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**Life after SAB 107:**

**Creating lasting solutions for your  
stock option grants**

**30th October 2007**

## *Staff Accounting Bulletin 107 ("SAB 107")*

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- Ø Created simplified method for estimating expected term for "vanilla" options:

*[T]he staff will accept the following "simplified" method for "plain vanilla" options:*

$$\text{expected term} = ((\text{vesting term} + \text{original contractual term}) / 2)$$

- Ø *For example, if the vesting term is 3 years and the contractual term is 10 years, the expected term = 6.5 years.*
- Ø *This is long for most companies.*

## *Simplified Method Scheduled to Sunset*

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- Ø *[T]he staff does not expect that such a simplified method would be used for share option grants after December 31, 2007, as more detailed information should be widely available by then.*
  
- Ø Expectation is that the SEC will sunset the simplified method, at least as a safe harbor, if not completely. Except for private companies and public companies with absolutely no data, it makes sense to proceed on the assumption that the simplified method will no longer be available next year.
  
- Ø Even for public companies with absolutely no data, it makes sense to also go beyond the simplified method for three reasons:
  1. It tends to overstate expected term
  2. Not all valuations involve only “vanilla” options
  3. It is a temporary solution at best

## *Alternatives to Simplified Method*

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∅ How much exercise history does company have?

- Rich data set
  - Analyze own data
- Limited data set
  - Blend data with comparable companies
- No useful data
  - Use comparable company data

## *Methods for Calculating Expected Term*

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### Historical time-to-exercise:

- Very dependent on historical stock price – e.g., if declining stock price over several years you will see long historical terms
- What to do about unexercised options?
  - Ignoring them understates term
- What do do if contract term or vesting period differ from those granted historically?
  - No good solution
- What to do if projected post-vest termination rate has changed?
  - No good solution

## *Expected Term: Exercise Behavior and Post-vest Termination*

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Best method for estimating expected term:

- ∅ Build a realistic (not risk-neutral) model of the company's future stock price based on:
  - Volatility term structure
  - Cost of Equity =  
(Interest rate term structure plus company equity risk premium)
  
- ∅ Import hazard rate into the model:
  - Exercise rates
  - Termination rates

## *Expected Term: Exercise Behavior and Post-vest Termination*

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Realistic model of the company's future stock price with imported hazard rate based on exercise rates and termination rates is not only the best method to calculate standard expected term for vanilla options, but also facilitates analysis of many other issues:

- Performance and Market conditions
- Expected term analysis when contract period changes or vesting schedule changes
- Current Fair Value (Mark-to-market) analyses of outstanding options:
  - Modifications (repricings, exchanges, accelerations, term extensions, etc.)
  - HR analyses by employee
  - Projections (tax, budget)

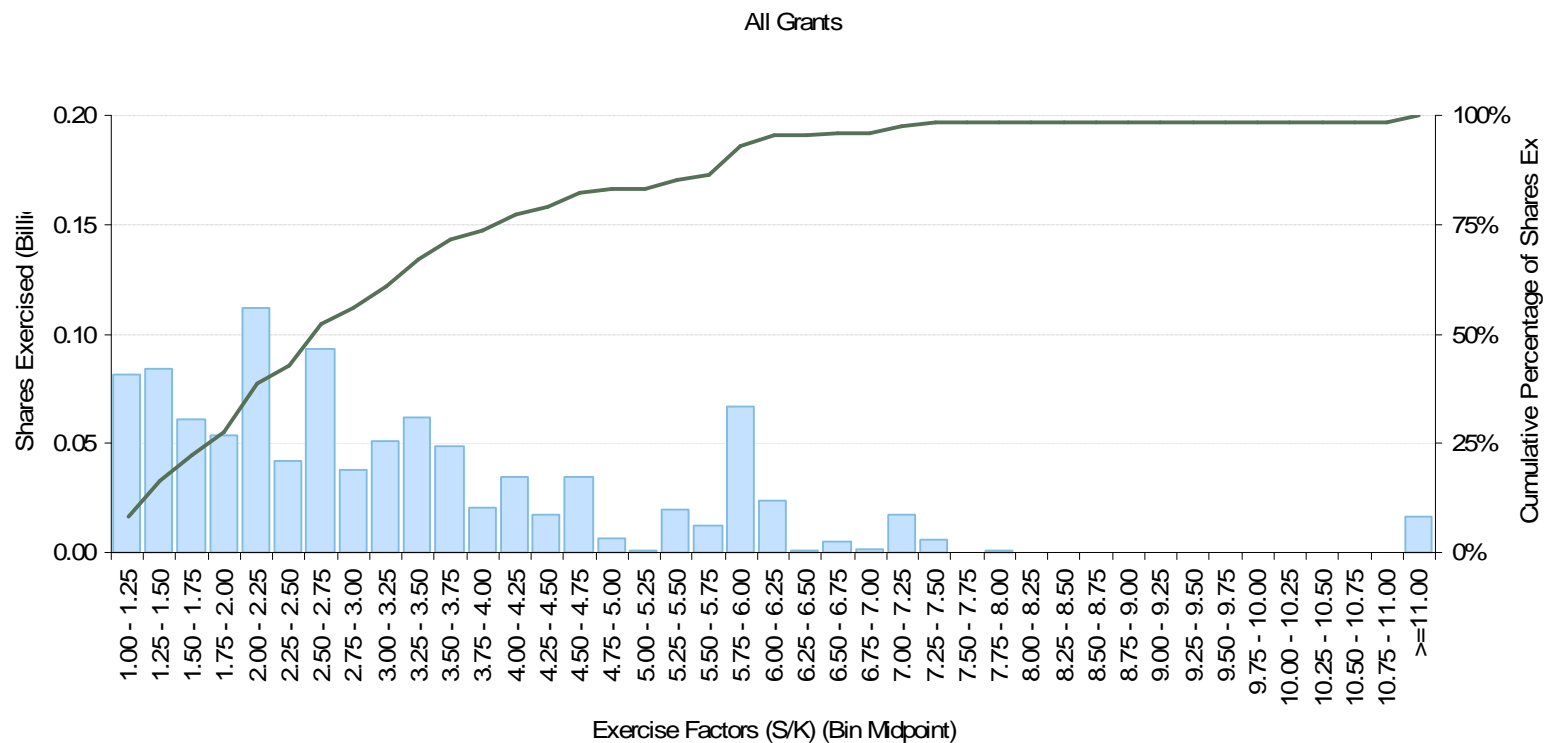
## ***Expected Term: Exercise Behavior and Post-vest Termination***

