FASB Stock-Based Compensation Project

SHARE-BASED PAYMENT:
COMMENTS ON EXPOSURE DRAFT OF MARCH 31, 2004

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A. INTRODUCTION

Transfer Pricing Options Consulting ("TPOC") is pleased to submit these comments to the Financial Accounting Standards Board ("FASB" or "Board") regarding the exposure draft of March 31, 2004, Share-Based Payment, an Amendment of FASB Statements No. 123 and 95 ("exposure draft"). These comments represent a continuation of TPOC's efforts in this area over the past year, at times expanding upon and at times revising TPOC's prior comments and letters to the Board.

TPOC also addresses these comments to the International Accounting Standards Board ("IASB"; collectively, with the FASB, "Boards") with reference to International Financial Reporting Standard No. 2 ("IFRS 2"), "Share-Based Payment," issued in February 2004. At the outset, TPOC wishes to express its strong support for international convergence and to commend both Boards for their tireless efforts to this end.
Overall, TPOC is very pleased with the exposure draft and believes it represents a significant step forward in a number of areas. Most notable are the great improvements in guidance with respect to grant-date fair value estimates, and the deft and subtle navigation of many complex permutations in stock-based payment arrangements and circumstances. The draft’s creation and handling of the “requisite service period” concept is particularly excellent.

1) Executive Summary

The exposure draft’s most important advance is to urge the explicit modeling of early exercise behavior in the valuation of employee stock options. These models substantially improve the accuracy of valuations compared to the “rough justice” of using a simple expected life assumption, especially in conditions of high volatility. The Board made a reasonable decision to allow considerable flexibility in selecting valuation models and techniques, favoring goals of accuracy and adaptability over comparability and transparency. In this spirit, these comments suggest specific revisions to the exposure draft’s guidance on option-pricing models (Part B.1) and additional disclosure requirements (Part B.2) that TPOC believes will better serve all purposes.

TPOC also applauds the exposure draft’s treatment of performance conditions (Part B.3). In the face of daunting valuation issues, the Boards’ decision to harness modified grant-date accounting for this purpose was enlightened. Rather than try to place a value on the discount for performance conditions on the grant date, the exposure draft makes recognition of stock option cost conditional on meeting the conditions. This is a superb compromise that serves the goal of representational faithfulness in a reasonable way at the same time as providing appropriate compliance incentives to management. Nonetheless, TPOC recommends some modest revisions to the exposure draft in order to guard against remaining incentives for abuse. In particular, these comments offer two alternative approaches to guard against the greatest danger, overly subjective performance conditions.

Taken as a whole, the exposure draft laudably strengthens the conceptual framework behind fair-value expensing of stock-based compensation and the modified grant-date method. These comments point out a few specific areas where further improvement could be achieved. First, the measurement objectives (Part B.4) could be stated more clearly and directly as can the conceptual basis for “fair value” in this context. Having more clearly defined the conceptual framework, certain deadwood can then be removed and certain other concepts clarified, including restrictions and contingencies (Part B.5).
The exposure draft rightly recognizes that award modifications are a source of potential abuse. In TPOC’s view, the governing principle should be that modifications can never result in a reduction of stock-based compensation expense attributed to any period. Rigorously applied, this principle eliminates two points of divergence between U.S. and international standards, adopting the rule of the exposure draft in one case (equity-to-liability modifications) and that of IFRS 2 in the other (improbable-to-probable modifications). On the other hand, by recognizing additional compensation expense in virtually all cases, the basic rule of both standards arguably overreaches; these comments suggest an alternative rule for modifications (Part B.6) that better reflects the governing principle.

In the interest of completeness, Part C of these comments briefly addresses each of the specific issues raised by the FASB in the exposure draft’s introduction. Finally, two Annexes contain suggested mark-ups of the draft’s guidance on option valuation (paras. B1-B36) and disclosure (paras. B106-112).

2) Accounting for Income Tax Effects

Finally, for the record, TPOC would like to express its continued disagreement with the method of accounting for income tax effects. As stated in its letters to the Board dated October 13 and 21, 2004, TPOC believes that a so-called “one-event” approach which recognizes all tax effects in the income statement is both stronger in principle and sounder in practice than any “two-event” approach. However, considering how strongly some Board members support the “two-event” approach, TPOC chooses not to expand upon its earlier comments at this time.

Conceding that both approaches are principles-based, TPOC’s greatest concern with the two-event approach is that it has proven to mislead and confuse tax policymakers. In order to understand the stock option deduction’s cost to the Treasury or its arbitrary and perverse effects on similarly situated taxpayers, tax legislators have to be able to reconcile and interpret both income and equity statement items. Few members of Congress are sophisticated enough users of financial statements to do this. Recognizing that the FASB does not seek to influence tax policy, TPOC is prepared to acquiesce in the adoption of a
two-event approach and accepts the responsibility both to educate legislators and to advocate fundamental tax reform as its own.1

While retreating from this issue, TPOC predicts a veritable firestorm as other commentators realize the full implications of the proposals. Specifically, the asymmetrical treatment of excess tax benefits (straight to equity) and write-offs of deferred tax assets (income statement) is likely to be quite unpopular. The asymmetry in the current rules of FAS 123 is widely disliked, but is begrudged because it is mitigated by pooling rules (i.e., write-offs do not hit the income statement unless pool of prior excess benefits in equity is exhausted).

There is some irony in the recent history of this issue: the initial approaches suggested by both Boards would have resolved the asymmetry (though in opposite ways); asymmetry was reintroduced (and made worse than under current FAS 123 rules) by the Boards in an attempt to achieve convergence; and, yet, there remains a significant divergence between the proposed U.S. standard and the final IASB standard on this point.2

1 The U.S. federal tax deduction for non-qualified stock options is currently based on the intrinsic value of the option upon exercise ("spread at exercise"). Spread at exercise produces arbitrary and perverse results by giving an enormous deduction to the most successful and fastest growing companies at the same time as it denies any deduction whatsoever to less successful companies that rely just as heavily on stock-based compensation. At the same time, to unsophisticated users looking at the tax provision in the income statement alone, all companies appear to receive the same deduction at the same time (under either current or proposed FAS 123 rules). The full and true picture is only available to users who are sophisticated enough to know to look for the tax benefit from stock option exercises in the statement of equity (or the statement of cash flow). In TPOC's view, the U.S. corporate tax system would be fairer and more equitable if deductions for stock-based compensation were largely or completely conformed to GAAP fair value accounting rules.

2 In Exposure Draft 2, the IASB proposed to recognize all tax effects of equity-based payments in the income statement (essentially on a mark-to-market basis). In deliberations during 2003, the FASB rejected the income statement (one event) approach, but tentatively decided that both excesses and deficits of realized tax benefits should go directly to equity. When the two Boards met in October 2003, the IASB members acquiesced and accepted the two-event approach for the sake of convergence. The IASB members, however, were unwilling to recognize a putative deduction on the income statement that is not actually available under tax rules (even if offset by a decrease in equity). The FASB acquiesced on this point, leading to the asymmetrical treatment of tax benefit excesses (equity treatment) and write-offs of unrealized benefits (income statement). The Boards' remaining point of divergence is timing: the FASB would assume that a tax deduction equal to the book expense will become available until proven otherwise (by forfeiture or exercise at lower value); the IASB, on the other hand,
If this firestorm materializes and the Boards are ready to reconsider a
principled two-event approach to help resolve it, TPOC would be most happy
to expand upon the comments in its prior letters. In any event, TPOC
strongly urges both Boards to work together to achieve complete convergence
on this issue—the Boards have come too far to give up now.

B. SUGGESTED REFINEMENTS

In the following sections and accompanying annexes, these comments make
specific recommendations for revisions to the exposure draft. The annexes, in
particular, offer specific language to revise the implementation guidance in
Appendix B of the exposure draft. If these suggestions are implemented, the
required changes to the main text of the standard are relatively few and
minor. TPOC would be happy to work with the Board or its staff to identify all
affected paragraphs and craft revised language.

Suggestions are offered in order of importance and likelihood of adoption. In
TPOC's opinion, the first three suggestions (on valuation guidance, disclosures
and performance conditions) are very important and, at the same time, not
likely to be particularly controversial. The next two suggestions (on
measurement objectives and restrictions/contingencies) would simplify the
standard and improve its logical coherence; but would have little substantive
impact and might give rise to controversy with those who see the issues
slightly differently. The final suggestion (on modifications) would have the
largest substantive impact and is likely to be the most controversial since it
challenges an aspect of the standards that has already achieved convergence;
TPOC urges both Boards to review these comments carefully nonetheless and
consider whether the likely consequences are intended and desirable.

1) Option-Pricing Model Guidance

TPOC agrees with the FASB that it is both necessary and appropriate to
provide more extensive guidance regarding employee stock option valuations
than is provided for “fair value” determinations in other contexts. As the
Board concluded in paragraph C63 of its Basis for Conclusions, reporting
entities and their advisors both want and need such detailed guidance. As
such, TPOC believes that the guidance provided in Appendix B to the
standard is extremely important. In this spirit, TPOC offers not only these

would recognize (and reverse) tax deductions on a mark-to-market basis depending on
changes in stock prices at each reporting date.

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comments but also a suggested redline revision of paragraphs B1 through B36 of the draft Appendix B, attached as Annex 1.

Not Fixed In Stone. There is an unfortunate but understandable tendency among entities and auditors to read implementation guidance as scripture. For example, as the Board noted in paragraph C62, many entities have been reluctant to stray from using the Black-Scholes-Merton formula because no other model was illustrated in the original Appendix B of FAS 123. Accordingly, TPOC considers it worthwhile to explicitly remind readers that the guidance is not fixed in stone but will evolve with further academic study and practical experience. Nonetheless, keeping these tendencies in mind, it is important to make the implementation guidance as accurate and up-to-date as possible and to keep a keen eye on the emphasis and tone of the guidance.

Lattice Models. TPOC approves of the exposure draft's stated preference for lattice models, but fears that the draft stresses the wrong aspects of such models. The main advantage of lattice models is their ability to model employees' early exercise behavior in a practical and efficient way. Modern lattice models substantially improve the accuracy of valuations compared to the "rough justice" of using a simple expected life assumption with the Black-Scholes-Merton formula. As TPOC demonstrated in earlier comments to the Board, this improvement is particularly pronounced for companies with highly volatile stock, including many in the high technology industry.

In addition to early exercise modeling, the exposure draft also emphasizes the ability of lattice models to take into account parameters that are expected to change over time (so-called "term structures"). While undeniably true, the difference between modeling term structures and using weighted average assumptions is typically far less material than different approaches to early exercise. In prior comments, TPOC argued in favor of the simpler weighted average approach in service of the goals of transparency and comparability. However, TPOC recognizes that term structures (especially for interest rates and dividends) do improve representational faithfulness—at least marginally—and may prove important for adapting option pricing models to new circumstances and inevitable innovations in stock-based compensation. Below, TPOC suggests a few modest revisions to the guidance on term structures and some additional disclosure requirements (e.g., weighted

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3 Transfer Pricing Options Consulting, Comments on FASB Stock-Based Compensation Project, Part I: Improving the Accuracy and Comparability of Option Pricing Models (July 6, 2003) [submission no. 101 - unsolicited letters on share based payment at www.fasb.org]
averages as well as ranges) in hopes of advancing all four goals (i.e., transparency, comparability, representational faithfulness and adaptability).

