JUDICIAL CALCULATION OF DAMAGES FOR LOSS OF EMPLOYEE STOCK OPTIONS

by

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ABSTRACT

Option pricing models are useful in most option valuation situations. This paper presents a special case where the models are not applicable. A review of the finance literature and accounting standards suggests that valuation from the perspective of the firm can be addressed with adjustments to option valuation models. However, the existing models have limitations when dealing with the question of calculating the value to an employee of employee stock options (ESOs). Specifically, I consider the issue of how to calculate the loss to an employee in the special case of a termination without reasonable notice. Legal precedent provides one approach to this calculation. I review this approach to evaluate whether it is in accord with the legal concept of damages. I also consider whether financial theory can contribute to this special case.

I deal with two questions: Why don't judges use option theory to value ESOs in the same way that other professions, such as the accountants, do? Is the legal approach appropriate and consistent with the legal concept of damages? My conclusion is that judges have been correct not to have used option pricing theory because they must consider the employee's rather than the employer's perspective. In such situations, the option valuation approach would be inappropriate. I support this conclusion by considering the means available to employees for recognising value from their ESOs, and find that for employees unable to "delta" hedge, the only way to obtain value is to wait for expectations to be realised. Damages are thus appropriately calculated as the loss suffered from not being able to exercise the ESOs. This is consistent with the legal

concept of damages, which obliges the courts to attempt to place plaintiffs in the same position they would have been in had their rights been observed.

DEDICATION

To Nicholette, for providing my 'raison d'être'

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1 INTRODUCTION: THE PROBLEM OF ESO VALUATION

An extensive finance literature exists concerning option valuation. Central to this literature is the seminal option pricing formula and risk neutral methodology of Black and Scholes (1973). Financial practitioners on trading floors worldwide commonly use this formula and extensions of it. The risk neutral approach has also been applied in a number of specialized situations in industry, for example, to measure the cost of stock options issued to employees. Pandher (2003) suggests, however, that use of the Black-Scholes model overestimates the value of employee stock options (ESOs). Although a risk neutral approach is valid in most situations, this overestimation arises because of the special characteristics of employee stock options compared to traded options. These differences in the characteristics of traded options and ESOs are well documented (Pandher, 2003), as is the difference in value to the firm and value to employees of ESO grants.

The accounting profession has generally incorporated the financial theory of options in its approach to valuing employee stock options for accounting purposes. Accounting regulatory bodies, such as the Financial Accounting Standards Board in the United States, recommend an option-pricing model based on 'fair value' for valuing

ESOs. However, many adjustments have been proposed to the basic option model to account for the special characteristics of ESOs.

In contrast, in most cases the legal profession has not used financial models in determining the value of options when awarding damages. This has been particularly apparent when damages for unexercised ESOs have been awarded in wrongful termination cases. Rather, the courts have taken an *ex post* approach, looking at the facts at hand in each case to determine what position an employee would have been in had he or she been able to exercise the ESOs.

The purpose in this paper is to analyze why the courts have not embraced risk neutral pricing when calculating damages with respect to ESOs. I review the case law in this area to determine whether the approach taken by the courts is in accord with the legal concept of loss (and how this concept does not necessarily equal 'value'). I then review whether the financial theory can contribute to the legal approach in valuing ESOs. My analysis suggests that generally the calculation of loss should not follow an *ex ante* approach, such as in the option valuation models. It requires an *ex post* analysis, as if termination notice had been provided. This recommendation follows from the recognition that to obtain value an employee prevented from selling or from hedging ESOs (typical restrictions of ESOs) has no alternative except to wait for expectations to be realized. An option valuation model would price in outcomes that do not apply to the facts at hand and would include an option's 'time value'; in fact, an employee is unlikely

to realize the value from either of these sources given the restrictions that typically apply to ESOs.

The paper proceeds as follows. Section 2 reviews the approaches taken to valuing ESOs. Section 2.1 explains how financial economists value options. Section 2.2 describes how accounting standards boards have approached the option pricing debate. Section 2.3 reviews the basic legal issues concerning employee stock options. Section 3 compares, contrasts, and reconciles the legal approach to damage awards with the financial theory. Section 4 presents a conclusion.

2 A REVIEW OF ESO VALUATION APPROACHES

Employee stock options have become an increasingly important form of compensation. They are now offered to a wide range of employees, extending well beyond the traditional executive level. Firms grant employee stock options for a number of reasons: to minimize the firm's compensation expense, to conserve cash, and to avoid the limits on the tax deductibility of cash compensation. ESOs may also be used to help align employees' incentives with shareholders' interests (Congressional Budget Office, 2004). Such a transfer of value from shareholders to employees increases the importance of establishing a value that accurately reflects both the cost to the company and the benefit to the employee (e.g., Maris, Maris and Yang, 2003; Pandher, 2003).

As described in the previous paragraph, one reason for the use of stock options is that they represent deferred compensation and help to align each employee's commitment to the company. However, this commitment is obtained at a cost, because an option that is exercisable in the future has some expected net present value. If the option is exercised in the future (i.e., if the company's share price rises above the option's exercise price), the company is deprived of an amount of cash. If the option contract did not exist, the company would be able to sell the designated number of shares for the going market price on what would otherwise be the exercise date (Lew and Schirger, 1994).

