Fair Value Accounting for Sequential Stock Option Grants?

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Abstract

This paper analyses some implications of fair value accounting for employee stock options. Assuming a certain strategy of sequential stock option grants, we show that fair value accounting may lead to a recognition of compensation expense that is uncorrelated or even negatively correlated to the value of services received by the firm. The value of services is operationalised by the value of options traded in exchange, thereby assuming a fair deal. In that sense, fair value accounting does not provide relevant and comparable information. As an alternative, we argue that only periodical adjustments up to the level of realized exercise gains reveals the true cost, i.e. value of services received, for the firm.

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1. Introduction

There is an ongoing debate on how to account for stock option compensation. While US-GAAP has FAS 123, there is still no standard in the system of International Accounting Standards. However, on November 7, 2002, the International Accounting Standards Board (IASB) issued exposure draft ED 2 *Share-based Payment* together with a document containing the Boards basis for conclusions (BC). This draft calls for fair value accounting and is similar to FAS 123 but with no exceptions. FAS 123 still offers the right to account for stock options based on the intrinsic value method according to APB 25. ED 2 offers no such choice between different accounting methods. Under fair value accounting, the value of equity-settled options is calculated at grant and is allocated over the service period with no ex-post adjustments. To measure the value of options, any option pricing model which includes all relevant factors is feasible, Black-Scholes and the binomial model explicitly mentioned in FAS 123 and ED 2. The question arises whether fair value accounting is more likely to produce the “most relevant, comparable information” (ED 2 BC293) compared to alternative methods like an intrinsic value method with ex-post adjustments at each of the reporting dates.

To gain insight into this problem, we analyse a strategy of sequential stock option grants. First of all, we show that, when designed correctly, a sequential stock option contract can be used to transfer wealth of a given net present value with certainty. We then ask whether or not the application of the fair value methods suggested in ED 2 or FAS 123 reveals the amount of transferred wealth. We acknowledge that the strategy we employ may seem rather strange at first sight. But we strongly believe that accounting rules should also be capable of dealing with extreme cases as well. In that sense, the strategy of sequential stock option grants can be regarded as a ‘crash test’ for fair value accounting.
The paper is structured as follows. In section 2 we give an overview about fair value accounting under ED 2 and FAS 123. In section 3 we present and justify our model of sequential stock options grants. Section 4 is devoted to showing the accounting implications of sequential stock option grants. Section 5 concludes this paper.

2. Fair value accounting

After a decade of discussion there is a general consensus among main standard setters about the accounting treatment of share-based compensation. The new IASB Exposure Draft ED 2 “Share-based Payment” can be seen as the result of this debate. Standard setters try to measure and to allocate the value of the employee services which are delivered in exchange for stock options. A reasonable matching between revenues and expenses has to be reached. The difficulty is to derive a solution that is consistent with existing accounting principles. If an entity applies FAS No. 123, the fair value of awards that call for settlement by issuing equity instruments is measured at grant date and is allocated, based on the number of options that actually vest, over the service period (usually the vesting period) in the income statement with a corresponding credit to equity (paid-in capital). To estimate the fair value of an option on the grant date, any accepted option pricing model can be used. FAS No.123 mentions, above all, the Black-Scholes and binomial option pricing models.

When the IASB issued ED 2, it concluded that all share-based payment transaction should be recognised in the financial statements, measured at fair value, resulting in the recognition of an expense when the goods or services are consumed. If the entity receives services as consideration for equity instruments, the transaction and the corresponding increase in equity should be measured „either directly, at the fair value of the goods or services received, or indirectly, by reference to the fair value of the equity instruments granted, whichever fair value is more readily determinable” (ED 2.7). For transactions with employees, the latter fair value is more readily determinable (ED 2.11). Hence, the fair value of options granted is a surrogate measure of the services received. The entity has to determine the amount to
attribute to each unit of service (e.g. one month’s or one year’s service) received during the vesting period. The total fair value at grant date is divided by the number of units of service expected to be received during the vesting period. “Having recognised the services received and a corresponding increase in equity, the entity shall make no subsequent adjustment to total equity, even if the equity instruments granted are later forfeited or, in the case of options, the options are not exercised” (ED 2.16). The measurement of the fair value of equity instruments granted shall take into account the terms and conditions (vesting conditions, e.g. minimum employment period, performance conditions) upon which those equity instruments were granted. FAS 123 and ED 2 are very similar, indeed. Both call for the recognition of expenses based on the fair value of options at grant. There is almost no ex-post adjustment of expenses over time. Exceptions are adjustments for differences in the expected and realised numbers of units of service. There are minor differences between the two standards with respect to the adjustments for forfeiture and with respect to the treatment of performance conditions (ED 2, p. 12-13). These differences play no role in our analysis, however. We therefore treat FAS 123 and ED 2 in like manner. We thereby assume that in the future accounting according to APB 25 is no longer allowed.