Data Availability. The draft implementation guidance is wrong (at paragraph B11) to suggest that lack of early exercise data is a valid reason for rejecting lattice models. As demonstrated by the Insert (on the next 5 pages), similar but more acute - data availability problems plague the determination of expected life for traditional applications of the Black-Scholes-Merton model. For either expected life and early exercise factor, TPO strongly advocates the use of broad industry and regional studies, especially for broad-based options, and is working with friends in academia to develop such a study for the high technology industry.

Even as it embraces lattice models, the Board's reluctance to soundly dismiss simple applications of the Black-Scholes-Merton formula is understandable. Indeed, it would be uncharitable at best to cast aspersions on the fixed expected life convention that has served the cause of fair-value accounting so well over these past 10 years. Nonetheless, with advances in computing power and option-pricing theory, the time has come to recognize that more precise models of early exercise and post-vesting employment termination behavior are appropriate. In TPO's view, the only valid reason to continue using the Black-Scholes-Merton formula and a fixed expected life assumption to value non-transferable employee stock options is lack of materiality.

Expected Term. TPO is pleased that expected term is the first assumption discussed at length in the draft implementation guidance. Vesting schedules and early exercise patterns are the two most important parameters in the valuation of employee stock options. Volatility - and even full contractual term - tend to have considerably less impact on value. By discussing it first, the draft rightly places more emphasis on the expected term. Given the

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4 TPOC agrees that use of company-specific data for post-vesting employment termination rates (in contrast to early exercise patterns) is reasonable and appropriate. Even those entities that have recently begun to use stock-based compensation would typically have generalized employee turnover data on which to rely. For start-up entities that lack any historic data, industry surveys typically should used as for most or all other model assumptions.

5 TPOC's earlier comments (cited in footnote 3 above) generally demonstrate that increases in volatility above a certain level (around 50%) do not change the value of vested options, assuming the early exercise factor is held constant. The same can be shown about full contractual term (beyond 6 or 7 years). In both cases, it is due to fact that most expensive outcomes (nodes on lattice) are sheared off by early exercise factor.
Expected Life vs. Early Exercise Factor

The key distinguishing feature of employee stock options is their non-transferability. Other options can be traded in the market or fully hedged, eliminating risk and locking in time value. As a result, marketable options are "worth more alive than dead" and are rarely exercised before the end of their contractual term. For employee options, in contrast, because exercise is the only practical way to eliminate risk or lock in value, early exercise is very common.

It happens that it was the ability to hedge options that led to the development of viable risk-neutral option-pricing models. Specifically, the breakthrough insight was that options can be fully financed through dynamic hedging of the underlying stock. By arbitrage principles, the fair value of the option must be equal to the cost of hedging. The hedging basis for option-pricing models can be easily seen in a one-step binomial tree:

This simple one-step model assumes that a stock currently trading at $80 can either go up to $100 or down to $70 at the end of the option term, but can take no other value. In this scenario, the grantee of an at-the-money option can perfectly hedge his exposure by purchasing \( \frac{2}{3} \) of a share. That is, he is perfectly indifferent to whether the stock goes up or down because he will end up with the same amount ($46.67) in either case. If the stock goes up and the option is exercised, he receives the strike price ($80) but has to purchase \( \frac{2}{3} \) of a share at the higher market price \( \frac{2}{3} \times 100 = 33.33 \), netting $46.67. If the stock goes down and the option expires worthless, he would be able to sell his \( \frac{2}{3} \) of a share at the lower market price \( \frac{2}{3} \times 70 = 46.67 \).

More precisely, all marketable options have an "optimum exercise date": for options on stocks that do not pay dividends, the optimum exercise date is always the date of expiration; for dividend-paying stocks, the optimum exercise date may be earlier depending on the trade-off between foregone dividends and the options' remaining time value.

Thus, employee stock options are subject to "early exercise." Because exercise occurs in advance of the optimum exercise date for otherwise-similar marketable options, it is also called "suboptimal exercise." The former term is preferable to avoid the negative connotations of the word "suboptimal"; in fact, early exercise is often "optimal" for employees, serving important diversification and liquidity needs.

\[\text{Buy } \frac{2}{3} \text{ share of stock; write } 1 \text{ call (sell } 1 \text{ call);} \]
\[\text{2/3 to 1 is hedge ratio = amount of stock purchased per call written} \]
\[\text{If stock goes up: call is exercised, you get } (80 - 33 \times \frac{1}{3} = 46.67) \]
\[\text{If stock goes down: you get } (46 \times \frac{2}{3} = \frac{2}{3} \text{ of } 70) \]
The cost of this hedging strategy -- and therefore the value of the option -- can be readily determined. The amount invested by the option grantee at the outset is the cost of the 2/3 of a share held as a hedge (2/3*$80=$53.33) and the payoff, as we have seen, is also known in advance ($46.67). The hedging cost is simply the difference between the initial investment and the discounted value of the future payoff.3

A full binomial tree aggregates a series of such time-steps over the option term and calculates overall hedging cost through a process of induction, working backwards from the terminal nodes of the tree to its root. The following five-step binomial model illustrates the valuation of a marketable option, assuming a 4-year term, 55% volatility, no dividends, 2% risk-free rate, granted at-the-money when the stock is trading at $8.4 Note that, since it is a marketable option, all terminal nodes (reflecting exercise or expiration / denoted by double borders) are in the final time period.

Some argue that non-transferability undermines the foundations of option-pricing models: i.e., because employees can neither sell nor hedge their options, arbitrage and hedging principles cannot be applied to value them. This argument is misplaced. Since there can be no market for employee stock options, which are by their terms non-transferable, it is necessary to hypothesize a relevant transaction. Specifically, the proper inquiry is what would be the cost or value that an outside investor would place on the option cash flows, taking into account employees’ expected exercise behavior.

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3 The risk-free rate of interest (e.g., the Treasury bill rate) is the proper discounting rate since the investment is entirely risk-free (i.e., the same payoff is guaranteed whether the stock goes up or down).

4 For simplicity, the binomial trees and analysis in this insert do not take into account vesting structures (where relevant, immediate vesting should be assumed) or employment termination patterns (pre- or post-vesting, forfeiture or forced early exercise).
Thus, the nub of the non-transferability issue is how best to adapt option-pricing models to reflect early exercise behavior. While not a simple problem, it is not intractable either. Indeed, the expected life convention of FAS 123 was a reasonable first attempt. In the ten years since FAS 123 was released, increases in computing power make it feasible to harness the power and flexibility of binomial modeling to try other approaches.

The concept of an early exercise factor is an alternative to the expected life convention. As the following illustrations show, each of the two approaches effectively "trims off" certain branches of the binomial tree to model early exercise. The expected life approach makes a vertical cut that removes all branches representing later periods in the contractual term, without regard to whether the option is in-the-money. The early exercise factor approach makes a horizontal cut instead, lopping off all branches that are more greatly in-the-money at any time during the contractual term.

The illustrations below adopt the same assumptions used for the marketable option in the previous illustration: 5 step binomial tree, 4-year full term, 55% volatility, no dividends, 2% risk-free rate, strike and stock prices at $8. Expected life approach (left) assumes a 3.2 year expected life. Early exercise factor approach (right) assumes exercise when stock price reaches 180% of strike price. (Terminal nodes are again denoted by double borders; post-exercise stock-value nodes by dashed borders.)

Both approaches result in a downward adjustment from the $3.66 value derived for an otherwise similar marketable option (see prior illustration). Under these assumptions, the early exercise factor approach results in a substantially lower value ($1.95) than the expected life approach ($3.00).6

5 The early exercise factor approach illustrated here limits option payoff to 180% of strike price regardless of stock price at the terminal node. This is similar to other barriers-alignment or interpolation methods.

6 Although the small number of time steps in examples exaggerates the size of the difference, this result is correct (and confirmed by a 250-time step model). The comparison is fair because the 180% exercise factor correlates with a 3.2 year expected life. Further analysis shows that volatility is main factor causing the difference in values between the two approaches; the greater the volatility, the greater the difference.
The expected life approach and the early exercise factor approach both constitute simplified descriptive models of employee exercise behavior. As descriptive models, these approaches attempt to represent expected or observed exercise patterns without explicitly considering employees' reasons for early exercise. Behavioral models, by contrast, attempt to simulate option exercise behavior assuming the employee seeks to maximize his personal utility. Behavioral models require an explicit estimate of difficult-to-observe variables like risk aversion and wealth diversification. An advantage of descriptive models is that they are more easily calibrated and tested with empirical data.

Although expected life and early exercise factor are both generally susceptible to empirical calibration (as discussed on following page), they do not have equal descriptive power. For example, it is obvious that employees do not exercise their options merely because a certain amount of time has passed, without regard to how much they are in-the-money. Conversely, a correlation between moneyedness and early exercise is entirely plausible; and is confirmed by an analysis of the output of behavioral models. Reproduced below is a figure from a peer-reviewed article by Brian Hall and Kevin Murphy that illustrates "threshold prices" (i.e., early exercise factor * strike price) given four different sets of assumptions about risk aversion (?) and wealth diversification.

The figure shows that, for any given set of assumptions, the early exercise factor is a downward sloping function of time. In analyzing empirical data, a reasonable first step would be to find a weighted-average early exercise factor, which can be used in a simple binomial model like the one above. The binomial model can readily be refined to reflect a "term structure" of early exercise factors once sufficient data is collected and analyzed.
Calibration from Empirical Data

Any approach to early exercise behavior modeling needs to be calibrated with empirical data. In theory, expected life and early exercise factor both can be directly observed. In practice, however, each parameter has its own data collection and analysis concerns.

The overriding issue is whether to use the company's internal data or a broader industry sample. In short, industry data is better for both approaches - ideally, segregated by region and employee level. While corporate culture may play a role in exercise behavior, other factors (e.g., wealth, peer behavior) seem certain to be more important.

For expected life, in particular, industry data is an absolute necessity; company-specific data leads to systematically false conclusions. Employee options are inevitably held longer if company stock happens to fare poorly than if it performs well. (Indeed, out-of-the-money options are typically held for their full contractual term.) Consider two similar companies: one's stock has historically performed poorly; the other well. If each uses its own historic data, the former will report a longer expected life and derive a higher value for its options. If history repeats itself, of course, the reverse will be true ex post: the poor performer's options will be worth less; but this counterintuitive result is not the problem. The problem is that, ex ante, expected life and option value should be the same regardless whether the stock happens to go up or down (as shown in hedging cost discussion above). To properly derive average expected life from historic data, a statistically valid industry-wide sample must be collected and analyzed.