Employee options are difficult to value because firms face a number of uncertainties. They cannot accurately predict what will happen to their share price, who will leave the company before their options vest, and which options will expire "out of the money" that is, when the option exercise price will be higher than the share price, so the option holder will not benefit from exercising the option. Thus, it is hard to predict what ESOs will be worth several years after their issue – the value of ESOs is only known with certainty when they are exercised. While methods have been developed for predicting this future value, which can be used to calculate a present value, none are ideal because of the particular characteristics of ESOs. The assumptions of the models that these methods are based upon can significantly affect the estimated option values. Clearly, though, the restrictions placed on employee options make ESOs worth considerably less than exchange-traded options (Lavelle, 2002).

2.1 Financial Theory of Options

The Black-Scholes model (Black and Scholes, 1973), the best known of the option pricing models, was developed to value traded options. The work done by Black & Scholes in the 1970s made possible further pricing of derivatives and, in particular, the development of "exotic" options. The Black-Scholes partial differential equation also enabled derivation of the "Greeks" of option pricing. The Black-Scholes model and risk neutral approaches are both widely used today in pricing options and other derivative instruments. They have spawned the field of financial engineering, which is dedicated to

designing and implementing such derivatives pricing models. Almost all formulas for pricing of exotic options have as their foundation the Black-Scholes model.

The basic inputs to price a "plain vanilla" option are as follows:

S = Underlying stock price

X = Strike price

r = Risk free rate of interest

V = Volatility

T-t = Time to maturity

These inputs, other than volatility, are all readily observable. Volatility can normally be estimated from historic stock price data. However, commonly used historical estimates can vary considerably, depending on the length of the period and sampling frequency selected during the period (Rubenstein, 1995). For a dividend paying stock, the standard Black-Scholes model can be adjusted to incorporate an annual dividend yield (Merton, 1973).

The assumptions of the Black-Scholes model are as follows:

1. Stock prices follow a geometric Brownian motion
2. Short selling with full use of proceeds is permitted

3. There are no transactions costs or taxes
4. Securities are perfectly divisible
5. Markets are efficient
6. Security trading is continuous
7. The risk-free rate and the volatility of the underlying stock price remain constant over the period of analysis.

A full description of these assumptions is beyond the scope of this paper (see Hull, 2003 for further detail). They are presented here for clarification of the basic Black-Scholes model to provide a reference point for the discussion in Section 2.2 where I describe the differences between ESOs and traded options. These differences either violate the assumptions listed above or require additional adjustments that introduce further assumptions beyond those in the base Black-Scholes model.

The Black-Scholes approach relies on the principle of risk-neutral valuation. The assumptions of the Black-Scholes model do not involve any variable that is affected by the risk preferences of investors. All the variables are independent of risk preferences. Risk-neutral valuation enables the pricing of options by constructing a portfolio that exactly replicates the future returns of the option in any state of nature (Hull, 2003). Risk-neutral valuation consists of buying a particular number of shares of the underlying asset and using them as collateral to borrow an appropriate amount of money at the riskless rate. Since the option and this portfolio would provide the same future returns, they must sell for the same price at any given time to avoid creating risk-free arbitrage

profit-making opportunities. Thus, we can value the option by determining the cost of constructing a replication portfolio.

Black-Scholes, in essence, represents the continuous application of a replicating portfolio hedge. If the Black-Scholes formula is interpreted in terms of the riskless portfolio hedge, the option is equivalent to a levered position in the stock. The number of shares of the stock held in the replicating portfolio is called the "option hedge" or "delta". Continual adjustment to the portfolio is necessary to maintain equivalence to the option. The sensitivity of an option to changes in the underlying stock price is not constant and, therefore, the option-replicating portfolio changes with the stock price. The relationship between the option and the stock price is captured by the option's "delta" and its "gamma". The delta tells the trader how sensitive the option is to a change in the stock price, which implies the value of the "hedge ratio".

The hedge ratio is the number of options required to hedge the effects of a change in the price of the underlying stock. The gamma is the change in the delta when the stock price changes. The gamma tells the trader how much the hedge ratio changes if the stock price changes. Options that are "near-the-money" require the most frequent changing of the hedge position (Fortune, 1996).

In practise, there is a limit to how frequently a trader can re-hedge. Transactions costs and the impracticality of constantly watch market movements reduce the ability of

most people to delta hedge their option positions. Dynamic hedging is therefore an uncertain undertaking. Anytime the underlying security value changes entails risk.

At the time of granting, a typical ESO has "time value", but no "intrinsic value". Time value is the value attributable to the amount of time remaining until the expiration of the option. For ESOs, intrinsic value is the higher of the difference between the underlying stock price and the strike price of the option or zero. If zero is used as the volatility input into the Black-Scholes formula, the output is the minimum value of the option. The minimum value is the minimum price that someone would be willing to pay for the option. Essentially, this removes all risk. This value assumes the stock will grow in value by at least the risk-less rate.

