the 2004 FAS 123R (Section A87).
- Software calculates both closed-form models (Black-Scholes) as well as different binomial and trinomial lattices.
- Theories are all covered extensively in the author's books and articles—use the published books/research to successfully defend an audit.
- All equations are visible within Excel when creating your own option valuation models.
- Costs a lot less than expensive consultants… have the ability to check their work instead!
- Have the ability to compare the naïve Black-Scholes versus more sophisticated binomial lattice results (FASB's preferred method).
- Consulting projects will be implemented by Dr. Johnathan Mun, finance professor, consultant, and author of many well-known books.

Types of Employee Stock Option Conditions Solved

- **Blackout Periods**
- **Changing Forfeiture Rates**
- **Changing Risk-free Rates**
- **Changing Volatilities**
- **Forfeiture Rates (Pre- and Post-vesting)**
- **Stock Price Barrier Requirements**
- **Suboptimal Exercise Behavior Multiple**
- **Vesting Periods**
- **ALL OTHER EXOTIC VARIABLES**



Algorithms Used to Solve Real Options

- **American Closed-Form Models**
- **Binomial and Trinomial Lattices**
- **European Black-Scholes**
- **CREATE YOUR OWN CUSTOM OPTIONS**

Consulting, Training and Modeling

Advanced analytical tools such as ESO Valuation Toolkit might be easy to use but may get the analyst in trouble if used inappropriately. Sufficient theoretical understanding coupled with pragmatic application experience is vital; therefore, consulting and training are critical. In our consulting services, we provide the client with a results memorandum explaining the inputs into the model, the computations and technical issues in the model, as well as the results and their interpretation. More important, the final deliverables include the report memo as well as Excel-based models and software, in which the client can reuse in future years to re-run the analysis or perform scenario analysis. Finally, training can also be provided to the client's key employees on the use and modeling of ESOs using closed-form models such as the Black-Scholes, as well as binomial lattices. After the training sessions, clients will be able to model ESOs themselves using the ESO Valuation Toolkit software and the accompanying Super Lattice Solver software.

Options Analytics Expertise

Dr. Johnathan Mun is the software's creator and teaches the **Risk Analysis, Real Options for Analysts, Risk Analysis for Managers, CRM,** and other courses. He has consulted for many Fortune 500 firms (from 3M, Airbus, Boeing to GE and Motorola) and the government (Department of Defense, State and Federal Agencies) on risk analysis, valuation, and real options, and has written a number of books on the topic, including *Real Options Analysis: Tools and Techniques, 1st* and *2nd Edition* (Wiley Finance, 2005, 2002); *Real Options Analysis Course: Business Cases* (Wiley Finance, 2003); *Applied Risk Analysis: Moving Beyond Uncertainty in Business* (Wiley, 2003); *Valuing Employee Stock Options Under 2004 FAS 123R* (Wiley Finance, 2004); *Modeling Risk: Applying Monte Carlo Simulation, Real Options Analysis, Forecasting and Optimization* (Wiley, 2006); *Advanced Analytical Models: 800 Functions and 300 Models from Basel II to Wall Street and Beyond* (Wiley 2008); *The Banker's Handbook on Credit Risk: Implementing Basel II* (Elsevier Academic Press 2008); and others. He is the founder and CEO of Real Options Valuation, Inc., and is responsible for the development of analytical software products, consulting, and training services. He was formerly Vice President of Analytics at Decisioneering, Inc. (Oracle), and was a Consulting Manager in KPMG's Global Financial Strategies practice. Before KPMG, he was head of financial forecasting for Viking, Inc. (an FDX/FedEx Company). Dr. Mun is also a full professor at the U.S. Naval Postgraduate School and a professor at the University of Applied Sciences and Swiss School of Management (Zurich and Frankfurt), and he has held other adjunct professorships at various universities. He has a Ph.D. in finance and economics, an MBA in business administration, an M.S. in the area of management science, and a BS in applied sciences. He is certified in Financial Risk Management (FRM), Certified in Financial Consulting (CFC), and Certified in Risk Management (CRM).

FASB Uses This Software!