For early exercise factor, on the other hand, company-specific data is not wrong or misleading -- just likely to be insufficient. As long as a company's stock performs poorly, employees will not exercise underwater options and no misleading data will be produced. If and when the stock turns around, the stock price at which exercise occurs remains meaningful even if late in the contractual term. In fact, careful data handling is required to avoid misleading results from options on stocks that perform well too early: the apparent early exercise threshold will be biased upward unless option exercises that occur immediately after vesting are segregated and analyzed separately. Therefore, it would be vastly superior to collect data from many companies, reflecting many different stock price paths, than for each company to rely on its own data.

\[7\] Industry data is especially relevant for broad-based stock option plans. In cases where the company grants options primarily (or disproportionately) to a few highly-compensated and high-profile executives, it may be more appropriate to rely more heavily on company-specific data. In any event, if an executive has a pre-established plan to exercise options on a regular schedule, the binomial model and assumptions should reflect this plan.

\[8\] During the past ten years of FAS 123 compliance, no such study seems to have been undertaken. Instead, companies have either relied on their own internal data or referred to the expected life estimates disclosed by other companies in their FAS 123 footnotes, more likely to result in a "race to the bottom" than a statistically meaningful survey.
importance of expected term, however, TPOC believes that additional substantive guidance on how to approach early exercise modeling is warranted (as suggested in Annex 1 and described below).\footnote{Conversely, for the sake of balance and emphasis, TPOC recommends trimming the guidance on volatility. Specifically, as shown in Annex 1, TPOC suggests eliminating the final sentence of paragraph B25 and all of B26 as unnecessarily repetitive.}

In light of the Board’s decision to favor “term structures” for other option-pricing model inputs, the concept should clearly be introduced with respect to early exercise patterns. As shown in the Insert (above), utility-maximizing models of employee exercise behavior show that the early exercise factor should be a declining function of time. Even more importantly, the guidance ought to clearly specify that industry data is particularly relevant to this inquiry. If a sufficiently robust sample of industry data can be developed, lattice models of early exercise behavior can be calibrated to reflect this declining term structure.

Volatility. As for volatility, on the other hand, the draft implementation guidance arguably over-emphasizes term structures. While it is true that volatility changes over time, these variations are themselves best described as a random process (sometimes called “the volatility of volatility”). With the rare exception of entities that have market-traded options of varying expirations, the implication that a complex structure of expected volatility can be derived from historical data is inaccurate.\footnote{By contrast, the “term structure” of interest is a well-understood and meaningful concept. Unlike option markets, there is an extremely robust market in Treasury bills of varying expirations. Based on this market, it is possible to “lock in” borrowing rates for each relevant period in the future (and incorporate them in the lattice model) on the grant date.} Having said this, if volatility happens to be at an unusual level (either high or low) at the time an option is granted, it would be appropriate to assume that volatility would revert to the mean within a reasonable timeframe and to incorporate this “term structure” into the lattice model. In Annex 1, TPOC suggests modifications to paragraph B25 that would place greater emphasis on average and mean-reverting tendencies of volatility.

2) Disclosures

The disclosure objectives established by paragraph 46 of the proposed standard are generally adequate, provided they are read in conjunction with the detailed guidance in Appendix B (paragraphs B191-192) supplemented as suggested in Annex 2 and explained here. However, the parenthetical phrase...
following the first objective ("for example, the transfer of value from existing shareholders to option holders upon option exercise") is misleading and inappropriate. The transfer of value from existing shareholders to employee option holders is fully consummated upon vesting. From that point on, the employees hold an indirect but inalienable equity interest in the company.

As for the minimum disclosures in the draft implementation guidance, TPOC recommends four additional requirements. At the outset, TPOC wishes to note that its primary interest as a user of financial statements is that there is adequate information on operating profits and operating assets to assess the comparability of the reporting entity and to establish meaningful profitability metrics. Thus, as advisors on intercompany transfer pricing, TPOC's chief criteria for valuable disclosures are comparability and transparency. TPOC has little interest in, or experience with, disclosures of income statement items below the operating profit level or statements of cash flow and equity; and therefore leaves it to other commentators to indicate whether more information is needed (or too much is required) in these areas.

First, aggregate cost and amortization schedule [new B191(b)(4)]. From existing disclosures, it is possible to determine the aggregate cost of awards during the year through simple multiplication: i.e., weighted average option value * total options granted. This information is important for users to assess the accuracy and reasonableness of the valuation methods used by the reporting entity. Existing disclosures are insufficient, however, to determine the expected annual distribution of this aggregate cost over the award's vesting schedule. For shareholders, such information is essential to assess whether the entity's stock option plans provide appropriate levels of compensation. For users like TPOC, the information is important to understand the entity's vesting schedules (or requisite service periods) and assess the accuracy and reasonableness of the methods used to account for these schedules.8

Second, expanded disclosures about option-pricing model assumptions (inputs) [revised B191(f)(2)(a)] and results (outputs) [new B191(f)(3)]. In order to advance the goals of transparency and comparability, it is essential that

8 Annex 2 suggests changing the vesting schedule in the illustration in paragraph B192 by replacing simple 5-year cliff vesting with graded vesting over the 3rd to 5th years. This is more consistent with the typical stock option plans currently used in the high tech industry. Under the original facts of the illustration, the aggregate cost would have been amortized on a straight-line basis over the 5-year vesting period; the revised illustration demonstrates the more common situation in which compensation expense is front-loaded.
entities disclose the factors underlying expected term—not just the weighted average expected life that is an output of lattice models. There is a growing consensus that four factors are appropriate: contractual term, vesting period (or requisite service period), post-vesting employment termination rate, and early exercise factor. In TPOC’s suggested revision to the draft disclosure guidance (see Annex 1), this four-factor approach is used in the illustration; however, the suggested disclosure requirements themselves do not prescribe specific factors in keeping with the Board’s desire to allow modeling flexibility. TPOC also suggests that the results of option pricing models be disclosed alongside the assumptions typically, option value and expected life. Finally, TPOC advocates disclosure of both ranges and weighted average values for all inputs and outputs. This disclosure is crucial for users to assess whether the reported values are reasonable; ranges without weighted averages (as currently allowed for expected term) or, conversely, weighted averages without ranges (as for option fair value) tend to obscure as much as they reveal.

Third, subcategories of expenses [revised B191(g)(1)]. Since stock-based compensation may play a very different role in different functions (e.g., research and development vs. sales and marketing vs. general and administrative), detailed breakdowns would be helpful to investors and other users of financial statements. For transfer pricing analysis, in particular, the

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9 TPOC urged this approach in its first comments to the Board, cited in footnote 3 above. The draft implementation guidance (at § B60) adopts the same convention. Leading economists John Hull and Alan White (of the University of Toronto) independently came to the same conclusion in their work for the Ontario Teachers Pension Plan, since published as How to Value Employee Stock Options, Financial Analysts Journal, Vol. 60, No. 1, January/February 2004, 114–119.

10 FAS 123 already requires disclosure of weighted average option values derived for each year. On this point, TPOC’s suggestion is chiefly cosmetic: putting option values in the same table as model inputs (and disclosing ranges). Weighted average expected life is, of course, currently disclosed as an input (rather than an output). In those cases where reporting entity continues to use the Black-Scholes-Merton formula because stock options are not a material part of employee compensation, expected life would continue to be disclosed as an input (in lieu of the four factors described above). The draft guidance (in footnote 16) erroneously suggests expected life can be validly estimated by using the lattice model’s fair value output as an input in a Black-Scholes-Merton formula. This approach gives a systematically incorrect estimate for the same reason that the expected life convention is less accurate than early exercise modeling (see Insert above): apparent life produced by the formula would be shorter than the weighted average life derived directly from the lattice itself, especially if volatility is high.
portion of stock-based compensation expense that relates to research and development is a topic currently subject to heated debate (and even litigation).

Finally, performance conditions [new B191(g)(3)]. Reporting entities should be required to disclose the probability judgments underlying their treatment of awards with performance conditions in greater detail. Further, full grant-date disclosure of all valuation assumptions should be required even if meeting the performance conditions is not judged to be probable. These suggested requirements are particularly important in view of the risks of entities abusing performance conditions to avoid recognizing expense for underwater options, as discussed in the following section.

3) Performance Condition Issues

TPOC congratulates the FASB on its decision to rely on modified grant-date accounting principles to handle performance conditions. Insofar as an award with performance conditions is necessarily less valuable than an otherwise identical award without such conditions, the IASB's initial proposal to include a discount for performance conditions in the grant-date valuation has considerable conceptual appeal. However, TPOC agrees with the FASB that a "pure" grant-date standard along these lines would be too vulnerable to abuse by reporting entities due to the highly subjective nature of the valuation exercise. Applying the conditional recognition principles of modified grant-date accounting to performance conditions was an enlightened compromise; it serves the goal of representational faithfulness in a reasonable way at the same time as providing appropriate compliance incentives to management.

Nonetheless, TPOC recommends some modest revisions to the exposure draft in order to guard against remaining incentives for abuse. In particular, these comments offer two alternative approaches to guard against the greatest danger, overly subjective performance conditions. It is important to note that the Board is largely writing on a blank slate with respect to performance conditions. Although FAS 123 would have eliminated the bias in favor of "fixed plans" if fully implemented, extremely few U.S. companies adopted performance-based plans in the intervening 10 years since most elected to continue to apply the principles of APB 25. Accordingly, abuses of performance conditions have not yet surfaced in practice, but can be expected to rear their

11 For the record, TPOC wishes to explicitly disclaim the "hybrid method" proposed in its earlier comments. See TPOC, Comments on FASB Stock-Based Compensation Project, Part II: Accounting for Performance Conditions (September 14, 2003) [submission no. 105 - unsolicited letters on share-based payment at www.fasb.org].
heads when fair-value expensing becomes mandatory next year. If the Board fails to anticipate – and guard against – the most egregious potential abuses, rocky times can be expected.

Due to the all-or-nothing nature of the recognition rule, there will be a strong incentive for management to insure that performance conditions fail to be met in circumstances where stock prices have fallen and employee options are underwater. The greatest danger, therefore, is that companies will implement stock option plans that contain overly subjective performance conditions. For example, if vesting were conditioned on individual employees' achieving an specific "grade" on performance reviews, management could arbitrarily insure that most employees receive nonpassing grades even as they give raises, promotions and rewards to the top performers. Employees lose nothing since the options are underwater while the company avoids recognizing stock-based compensation expense.

Fairly simple change s can be made to the exposure draft to guard against this danger. In all events, the term "performance condition" must be redefined to explicitly exclude overly subjective conditions. As with many other elements of the standard, this determination will require the exercise of judgment by issuers and their auditors. Then, either of two approaches can be adopted to account for stock-based compensation awards with overly subjective conditions. One approach is to clarify the definition of "grant date" to include the date that any subjective conditions are met. The other approach is to clarify that an overly subjective conditions are "conditions that are not market, performance, or service conditions" subject to liability treatment under paragraph 26F of the standard.

The former approach would defer measurement of equity-based compensation expense until subjective performance condition are satisfied. For example, if vesting is conditioned on both a positive performance evaluation at the end of one year and continuous service for three years, then total compensation would be measured at the end of the first year and then recognized over the following two years (subject to the possibility of pre-vesting forfeiture). The latter approach, on the other hand, would presumably require both measurement (or re-measurement) and an assessment of the probability of all conditions being met at each reporting date throughout the three year period.

The choice between these two alternatives may depend on how abusive the Board views overly subjective performance conditions to be. If viewed as an abuse to be discouraged in all cases, then liability treatment would be appropriate. On the other hand, if subjective performance conditions are
considered to be a legitimate device for managing employee compensation, then deferring recognition of the grant date may seem more appropriate; such treatment would be analogous to cash bonuses that are dependent on similar performance reviews. Consistent with its position on modification (see Part B.6 below), TPOC has a mild preference for the less punitive, deferred grant date approach.

4) Measurement Objectives

TPOC believes that the measurement objective of the fair value standard for stock-based payment can be stated more clearly and forcefully than the exposure draft does. Suggested revised language for paragraph B2 of the draft implementation guidance is provided in Annex 1 to these comments; the same language can be incorporated in paragraph 17 of the proposed standard itself. In TPOC's opinion, the wording of the exposure draft is unnecessarily equivocal about the basis for modified grant date accounting.