Black-Scholes calculates the option's minimum value, plus the additional value for the option's volatility. Black-Scholes estimates a fair value of an option. If the assumptions of the model are correct, the model is a mathematical proof and its price output must be correct. Strictly speaking, the assumptions are not correct and the Black-Scholes provides an imprecise, but useable, estimate. For short-term traded options, the model has been extremely successful in empirical tests that compare its price output to observed market prices (Harper). As explained later, the Black-Scholes must be adjusted for ESOs due to the differences between ESOs and traded options. Each of these differences violates a Black-Scholes assumption. The adjustments attempt to fix the models output to account for the differences.

The Black-Scholes model is a "closed-form" model, which means it solves for, or deduces an option's prices from an equation. In contrast, the binomial method is an "open form" or "lattice model". The binomial model creates a decision tree of possible future stock price movements and induces the option's price (Harper). A tree of possible future prices is constructed with the volatility input determining the magnitude of the up or down stock price movement. The future stock price is then translated into option values at each interval. The option values are then discounted back to a single net present value. This backward induction estimates the option value.

Binomial models are based on the same basic theory as the Black-Scholes model and depend upon the same assumptions as Black-Scholes. One difference is that Binomial models attempt to measure option value by developing many possible future scenarios, each with its own probability. They are sometimes called lattice models because they produce a framework of interwoven scenarios. Each scenario takes into account possible changes to volatility, to interest rates and to option life. The combination of these outcomes, or iterations, is supposed to generate a more accurate option value. The binomial model is more intensive in computational terms than Black-Scholes. The binomial model can, however, build in some of the unique features of an ESO.

There are many different types of Binomial, or lattice models, in use today. As more iterations are added, the Binomial models produce results that converge to create the same option value as the Black-Scholes model, given the same inputs. Binomial models require more predictions of future events than Black-Scholes, so their accuracy is only as good as the inputs given to them.

2.2 The Accounting Approach

The International Accounting Standards Board (IASB) recently recommended that employee compensation in the form of stock options be measured at the 'fair value' based on an option-pricing model and this value be recognised in financial statements. This follows the adoption of Statement of Financial Accounting Standards (SFAS) No. 123, Accounting for Stock-Based Compensation by the Financial Accounting Standards Board (FASB) in the United States in October 1995. SFAS No. 123 encouraged, but did not require, firms to adopt a method of accounting for stock options based on fair values estimated using either a Black-Scholes or a binomial model. The SFAS No. 123 approach was proposed as a replacement to the intrinsic-value-based method traditionally used in accordance with the Accounting Principles Board Opinion No. 25 issued in 1972.

Much of the research done on ESOs is recent. This research appears to have been motivated by the FASB standard and the proposals in response to it (Maris, Maris and Yang, 2003). FASB generated much discussion regarding how firms should calculate

and recognise the value of ESOs when it issued its Exposure Draft in the early 1990s (see McCann, 1994: Rubinstein, 1995) for discussions of the controversy surrounding the original FASB proposal). The Draft proposed that firms recognise as a compensation expense the estimated fair value of their ESO grants measured at the date of each grant. The Draft proposed that a method or model taking into account parameters equivalent to those of the Black-Scholes model or related option pricing models should be used to determine the fair value. While the original proposal would have required firms to expense the value of ESOs, vigorous opposition to the proposal led FASB to require only that the value of ESOs be disclosed in financial footnotes, rather than reported directly as an expense and deducted from net income. However, if a firm reports the intrinsic value in its income statement, it must disclose the effects of the estimated value in a pro forma statement.

With a recent IASB announcement that companies using international accounting standards must expense stock options beginning January 1, 2005 and a FASB initiated project to address issues in equity-based compensation, proper ESO valuation is again a topical issue. FASB currently has an exposure draft published as a result of a review of US accounting standards with respect to ESOs. Both the original and the recent discussion has focused on the value of ESOS from the firm's perspective, and evidence has been presented indicating that an approach such as that in SFAS No. 123 would result in overstating the fair value of ESOs granted by a firm (Maris, Maris and Yang, 2003). In addition, several studies have pointed out the difference between the market value of

these options and the subjective value to employees of non-tradable options (Kulatilaka and Marcus, 1994; Carpenter, 1998).

Employee stock options differ from exchange traded options in three important ways (see Hemmer, Matsunaga and Shevlin, 1994 for a full description of the following):

(1) ESOs generally have a much longer life than traded options. The typical life is ten years, while currently traded options have at most nine months to maturity.

(2) Delayed vesting: there is normally a period in which the option cannot be exercised. When employees leave (voluntarily or involuntarily) after the vesting period, they forfeit out-of-the-money options and have to exercise in-the-money options immediately (or at least during the exercise window granted by their option agreements).

(3) ESOs are non-transferable; they must either be exercised or they expire. Employees who wish to realise a cash benefit or diversify their portfolios must exercise the options and sell the underlying shares. (Maris, Maris and Yang, 2003; Hull and White, 2004).