3. The model

Stock options right now provide the lion’s share of managerial compensation in the US. Based on arguments provided by agency theory, it has long been suggested that options are an efficient means to align the interests of managers and shareholders (Haugen and Senbet, 1981). The empirical evidence, however, tells a different story. Studies by Brickley et al. (1985), DeFusco et al. (1990), DeFusco et al. (1991) and Gerety et al. (2001) shed light on whether or not shareholders profit from the introduction of option schemes for managers and directors. At most, there seems to be no convincing evidence of a positive wealth effect for shareholders. In their review of practices of stock option compensation in the US, Bebchuk et al. (2002) take a different view. From their perspective, stock options are seen not primarily
as an incentive device but rather as a means through which managers are able to extract rents for themselves. This implies that stock options are mainly (mis-)used to transfer wealth from shareholders to executives. In what follows, we don’t try to decide whether the incentive or the wealth transfer story is correct for the typical stock option plan. We rather assume that there may at least be plans directed at wealth transfer. To achieve such a transfer, we suggest a strategy of sequential stock options grants. The sequence of grants is chosen to transfer an amount of wealth with a given net present value (NPV) with certainty. One may not necessarily think of this wealth transfer as an extraction of rents. It may rather be that the wealth transfer is necessary to induce an executive to join the firm. However, if the wealth transfer is part of a fair bargain, then it seems rather strange to use a complicated strategy of sequential stock option grants instead of a simple cash settlement. In the introduction we already pointed out that such a strategy may simply be interpreted as an extreme example used to test the capability of an accounting standard in providing comparable and relevant information. But beyond this interpretation, using such a complicated strategy may have real economic advantages as well. In that sense our strategy may have more meaning than just an intellectual exercise. For example, it may help to overcome some constraints of cash transactions. First of all, stock options may help to deal with liquidity constraints of the firm. Consider a firm that wants to hire a high potential CEO but is not able to offer a salary that is acceptable to her. In that case the firm may wish to use options in a way that guarantees a certain amount of wealth transfer. Our strategy is designed to perform this task. Another argument comes to mind with respect to the tax regimes in different countries, e.g. the US and Belgium. Following the Tax Reform Act ’93, the deductibility of managerial compensation in the US was capped at $1 million unless performance based (Barker and Sollee, 1994). Stock options typically qualify as performance based compensation, thereby reducing the tax burden of the firm. However, it is highly likely that this advantage would be lost would it become known that the option grants are designed in a way that guarantees a certain wealth transfer. An implicit strategy of sequential stock option grants may overcome this problem.
Belgium, taxation of the employee is based on the value of options at grant (BDI, 2000). However, the method used for option valuation there is rather simple and is highly likely to underestimate the true fair value of options. In such a setting, substitution of cash compensation by sequential stock option grants leads to a reduced tax burden of the employee. Last but not least, sequential stock option grants may indeed be used by powerful executives to extract rents. To use sequential grants of options may be preferable over more visible, more direct means of wealth transfer. For example, granting new options over and over again may be easier to justify than simply taking a large amount of cash. Again, it can be argued that an implicit contract is preferable here, too. That gives the impression of a highly incentivised executive when the true goal is wealth transfer only. Of course, one question remains. That is the question of enforceability of a contract that is only implicit. However, the contract may be self enforcing due to reputational concerns. First, note that the manager and the firm may have strong economic incentives to settle on sequential stock option grants. Possible tax reasons are given above. With only an implicit contract the manager faces a situation where the firm may be inclined to break it by not granting new options. But this could destroy the firm’s reputation, making any such contract in the future impossible, thereby sacrificing future tax savings. We therefore strongly believe that the strategy suggested in this paper may have much more meaning than just an intellectual exercise with no real world relevance.