True, conditional recognition of expense serves the purpose of reducing valuation subjectivity by not allowing a speculative discount for vesting conditions to be estimated on grant date. However, the approach is also supportable from first principles: it recognizes grant date as the date that the parties agree on the expected value of exchange, and vesting date as the date that the exchange is fully consummated. Vesting may be viewed as an indicator of whether agreed services were actually rendered and value actually exchanged.

By the same token, although the expected effects of reloads and contingencies can theoretically be estimated at the initial grant date, the date of the contingent event's occurrence is considered both the more appropriate time to measure bargained-for-exchange (reflecting parties' new agreement in light of contingency) and more conducive to more objective valuation.

In addition, it is important to recognize that the very fact that employee stock options are not marketable but are subject severe transferability restrictions means that the premise of a free market and noncompelled bargained-for-exchange that underlies the notion “fair value” is necessarily somewhat hypothetical. As discussed in the Insert above, the hypothetical nature of the question does not undermine the fundamental principles of risk-free option pricing models. The appropriate question to ask is what value a fully diversified outside investor would place on an instrument replicating the cash flows from employee stock options, taking into account expected exercise and forfeiture behavior. TPOC was mildly surprised that the perspective of the third party investor, which was introduced in the FASB staff's software survey...
of November 14, 2003 (at paragraph 28), was not mentioned in the draft implementation guidance. In Annex 1, TPOC suggests new language for paragraph B6 of the guidance that reintroduces the concept in terms that are hopefully clearer and more precise than those in the software survey.

5) Restrictions and Contingencies

Once option-pricing guidance is improved, performance condition issues are addressed, and measurement objectives are more clearly defined, a few definitions can be removed from the standard as deadwood and certain other concepts can be clarified.

First, the stand-alone concept of “restrictions” can be eliminated from paragraph B2 (and footnote 2 removed) as well as from the glossary in Appendix E. The effect of restrictions that remain in effect after vesting would already be captured if exercise behavior is fully modeled. By not introducing a defined term, it is no longer be necessary to differentiate pre-vesting conditions that, under the modified grant-date method, are not to be reflected in the option-pricing model. (As a result, there is no need for the standard to continue its heroic effort to distinguish common usage of the term “restricted stock”)

In any event, TPOC believes that restrictions rarely, if ever, give rise to discount that should be recognized for accounting purposes. Annex 2 therefore suggests the deletion of item B191 (3(e) (“discount for post-vesting restrictions and method for estimating it”) from the draft disclosure guidance. As it happens, in applying a lattice model most post-vesting restrictions would have the counterintuitive effect of increasing option value. For example, by foreclosing early exercise, black-out periods have the effect of forcing executives to hold options for a longer time: although this increases the executive’s level of risk, it also increases option’s value (and its cost to the company) by the time value associated with the black-out period.

It is also possible to eliminate the distinction between equity instruments “issued” upon vesting and stock options that are “granted” earlier. (This is also achieved by deleting paragraph B2 and footnote 2; in addition, the

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15The Board has essentially reached the same conclusion, as indicated by the final sentence of footnote 2 in Appendix B: “For instance, if the shares are traded in an active market, post-vesting restrictions may have little, if any, effect on the amount at which the shares being valued would be exchanged.” This conclusion is a direct corollary of the requirement (in ¶ B7) that “fair value” assumptions must not represent the biases of a particular party.
glossary entry for removing “issued, issuance or issuing” should be removed.) Although the distinction was hotly debated 10 years ago, it is really a moot point now. Aside from being confusing, the current wording gives a misleading impression of the measurement objective: the modified grant-date method does not seek to value the instrument that is “issued” upon vesting but rather the value of option that is initially granted, ignoring the effect of vesting conditions. These two values are quite different and distinct since the “stock price and other pertinent factors” will have changed between the grant and vesting dates.

Finally, TPOC recommends that the Board add a definition of “contingencies” to the glossary in Appendix E. While the concept is currently described at some length in draft paragraph B2, the guidance could be simplified and improved by introducing a more rigorous definition. In this respect, TPOC has left paragraph B2 as is and has not proposed a specific definition for the glossary. It is important that the definition be coordinated with the Board’s selected approach for dealing with performance conditions (see Part B.3 above).\textsuperscript{13}

6) Modifications

[Under Development]

C. SPECIFIC RESPONSES TO ISSUES RAISED

Issue 1: Yes, we fully agree that employee services received in exchange for equity instruments give rise to recognizable compensation cost as the services are used in the issuing entity’s operations.

Issue 2: Yes, we agree that pro-forma disclosures are not an appropriate substitute for recognition in financial statements. Having said this, because different users have different views regarding the proper measure or impact of

\textsuperscript{13} It is noteworthy that another commentator on the exposure draft has raised the concern that certain types of contingencies might give rise to liability treatment (i.e., exercise date accounting as currently used for “variable plans”) under draft paragraph 26F if found to be “a condition other than a market, performance or service condition.” See Frederick W. Cook & Co., letter dated May 25, 2005 [submission no. 2287B comments on share-based payment exposure draft at www.fasb.org] (regarding clawbacks in the event of accounting fraud or breach of covenants). TPOC also submits that clauses that call for acceleration of vesting on change of control should also fall within the definition of contingencies.
stock-based compensation expense, we strongly believe that detailed disclosures of the effect of stock-based compensation on each element of the income statement are necessary. Unless disclosure standards are enhanced (as discussed in Part B.2 above), we have some sympathy for those critics of fair-value accounting who believe that the result will be less accuracy and comparability than under intrinsic-value accounting.

Issue 3: Yes, we strongly agree that grant-date fair value provides the most appropriate measure of the value of the bargained-for-exchange between the company and the employee. Any other single measurement date (e.g., vesting or exercise date) would improperly treat employee gains (or losses) that are essentially equity participation as expenses (or contra-expenses) of the company. Although periodic re-measurement during the service period has some conceptual merit (i.e., by recognizing that employees' incentives and bargaining position are influenced by the value of their unvested options), such an accounting system would be unreasonably complex and volatile.

Issue 4(a): No, although it represents a major step forward, we do not believe that the exposure draft yet provides sufficient guidance on the use of option-pricing models to ensure that the fair value measurement objective is applied with reasonable consistency. We also believe that additional disclosures of model inputs are desirable to ensure consistency and comparability. Our concerns are discussed at length in Parts B.1 and B.2 of our comments. Further, Annex 1 suggests revisions to option-pricing guidance (paras. B7-B36 of Exposure Draft) and Annex 2 suggests revised disclosure guidance (paras. B191-B193).

Issue 4(b): Yes, we firmly agree that employee stock options can be valued with sufficient reliability using option-pricing models. We also agree that lattice models are generally preferable to closed-form formulas, but wish to emphasize differences between our reasoning and that of the exposure draft. See "Lattice Models" in Part B.1 above.

Issue 4(c): We agree with the Board's general approach to volatility, but have suggested certain minor modifications to the specific guidance. See Part B.1 and Appendix A.

Issue 4(d): Yes, we agree with that option-pricing models of expected term and the modified grant-date methodology are both conceptually sound and appropriate ways to reflect the unique characteristics of employee options.
Issue 5: Yes, we agree entirely with the Board's reasoning in paragraph C67 and believe that it would be quite rare indeed for impossible to estimate the value at grant date (especially since performance conditions and reload contingencies are ignored). We call attention, however, to the need for greater clarity in definition of grant date (or alternatively performance condition) as described in Part B.5 above.

Issue 6: Yes, we agree with the employee stock purchase plan principles.

Issue 7: Yes, we agree that the requisite service period is the appropriate period over which to recognize compensation cost. We acknowledge that a theoretic case can be made for attributing the cost over the full contractual life (in a declining amortization pattern that reflects expected exercise behavior and post-vesting employment termination), but consider such a method to be impractical and unnecessarily complex.

Issue 8: Yes, we consider the guidance on requisite service period to be sufficient – indeed, excellent. We have no recommendations for changes.

Issue 9: Yes, we agree that this type of “frontloaded” recognition pattern is the natural and proper result of applying the principle described in Issue 7 to option grants with graded vesting schedules. Even for companies with highly graded option plans (e.g., monthly vesting over a three year period), compliance can be readily accomplished by software that rolls up valuation and amortization data on an option-by-option basis. From a disclosure perspective, it is important to realize that a significantly greater range of option values will be produced than under the aggregate approach currently allowed; therefore, it is important that weighted averages (as well as ranges) be provided for all option model inputs and outputs (as we recommend in Part B.2 and Appendix B).

Issue 10: No, we do not agree with the Board's approach to modifications (but fully agree with the approach to settlements). See Part B.5.

Issue 11: We disagree with the treatment of income tax effects but have chosen not to address the issue in detail here, as explained in Part A.2 above.

Issue 12: With one exception, we believe that the disclosure objectives laid out in the proposed statement are appropriate; but suggest that additional disclosures beyond those illustrated in paras. B191-193 are needed to meet these objectives. See our comments at Part B.2 and Appendix B.
Issues 13-15: We generally agree with the Board's approach to these issues and have no specific comments.

Issue 16: Same comment as for Issue 11.

Issue 17: As noted above in Part B.2, we consider convergence to be a very important goal and urge both Boards to compromise if necessary. See Part B.5 (on modifications) for our views on two specific convergence issues.

Issue 18: We find the standard to be quite understandable taken as a whole and commend the Board and the Staff for their excellent work.
Annex 1.

Suggested Mark-Up of Paras. B1-B36
(Valuation Guidance)
INTRODUCTION

B1. This appendix, which is an integral part of this Statement, provides implementation guidance (a) that illustrates the fair-value-based method of accounting for share-based compensation arrangements with employees and (b) that elaborates on certain other aspects of this Statement. The illustrations are designed to provide guidance on, and emphasize considerations that should be taken into account in, applying this Statement. Using this guidance to apply this Statement in actual situations will require the exercise of judgment.

FAIR VALUE MEASUREMENT OBJECTIVE AND ITS APPLICATION

B2. The measurement objective for equity instruments granted to employees is to estimate the fair value of the equity instruments on the grant date, taking into account all terms except vesting conditions and specified contingencies to which employees become entitled when they have rendered the requisite service and satisfied any other conditions necessary to earn the right to benefit from the instruments. That estimate is based on the share price (and other pertinent factors, including those enumerated in paragraph 19 of this Statement) at the grant date and is not remeasured in subsequent periods, under the modified grant date method. Restrictions (refer to Appendix E) that continue in effect after employees have earned the right to benefit from their equity instruments affect the value of the instruments issued at the vesting date and, therefore, are reflected in estimating the instruments' fair value at the grant date. The estimated fair value of an equity instrument on the date it is granted should not reflect the effects of vesting conditions; or other restrictions that apply only during the vesting period. Those effects are reflected by recognizing compensation cost only for awards that actually vest because the requisite service is provided. Reload features and contingent features that require an employee to transfer equity shares earned or realized gains from the sale of equity instruments earned as a result of share-based payment arrangements to the issuing enterprise for consideration that is less than fair value on the date of transfer (including no consideration), such as a clawback feature, shall not be considered in estimating the

1 The phrase this Statement refers to Statement 123 as revised by Statement 15X (that is, this proposed Statement).

2 For example, if restricted shares (refer to Appendix E) are granted to an employee, the post-vesting restriction shall be reflected in estimating the grant date fair value of the shares, but only to the extent that the post-vesting restriction would affect the amount at which the shares being valued would be exchanged (paragraph B4). For instance, if the shares are traded in an active market, post-vesting restrictions may have little, if any, effect on the amount at which the shares being valued would be exchanged.

