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AEGON USA  
400 W. Market, AC-10  
Louisville, KY 40202  
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Director of Major Projects and Technical Activities  
Financial Accounting Standards Board  
401 Merritt 7  
P.O. Box 5116  
Norwalk, CT 06856

Re: Exposure Draft: Accounting for Stock-Based Compensation—Transition and Disclosure (file Reference 1101-001)

Dear MP&T Director,

Please consider the attached paper on Expensing Employee Stock Options. My job duties include modeling and trading derivatives including options. This gives me insight into the issues you are addressing. I am submitting this as an individual, however, and not as a representative of my employer or any professional organizations.

I worked extensively with Wayne Upton many years ago during the development of FAS 97. He said he found my assistance quite helpful. Hopefully I can be of assistance in this effort as well.

Sincerely,



Mark Evans, FSA

## Expensing Employee Stock Options

FASB is considering the use of Black Scholes to calculate the value of stock options given to employees. Black Scholes assumptions imply independence between the grantor and receiver of an option and the underlying security. In the case of employee stock options, the incorporation of Black Scholes must be modified to reflect that the stock underlying the option is equity in the grantor.

Consider an illustrative example. Company XYZ is a small company with a volatile stock price and limited net worth. XYZ pays no dividends. It offers generous stock options to its highly skilled employees. Let us assume a strike price equal to the current stock price of 100. XYZ grants 1 million options in addition to 1 million shares previously outstanding. The options are struck at the money and are ten-year Europeans. XYZ can issue additional stock at any time. XYZ has net equity of 50 million. At 50% volatility and 5% risk free interest, the value of one call is 67.32. According to Black Scholes, this means the value of the call options exceeds the company's net worth. In actuality, Company XYZ is a viable corporation. The employee options in this case redefine how the company's future earnings may be split among equity stakeholders, but do not impair the total amount of those future earnings. If XYZ performs well over the next ten years, then most likely its net equity and stock price will grow. The options will become valuable, but so will the company's fortunes and therefore ability to support the options. On the other hand, if the company does poorly, the options are likely to expire with little or no value.

In issuing employee stock options, company XYZ is essentially creating a contingent liability whereby a claim is placed against equity if XYZ does well, but there is no assessment if XYZ performs poorly or mediocre enough that the stock price at the end of ten years does not exceed 100. There is a significant difference between XYZ issuing employee stock options and a third party issuing options on XYZ stock. The critical element is the inherent link between success and option value and the ability of XYZ to issue more stock.

For example, assume XYZ's net equity increases to 100 million and the stock price increases to 150 at the end of ten years. Then XYZ issues one million shares of stock in exchange for 100 million in cash to honor the options. This leaves net equity of 200 million, 2 million shares, and market capitalization of 300 million.

Now assume XYZ's net equity and share price remain flat. The options expire worthless. Net equity is 50 million, we have one million shares, and market capitalization of 100 million.

So we see options on XYZ stock issued by XYZ represent a share of the upside potential of XYZ, but not a claim on the economic viability of XYZ. Rather than arbitrarily assigning a cost to employee options that ignores the relationship between the underlying and the issuer of the derivative, let us consider an approach which recognizes that

employee stock options affect future divisions of the pie but do not completely consume shareholder's equity.

A simple approach is available to address these issues. Define the following variables:

T = time to maturity of employee stock option

MV(t) = the market value of company at time t

S(t) = stock price at time t

C(T) = value of a call option on the stock as of time zero when option expires at time T

Shares = number of shares outstanding

Options = number of options granted

r = risk free rate of return

E = stock holder equity ignoring any claim of option holders to such equity

From risk neutral assumptions, we can say that the expected value of MV(T) just prior to option expiry is equal to:

$$E[MV(T)] = \text{Shares} * S(0) * \exp(rT) + \text{Options} * C(T) * \exp(rT)$$

Also,

$$MV(0) = E[MV(T)] * \exp(-rT)$$

A portion of MV(0) is associated with stock, but a portion is associated with options. Clearly the portion associated with stock is Shares\*S(0) with the remainder being associated with the options. Simple algebra shows this to be equal to Options\*C(T).

This approach gives us a convenient means to reflect the impact of options on the company. At the end of each accounting period, a portion of the company's equity should be allocated to the optionholders. Algebraically, this equals:

$$E * \text{Options} * C(T) / (\text{Options} * C(T) + \text{Shares} * S(0))$$

This amount would then be set up as a liability. The change in the liability would flow through earnings in each accounting period. If E is negative, then the liability is zero since the presence of options cannot increase the net worth of a company.

In the example above, the option liability for XYZ is equal to:

$$50,000,000 * 1,000,000 * 67.32 / (1,000,000 * 67.32 + 1,000,000 * 100) = 20,117,140$$

On the one hand, the liability is sensitive to a variety of factors, including stock level and earnings. It can change dramatically from period to period. On the other hand, it will automatically adjust to changing factors. It will always bear a logical relationship to the value of the employee options.

If the stock price rises, then the value of the option,  $C(T)$ , will increase more than proportionally, meaning that the option liability will be larger in proportion to remaining stockholder equity. Note this is more likely to occur when total equity has increased due to correlation between company success, equity, and stock price. If the stock price falls, then all these relationships operate in reverse.

The analysis becomes more tedious due to multiple option grants, exercise rights prior to maturity, and the existence of stockholder dividends, but the principles remain the same.

Hull<sup>1</sup> discusses a company issuing warrants (options on its own stock). While it recognizes these should not be valued as options issued by a third party, their approach assumes market capitalization equals book equity which is rarely the case.

<sup>1</sup>Hull, John C., *Options, Futures, and Other Derivatives*, 5<sup>th</sup> edition, Prentice Hall, Upper Saddle River, New Jersey, 2002