The figure below shows the solution of the case example provides in Section A87 of the Final 2004 FAS 123R.
Specifically, A87-A88 states:

> *"A87. The following table shows assumptions and information about the share options granted on Jan 1, 20X5.*
> *Share options granted 900,000; Employees granted options 3,000;*
> *Expected forfeitures per year 3.0%; Share price at the grant date $30;*
> *Exercise price $30; Contractual term (CT) of options 10 years;*
> *Risk-free interest rate over CT 1.5 to 4.3%; Expected volatility over CT 40 to 60%;*
> *Expected dividend yield over CT 1.0%; Suboptimal exercise factor 2;*
> *A88. This example assumes that each employee receives an equal grant of 300 options. Using as inputs the last 7 items from the table above, Entity T's lattice-based valuation model produces a fair value of $14.69 per option. A lattice model uses a suboptimal exercise factor to calculate the expected term (that is, the expected term is an output) rather than the expected term being a separate input. If an entity uses a Black-Scholes-Merton option-pricing formula, the expected term would be used as an input instead of a suboptimal exercise factor."*

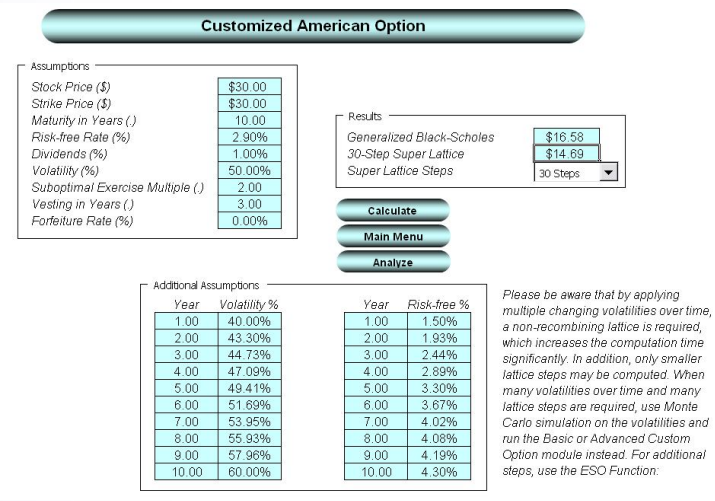
The figure shows the result as $14.69, the answer that FASB uses in its example. The forfeiture rate of 3% used by FASB's example is applied outside of the model to discount for the quantity reduced over time. The software allows the ability to input the forfeiture rates (different pre-vesting and post-vesting forfeiture rates) inside or outside of the model. In this specific example, we set forfeiture rate to zero in the figure below, and the option quantity is adjusted outside, just as FASB does, in A91:

> *"The number of share options expected to vest is estimated at the grant date to be 821,406 (900,000 × .97^3)."*

Testimonials

From the corporations...

"Veritas has modeled the valuation of its employee stock options for analytical purposes using a proprietary customized binomial lattice, developed by Dr. Johnathan Mun. The valuation based on the customized binomial lattice model allows us to take into account the impacts of multiple vesting periods, employee suboptimal exercise behavior, forfeiture rates, changing risk-free rates, and changing volatilities over the life of the option which are required under the 2004 FAS 123R issued by the Financial Accounting Standards Board. It is not possible to consider these factors in a valuation based on the traditional modified Black-Scholes model. Under the assumptions used by Veritas when modeling the valuation of employee stock option grants both based on the customized binomial lattice model as well as the traditional modified Black-Scholes model, the customized binomial lattice model resulted in a considerably lower expense, considering the expensing guidelines as included in the FAS 123R Statement."
—Don Rath, VP of Tax & Stock Admin., Veritas Software Corp.



From the consultants...

"This is one of those rare books/software written in anticipation of a major shift in the industry and economy. FAS 123R will throw a lot of public companies in a frantic, however the smart ones are identifying the opportunity to master the process and take over the driving seat. The methodology and the tools developed by Dr. Johnathan Mun are proven, pragmatic, and offer a great deal of value and benefit to those early adopters. IBCOL Consulting AG is using Dr. Mun's algorithms and methodology because of their applicability, accuracy, and the fair-market values that we have obtained for our clients are significantly less than traditional Black-Scholes models."
—Dr. Markus Junginger, Managing Partner, IBCOL Consulting

From the software developers...

"After extensive review of the FASB exposure draft and consideration of a variety of option valuation methodologies, E*TRADE FINANCIAL has decided to implement a binomial lattice model in Equity Edge, our stock plan management and reporting software, in consultation with Dr. Johnathan Mun. We found Dr. Mun's work on employee stock option pricing very valuable."
—Naveen Agarwal, Director, Product Management , E*TRADE FINANCIAL Corporate Services