3 Performance and service conditions (refer to Appendix E) are vesting conditions for purposes of this Statement. However, market conditions (refer to Appendix E) are not vesting conditions for purposes of this Statement; rather, market conditions relate to the exercise price may affect exercisability of an award. Consequently, market conditions are included in the estimate of the grant-date fair value of awards.

4 A clawback feature can take various forms but often functions as a noncompete mechanism: for example, an employee that terminates the employment relationship and begins to work for a competitor is required to transfer to the issuing enterprise (former employer) shares granted and earned under a share-based payment arrangement.
fair value of an equity instrument on the date it is granted. Those features are accounted for if and when a reload grant or contingent event occurs. This methodology, known as the modified grant date method, is considered to best reflect the bargained-for exchange or employee services for entity equity instruments. It recognizes grant date as the date that the parties agree on the expected value of exchange, and vesting date as the date that the exchange is fully consummated. 5

B3. The fair value measurement objective for liabilities incurred under share-based payment arrangements with employees is the same as for equity instruments. However, awards classified as liabilities are subsequently remeasured to their fair values (or a pro rata portion thereof until the requisite service has been rendered) at the end of each reporting period until the liability is settled.

**Fair Value of Instruments Granted under a Share-Based Payment Arrangement**

B4. Fair value is defined in FASB Concepts Statement No. 7, Using Cash Flow Information and Present Value in Accounting Measurements, as follows:

> The amount at which that asset (or liability) could be bought (or incurred) or sold (or settled) in a current transaction between willing parties, that is, other than in a forced or liquidation sale. [Glossary of Terms of Concepts Statement 7]

That definition refers explicitly only to assets and liabilities, but the concept of value in a current exchange embodied in it applies equally to the equity instruments subject to this Statement. Observable market prices of identical or similar equity or liability instruments in active markets are the best evidence of fair value and, if available, are to be used as the basis for the measurement of equity and liability instruments awarded as part of share-based payment arrangements with employees. For example, awards to employees of a public entity of shares of its common stock, subject only to a service or performance condition for vesting, that are awards of non-vested shares, are to be measured based on the market price of otherwise identical (that is, identical except for the vesting condition) common stock traded in the marketplace.

B5. If observable market prices of identical or similar equity or liability instruments of the entity are not available, the fair value of equity and liability instruments awarded to employees shall be estimated by using a valuation technique that (a) is applied in a manner consistent with the fair value measurement objective and the other requirements of this Statement, (b) is based on established principles of financial economic theory and generally accepted by experts in that field (paragraph B9), and (c) reflects any and all

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5 Vesting may be viewed as an indicator of whether agreed services were actually rendered and value actually exchanged. The modified grant-date method also serves purpose of reducing valuation subjectivity by not allowing a speculative discount for vesting conditions to be estimated on grant date. By the same token, although expected effects of reloads and contingencies can theoretically be estimated at initial grant date, the date of contingent event's occurrence is considered both the more appropriate time to measure bargained-for-exchange (reflecting parties' new agreement in light of contingency) and more conducive to more objective valuation than the initial grant date.
substantive characteristics of the instrument (except for those characteristics explicitly excluded, such as vesting conditions and reload features). That is, the fair value estimate for equity and liability instruments granted as part of a share-based payment arrangement shall be determined by applying a valuation technique that would be used in valuing instruments with the same characteristics (except for those explicitly excluded by this Statement) to form the basis for an amount at which the instruments being valued would be exchanged (paragraph B6).

B6. In the case of employee stock options that, once vested, may be exercised but cannot be transferred and must be exercised or forfeited upon termination of employment, the current exchange upon which fair value is premised is necessarily hypothetical. Fair value in this context may be conceptualized as the value that a fully diversified outside investor would place on an instrument replicating the cash flows inherent in the employee stock options. That is, fair value is the expected cost or value that the outside investor would place on the option cash flows, taking into account employees' expected exercise and forfeiture behavior. In estimating the fair value of employee share options at the grant date, the determination of the amount at which the instruments being valued would be exchanged would factor in expectations of the probability that the options would vest (that is, that the service or performance vesting conditions would be satisfied). However, as noted in paragraph B2, the measurement objective in this Statement is to estimate the fair value at the grant date of the equity instruments to which employees will become entitled when the service or performance conditions for vesting have been satisfied (that is, when the requisite service has been rendered). Therefore, the estimated fair value of the equity instruments at grant date does not take into account the effect on fair value of vesting conditions and other restrictions prior to vesting (as well as other items explicitly excluded). The effect of the vesting conditions and other restrictions prior to vesting are considered by the modified grant-date method by recognizing compensation cost only for instruments that vest (in other words, instruments for which the requisite service is rendered). In addition, in accordance with the measurement objectives of this Statement (paragraph B2), the hypothesized cash flow must be based on the presumption that any performance conditions will be satisfied (although, under modified grant-date accounting, compensation expense will only be recognized if performance conditions actually are satisfied); and cash flows relating to reloads or similar contingent features must be excluded from the grant-date valuation (to be valued if and when the reload grant or contingent event occurs).

Valuation Techniques

B7. In applying a valuation technique, inputs and assumptions should be those that would be used or made in accordance with paragraph B5. That is, the estimates and assumptions should reflect information that is (or would be) available to form the basis for an amount at which the instruments being valued would be exchanged. In estimating fair value, the assumptions made should not represent the biases of a particular party. Some of those assumptions will be based on or determined directly from external data. Other assumptions will be derived from the entity's own historical experience with share-based
payment arrangements. Some of those assumptions will be based on or determined directly from external data, including industry or regional surveys. Other assumptions, such as employee termination rates, will be derived from the entity’s own historical experience with employees participating in share-based payment arrangements.

B8. The fair value of any equity or liability instrument depends on the specific characteristics of that instrument. Paragraph 19 of this Statement enumerates a list of substantive characteristics of equity instruments with option (or option-like) features that shall be considered in estimating their fair value. However, a share-based payment arrangement could contain other features that should be included in a fair value estimate (such as a market condition). Judgment will be required to determine both what features should be included and, as described in paragraphs B9–B12, how to incorporate those features in the valuation technique used.

Valuation Techniques for Share Options

B9. Several valuation techniques, including a lattice model (an example of which is a binomial model) and a closed-form model (an example of which is the Black-Scholes-Merton formula) meet the criteria required by this Statement for estimating the fair values of employee share options and similar instruments. Those valuation techniques or models, sometimes referred to as option-pricing models, are based on well-established financial economic theory. Those models are used by valuation professionals, dealers of derivative instruments, and other experts to estimate the fair values of options and similar instruments related to equity securities, currencies, interest rates, and commodities. Those models are used to establish trade prices for derivative instruments, to establish fair market values for U.S. tax purposes, and to establish values in adjudications. Both a lattice model and a closed-form model can be adjusted to account for the characteristics of share options and similar instruments granted to employees.

B10. This Statement requires the use of a valuation technique or model that meets the requirements in paragraph B5 to estimate the fair values of employee share options and similar instruments. The selection of a valuation model will depend on the substantive characteristics of each arrangement and the availability of data necessary to use the model. A valuation model that is more fully able to capture and better reflects those characteristics is preferable and should be used if it is practicable to do so. For example, the Black-Scholes-Merton formula, a closed-form model, assumes that option exercises occur at the end of an option’s contractual term, and that volatility, dividends, and

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6 This guidance is not intended to preclude use of an entity’s own data about employees’ expected option exercise behavior in developing the fair value estimate. Forming the basis for an amount at which instruments being valued would be exchanged would require data about expected option exercises, and such data generally could be obtained only from the entity. Although each employee’s exercise behavior will reflect individual biases (such as risk-aversion or liquidity needs), employee exercise behavior in aggregate is susceptible to empirical analysis and would be considered by hypothetical outside investors. By contrast, no discount would be allowed to account for lower perceived values that an individual employee might place on unvested options or restricted shares due to the employee’s lack of diversification or risk aversion.
riskfree interest rates are constant over the option’s term. If used to estimate the fair value of employee share options and similar instruments, the Black-Scholes-Merton formula must be adjusted to take account of certain characteristics of employee share options and similar instruments that are not consistent with the assumptions of the model (for example, exercise prior to the end of the option’s contractual term and changing volatility and dividends). Because of the nature of the formula, those adjustments take the form of weighted-average assumptions about those characteristics. In contrast, a lattice model can be designed to incorporate certain characteristics of employee share options and similar instruments; it can accommodate changes in dividends and volatility over the option’s contractual term, estimates of expected option exercise patterns during the option’s contractual term, and blackout periods. A lattice model, therefore, is more fully able to capture and better reflects the characteristics of a particular employee share option or similar instrument in the estimate of fair value.

BII. Although a lattice model may be preferable because of its ability to more fully capture and better reflect the characteristics of a particular employee share option or similar instrument in the estimate of fair value, it may not be practicable to use such a model. For example, an enterprise may lack the historical data on employee exercise patterns that could be used within a lattice model in estimating expected option exercises over the option’s contractual term. For instance, a nonpublic enterprise that elects to account for employee share options using the fair-value-based method or a newly public company may not have a significant history of share option exercise; consequently, such entities may conclude that it is not practicable to use a lattice model and that a closed-form model would provide a reasonable estimate of fair value. Entities that do not have reasonable access to the data required by a lattice model may conclude that a closed-form model the Black-Scholes-Merton formula, for instance, provides a reasonable estimate of fair value; those entities subsequently may obtain reasonable access to the data and decide to use a lattice model. Further, entities for which compensation cost is not a significant element of the financial statements may conclude that a closed-form model produces estimates of fair value that are not materially different from those produced by a lattice model and that this pattern can reasonably be assumed to persist. Those entities may conclude that a closed-form model provides reasonable estimates of fair value.

7 A blackout period is a period of time during which an employee is contractually or legally prohibited from exercising a share option granted under a share-based payment arrangement.

8 Valuation techniques used for employee share options and similar instruments estimate the fair value of those instruments at a single point in time (for example, at the grant date) that is independent of all other points in time. The estimated fair value of those instruments will change over time as factors used in estimating their fair value change, for instance, as share prices fluctuate, risk-free interest rates change, or dividend streams are modified. That change in the estimated fair value of those instruments is a normal economic process to which any valuable resource is subject. The estimated fair value of those instruments at a single point in time is neither a prediction nor a forecast of what the estimated fair value of those instruments may be in the future or was in the past.

9 Even if an entity concludes that a closed-form model provides a reasonable estimate of fair value, that entity should perform a rigorous analysis of the employee share option or similar instrument’s expected term in estimating that input for use in the model.
B12. Public entities for which compensation cost from share option arrangements is a significant element of the financial statements may ordinarily conclude, when inputs are available, that a lattice model would provide a better estimate of fair value because of its ability to more fully capture and better reflect the characteristics of a particular employee share option or similar instrument in the estimate of fair value.

SELECTING ASSUMPTIONS FOR USE IN AN OPTION-PRICING MODEL

B13. If an observable market price is not available for an option with the same or similar terms and conditions, this Statement requires an entity to estimate the fair value of an employee share option or similar instrument using a valuation model that meets the requirements in paragraph B5 and takes into account, at a minimum:

a. The exercise price of the option
b. The expected term of the option, taking into account both the contractual term of the option and the effects of employees' expected exercise and post-vesting employment termination behavior (refer to paragraph B20 for an explanation of the expected term in the context of a lattice model)
c. The current price of the underlying share
d. The expected volatility of the price of the underlying share
e. The expected dividends on the underlying share (except as provided in paragraphs 32 and 33 of this Statement)
f. The risk-free interest rate(s) for the expected term of the option.