We now analyse a strategy of sequential stock option grants to transfer wealth of a certain net present value. This approach entails that, every time a stock option expires out of the money, the executive is granted a number of new options. Designed correctly, this strategy can be used to guarantee the transfer. For our analysis, we employ the binomial model of stock price evolution. This model was suggested by Cox et al. (1979) for stock option evaluation purposes. The model assumes that the stock price $S$ over time follows a binomial process at each point in time, where time is assumed to be discrete. Starting with a stock price of $S_t$ at
time $t$ the price can only change in two distinct ways. It can increase by a factor of $u > 1$ if an uptick occurs or it can decrease by a factor of $d < 1$ if a downtick occurs. Therefore, the stock price at time $t + 1$ is either $S_{t+1} = uS_t$ or $S_{t+1} = dS_t$. For simplicity assume $d = 1/u$. Let $B$ denote the exercise price of the option and assume that any option has a life span of one period. All options are granted at the money, i.e. $B = S_t$. The risk free interest rate is $r$. The fair value $c_t$ of such an option at time $t$ then is

$$c_t = \frac{q(u-1)S_t}{1+r}$$  \hspace{1cm} (1)$$

where $q$ is defined as

$$q = \frac{1+r-d}{u-d}$$

In a risk-neutral world, $q$ would be the equilibrium probability of a stock price increase by the factor of $u$ between $t$ and $t+1$. However, when risk aversion is introduced, this interpretation is no longer valid. In a setting of risk aversion, the true probability $p$ of a stock price increase may deviate from $q$.

Now consider the following sequence $Y_t$ of option-based compensation contracts $y_t$: at time $t$ a number $n_t$ of options with exercise price $B_t = S_t$ is granted to the employee. These options mature at $t+1$. If after grant a downtick occurs, options are replaced by a new grant. On the other hand, if an uptick occurs, the option contract is designed to provide for an exercise gain of $V(1+r)^{t+1}$, $V$ being the net present value of wealth to be transferred to the employee. It follows that the per option gain after an uptick would be $S_{t+1} - B_t = uS_t - S_t$. Then simply choose
\[ n_t = \frac{V(1+r)^{t+1}}{(u-1)S_t} \]  

(2)

and the contract indeed yields \( V(1+r)^{t+1} \) after an uptick and 0 otherwise. Since the exercise gain at \( t+1 \) would be \( V(1+r)^{t+1} \), the NPV of that gain is \( V \). If the options can be exercised with that gain, the sequence of contracts ends. If the options end out of the money, a new contract is signed with the same properties as described above. For all \( t \leq T \) define

\[
Y_t(T) = \begin{cases} 
    Y_t(n_t, B_t) & \text{if } B_t < S_{t+1} \\
    Y_{t+1}(T) & \text{else}
\end{cases}
\]

(3)

For \( t = T + 1 \) let \( Y_T = Z \), where \( Z \) is an arbitrarily chosen severance payment for the employee that is due at \( t = T + 1 \) if and only if all preceding options have ended out of the money. The expected net present value of this sequence of option contracts is:

\[
E(NPV(Y_t(T))) = pV + (1-p)E(NPV(Y_{t+1}(T)))
\]

(4)

Substituting \( T \)-times and simplifying yields an expected NPV at \( t = 0 \) of

\[
E(NPV(Y_0(T))) = V(1-(1-p)^{T+1}) + (1-p)^T E(NPV(Z))
\]

(5)

Define \( \bar{Y}_T \equiv E(NPV(Y_0(T))) \). Now, as \( T \to \infty \) the expected NPV of the sequence \( Y_t(T) \) for \( t = 0 \) becomes:

\[
\lim_{T \to \infty} \bar{Y}_T = \bar{Y}_\infty = V
\]

(6)
In the limit, wealth of net present value of $V$ is transferred with certainty. If the severance payment $Z$ is chosen to satisfy $Z = V(1 + r)^T$, then $E(NPV(Z)) = V$ and $\mathcal{V}_T = V$ for all $T$.

