The Fair Value Method of Measuring Compensation for Employee Stock Options:
Basic Principles and Illustrative Examples
May 2002
Introduction

This memorandum has been prepared by Deloitte & Touche at the request of the Ontario Teachers Pension Plan Board to illustrate the basic properties of the fair value method of accounting for compensation related to employee stock options. For the purposes of the memorandum, stock options are defined as those awards granted to an employee requiring the employee to pay an exercise price in cash for the receipt of stock issued by the company. The options may vest based on the passage of time or based on the achievement of performance conditions. Stock options that provide for settlement in cash or cashless exercises are not included in the definition of a stock option.

With this document, it is our intention to give preparers and users of financial statements an intuitive grasp of the fundamentals of the method, and its implications for measuring compensation expense for employee stock options. The document does not address accounting for stock options granted to non-employees or to any other type of award granted to employees or non-employees.

This guide should be used for illustrative purposes only. Preparers of financial statements should consult the CICA Handbook, other guidance prepared by the Canadian Accounting Standards Board, and/or their auditors or accounting advisors for expert opinion on the application of these principles in specific situations.

A Brief History and Background of Fair Value Accounting

The “fair value” method of accounting for employee stock options and other stock-based compensation was introduced into the CICA Handbook, and thus into Canadian generally accepted accounting principles (GAAP), in late 2001. The fair value method is mandated for all non-employee transactions involving stock options and other forms of stock compensation. It is also mandated for certain types of employee compensation transactions involving consideration such as direct awards of stock, stock appreciation rights (SARS), stock awards payable in cash or other assets, and cashless exercise options. However, for traditional employee stock options, the fair value method is not mandatory but only “encouraged” as a method of accounting. Its use is mandatory, nonetheless, in the computation of certain pro forma disclosures required by entities that do not use the fair value method for all stock compensation plans.

Prior to its appearance in the CICA Handbook, the fair value method was rarely if ever used to record stock compensation expense by public enterprises reporting under Canadian GAAP. As a consequence, uncertainty may exist about the accounting process and effects of using the fair value method as defined in Canadian GAAP. Key issues include the question of whether one must reflect changes in the market value of options once granted, the effects of different vesting patterns and methods, and the potential volatility in net income that might arise from using this method either in the primary financial statements or in supplemental disclosures.
Basic Terminology

The Components of Fair Value
The fair value method records compensation for stock option transactions with employees at the fair value of the option instrument granted – the value that would generally be received when a similar option was issued in any other arm’s length transaction, such as in an options market. Fair value is generally determined at the date the employer grants the option to the employee and the employee understands the terms of the grant. The fair value of any option is the sum of two component parts: its intrinsic value and its time value.

- The intrinsic value of an option reflects the extent to which it is “in the money” (the underlying stock has a market value that is greater than the exercise price of the option) at any date. The intrinsic value does not measure the upside to the option holder from potential future increases in the value of the underlying shares that may occur over the remaining term of the option. In practice, options granted to employees of public companies will frequently have zero (or close to zero) intrinsic value on the date they are granted. This is the result of stock exchange or similar regulations prohibiting the issuance of options that are in the money, and hence instantly dilutive to existing shareholders. The value of such an option at grant date is almost entirely determined by its time value.

- The time value of the option is the value of these potential increases to the option’s holder at any given time. This estimated time value is added to the intrinsic value to determine the fair value of the option at any time. While the estimation process is reasonably complex, commercially available software puts this capability within the reach of most enterprises.

Types of Stock Options
Not all employee stock options are alike. Many compensation plans feature “plain vanilla” options that are exercisable by an employee in accordance with a vesting schedule that may be all-at-once (“cliff vesting”), or “graded” (vested proportionately over time). Other options may be performance related, that is, exercisable only under market certain conditions (e.g. the underlying stock price achieves a specified target price), or upon the achievement of certain non-market conditions (e.g. the accomplishment of certain organizational performance objectives).

