Actuaries Institute

Technical Paper: Valuation of share-based payments

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Contents

A. Purpose and status of Technical Paper

1. This Technical Paper has been prepared to assist Members who are performing valuations of share-based payments ("SBPs") which include executive and employee share options, performance shares or any other payment or form of compensation the quantum of which depends on an equity value.

2. This Technical Paper replaces Guidance Note 510 (Valuation of Share-based Payments) which was last issued in July 2003. It does not represent a Professional Standard or Practice Guideline of the Institute.

3. Feedback on this Technical Paper from Institute Members is encouraged and should be forwarded to the Institute's Director – Governance and Regulation, Anne Peters (anne.peters@actuaries.asn.au).

B. Background

4. There is no single accepted method for the valuation of SBPs. In addition, the valuation of SBPs is an area where active research is continuing and it is envisaged that valuation techniques will continue to develop over time.

5. The intention of this Technical Paper is to set out the considerations, basic principles and framework that are relevant to undertaking an SBP valuation. It is not the intention of this Technical Paper to prescribe a particular method or approach that Members should follow when valuing SBPs. Members should exercise professional judgment in choosing an approach that they feel is appropriate to the circumstances.

6. There is a substantial body of research and a variety of approaches used in relation to option valuation which are not intended to be covered by this Technical Paper. Members providing advice in this area should be familiar with the relevant valuation techniques to an appropriate level.

C. SBP valuation terms

7. In this Technical Paper:

   (a) "**exercise price**" refers to the price paid by the SBP holder to convert the SBP into a share. This price is sometimes also known as the "strike price" and may be $0.00;

   (b) "**expiry date**" refers to the latest date at which the SBP is able to be converted to a share;

   (c) "**grant date**" refers to the date at which the company and employee enter into a contract that will entitle the employee to receive an SBP either on this date or some future date, provided that certain conditions are met;

   (d) "**measurement date**" refers to the date at which the value of the SBP is to be estimated;

(e) “**performance hurdle**” refers to a condition (generally expressed in terms of company share performance) which must be satisfied in order for the employee to become eligible for some entitlement of the SBP; and

(f) “**vesting date**” refers to the date at which the employee becomes unconditionally entitled to the SBP. It should be noted that, in this context, the vesting date may be unknown in advance (for example, it may depend on the achievement of one or more performance hurdles).

D. Purpose of an SBP valuation

8. It is important to clarify the purpose of the valuation prior to commencing. Members may be requested to perform a valuation for a variety of reasons, including:

(a) regulatory expensing or disclosure requirements for SBPs awarded to executives or broadly-based employee option plans;

(b) calculation of the value of liabilities and changes in liabilities in respect of option plans, for inclusion in financial statements;

(c) for design and communication of executive and employee remuneration packages;

(d) determination of compensation to employees affected by company restructuring, or mergers and acquisitions;

(e) recommendations regarding share holdings;

(f) modelling share benefit plan design alternatives;

(g) individual financial counselling;

(h) taxation purposes; and

(i) for the resolution of legal matters (for example, divorce settlements).

9. This Technical Paper is intended to cover valuations carried out for many different purposes. As a result, not all sections of the Technical Paper will be relevant in all circumstances. It is expected that Members will refer to those sections of the Technical Paper which are relevant to, or are significant in, the particular circumstances in which they are conducting a valuation.

E. Applicable standards and other materials

E.1 Legislative and accounting requirements

10. Where the valuation is performed to satisfy the requirements of an accounting standard or legislative requirement, Members should be familiar with the requirements of the applicable standard or legislation in the jurisdiction relevant to the valuation.

11. As at the date of this Technical Paper, the following standards are of particular relevance to actuaries working in Australia:

    (a) Australian Accounting Standards Board AASB 2 'Share Based Payment – For-profit (FP) Entities';

    (b) Australian Accounting Standards Board AASB 2 'Share Based Payment – For Not-for-profit (NFP) Entities Only';

    (c) Australian Accounting Standards Board AASB 119 'Employee Benefits';

    (d) Australian Accounting Standards Board AASB 124 'Related Party Disclosures'; and

    (e) Australian Accounting Standards Board AASB 139 'Financial Instruments: Recognition and Measurement'.