In the next section we analyse accounting implications of sequential stock option grants under the assumption that financial statements are prepared in accordance with ED 2.

4. Accounting implications of sequential stock option grants

4.1. Implicitly contracted strategy

In what follows, we assume that the strategy defined by (3) combined with the severance payment is only implicitly contracted. By an implicit contract we mean one that is only known to the manager and the firm. When the manager and the firm wish to keep the contract secret, they will not recognise the value of the strategy but rather the value of each single grant of options in the financial statements. Given that no other information is available to outsiders, there will be no correcting mechanism so that indeed each single grant will be recognised separately. By this treatment, the economic substance of the contract will not show up in the financial statement. We show in section 4.3. that this accounting treatment leads to a material over- or underestimation of expected and realized total expenses depending on stock price movements. We would like to stress here that this result is not the rather trivial one that adjusted ex post values may deviate from ex ante values. Our goal is to show that even when ex post values are known ex ante, fair value accounting will only incidentally provide relevant information. In that sense, deviations between recognised ex ante values and ex post values are shown to occur systematically.

4.2. Explicitly contracted strategy

On the other hand, if the firm and the manager would choose to make the contract explicit, then the economic substance of the transaction must govern the accounting treatment (see
IASB Framework 35). Assuming that it is legally enforceable for both parties, the contract specifies that the manager owes services of value $V$ in exchange for a sequence of options of identical value. If the firm receives services of value $V$ over a number $\tau$ of periods in exchange for the sequential stock option grant, this value has to be recognised in the financial statements. ED 2.17 requires that the measurement of the fair value of equity instruments granted shall take into account the terms and conditions (in our case: the granting of new options whenever older ones lapse) upon which those equity instruments were granted. A possible accounting solution would be to recognise in the balance sheet at grant date an asset (here: prepaid expenses or deferred compensation at an amount of $V$) with a corresponding credit entry to paid-in capital. Then, in each period an amount of $V/\tau$ should be amortized as stock option expense. However, in most cases it will be questionable whether the future employee services meet the definition of an asset (ED 2, BC 193). In this case, i.e. the services acquired do not qualify for recognition as assets, an amount of $V/\tau$ is expensed each period in the profit and loss account with a corresponding entry to paid-in-capital. Indeed, this is the required recognition method of ED 2 (ED 2.4,5)

4.3. Fair value accounting

Under fair value accounting, the value of options has to be recognised in the year of grant with no adjustments thereafter (ED 2.7-16). In what follows, we assume that the contract is an implicit contract as defined in section 4.1. Each grant has to be accounted for separately. Using the granting strategy suggested above, at $t$ a number of $n_t$ options is granted with a fair value of $c_t$ each. Therefore a compensation expense of $n_t c_t$ has to be recognised in $t$:

$$n_t c_t = \frac{V(1+r)^{c_t}}{(u-1)S_t} \frac{q(u-1)S_t}{1+r} = qV(1+r)^t$$
However, this recognition is only triggered as long as all preceding grants ended out of the money. The expected value of total expense recognition ($TER$) over the contract lifetime is given by

$$E(TER) = qV \left[ \sum_{t=0}^{T} (1 - p)^t (1 + r)^t \right] + (1 - p)^{T+1} Z$$

Depending on parameters, neither realised $TER$ nor its expected value can be sure to provide relevant information about the wealth transfer that took place. It can not even be ascertained whether $E(TER)$ overestimates or underestimates the transfer. The following employs numerical examples to support our claim.

First of all, note that $E(TER)$ is strictly decreasing in $p$. In the binomial model of stock price evolution employed above, $p$ can be thought of as a measure of expected return on the stock. If and only if $p > q$, the expected return on the stock exceeds the risk free interest rate $r$. It is natural to think of a stock as having an expected return above the risk free interest rate. However, as the Capital Asset Pricing Model (CAPM) reveals, the opposite can be true. In the CAPM, as the beta between stock and market returns falls below zero, the expected equilibrium return on the stock falls below the risk free interest rate. So while $p > q$ may be the usual case, $p \leq q$ might as well be possible.