- “Plain vanilla” situations: The fair value of options awarded is simply the total fair value of the number of options awarded. If the ultimate number of shares or options is initially uncertain because of non-market performance conditions, the fair value method requires the employer to make its best estimate of the number of options expected to be exercisable as a result of the performance condition. This estimate is continuously updated until the options are vested.
**Performance-related situations:** The effects of market performance conditions, such as those that depend on achieving a specific stock price or a specified amount of intrinsic value, are reflected directly in computing the fair value of the awarded options. The total fair value may also reflect the fact that an estimated number of employees initially rewarded options may not satisfy the vesting conditions through voluntary departures or other reasons. No direct recognition is given in the valuation process to the effects of vesting conditions on the value of an employee option; however, to reflect the effects of the holder’s inability to sell unvested options, the value of an unvested option is calculated by reference to its expected life (i.e. expected time to exercise) rather than its maximum term, reducing its value.

**Applying Basic Accounting Principles**

**Tools for determining the fair value:** The fundamental assumption underlying the use of fair values for employee stock options is that they can be reasonably estimated by modern option valuation techniques. Two of these techniques are the Black-Scholes and the binomial methods. These methods take into account the following factors:

- The time value attributed to options given data on the style of the option (American or European),
- The term of the option
- The volatility of the underlying share price (for options on publicly-traded equity securities)
- Dividend rates on the underlying shares
- Prevailing risk-free interest rates
- Other relevant factors

**General amortization principles:** The fair value is amortized over the subsequent periods that employees render service to earn the unconditional right to the reward. The amount allocated to each period is reflected as a charge to periodic compensation cost. This process is essentially an extension of the historical cost principle to stock-based compensation. As a general rule, under the historical cost method, a recorded transaction is measured at the value of the consideration exchanged between the enterprise and the parties to the transaction as established on the transaction date. Costs measured in this way are then charged or amortized over the period(s) in which the services reflected in the costs are rendered.

In the case of stock options granted as employee compensation, the amortization period is generally determined to be the vesting period, as it is over this period that an employee renders service in exchange for the right to exercise the option. Vesting provisions and expected and actual patterns of employee forfeitures will affect the amortization pattern. As a general rule, if the number of shares and exercise price of an award is fixed from the start, the total cost of the award to be expensed over the vesting period does not change.
once it is established. Subsequent increases or decreases in option values do not result in adjustments to compensation cost. No adjustment is made for options that vest then lapse unexercised: the cost to the issuer is the fair value of the option at its grant date, and not the fair value of its post-grant result.

**Impact of option type on amortization**

If an award vests in its entirety at a specific future date, known as **cliff vesting**, the entire cost of the award will be amortized uniformly over the vesting period, as illustrated in **Example 1**.

If the vesting is **graded** with, for example, one-third of the award vesting in each year of a three-year period, the company has a choice of the method of recognition. If each the fair value of each “tranche” of awards is determined, then one-third of the award is expensed over the first year, one-third over two years, and the final third over three years. However, if the company determines one fair value for the entire award, the cost may be amortized over the vesting period, in a manner similar to that in Example 1. (The cumulative proportion of the stock compensation cost expensed by any date should at least equate the proportion of the awards that are vested at that date.) See **Example 2** for an illustration of this situation.

Fair value estimates of options or shares subject to **non-market performance conditions** reflect the best estimates of the number of options to be earned. Adjustments to such estimates are treated as changes in accounting estimates. Hence, the cumulative effect of changes in expected or actual outcomes of performance conditions are reflected in the period of the change. Similarly, changes in the estimated rate of forfeiture of options may be treated as a revision of an estimate. **Example 3** provides an illustration of the process for applying fair value when estimates are used.

**The Financial Statement Consequences of Using Fair Values**

**Effects on compensation costs** Using the fair value method, the amount of stock compensation cost reported in any given period will be the portion of the fair value of current and previous awards allocated to that specific period. If it is not performance based, the annual compensation cost arising from a particular year’s award should remain relatively stable, once incurred. As a transition measure, however, Canadian GAAP stipulates that the fair value method, if electively used, should only be applied to awards granted on or after January 1, 2002.

Assuming the costs of stock compensation awards are relatively stable and are amortized over a period of four years, annual expenses will initially increase over time to reflect the effects of awards occurring after the transition date. Once four years of awards are being amortized, however, there should be little added volatility to net income from the fair value method itself. Volatility would be generated by varying patterns and values of annual awards creating variations in subsequent annual amortization costs. Alternatively,
awards that are based on non-market performance conditions may reflect changes in the estimated likelihood of achieving the performance benchmark.