The three factors listed above have direct valuation implications for ESOs. First, the longer life of ESOs means that an underlying assumption of the Black-Scholes model – that the parameters will remain constant over the life of the option – is more likely to be violated than in the case of traded options. The basic inputs into either the Black-Scholes or standard binomial option valuation approach are the underlying asset price, volatility,

interest rate, option strike price and time to maturity. Particularly over long periods of time, it becomes difficult to estimate underlying asset volatility. Even slight errors can radically change the calculated option value (Rubinstein, 1995).

Second, a vesting date before which an employee cannot exercise an ESO clearly limits the option rights, making an option with vesting restrictions less valuable than one which can be exercised at any time (Young, 1993). The option value derives from the rights conferred during the exercisable portion of the option term, rather than the full option term. This implies that a vesting restriction on option exercise should substantially reduce the calculated value of an ESO. Similarly, the possibility of forfeiture means the current value of ESOs must be adjusted downward to account for the event of the employee resigning or being fired (Rubinstein, 1995). The anticipated forfeiture rate can be estimated. The probability is not easy to calculate because employment conditions change. Also by adding another variable that must be estimated, the certainty of the valuation technique is reduced. Rubinstein (1995) indicated such an amendment is flawed due to problems with the amendment procedure including continuation of the possibility of forfeiture after vesting date, the negative correlation likely between forfeiture and success of the corporation and presupposition of risk neutrality towards forfeiture risk.

Third, because ESOs are non-transferable their optimal exercise policy differs from that of ordinary options. Unlike exchange-traded options, ESOs are not traded in a secondary market. The only way an employee can liquidate a position in ESOs is to

exercise the options and then sell the stock received in the secondary market. The value of the option to an employee is affected by the employees' personal aversion to risk, beliefs about the employers' future stock price and wealth position (Rubinstein, 1995). Since the wealth of many employees is poorly diversified and heavily tied to the employing firm, employees may not value their stock options as highly as the Black-Scholes model or binomial model would suggest (Rubinstein, 1995). An employee might rationally choose to exercise ESOs prior to their expiration date (for example, if the employee decides to leave the company), even though early exercise might not maximise the expected value of the option.

Rubinstein (1995) discusses several other differences between ESOs and traded options, including capital structure effects and the potential influence on employee attitudes towards firm risk. The exercise of the options causes the firm to issue new shares and receive the strike price, which increases both the number of outstanding shares and the total funds of the firm. As well as these capital structure effects, the compensation in the form of options may increase employee risk-taking through the altered work incentive provided by the employee stock options.

The estimated value provided by the Black-Scholes model is determined as a function of the time to expiration, which is appropriate in most cases for traded options. Further, in a Black-Scholes world, a call option on a stock that pays no dividends should never be exercised prior to expiration (Merton, 1973). This characteristic of listed options relies on the ability of risk adverse investors to perfectly hedge the option through

short positions in the underlying stock or to sell the option in the open market (Black and Scholes, 1973; Cox and Rubinstein, 1985). Employees are not in a position to perfectly eliminate their exposure to the risk of ESOs through short selling (see Lambert, Larcker and Verrecchia, 1991; Huddart, 1994). Rubinstein (1995) suggests that constraints such as loss of interest on the proceeds of short sale, reputational difficulties, and possible securities regulation requirements impede the ability to short sell for most employees. Therefore, risk adverse employees may, optimally, exercise their options early to reduce their risk exposure (Hemmer, Matsunaga and Shevlin, 1994). Similarly, since employees cannot sell ESOs, they may exercise the ESOs early to meet diversification or liquidity needs, or when leaving the firm. On the other hand, employees might delay exercise to defer tax liabilities or because they possess favourable inside information.

Thus, ESOs are more difficult to value than tradable options, and standard option valuation models developed for traded options should not be directly applied to ESOs. Nonetheless, proponents of the standard models think the application of these models is the best available approach because objective inputs are easily obtained, the user can calculate values with relative ease, and the models can be applied consistently from company to company without excessive subjectivity. Therefore, proponents have attempted to skirt some of the problems by adjusting the models' values to recognise the differences between ESOs and traded options (Young, 1993). For example replacing the time to maturity of the ESO with an expected time to exercise or expiration, whichever comes first, can by used in the Black-Scholes model to adjust for the non-transferability difference. While the adjustments have solved some of the problems, the restrictive

assumptions that we must make to apply these models to ESOs mean the models still do not convincingly account for the differences between these option types.

The features of ESOs also mean that the value to employees can differ from the cost to shareholders. This is a key point that underlies the remainder of my analysis in this paper. The cost to shareholders is the amount an outside investor would pay for such options without the normal ESO restrictions (Carpenter, 1998). This amount can be determined through risk neutral valuation. A replicating portfolio consisting of a partially leveraged position in a fractional number of shares can be set up, and the value of the option must equal the cost of this portfolio.

As pointed out, though, employees who cannot trade or hedge the options might not make the same exercise decisions as an outside option holder not subject to the ESO constraints. This must be taken into account when valuing ESOs from the employee point of view (Hemmer, Matsunaga and Shevlin, 1994).