A U.S. entity issuing an option on its own shares must use as the risk-free interest rates the implied yields from the U.S. Treasury zero-coupon yield curve over the expected term of the option if the entity is using a lattice model incorporating the option's contractual term. If the entity is using a closed-form model, the risk-free interest rate is the implied yield currently available on U.S. Treasury zero-coupon issues with a remaining term equal to the expected term used as the input to the model. For entities based in jurisdictions outside the United States, the risk-free interest rate is the implied yield currently available on zero-coupon government issues denominated in the currency of the market in which the share (or underlying share), which is the basis for the instrument awarded, primarily trades. It may be necessary to use an appropriate substitute if no such government issues exist or circumstances indicate that the implied yield on zero-coupon government issues is not representative of the risk-free interest rate (for

10 The fair value of a transferable share option is based on its contractual term because rarely is it economically advantageous to exercise, rather than sell, a transferable share option before the end of its contractual term. Employee share options generally differ from transferable (or traded) share options in that employees cannot sell their share options—they can only exercise them. To reflect the effect of employees' inability to sell their vested options, this Statement requires that the fair value of an employee share option be based on its expected term rather than its contractual term.

11 The term expected in items (b), (d), (e), and (f) relates to assumptions about the respective factor that is used as an input in a valuation model.
example, in high-inflation economies). Guidance on selecting the other assumptions listed above is provided in the following paragraphs.

B14. There is likely to be a range of reasonable estimates for expected volatility, dividends, and option term. If no amount within the range is more or less likely than any other amount, an average of the range (its expected value) should be used. In using a lattice model, the expected values used are to be determined for a particular node (or multiple nodes during a particular time period) of the lattice and not over multiple periods, unless such application is supportable given the characteristics of the instrument being valued.

B15. Expectations about the future generally are based on past experience, modified to reflect ways in which currently available information indicates that the future is reasonably expected to differ from the past. In many circumstances, the available information may indicate that unadjusted historical experience is a relatively poor predictor of future experience. For example, an entity with two distinctly different lines of business of approximately equal size may dispose of the one that was significantly less volatile and generated more cash than the other. In that situation, volatility, dividends, and perhaps employees' exercise and post-vesting termination behavior from the predisposition (or disposition) period may not be the best information on which to base reasonable expectations for the future.

B16. In other circumstances, historical information may not be available. For example, an entity whose common stock has only recently become publically traded may have little, if any, historical data on the volatility of its own shares. That entity might base expectations about future volatility on the average volatilities of similar entities for an appropriate period following their going public. A nonpublic entity that elects to use the fair-value-based method of accounting will need to exercise judgment in selecting a method to estimate expected volatility and might do so by basing its volatility expectations on the average volatilities of otherwise similar public entities.

Consistent Use of Valuation Techniques and Methods for Selecting Assumptions

B17. Data and assumptions used to estimate the fair value of equity and liability instruments granted to employees should be determined in a consistent manner from period to period. For example, for grants made before the market closes, an entity might use either the closing share price or the average of that day's share price as the "current" price. 

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12 The term supportable is used in its general sense: "capable of being maintained, confirmed, or made good; defensible" (The Compact Oxford English Dictionary, 2nd edition, 1998). Application is supportable if it is based on reasonable arguments, given a rigorous analysis that takes into account the relevant facts and circumstances.

13 This paragraph is in no way intended to suggest that historical volatility is the only indicator of expected volatility. Expected volatility is an expectation of volatility over the expected term of an employee share option or similar instrument; paragraphs B24 and B25 provide further guidance on estimating expected volatility.
share price on the grant date, but whichever method is selected, it should be used consistently. The valuation technique an entity selects to estimate fair value also should be used consistently and should not be changed unless a different valuation technique is expected to produce a better estimate of fair value.

B18. For employee share options and similar instruments, a lattice model is preferable to a closed-form model and, therefore, is preferable for justifying a change in accounting principle. Once an entity changes its valuation technique for employee share options and similar instruments to a lattice model, it may not change to a less preferable valuation technique. A change in valuation technique is a change in accounting estimate or a change in accounting estimate inseparable from a change in accounting principle, depending on the facts and circumstances, for purposes of applying APB Opinion No. 20, Accounting Changes. For example, if an entity changes its valuation technique from a closed-form model to a lattice model because it has accumulated data to support an estimate of expected option exercise over the contractual term of the option, that change is a change in accounting estimate because that change is based on new information that provides better insight and improved judgment.

B19. Not all of the general guidance on selecting assumptions provided in paragraphs B2-B18 is repeated in the following discussion of factors to be considered in selecting specific assumptions. However, the general guidance is intended to apply to each individual assumption. An entity should not estimate share option fair values based on historical average share option lives, historical share price volatility, or historical dividends (whether stated as a yield or a dollar amount) without considering the extent to which future experience is reasonably expected to differ from historical experience. Furthermore, the guidance in the following discussion should not be considered all-inclusive or fixed in stone. There have been significant developments in option pricing theory since this Statement was originally issued, and there are likely to be further developments in the future, particularly in the area of expected exercise behavior. Applying option-pricing models to share-based payment arrangements will require the continuing exercise of judgment on an ongoing basis.

Expected Term of Employee Share Options

B20. Expected term-life is an input to a certain closed-form model (such as the Black-Scholes-Merton formula). However, if an entity uses a lattice model that has been modified to take into account an option’s contractual term and employees’ expected exercise and post-vesting employment termination behavior, the expected term is ordinarily should be estimated based on the resulting output of the lattice. For example,

\[14\] However, if subsequent to that change an entity grants a different type of share-based payment award (for instance, a share option with a three-month contractual term that is exercisable only at the end of its term) it may decide that a closed-form model provides a reasonable estimate of fair value, given the characteristics of the instrument being valued.

\[15\] In some share option arrangements, an option holder may exercise an option prior to vesting (usually to obtain a favorable tax treatment); however, such arrangements generally require that any shares received
an entity’s experience or industry data might indicate that option holders tend to exercise those vested options when the share price reaches 200 percent of the exercise price. If so, that entity might use a lattice model that assumes exercise of the option at each node along each share price path in a lattice at which the early exercise expectation is met, provided that the option is vested and exercisable at that point. Moreover, such a model would assume exercise at the end of the contractual term on price paths along which the exercise expectation is not met but the options are in-the-money at the end of the contractual term. That method recognizes that employees’ exercise behavior is correlated with the price of the underlying share. Employees’ expected post-vesting employment termination behavior also would be factored in. Expected term-life then could be estimated based on the output an analysis of the resulting lattice.

B21. Other factors that may affect expectations about employees’ exercise and postvesting employment termination behavior include the following:

a. The vesting period of the award. An option’s expected term must at least include the vesting period.

b. Employees’ past exercise and post-vesting employment termination behavior for similar grants to employees in similar industries and regions and at similar employment levels (e.g., rank-and-file vs. top executives).

c. Expected volatility of the price of the underlying share. The term structure of early exercise behavior. In general, the early exercise expectation is likely to decline as a function of time to expiration. For example, data may indicate that vested options are typically exercised if the share price reaches 200 percent of the exercise price during the first half of a 10-year contractual term; but, if the share price failed to reach this level during the first five years, will be exercised if the share price reaches 150 percent of the exercise price during the final five years of the contractual term.

d. Blackout periods and other coexisting arrangements such as agreements that allow for exercise to automatically occur during blackout periods if certain conditions are satisfied.

B22. If sufficient information about employees’ expected exercise and post-vesting employment termination behavior is available, a method like the one described in paragraph B20 would produce a better estimate of the fair value of an employee share option because that method reflects more information about the instrument being valued (paragraph B10). However, if sufficient information about exercise and post-vesting employment termination behavior is not available, expected term would be estimated in

upon exercise be returned to the entity (with or without a return of the exercise price to the holder) if the vesting conditions are not ultimately satisfied. Such an exercise is not substantive for accounting purposes.

16 The terms at-the-money, in-the-money, and out-of-the-money are used to describe share options whose exercise price is equal to, less than, or greater than the market price of the underlying share, respectively.

17 An example of an acceptable method, for purposes of financial statement disclosures, of estimating the expected term based on the results of a lattice model is to use the lattice model’s estimated fair value of a share option as an input to a closed-form model, and then to solve the closed-form model for the expected term.
some other manner. That estimate would take into account whatever relevant and supportable information is available, including industry averages and other pertinent evidence, such as published academic research.

B23. Option value is not a linear function of option term; value increases at a decreasing rate as the term lengthens. For example, a two-year option is worth less than twice as much as a one-year option, other things being equal. Accordingly, estimating the fair value of an option based on a single expected term that effectively averages the widely differing exercise and post-vesting employment termination behaviors of identifiable groups of employees will potentially misstate the value of the entire award. Aggregating individual awards into relatively homogenous groups with respect to exercise and postvesting employment termination behaviors, and estimating the fair value of the options granted to each group separately reduces such potential misstatement; that aggregation of individual awards should be performed regardless of whether the lattice or closed-form model is used to estimate the fair value. For example, the experience of an employer that grants options broadly to all levels of employees might indicate that hourly employees tend to exercise for a smaller percentage gain than do more highly compensated employees. In addition, employees who are encouraged or required to hold a minimum amount of their employer’s equity instruments, including options, might exercise options, on average, at higher share prices (or later) than employees not subject to that provision.

Expected Volatility

B24. Volatility is a measure of the amount by which a financial variable such as a price has fluctuated (historical volatility) or is expected to fluctuate (expected volatility) during a period. The concept of volatility is defined more fully in Appendix E. This Statement does not specify a particular method of estimating expected volatility; rather, paragraph B25 provides a list of factors that might be considered in estimating expected volatility. An entity’s estimate of expected volatility should be reasonable and supportable.

B25. Factors to consider in estimating expected volatility include:

a. The term structure of the average volatility of the share price over the most recent period that is generally commensurate with (1) the contractual term of the option if a lattice model is being used to estimate fair value or (2) the expected term of the option if a closed-form model is being used.
b. The mean-reverting\(^{18}\) tendency of volatilities. To the extent the recent volatility of the company’s share price (or the overall market) is lower or higher than average volatility over the appropriate term, option-pricing models can incorporate a term structure of volatility that presumes a tendency to revert to the mean.
c. The average implied volatility of the share price determined from the market prices of traded options, based on sufficient observations of option trades over a

\(^{18}\) Mean reversion refers to the tendency of a financial variable, such as volatility, to revert to some long-run average level.
reasonable period of time. Again, the mean-reverting tendency of volatilities should be considered. Additionally, if sufficient traded options of varying expirations are available for the company's shares, the term structure of the implied volatility of the share price derived from option price data may be incorporated in the option-pricing model, over the most recent period that is generally commensurate with (1) the contractual term of the option if a lattice model is being used to estimate fair value or (2) the expected term of the option if a closed-form model is being used.

For public companies, the length of time an entity's shares have been publicly traded. If that period is shorter than the expected term of the option, the term structure of volatility for the longest period for which trading activity is available should be more relevant. A newly public entity also might consider the volatility of similar entities. A nonpublic entity that elects the fair-value-based method might base its expected volatility on the volatilities of entities that are similar except for having publicly traded securities.