**Other effects on financial statements:** In addition to changing compensation costs, certain other financial statement balances are affected by the adoption of the fair value method. If the compensation expense attributed to stock options is not tax deductible, as is generally the case in Canada, then the effective tax rate on reported net income may rise as reported net income is reduced but tax expense is not. Shareholder’s equity would not be affected as the reduction in income and hence retained earnings from increased compensation costs are exactly offset by the increase in shareholders’ equity arising from recognizing the value of the granted (and thus expensed) instrument.

**Effect on other performance indicators:** The effect of fair valuation of stock options on other key performance indicators generally reflects their effects on the income statement. The computation of basic and diluted earnings per share (EPS) is generally affected in the same manner that reported net income is affected. The numerator of the basic EPS calculation reflects the effects of the additional cost of compensation. The denominator of the basic EPS calculation reflects the effects of granted options in the same manner regardless of the method used to measure option expense. With respect to diluted EPS, the use of the fair value method requires that the take into account the effects of unamortized compensation expense in the application of the treasury stock method. This will generally reduce the dilutive effects of employee stock options on diluted EPS calculations. Key performance indicators such as gross margins may reflect the costs of expensed awards, depending on the classification of the compensation expense. Cash flows from operations would not be affected, as stock compensation is not a cash expense. The effects on EBITDA depend on its definition.

**Management proxy circular considerations:** The fair value method of accounting for stock options will not reconcile compensation expense reported in net income to the compensation expense for certain officers and directors as disclosed in the management proxy circular under current Canadian securities regulation. Amounts disclosed as compensation in the proxy circular are generally based upon amounts paid in a year, and reflect amounts attributable to the exercise rather than the award of stock options. In short, the proxy circular reports as compensation those amounts actually realized from the exercise of options after vesting is achieved. GAAP reports the amortized portion of the fair value of the option at the grant date, prior to vesting.

**Alignment with US GAAP:** The fair value method for stock compensation accounting under Canadian GAAP is essentially the same as that under US GAAP. There are no differences between the fair value method under SFAS 123 and the fair value method under CICA Handbook section 3870. However, there are significant differences if the fair value approach is not employed. US GAAP extensively dictates the method to be used, and the treatment to be given in certain circumstances such as repricing. Canadian GAAP does not require these treatments. Financial statement preparers and users not using the fair value method should consult the appropriate publications and their accounting advisors for further details on these differences.
Sample Applications of the Fair Value Method

The following three hypothetical examples illustrate the mechanics of using the fair value method to measure stock-based compensation expense. The examples illustrate the following scenarios:

**Example 1:** An award of 3,000 options with a fair value of $12.00 per option, that cliff vest at the end of three years. No forfeitures are assumed.

**Example 2:** An award of 3,000 options with a fair values of $8.00, $10.00, and $12.00 per option that vest at the rate of 1,000 options per year. No forfeitures are assumed.

**Example 3:** An award of 3,000 performance-based options, where vesting is conditional upon the achievement of benchmarks with respect to increasing the company’s market share with respect to a specified group of products. Each option has a fair value of $15.00 at the grant date. At the grant date and until the end of year 2, management’s best estimate is that an increase sufficient for 2,000 options to vest will be met, but not an increase sufficient for the last 1,000 options to vest. At the end of year 2, the increase is sufficient such that all options vest and are exercised.

In each example, the fair value of the compensation cost is established at the grant date, and then recognized in income in accordance with the vesting schedule (Examples 1 and 2), or in accordance with management’s best estimate of the vesting that will be achieved (Example 3).