Several approaches have been adopted to model exercise decisions and value the cost of ESOs to the firm. One is a utility maximization approach subject to restrictions on hedging and option sales. This framework requires information regarding unobservable variables such as employee risk aversion, wealth holdings, and the impact of employment change and the modelling of such variables. A second approach is an alternate risk-neutral approach with an early option exercise modelled as a random

stopping time with a Poisson exercise trigger. Pandher (2003) elaborates on these approaches and proposes a binomial ESO valuation model which incorporates multiple severance risks with ex-severance values depending on the employee's mode of exit from the firm, allows the stock price and other state variables to affect the severance probabilities, and finds near-arbitrage-free prices that are independent of the option holder's personal risk and wealth attributes. From the perspective of a company attempting to determine the cost of its ESO grants, these features of this model are attractive (Pandher, 2003).

Maris, Maris and Yang (2003), following a literature review of ESO research, assume that option life follows a gamma distribution, allowing the variance of option life to be separate from its expected life. Their results indicate that the adjusted Black-Scholes model could overvalue ESOs on the grant date by as much as 72 percent for non-dividend-paying firms and by as much as 84 percent for dividend-paying firms. This further demonstrates the sensitivity of ESO values to the volatility of the expected option life, a parameter that the Black-Scholes model or a Poisson process cannot accommodate. The variability of option life has an especially strong impact on ESO values for firms characterized by relatively short-lived ESOs (for example, expiry within five years), and high employee turnover. For such firms, Maris, Maris and Yang (2003) conclude that a binomial option-pricing model is more appropriate than the Black-Scholes model for estimating ESO values.

FASB has yet to issue a new rule, but its exposure draft (released in March) recommends the Black-Scholes method while also embracing the binomial valuation method to some degree. Companies will be responsible for determining which method works best for them, but will be encouraged by FASB to use the binomial method given the advantages of what FASB calls a "more robust" approach. This will especially be the case for companies that have large outstanding option grants. While both methods need adjustments, the binomial method (unlike the Black-Scholes method) takes into account the possibility that changes in the underlying stock price may influence the timing of ESO exercise. The binomial method divides the time from the option grant date to the expiration date into small intervals. Since the share price may increase or decrease during an interval, the binomial model takes into account how price changes over the term of the option will affect the employee's inclination to exercise the option during each interval. The binomial method can also take into consideration an option's lack of transferability, its forfeiture restrictions, and its vesting restrictions. As a result, the binomial method produces a much lower estimate of the value of an option grant than the Black-Scholes method will, which reflects the length of time the options are likely to be held (using the same set of assumptions will lead to similar results for both methods – however, adding the vesting schedule, lack of transferability, and forfeiture requirement adjustments to the binomial method will lower the option value (Schneider, 2004).

Adjusting the binomial model for this purpose is not easy; assumptions must be made regarding the patterns of ESO exercise, as well as assumptions regarding the volatility of the underlying stock. Some scepticism thus remains as to the model's

applicability to ESOs, and some believe (for example, Rubinstein, 1995) that the binomial method also overstates the value of ESOs.

In summary, although debate continues as to the most appropriate means for valuing ESOs for the purposes of financial statement disclosure, financial theory is clearly being applied in the accounting profession's efforts to accurately value ESOs.

2.3 The Legal Approach

The approach taken by the courts has been quite different in that the courts have taken an *ex-post* rather than an *ex-ante* point of view. Why have the courts chosen to take such a different approach? One reason may be that they are looking solely at the employee and not at the company, whereas the finance and accounting approach has focused on the employer. When ESO plans find their way into the legal system, such as in a termination dispute or a matrimonial dispute, the value to the employee is considered the appropriate measure, rather than the value to the firm. When the courts take this viewpoint, use of a conventional valuation model may not serve the purposes of the case at hand.

These situations raise the question of how to value ESOs from the perspective of the employee. The difference between value to the firm and that to the employee has

been noted, but work on the former has outpaced work on the latter. Pandher (2003) suggests applying the risk neutral approach to only the valuation from the firm's perspective because while the option holder cannot freely sell the stock or the ESO, the corporation is free to hedge the option using its stock directly or through a financial intermediary.

Pandher's risk neutral model for valuing ESOs exposed to severance risk from multiple sources with varying cause-contingent severance payoffs and stock holder restrictions captures ESO features that cannot be captured under the assumptions of the Black-Scholes model. Pandher's valuation also does not depend on the risk aversion and wealth endowment of the option holder. From the company perspective, one may therefore use a risk neutral probability for the purpose of valuing its stock option grants.

These arguments, however, do not apply to the option holder, and a utility framework is necessary for complete analysis. This approach requires information and assumptions on unobservable variables such as each employee's risk aversion and wealth endowments, which pose substantial problems in implementation. What can be asserted is an upper bound on the value of a stock option grant to an employee that is much lower than the value provided by the Black-Scholes model (Pandher, 2003).

Consider the example of an employee who has stock options in his or her employer and whose employment is terminated with insufficient notice at some point

prior to the expiry of the option. The issue of what damages to award, because of the employer's failure to give reasonable notice, is raised. A financial economist and a lawyer would approach this question from different viewpoints. The financial economist would calculate the value of the option and the lawyer would determine the loss suffered. These approaches can result in different outcomes.