The mean-reverting tendency of volatilities. Unusual circumstances or events. For example, in computing historical volatility, an entity might disregard an identifiable period of time in which its share price was extraordinarily volatile because of a failed takeover bid or a major restructuring. Statistical models have been developed that take into account the mean-reverting tendency of volatilities.

Appropriate and regular intervals for price observations. If an entity considers historical volatility or implied volatility in estimating expected volatility, it should use the intervals that are appropriate based on the facts and circumstances and provide the basis for a reasonable fair value estimate. For example, a publicly traded entity might use daily price observations, while a nonpublic entity with shares that occasionally change hands at negotiated prices might use monthly price observations.

Corporate structure. An entity's corporate structure may affect expected volatility. For instance, an entity with two distinctly different lines of business of approximately equal size may dispose of the one that was significantly less volatile and generated more cash than the other. In that situation, an entity would consider the effect of that disposition in its estimate of expected volatility.

An entity that uses historical share price volatility as its estimate of expected volatility without considering the extent to which future experience is reasonably expected to differ from historical experience (and the other factors cited in this paragraph) would not comply with the requirements of this Statement.

Lattice models can incorporate a term structure of volatilities, that is, a range of expected volatilities can be incorporated into the lattice over an option's contractual term. That capability is one of the advantages of a lattice model as explained in paragraph B10. Determining how a range of expected volatilities can be incorporated into a lattice model to provide a reasonable fair value estimate is a matter of judgment and should be based on a careful consideration of the factors identified in paragraph B25.

19 In evaluating similarity, an entity would likely consider factors such as industry, stage of life cycle, and financial leverage.

20 Mean reversion refers to the tendency of a financial variable, such as volatility, to revert to some long-run average level.
Expected Dividends

B27. Option-pricing models generally call for expected dividend yield as an input. However, the models may be modified to use an expected dividend amount rather than a yield. An entity may use either its expected yield or its expected payments. If the latter is chosen, the entity’s historical pattern of increases in dividends should be considered. For example, if an entity’s policy generally has been to increase dividends by approximately 3 percent per year, its estimated share option value should not be based on a fixed dividend amount throughout the share option’s expected term.

B28. Generally, the assumption about expected dividends should be based on publicly available information (paragraph B7). As with other inputs to an option-pricing model, an entity should use the expected dividends that would likely be reflected in an amount at which the option would be exchanged (paragraph B5).

Other Considerations

B29. An entity may need to consider the effect of its credit risk on the estimated fair value of awards that contain cash settlement features (liability instruments) because cash payoffs from the awards are not independent of the entity’s risk of default. Any credit risk adjustment to the estimated fair value of awards with cash payoffs that increase with increases in the price of the underlying share is expected to be de minimis because increases in an entity’s share price generally are positively associated with its ability to liquidate its liabilities. However, a credit-risk adjustment to the estimated fair value of awards with cash payoffs that increase with decreases in the price of the entity’s shares may be necessary because decreases in an entity’s share price generally are negatively associated with an entity’s ability to liquidate its liabilities.

B30. Contingent features that might cause a loss to the employee of equity shares earned or realized gains from the sale of equity instruments earned as a result of share-based payment arrangements, such as a clawback feature (paragraph B2, footnote 4), are not accounted for in the estimated fair value of an equity instrument on the date it is granted. Those features are accounted for if and when the loss to the employee occurs. For instance, a share-based payment may stipulate that vested equity shares must be returned for no consideration to the issuing entity if the employee terminates the employment relationship to work for a competitor. The effect of that provision on the grant-date fair value of the equity shares shall not be considered. If the issuing entity receives those shares (or their equivalent value in cash or other assets), an entity shall account for that event by recognizing a credit in the income statement upon receipt of the shares. Illustration 15 (paragraph B154) provides an example of the accounting for an award that contains a clawback feature.

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21 The event is recognized in the income statement because the resulting transaction takes place with an employee (or former employee) as a result of the current (or prior) employment relationship rather than as a result of the employee’s role as an equity owner.
Annex 2.

Suggested Mark-Up of Paras. B106-B112
(Disclosure Guidance)
MINIMUM DISCLOSURE REQUIREMENTS AND ILLUSTRATIVE DISCLOSURES

B191. The minimum information needed to achieve the disclosure objectives in paragraph 46 of this Statement is set forth below. To achieve those objectives, an entity should disclose the following information:

a. A description of the share-based payment arrangement(s), including the general terms of awards under the arrangement(s), such as the requisite service period(s) and any other vesting conditions, the maximum contractual term of equity (or liability) share options or similar instruments, and the number of shares authorized for awards of options or other equity instruments. A nonpublic entity shall disclose its policy for measuring compensation cost from share-based payment arrangements with employees.

b. For the most recent year for which an income statement is provided:

(1) The number and weighted-average exercise prices (or conversion ratios) for each of the following groups of share options (or share units): (a) those outstanding at the beginning of the year, (b) those outstanding at the end of the year, (c) those exercisable or convertible at the end of the year, and those (d) granted, (e) exercised or converted, (f) forfeited, or (g) expired during the year.

(2) The number and weighted-average grant-date fair value (or intrinsic value for a nonpublic entity that elects the intrinsic value method or an entity that measures awards pursuant to paragraph 22 of this Statement) of equity instruments not specified in B191(b)(1)—for example, shares of nonvested stock, for each of the following groups of equity instruments: (a) those nonvested at the beginning of the year, (b) those nonvested at the end of the year, and those (c) granted, (d) vested, or (e) forfeited during the year.

(4) The aggregate grant-date fair value (or intrinsic value for a nonpublic entity that elects the intrinsic value method or an entity that measures awards pursuant to paragraph 22 of this Statement) of share options (or share units) or other equity instruments granted during the year, and the schedule of annual cost amounts over which such aggregate fair value is expected to be recognized. Totals and schedules must be given for the entire grant (assuming all options were to vest) and for the portion of the grant for which recognition is considered probable as of the date of disclosure (i.e., taking into account expected forfeiture from failure to meet service or performance conditions). It is not necessary to differentiate amounts expected to be treated as an expense from those to be capitalized as part of inventory or fixed assets.

c. For each year for which an income statement is provided:

(1) The weighted-average grant-date fair value (or intrinsic value for a nonpublic entity that elects that method or an entity that measures awards at intrinsic value
pursuant to paragraph 22 of this Statement) of equity options or other equity
instruments granted during the year.

(2) The total intrinsic value of options exercised (or share units converted) and the
total intrinsic value of shares vested during the year.

d. For fully vested share options (or stock units) and share options expected to vest at the
date of the latest statement of financial position:

(1) The number, weighted-average exercise price (or conversion ratio), aggregate
intrinsic value, and weighted-average remaining contractual term of options (or
share units) outstanding.

(2) The number, weighted-average exercise price (or conversion ratio), aggregate
intrinsic value, and weighted-average remaining contractual term of options (or
share units) currently exercisable (or convertible).

e. An entity that grants share options or share units under multiple share-based payment
arrangements with employees shall provide the information specified in B191(a)–B191(d)
separately for different types of awards to the extent that the differences in the
characteristics of the awards make separate disclosure important to an understanding of
the entity’s use of share-based compensation. For example, separate disclosure of
weighted-average exercise prices (or conversion ratios) at the end of the year for options
(or share units) with a fixed exercise price (or conversion ratio) and those with an
indexed exercise price (or conversion ratio) could be important. It also could be important
to segregate the number of options (or share units) not yet exercisable into those that will
become exercisable (or convertible) based solely on fulfilling a service condition and
those for which an additional condition must be met for the options (share units) to
become exercisable (convertible). It could be equally important to provide separate
disclosures for awards that are classified as liabilities and those classified as equity.

f. For each year for which an income statement is presented (a nonpublic entity that elects
the intrinsic value method or an entity that uses the intrinsic value method pursuant to
paragraph 22 is not required to disclose the following information for awards accounted
for under that method):

(1) A description of the method used during the year to estimate the fair value of
awards under share-based payment arrangements.

(2) A description (and associated quantitative disclosures) of the significant
assumptions used during the year to estimate the fair value of share-based
compensation awards, including (if applicable):

(a) Factors underlying the expected term of share options and similar
instruments, including a discussion of the method used to incorporate the
contractual term of the instruments and employees’ expected exercise and
expected post-vesting termination behavior into the fair value of the instrument. An entity that uses a method that employs different values for certain factors shall disclose the ranges of values used and the weighted average expected values for each such factor.

(b) Expected volatility and the method used to estimate it. An entity that uses a method that employs different volatilities during the contractual term shall disclose the range of expected volatilities used and the weighted average expected volatility.

(c) Expected dividends. An entity that uses a method that employs different dividend rates during the contractual term shall disclose the range of expected dividends used and the weighted-average expected dividends.

(d) Risk-free rate(s). An entity that uses a method that employs different risk-free rates shall disclose the range of risk-free rates used.

(e) Discount for post-vesting restrictions and the method for estimating it.

(3) A description (and associated quantitative disclosures) of significant results of the valuation models or methods used during the year to estimate the fair value of share-based compensation awards, including (if applicable):

(a) Expected life of share options and similar instruments (unless the entity has used an expected life assumption as the measure of the instruments' expected term). Ordinarily, the expected life of different instruments comprising a single share-based compensation award will differ; in such cases, the entity shall disclose the range of values derived for expected life and the weighted-average expected life of instruments comprising the award.

(b) Grant-date fair value(s). In many cases, the grant-date fair value of different instruments within a single share-based compensation award will differ; in such cases, the entity shall disclose the range of fair values derived and the weighted-average fair value of instruments comprising the award.

g. For each year for which an income statement is presented:

(1) Total compensation cost for share-based payment arrangements (a) recognized in income, including each subcategory of cost or expense (e.g., research and development) separately presented in income statements, as well as the total income tax benefit (or expense) recognized in income and (b) the total compensation cost capitalized as part of the cost of an asset.
(2) A description of significant modifications, including the terms of the modifications, the number of employees affected, and the total incremental compensation cost resulting from the modifications.

(3) With respect to awards of equity instruments that are subject to performance conditions, (a) a description of significant estimates (and changes in estimates) regarding probability of performance conditions being met, (b) cost recognized during year that would have been recognized during the year if the awards were not subject to performance conditions ("current" cost), (c) cost recognized during year as a result of changes in probability estimates that would have been recognized during a prior year in the absence of performance conditions ("catch-up" cost), (d) reversals of cost recognized in prior years as a result of changes in probability estimates, and (e) total cost recognized during the year (i.e., the portion of recognized cost disclosed under B191(g)(1)(a)) relating to awards subject to performance conditions.

h. As of the latest balance sheet date presented, the total compensation cost related to nonvested awards not yet recognized and the weighted-average period over which it is expected to be recognized.

i. If not separately disclosed elsewhere, the amount of cash received from exercise of share options and similar instruments granted under share-based payment arrangements and the excess tax benefits recognized in equity for accounting purposes.

j. If not separately disclosed elsewhere, the amount of cash used to settle equity instruments granted under share-based payment arrangements.

k. A description of the entity’s policy, if any, for issuing shares upon share option exercise (or share unit conversion), including the source of those shares (that is, new shares or treasury stock). If as a result of its policy, an entity expects to repurchase shares in the following annual period, the entity shall disclose the expected amount of shares to be repurchased during that period.

B192. An illustration of disclosures of an entity’s share-based compensation plans follows. The illustration assumes that compensation cost has been recognized in accordance with this Statement for several years. The amount of compensation cost recognized each year includes both costs from that year’s grants and from prior years’ grants. The number of options outstanding, exercised, forfeited, or expired each year includes options granted in prior years.