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- Ø Exercise Behavior is a Key Factor in Estimating Expected Term
  
- Ø Exercise Rates: Propensity to Exercise Quickly (Slowly) è Shorter (Longer) Terms and Lower (Higher) Fair Values
  
- Ø Voluntary Exercise
  - Hitting Your Stock Price
  - Diversification
  - Need for Liquidity
  
- Ø Involuntary Exercise or Cancellation
  - Termination of Employment with Vested Options
  - (Termination of Employment with Un-vested Options has no bearing on expected term or fair value)
  - Contractual Expiration

# Expected Term: Exercise Behavior and Post-vest Termination

If a company has a rich data set, we can estimate exercise factors:



## ***Expected Term: Exercise Behavior and Post-vest Termination***

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And more importantly, hazard rates:

### **Annualized Exercise Rates**

June 2000 - July 2007

	<b>Lower Tier</b>	<b>Upper Tier</b>
<b>2000 - 2007</b>	19.80%	15.90%
<b>2001 - 2007</b>	22.10%	16.20%
<b>2002 - 2007</b>	24.70%	18.50%
<b>2003 - 2007</b>	33.30%	25.70%
<b>2004 - 2007</b>	34.20%	26.60%
<b>2005 - 2007</b>	34.90%	26.90%
<b>2006 - 2007</b>	35.70%	27.20%

## *Expected Term:*

### *Exercise Behavior and Post-vest Termination*

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∅ If a company has limited data, then can integrate (“blend”) with peer company data to infer exercise behavior of optionees.

- Use statistical methods (standard errors and goodness of fit to test blend ratios)

∅ If a company has no data, then can use peer company data as a proxy to infer very reasonable exercise behavior of optionees.

∅ Post-vest termination rates at peer companies can also be used to lend support to observable rates at companies with limited data or as a proxy for companies with no data.

## *Expected Term: Exercise Behavior and Post-vest Termination*

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From our extensive client database data we are able to create extensive buckets based on grants in the millions and exercised shares in the billions. Criteria are:

Ø Industry

Ø Market Cap

Ø Volatility

Ø Employee Level

# ***Expected Term: Exercise Behavior and Post-vest Termination***

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## **Industry:**

- Ø Basic materials**
- Ø Communications**
- Ø Consumer cyclical**
- Ø Consumer non-cyclical**
- Ø Biotech and Healthcare**
- Ø Energy**
- Ø Financial**
- Ø Industrial**
- Ø Technology**

## ***Expected Term: Exercise Behavior and Post-vest Termination***

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### Market Cap:

Ø Micro:	0 to \$300 million
Ø Small:	\$300 million to \$2 billion
Ø Mid:	\$2 billion to \$5 billion
Ø Large:	Above \$5 billion

## ***Expected Term: Exercise Behavior and Post-vest Termination***

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Volatility:

Quartiles from Amex, NYSE, and Nasdaq

Ø 25<sup>th</sup> percentile is roughly 27%

Ø 50<sup>th</sup> percentile is roughly 37%

Ø 75<sup>th</sup> percentile is roughly 49%

Ø Also 95<sup>th</sup> percentile is 78%

## *Expected Term: Exercise Behavior and Post-vest Termination*

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### Volatility and Expected Term:

Going beyond the historical volatility term-matching principle (trailing historical period matches expected term):

∅ Volatility affects fair value in two ways:

- Direct affect on Black-Scholes
- Indirect affect on expected term

∅ Therefore, want to use better volatility estimation methods to avoid overstating expected term and expense

Questions:

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