The legal approach is most clearly outlined in the calculation of damages from the loss of opportunity to exercise ESOs. Some case law has been established in this area based on cases stemming from wrongful dismissal litigation and the 'termination of employment' clauses in ESO plans. These clauses commonly provide that the termination of employment triggers a time period exercise window for the options given as of the trigger date. Any options not yet awarded as of the trigger date are lost (Polowin, 2000).

The courts have found the primary determinant for whether an employee is entitled to damages is the stock option agreement the employee had with the former employer. The wording of the contract is examined to see if it contemplated the situation of termination and how the termination was to be handled. As stated above, the standard clause provides for a window of time following termination to allow the exercise of any vested options, and a forfeiture of any unvested options. This normally leaves little doubt as to the employee's rights, other than what the effective trigger date is. Employees argue that the trigger date is the last day of what is considered a reasonable notice period under the common law. Employers argue that the trigger date is the day the employer

says the employment relationship is at an end (companies seldom want ex-employees to retain a stake in the company after they leave). This issue is resolved by considering the circumstances of the termination and the wording of the option agreement.

In a lawful termination with reasonable notice this presents a clear case. The end of the notice period constitutes the trigger event, and the terms of the option agreement will apply from this date. This exercise window is itself an option, and a 4-year option with a 3-month exercise window can be shown to have the same value as a 3-month option when the other inputs are the same (as shown in the Appendix).

On the other hand, the courts have interpreted cases of unlawful termination as follows. If the contract does not unambiguously state that the stock options terminate when the employee ceases to be an employee, the employee has the period of reasonable notice required for termination to exercise the rights under the stock option agreement (*Veer v. Dover*). The rationale for this is that during the notice period the former employee would retain the status of employee. As Justice Goudge stated:

> In either case, the termination contemplated must, I think, mean termination according to law. Absent express language providing for it, I cannot conclude that parties intended that an unlawful termination would trigger the end of the employee's option rights. The agreement should not be presumed to have provided for unlawful triggering events. Rather, the parties must be taken to have

intended that the triggering actions would comply with the law in the absence of clear language to the contrary (*Veer v Dover*, para 14).

Where the stock option agreement terminates option rights when an employee ceases employment (due to wrongful dismissal or otherwise), the courts have not granted the former employee damages regarding ESOs. In *Brock v. Matthews Group Ltd.* (para 20), the court focused on the special language in that provision of "ceasing to be an employee … from the date of the notice of dismissal" and held that the termination of the option agreement would occur on that date, irrespective of whether that dismissal was lawful or unlawful. This exemplifies the traditional principle of strict contract interpretation.

Courts have also determined that this exception will not be liberally applied. In *Buchanan v. Geotel Communications* (para 166) the court stated:

> Where the terms of the stock option agreement makes rights and obligations dependent on when the employee ceases to be an employee, and the wording is ambiguous as to whether the parties meant the actual date of termination or the date when the employment would have been lawfully terminated had the employee not breached the employment agreement, then the wording shall be construed to mean that the determinative date is the latter.

Also in *Poplack v. Intermetco Ltd.* (para 32), Roberts J stated:

In order to dispense with the notice period, a clear and unequivocal termination clause must be agreed to between the parties.

This presents a second principle – that no advantage will be granted to an employer who provides inadequate notice of termination (Polowin, 2000, as exemplified in *Hardie v. Trans-Canada Resources Ltd.*). By finding room to interpret the ESO plan clauses, the courts can read in a requirement that "termination" cannot mean "wrongful termination," so the trigger date occurs upon expiry of the reasonable notice period (Polowin, 2000). In the absence of careful wording, courts will interpret stock option plans to the detriment of the employer and the trigger date for the termination of the options will not commence until the end of the reasonable notice period. In *Brock* the use of the phrase "notice of dismissal," rather than just "dismissal" or "termination," in reference to the time limit placed on the employee's right to exercise stock options meant the court did not interpret any ambiguity in the meaning (Israel, 2002).

3 THE CORRECT CALCULATION OF DAMAGES

With this background we now return to the issue of the correct damages to award an employee in relation to ESOs as a consequence of termination without a reasonable notice period. Why do judges not use option theory to value options, when other professions, such as the accounting community have? Should the optionality inherent in the exercise window be valued or is the legal approach correct with its *ex-post* approach? If the former, the option would need to be valued in a way similar to how an option with the original exercise date would be valued, with all of the inherent problems I have discussed. If the latter, is the legal approach consistent with the legal concept of damages as outlined earlier?

The financial community has debated the issue of valuation in certain cases, as discussed earlier. The financial theory starts with the perfect markets case using broad assumptions, and then makes adjustments to reflect situations different from a perfect market. The financial economist would value the option in the termination example as if the expiry date on the original option is accelerated to the end of the notice period. This is because the present value of the expected intrinsic value at the end of the notice period is the same as the present value of an otherwise identical option expiring at the end date of the notice period, as discussed earlier.