***

On December 31, 20Y1, the Company has two share-based compensation plans, which are described below. The compensation cost that has been charged against income for those plans was $29.4 million, $28.7 million, and $23.3 million for 20Y1, 20Y0, and 20X9, respectively.
<table>
<thead>
<tr>
<th>(000)</th>
<th>20Y1</th>
<th>20Y0</th>
<th>20X9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Revenue</td>
<td>$6,500</td>
<td>$6,300</td>
<td>$5,100</td>
</tr>
<tr>
<td>Research and Development</td>
<td>7,400</td>
<td>7,200</td>
<td>5,800</td>
</tr>
<tr>
<td>Sales and Marketing</td>
<td>7,900</td>
<td>7,700</td>
<td>6,300</td>
</tr>
<tr>
<td>General and Administrative</td>
<td>3,200</td>
<td>3,200</td>
<td>2,600</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$29,400</td>
<td>$28,700</td>
<td>$23,300</td>
</tr>
</tbody>
</table>

The total income tax benefit recognized in the income statement for share-based compensation arrangements was $10.3 million, $10.1 million, and $8.2 million for 20Y1, 20Y0, and 20X9, respectively. Compensation cost capitalized as part of inventory and fixed assets for 20Y1, 20Y0, or 20X9 was $0.5 million, $0.2 million, and $0.4 million, respectively.

**Share Option Plans**

The Company's 20X4 Employee Share Option Plan (the Plan), which is shareholder-approved, permits the grant of share options and shares to its employees for up to 8 million shares of common stock. The Company believes that such awards better align the interests of its employees with those of its shareholders. Option awards are generally granted with an exercise price equal to the market price of the Company's stock at the date of grant; those option awards generally vest based on 5 years of continuous service and have 10-year contractual terms; one-third of the options vest at the end of 3, 4 and 5 years of continuous service. Share awards generally vest over the end of five years of continuous service. Certain option and share awards provide for accelerated vesting if there is a change in control (as defined in the Plan).

The fair value of each option award is estimated on the date of grant using a lattice option valuation model based on the assumptions noted in the following table. Because lattice option valuation models incorporate ranges of assumptions for inputs, those ranges are disclosed. Expected volatilities are based on implied volatilities from traded options on the Company's stock, historical volatility of the Company's stock, and other factors. The Company uses historical data to estimate option exercise and employee termination within the valuation model; separate groups of employees that have similar historical exercise behavior are considered separately for valuation purposes. The expected term of options granted is derived from the output of the option valuation model and represents the period of time that options granted are expected to be outstanding; the range given below results from certain groups of employees exhibiting different behavior. The risk-free rate for periods within the contractual life of the option is based on the U.S. Treasury yield curve in effect at the time of grant.

<table>
<thead>
<tr>
<th></th>
<th>20Y1</th>
<th>20Y0</th>
<th>20X9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Volatility</td>
<td>25%–40%</td>
<td>24%–38%</td>
<td>20%–30%</td>
</tr>
<tr>
<td>Weighted Volatility</td>
<td>33%</td>
<td>30%</td>
<td>27%</td>
</tr>
<tr>
<td>Expected Dividends</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Expected Term (years)</td>
<td>5.3–7.8</td>
<td>5.5–8.0</td>
<td>5.6–8.2</td>
</tr>
</tbody>
</table>
A summary of option activity under the Plan as of December 31, 20Y1, and changes during the year then ended is presented below:

<table>
<thead>
<tr>
<th>Options</th>
<th>Shares (000)</th>
<th>Exercise Price</th>
<th>Wgtd-Avg Price</th>
<th>Wgtd-Avg Term</th>
<th>Aggregate Intrinsic Value ($000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding at January 1, 20Y1</td>
<td>4,660</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Granted</td>
<td>950</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercised</td>
<td>(800)</td>
<td>36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forfeited or expired</td>
<td>(80)</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outstanding at December 31, 20Y1</td>
<td>4,730</td>
<td>47</td>
<td>6.5</td>
<td>85,140</td>
<td></td>
</tr>
<tr>
<td>Exercisable at December 31, 20Y1</td>
<td>3,159</td>
<td>41</td>
<td>4.0</td>
<td>75,816</td>
<td></td>
</tr>
</tbody>
</table>

The aggregate grant-date fair value of share options granted during the year 20Y1 was $18.6 million. At this time, the Company estimates that pre-vesting employment termination rates will be 3% annually; and, due to resulting forfeitures, total compensation cost of $16.5 million will be recognized. These total are expected to be recognized according the following schedule:

<table>
<thead>
<tr>
<th>($000)</th>
<th>Total</th>
<th>20Y1</th>
<th>20Y2</th>
<th>20Y3</th>
<th>20Y4</th>
<th>20Y5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Grant-Date Fair Value</td>
<td>18,592</td>
<td>4,854</td>
<td>4,854</td>
<td>4,854</td>
<td>2,789</td>
<td>1,239</td>
</tr>
<tr>
<td>Recognition Probable</td>
<td>16,464</td>
<td>4,321</td>
<td>4,321</td>
<td>4,321</td>
<td>2,436</td>
<td>1,064</td>
</tr>
</tbody>
</table>

The weighted-average grant-date fair value of options granted during the years 20Y1, 20Y0, and 20X9 was $19.57, $17.46, and $15.90, respectively. The total intrinsic value of options exercised during the years ended December 31, 20Y1, 20Y0, and 20X9, was $25.2 million, $20.9 million, and $18.1 million, respectively.

A summary of the status of the Company’s nonvested shares as of December 31, 20Y1, and changes during the year ended December 31, 2011, is presented below:
The aggregate grant-date fair value of nonvested shares granted during the year 20Y1 was $9.5 million. Assuming annual employee turnover (and resulting forfeiture) of 3%, total compensation cost of $8.2 million is expected to be recognized ratably over the five year period 20Y1 to 20Y5. As of December 31, 20Y1, there was $25.9 million of total unrecognized compensation cost related to nonvested share-based compensation arrangements granted under the Plan. That cost is expected to be recognized over a weighted-average period of 4.9 years. The total fair value of shares vested during the years ended December 31, 20Y1, 20YO, and 20X9, was $22.8 million, $21 million, and $20.7 million, respectively.

During 20Y1, the Company extended the contractual life of 200,000 fully vested share options held by 10 employees. As a result of that modification, the Company recognized additional compensation expense of $1.0 million for the year ended December 31, 20Y1.

Performance Share Option Plan

Under its 20X7 Performance Share Option Plan (the Performance Plan), which is shareholder-approved, each January 1 the Company grants selected executives and other key employees share option awards whose vesting is contingent upon meeting various departmental and company-wide performance goals, including decreasing time to market for new products, revenue growth in excess of an index of competitors’ revenue growth, and sales targets for Segment X. Share options under the Performance Plan are generally granted at-the-money, contingently vest over a period of 1 to 5 years, depending on the nature of the performance goal, and have contractual lives of 7 to 10 years. The number of shares subject to options available for issuance under this plan cannot exceed five million.

The fair value of each option grant under the Performance Plan was estimated on the date of grant using the same option valuation model used for options granted under the Plan and assumes that performance goals will be achieved. If such goals are not met, no compensation cost is recognized and any recognized compensation cost is reversed. The inputs used in estimating those options’ fair value are the same as those noted in the table related to options issued under the Plan for post-vesting employment termination rates, early exercise factors, expected volatility, expected dividends, and risk-free rate. The expected term-life for options granted under the Performance Plan in 20Y1, 20YO, and 20X9 is 3.3 to 5.4, 2.4 to 6.5, and 2.5 to 5.3 years, respectively.

A summary of the activity under the Performance Plan as of December 31, 20Y1, and changes during the year then ended is presented below:

<table>
<thead>
<tr>
<th></th>
<th>Grant-Date Fair Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonvested at January 1, 20Y1</td>
<td>980</td>
</tr>
<tr>
<td>Granted</td>
<td>150</td>
</tr>
<tr>
<td>Vested</td>
<td>(100)</td>
</tr>
<tr>
<td>Forfeited or expired</td>
<td>(40)</td>
</tr>
<tr>
<td>Nonvested at December 31, 20Y1</td>
<td>990</td>
</tr>
</tbody>
</table>
The aggregate grant-date fair value of performance options granted during the year 20Y1 was $1.0 million. At this time, the Company considers it probable that performance conditions will be met (and expense will be recognized) for 75% of these options, resulting in total compensation cost recognition of $0.8 million. These totals are expected to be recognized according the following schedule:

<table>
<thead>
<tr>
<th>($000)</th>
<th>Total</th>
<th>20Y1</th>
<th>20Y2</th>
<th>20Y3</th>
<th>20Y4</th>
<th>20Y5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Grant-Date Fair Value</td>
<td>1,018</td>
<td>437</td>
<td>281</td>
<td>177</td>
<td>90</td>
<td>33</td>
</tr>
<tr>
<td>Recognition Probable</td>
<td>764</td>
<td>328</td>
<td>211</td>
<td>133</td>
<td>68</td>
<td>25</td>
</tr>
</tbody>
</table>

The weighted-average grant-date fair value of options granted under the Performance Plan during the years 20Y1, 20Y0, and 20X9 was $17.32, $16.05, and $14.25, respectively. The total intrinsic value of options exercised during the years ended December 31, 20Y1, 20Y0, and 20X9, was $5 million, $8 million, and $3 million. As of December 31, 20Y1, there was $16.9 million of total unrecognized compensation cost related to nonvested share-based compensation arrangements granted under the Plan. That cost is expected to be recognized over a period of 4.0 years.

At December 31, 20Y1, the Company estimates that performance conditions will be met (and expense recognized) for 70% of all nonvested options that have been granted under the Performance Plan (including 75% of those granted this year, as noted above). This represents an change in the Company’s estimate of options expected to meet performance conditions at December 31, 20Y0, and December 31, 20X9, which were 50% and 75%, respectively, of nonvested option then outstanding. The portion of share-based compensation cost recognized in each of these years relating to performance options and the effects of the Company’s changes in probability estimates are presented below:

<table>
<thead>
<tr>
<th>Performance Options (000)</th>
<th>20Y1</th>
<th>20Y0</th>
<th>20X9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Recognized (Current)</td>
<td>$900</td>
<td>$580</td>
<td>850</td>
</tr>
<tr>
<td>Cost Recognized (Catch-up)</td>
<td>300</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Reversals of Prior Cost</td>
<td>(150)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Cost Recognized</td>
<td>$1,100</td>
<td>$430</td>
<td>$850</td>
</tr>
</tbody>
</table>
$18.9 million, respectively. Realized tax benefits recognized in additional paid-in capital (and as financing cash inflows) related to the portion of tax deductions from option exercise or share vesting that exceeded recognized compensation cost of the related share-based payment arrangement totaled $5.1 million, $4.3 million, and $2.5 million, respectively, for the years ended December 31, 20Y1, 20Y0, and 20X9.

The Company has a policy of repurchasing shares on the open market to satisfy share option exercises and expects to repurchase approximately one million shares during 2012, based on estimates of those exercises for that period.

Supplemental Disclosures

B193. In addition to the information required by this Statement, an entity may disclose supplemental information that it believes would be useful to investors and creditors, such as a range of values calculated on the basis of different inputs, provided that the supplemental information is reasonable and does not lessen the prominence and credibility of the information required by this Statement. The alternative inputs should be described to enable users of the financial statements to understand the basis for the supplemental information.