In no case does the compensation cost reflect changes in the value of the options past the grant date; the effects of performance conditions on the number of options are reflected. Furthermore, the actual benefit realized from the exercise of the options is not reflected in income; only the fair value of the option granted is reflected.
Stock Compensation Accounting
Fair value method Theoretical Journal Entries
Canadian GAAP

Example 1
Stock Option – Cliff Vested, Not Performance Based
- Assumptions: Fixed award of 3,000 options with strike price of $10 per share
- Cliff vests in three years
- Forfeitures accounted for when incurred (or could estimate % forfeiture)
- Black Scholes model used to calculate fair value of $12 per option
- Total fair value is 3,000 * $12 or $36,000
- Annual expense is $36,000/3 or $12,000
- Exercised when vested when share price is $20 per share

<table>
<thead>
<tr>
<th>Grant Date</th>
<th>Account</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Account</strong></td>
<td><strong>Amount</strong></td>
</tr>
<tr>
<td></td>
<td>Grant Date</td>
<td>No accounting</td>
</tr>
<tr>
<td>Year 1</td>
<td>Dr Compensation expense</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td>Cr Contributed surplus</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td>To record compensation expense for year 1</td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>Dr Compensation expense</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td>Cr Contributed surplus</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td>To record compensation expense for year 2</td>
<td></td>
</tr>
<tr>
<td>Year 3</td>
<td>Dr Compensation expense</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td>Cr Contributed surplus</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td>To record compensation expense for year 3</td>
<td></td>
</tr>
</tbody>
</table>

If Exercised
- Dr Cash ($10 * 3,000) | 30,000 |
- Dr Contributed surplus | 36,000 |
- Cr Common share capital | 66,000 |
- To record the exercise of all of the options

If Not Exercised
- No entries - amount stays in contributed surplus

If Forfeited
- Dr Contributed surplus | 1,200 |
- Cr Compensation expense | 1,200 |
- To record the impact of options forfeited at the end of Year 2

If Forfeited Assumptions:
- Assume 5% forfeited at end of Year 2
- Revised compensation cost is 3,000 * 0.95 * $12 or $34,000, or $11,400 annually
- Cumulative expense at end of year 2 should be $11,400 * 2 or $22,800
- Adjustment to expense of $24,000 recognized to end of year 2 in the amount of $1,200 Year 3 expense would then be $11,400 as well

Deloitte Touche Tohmatsu
**Stock Compensation Accounting**

*Fair value method Theoretical Journal Entries*  
*Canadian GAAP*

**Example 2**  
Stock Option, Graded Vesting, Not Performance Based

**Assumptions:**
- Fixed award of 3,000 options with strike price of $10 per share
- Vests ratably over three years (1,000 options per year – 3 tranches)
- Forfeitures accounted for when incurred
- Exercised when vested when share price is $20 per share
- Different expected life of each tranche of options, resulting in different estimate of fair value for each tranche

**Calculation of Total Fair Value of Award**

<table>
<thead>
<tr>
<th>Tranche</th>
<th>Vesting</th>
<th>#Vested</th>
<th>Fair Value</th>
<th>Compensation expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tranche 1 vests 100% in Year 1</td>
<td>Year 1</td>
<td>1,000</td>
<td>8.00</td>
<td>8,000</td>
</tr>
<tr>
<td>Tranche 2 vests 50% per year for two years</td>
<td>Year 2</td>
<td>1,000</td>
<td>10.00</td>
<td>10,000</td>
</tr>
<tr>
<td>Tranche 3 vests 33.33% per year for three years</td>
<td>Year 3</td>
<td>1,000</td>
<td>12.00</td>
<td>12,000</td>
</tr>
</tbody>
</table>

30,000

**Compensation Recognized Per Year**

<table>
<thead>
<tr>
<th>Year</th>
<th>Vesting in Year 1</th>
<th>Vesting in Year 2</th>
<th>Vesting in Year 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>8,000</td>
<td>5,000</td>
<td>4,000</td>
<td>17,000</td>
</tr>
<tr>
<td>Year 2</td>
<td>5,000</td>
<td>4,000</td>
<td>4,000</td>
<td>13,000</td>
</tr>
<tr>
<td>Year 3</td>
<td>4,000</td>
<td>4,000</td>
<td>4,000</td>
<td>12,000</td>
</tr>
</tbody>
</table>

17,000 9,000 4,000 30,000

56.7% 30.0% 13.3%

**Could also use straight line method and calculate fair value for the entire award using one assumption regarding expected life of the award. If so – accounting would look like cliff vesting accounting (Example 1)**
Example 2 (Graded Vesting) Continued