This approach is based on the holder of an option having three ways in which to realize value. These are:

1. Wait for the outcome (i.e., wait for expectations to be realized)

2. Sell the option immediately (or sell an identical option immediately)

3. Replicate the position (hedge) and receive an immediate cash flow.

The legal position on the termination question is based on the legal concept of loss. This principle is that damages in a breach of contract case are based on placing the plaintiff in the position the plaintiff would have occupied had the contract been performed (*Sally Wertheim v. Chicoutimi Pulp Co.*). In the case of a termination without notice, the courts will attempt to put the employee back into the position he or she would have been in had a reasonable notice period been given.

How then do the financial economists' three ways of obtaining value apply with respect to ESOs in the case of termination? Working through these three possibilities, we discover from the facts at hand that two of the three are not applicable. Because the employee is denied the opportunity to exercise the option and is subject to the other trading restrictions that typically apply to ESOs, the employee cannot realize value through either the second or third of the means given above. Conceivably, an employee could realize value by hedging, but the practical means to do so are beyond most employees' capacity because dynamic hedging would be needed to realize the full value. As a result, in most cases the employee can obtain value only by waiting for the outcome

at the end of the notice period. The use of a valuation method, which presumes all three of these means are available to the employee, is not appropriate in these cases. In rare circumstances, where an employee is capable of dynamically hedging, it is appropriate to consider the option pricing models. As I discussed earlier dynamically hedging is difficult to do in practice, so the option pricing models do not apply in most situations. In cases where the employee is not practicably able to delta hedge, if the option agreement does not state that the value of the option is awarded, the legal approach of awarding damages calculated as the employee's loss is appropriate.

The courts have found that the calculation of damages for the loss of the right to exercise is a question of fact depending on the evidence of each case. In *Buchanan* (para 171), the court stated:

> The assessment of damages here requires the court to determine what the plaintiff would probably have gained had he been employed until the end of the notice period. With respect to the issue of valuing any benefit arising from the vesting of stock options in that period the courts have taken a number of approaches. It appears to me that the courts have simply done the best they can to make findings as to what would probably have happened in the particular case before them. I agree with what Roberts J. said in *Poplack v. Intermetco Ltd.*: there is no rule – it's a question of fact, which must be made depending on the evidence of each case.

This factual analysis is in accord with the well-established legal principle of damages flowing from a breach of contract. The damages principle asks what the parties would reasonably have foreseen as a consequence of such a breach. The aim is to put the injured party in the position that would have been occupied if the contract had performed. The cases follow this principle in determining the damage award by examining the facts to determine what the employee would likely have done with the ESOs under the circumstances. This likely outcome is what both parties under the ESO agreement could have reasonably expected to eventuate.

In the rare case where the plaintiff is indeed able and competent to delta hedge, then the appropriate measure would be to use an option-pricing model. The value obtained in this way is almost always different than the *ex-post* value, and may be higher or lower. A comparison can be drawn to damages awarded for failure to close in a contract of sale; typically there is an award only if the subsequent price moved against the interests of the aggrieved party. The court should therefore enquire into the ability of the plaintiff to delta hedge. No explicit discussion of an employee's ability to delta hedge is mentioned in any of the cases. For the cases presented, dealing with the special case of termination without reasonable notice, it is likely that the finding would have been that the plaintiff would not have been found to be in a position to implement such a hedging strategy. The courts should however be clear to recognise the possible effect that such a finding would have on the valuation issue.

The courts have considered several factors in determining the appropriate loss. Generally, once a trigger date is established the cost of the shares eligible to be optioned can be clearly determined from the option agreement clauses, such as those regarding the exercise price and vesting restrictions. The loss is the difference between that sum and the value of the shares as determined by the court.

In calculating this value the courts have taken account of the character of the employee, the price of the shares over the disputed period (including anomalies in price within this period), and the effects on sale price when the company shares were thinly traded. For example, in *Poplack* the court considered Mr. Poplack to be a conservative investor in applying how he could reasonably have been expected to act; in *Gryba v. Moneta Porcupine Mines Ltd.* the courts looked into the facts to determine whether the employee had previously exercised options. In *Poplack* the court took into consideration a hostile take-over bid for the company, which significantly raised the share price, and in *Gryba* the court looked at the price range of the stock during the notice period and used the average price to determine the former employee's loss. In *Poplack* the court considered the effects on the sale price of a closely held company if the employee exercised options. Therefore, the courts engage in a hypothetical inquiry concerning what a former employee would have done during the notice period.

To broadly summarize, the option pricing models and accounting standards treatment is criticized as likely to overstate the ESO cost. These approaches focus on the valuation perspective of the employer and are likely to overstate the value because of the

failure to account for the early option exercise behaviour of employees, which arises from ESO restrictions. The legal treatment of the few cases to date deals more with the employee perspective, and applies an *ex-post* analysis which appears to better reflect the realities of how an employee can recognise value given the typical ESO restrictions and inability of employees to delta hedge.

Bringing together the finance theory and case law clearly demonstrates that we face several difficulties in calculating the value of ESOs for the employee. Option valuation methods can provide us with some bounds as to the range of values for ESOs, but not with a precise valuation because of the need for subjective information regarding each employee's exercise behaviour. This is analogous to the difficulty of estimating the value of a prepayment option, which is an integral part of most residential mortgages (Hull and White, 2004). Often mortgages are prepaid for personal considerations unrelated to the current market interest rate.