Numerical Example:

Now assume the following values: $S_0 = 100$, $u = 1.3$, $r = 0.05$, $q = 0.53$, $T = 4$, $Z = V(1+r)^{T+1}$ and $V = 1000$. Varying the probability of a stock price increase yields the following pattern.
As can be easily inferred from figure 1, $E(TER)$ deviates from the net present value of the wealth transfer in different directions, depending on the probability $p$. For high return stocks, $E(TER)$ is below $V$, while for low return stocks it lies above. Using the strategy of sequential stock option grants, neither low nor high expected return firms will recognise the true value of the wealth transfer, not even in terms of expected total recognition.

![Expected total expense recognition](image)

Figure 1: Expected total expense recognition

Put in other words, one could think of $p$ as a “survival rate” of a population of ex ante identical firms employing sequential grants to transfer wealth $V$. In that sense $p$ is the percentage of firms managing to transfer $V$ by a single grant. Accordingly, $(1 - p)$ is the percentage of firms needing more than one grant. One may look now at the distribution of total expense recognition at $T + 1$ of that population. Using parameter values of our numerical example and assuming $p = 0.6$, the following pattern (see figure 2) emerges:
Total Expense Recognition

Figure 2: Total expense recognition

Remember that all firms transferred an amount with net present value of 1000. Total expense recognition, however, varies between approximately half and four times of that amount. Total expense recognition triggered by fair value accounting, therefore, does not provide meaningful information for investors. The case becomes even worse if there is no severance payment at the end. In that case, approximately 1% of firms never transfer wealth to the employee. However, these firms recognise the maximum of total expense in the population of firms while the true cost for investors is lowest, i.e. zero. What is more, there are other firms in the population with the same total expense recognition that have managed the desired wealth transfer through their last grant.

It is clear now that only full ex post adjustment of expense recognition reveals the relevant information to investors.\(^3\) Under full ex post adjustment, the former expense recognition of unexercised options is fully undone while the recognition of exercised options is reset to

\(^3\) Recently Penman (2003: 83) argued in the same direction.
reflect the realised gain of the employee. In that sense, it may be a good idea to account for
the initial value of options in the year of grant. We do not comment on how the total expense
should be distributed over time. But it is most important that in the end there is full ex-post
adjustment. Of course, a population of identical firms using the same strategy would still
differ in their total expense recognition. But this would reflect only the difference in the
timing of exercises through discounting.

5. Conclusion

The IASB considers that fair value accounting “might result in some understatement or
overstatement of associated expense” (ED 2 BC293). Our paper shows that, in the case of
sequential stock option grants, underestimation or overestimation may reach a considerable
size. Given our assumption of an implicit contract, it is clear that at the date of grant there is
no information available as to the value being transferred. This problem can be solved by no
accounting rule at all. The remaining question therefore is only whether the relevant
information is revealed at least ex post. We have shown that this is not or only incidentally the
case with current fair value accounting standards. It follows that the error in estimates would
mislead users of financial statements. What we have also shown is that this effect varies
systematically with firm characteristics like the expected rate of return on the stock. Fair value
accounting, therefore, has different implications for different firms, even given that all firms
transfer the same amount of wealth (and therefore, by assumption, receive the same value of
services). The information produced by fair value accounting is therefore neither comparable
nor relevant. To solve this problem, we see only one open route: The ex-post adjustment up to
the level of exercise gains realised by the employee. What is more, it is one of the IASB’s
stated goals to set standards in a way that doesn’t impact the firms decision to enter a certain
transaction and not the other: “In any event, the Board noted that the role of accounting is to
report transactions and events in a neutral manner, not to give ‘a favourable’ treatment to
particular transactions to encourage entities to engage in those transactions” (ED 2 BC55). However, in its current version, the exposure draft calls for a different treatment of cash-settled option schemes despite the fact that those schemes are economically equivalent to equity-settled ones.\(^4\) That problem would be solved, too, by our suggestion calling for an ex-post adjustment of equity-settled options.

\(^4\) In ED 2 the board has seen this problem and tried to solve it through a disclosure approach. Under that approach the difference between expense for cash settled and equivalent equity-settled transactions must be disclosed according to paragraph 52(b).
References


London.