Accounting entries

<table>
<thead>
<tr>
<th>Grant Date</th>
<th>Account Description</th>
<th>Account</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No accounting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>Dr Compensation expense 17,000</td>
<td>Cr Contributed surplus 17,000</td>
<td>To record compensation expense in year 1</td>
</tr>
<tr>
<td>Year 2</td>
<td>Dr Compensation expense 9,000</td>
<td>Cr Contributed surplus 9,000</td>
<td>To record compensation expense in year 2</td>
</tr>
<tr>
<td>Year 3</td>
<td>Dr Compensation expense 4,000</td>
<td>Cr Contributed surplus 4,000</td>
<td>To record compensation expense in year 3</td>
</tr>
<tr>
<td>If Exercised</td>
<td>Dr Cash ($10 * 3,000) 30,000</td>
<td>Dr Contributed surplus 30,000</td>
<td>Cr Common share capital 60,000</td>
</tr>
<tr>
<td>If Not Exercised</td>
<td>No entries – amount stays in contributed surplus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If Forfeited</td>
<td>Dr Contributed surplus 400</td>
<td>Cr Compensation expense 400</td>
<td>To record the impact of options forfeited at the end of year 2</td>
</tr>
</tbody>
</table>

If Forfeited Assumptions:
- 5% forfeited at end of Year 2 after Year 2 options vest (e.g. 5% of the options that are to vest in year 3 are forfeited)
- Revised compensation cost for year 3 vested options is 1,000 * 0.95 * $12 or $11,400
- Annual expense over three years should be $3,800
- Cumulative expense at end of year 2 should be $3,800 * 2 or $7,600
- Adjustment to expense of $8,000 recognized to end of year 2 for options to vest at the end of year 3 in the amount of $400
- Year 3 expense would then be $3,800 as well
Example 3
Stock Option – Performance Based

Assumptions:

- Award of 3,000 options with strike price of $10 per share
- 1,000 options will vest if the company’s market share for a specified group of products increases by 5% at the end of year 2
- 2,000 options will vest if the company’s market share for a specified group of products increases between 5% and 10% at the end of year 2
- 3,000 options will vest if the company’s market share for a specified group of products increases by more than 10% at the end of year 2
- Forfeitures accounted for when incurred (or could estimate % forfeiture and adjust fair value)
- Company estimates on day 1 that market share for the specified group of products will increase between 5% and 10%, so that first two tranches are included in initial best estimate of cost (cannot use weighted average probability)
- Reassess estimate at each reporting date
- Assume that initial estimate is reasonable until end of year 2 when market share for the specified group of products increased 12%
- Fair value of each option using Black Scholes is $15.00
- Compensation cost recognized ratably over two years
- Compensation cost is 2,000 * $15 or $30,000
- Annual compensation cost is $15,000
### Example 3 (Performance based) Continued

<table>
<thead>
<tr>
<th>Grant Date</th>
<th>Account</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No accounting</td>
<td></td>
</tr>
<tr>
<td>Year 1 estimate</td>
<td>Dr Compensation expense</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>Cr Contributed surplus</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>To record compensation expense in Year 1</td>
<td></td>
</tr>
<tr>
<td>Year 2 estimate</td>
<td>Dr Compensation expense</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>Cr Contributed surplus</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>Total Year 2 expense is $30,000, including third tranche for meeting new vesting performance benchmark</td>
<td></td>
</tr>
<tr>
<td>End of Year 2</td>
<td>Dr Compensation expense</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>Cr Contributed surplus</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>To record compensation expense in year 2</td>
<td></td>
</tr>
</tbody>
</table>

**If Not Exercised**
- No entries – amount stays in contributed surplus

**If Forfeited**
- Dr Contributed surplus 2,250
- Cr Compensation expense 2,250
- To record the impact of options forfeited at the end of year 2

**If Forfeited Assumptions:**
- 5% forfeited in Year 2
- Revised compensation cost is $3,000 * 0.95 * $15 or $42,750
- Downward adjustment in the amount of $2,250 to previous expense of $45,000 recognized to end of year 2