The case law has taken an *ex-post* view that looks to put the employee back to a position that they would have been in had they been able to exercise their options. Such an analysis can only be criticized if it introduces an element of perfect hindsight to the employee's actions since this would lead to an artificially high calculation of loss suffered.

My contention is that in a dismissal without reasonable notice case the only approach consistent with the attributes of employee stock options is to take an *ex-post* view. Included in this approach would need to be a careful consideration of the reasonable actions that the employee could be expected to have taken. The exception would be in a case where an employee is intellectually and operationally able to delta hedge. In such a case, the courts should be awarding risk-neutral style damages. An option valuation approach, using an option-pricing model adjusted for the differences between ESOs and traded options, would be appropriate to measure damages when an employee is able to delta hedge.

Using a conventional valuation method in cases where delta hedging is not available to the employee would lead to an unrealistically high "value" being attributed to the option. This is because of the restrictions and risk factors inherent in ESOs that cause early exercise. Acknowledging that most employees do not hold on to their options for the full term correspondingly reduces the apparent value of the option to the employee. To prescribe a value from a valuation model would overstate the loss that an employee suffered from a termination without sufficient notice. Valuation models need adjustments to reflect ESO characteristics and require some sort of estimate regarding the employee's exercise behaviour. They also need to reflect the impracticality of delta hedging for most employees. While current models may suffice for a firm valuing its aggregate ESO plan, the necessary assumptions regarding employee behaviour are not appropriate for estimating the loss suffered by an employee terminated without reasonable notice. The trading restrictions that typically apply to ESOs prevent the

employee realizing the ESO value by any other means apart from waiting for the outcome of the end of the notice period.

In the particular case of dismissal without reasonable notice and no clear treatment of this circumstance in the option agreement, the only way to calculate the loss caused to an employee from the employees' inability to exercise during this period is to wait until the end of the reasonable notice period. The loss can then be calculated by considering what action the employee would have taken if given the opportunity to exercise the eligible ESOs during this period. This follows from the recognition that to obtain value from such options an employee who is unable to sell or hedge can only wait for expectations to be realised. If denied these means of obtaining value, the appropriate damages to award will equal the loss suffered from this deprivation. The calculation of damages in such a case should be based on the loss between the option exercise price and the actual trading price at the time the court determines the stock would have been sold had that course of action been available to the employee. Trying to calculate this loss at the termination date using a valuation model will price in possibilities that reflect outcomes that do not fully reflect the implications of early employee exercise behaviour on the option value. Loss is not the same as assuming the employee is able to realize the value of the option immediately. No award for the time value of the option should be included. If an employee does exercise early they receive only the intrinsic value, and not the time value. The ways to achieve the time value of a traded option are to sell the option or delta hedge. With the lack of transferability of ESOs it is only in the case of an employee who is able to delta hedge his or her position that a valuation approach should

enter into the damages calculation. An employee is only able to gain the time value of an ESO by delta hedging. The award should depend only on whether the stock price rises or falls during the "reasonable period" timeframe. If the stock price rises, the loss is based on the increase: if the stock price falls, the loss is nil. While care must be taken in the *ex-post* analysis when assessing the likely employee behaviour during this period, the use of this approach is a more accurate means of calculating the loss suffered as a result of the termination event.

4 CONCLUSION

Through an analysis of several option models and legal cases, I considered the issue of how to calculate damages resulting from an employee not being able to exercise ESOs in a case of termination without reasonable notice. I examined the applicability of option valuation models to ESOs to see how well the assumptions inherent in these models handled the differences between ESOs and traded options. I found that while these models can be adjusted to value ESOs in most cases, the valuation perspective of the employee in the case of termination without notice suggest that the models are not appropriate in some situations. The usefulness of the valuation models in a case of termination without notice will depend on the facts of the case – an employee able to delta hedge can realise a value closer to the ideal value given by the option models. For the general case, though, an employee unable to transfer or hedge ESOs can realize value only by waiting for the reasonable notice period to pass. An appropriate value in this situation can be determined only by considering how likely the employee would be to exercise given the facts of the case. Such an *ex-post* approach has been applied in legal cases because this approach is consistent with the legal concept of damages. The governing legal principle is that the courts should attempt to put the employee back into the position they would have been in had reasonable notice been provided. This explains why judges have not used the option valuation models in these cases, and confirms that the courts' approach is in accord with both the contributions of financial theory and the

legal concept of damages (i.e., the judges have acted correctly based on the facts of the cases). As long as the courts look at the circumstances of the employee in each case when considering the loss that a particular employee has been subject to, the *ex-post* approach is appropriate. It is critical, though, that these considerations take into account the various factors influencing the exercise behaviour and ability of each employee with regard to realizing value from their ESOs.

5 APPENDIX

The intrinsic value at T1 of an option maturing at a later date T2 can be written as

$$\max\{S_{T1}-X,0\}.$$

The expectation of that value at an earlier time t is

$$E\{\max\{S_{T1}-X,0\}]\ .$$

This expression is also the expression for an otherwise identical option with maturity T1.

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