12. Other standards of interest/relevance in this area include:

    (a) International Accounting Standards Board IFRS 2 'Share Based Payment'; and

    (b) Financial Accounting Standards Board, Accounting Standards Codification Topic 718 'Compensation – Stock Compensation'.

E.2 Other materials

13. Other background materials and publications of interest in this area include:

    (a) Carrett, P & Wong, B, "Executive Options: Valuation and Projection Methodologies" (2002) (Vol 8, Issue 1), Australian Actuarial Journal, 113;[1]

    (b) American Academy of Actuaries, DRAFT Practice Note "Valuation of Employee Stock Options", October 2006;[2] and

    (c) The Board of Taxation, Report to the Assistant Treasurer, "Review into Elements of the Taxation of Employee Share Scheme Arrangements", February 2010.[3]

F. Measurement date

14. The measurement date for the valuation should be consistent with the purpose of the valuation. Measurement dates commonly used include:

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1 Available on the Institute's website.

2 Available at: http://www.actuary.org/files/publications/Draft_practice_note_Valuation_of_Employee_Stock_Options_oct2006.pdf

3 Available at: http://www.taxboard.gov.au/content/reviews_and_consultations/employee_share_scheme_arrangements/report/downloads/Employee_Share_Scheme_Report_to_Minister.pdf

(a) the relevant grant date;

(b) the allocation date;

(c) the beginning of any performance assessment;

(d) the vesting date; and

(e) the entity's balance date.

G. Data requirements

G.1 Design of the SBP

15. It is important to be familiar with the design of the SBP(s) to be valued and, in particular, design features such as:

    (a) the exercise price at which the SBP holder can purchase shares under the terms of the SBP;

    (b) the conditions under which the employee becomes entitled to exercise the SBPs. Typically, employee SBPs are subject to vesting requirements, which can take a number of forms. For example, exercise may not be permitted:

        (i) until a specified minimum period after the grant date;

        (ii) unless the share price, or total shareholder return, reaches a predefined level;

        (iii) unless some internal or accounting measure, such as earnings per share growth, exceeds a predefined level; or

        (iv) unless the total shareholder return exceeds the performance of a specified index or group of individual stocks.

    Careful consideration should be given to designs which combine non-market and market-based features, and it should be clear how such combinations have been addressed.

    (c) the extent (if any) to which the SBPs can be traded (including any trading restriction periods). Generally, employee SBPs are not tradeable. This liquidity limitation, along with wealth concentration and taxation issues, means that the economic value placed on an SBP by the employee may be less than the value from the company's perspective;

    (d) treatment of dividends during any vesting periods;

    (e) any discretion which may be exercised by the employer;

    (f) any share price averaging that might apply at the start and/or end of the performance assessment period;

(g) any retesting of hurdles;

(h) the treatment of delisted or suspended companies in the performance assessment period;

(i) the SBP expiry date;

(j) the status of the SBPs in the event of termination of employment; and

(k) vesting dates, performance period and retest dates.

G.2 Capital structure

16. It is important to be familiar with the capital structure of the company issuing the SBPs – in particular, any intention or obligation of the company to issue new shares during the life of the SBP (for example, to meet existing obligations to employees), which would have a dilutive effect on the ownership rights of existing shareholders.

G.3 Other data

17. Consideration should also be given to the extent to which the following additional data is required:

(a) share price and/or total shareholder return history;

(b) historical prices and/or implied volatilities of associated exchange-traded options;

(c) dividend history and forecasts;

(d) membership details (of option plans);

(e) forfeiture and early exercise history;

(f) the data above, but relating to other companies in the same comparator group, industry, country etc (including the treatment of currency and exchange rates when exercise prices are not in a common currency); and

(g) interest rate data.

18. Appropriate steps should be taken to ensure the accuracy of any data used in the valuation process.

G.4 Interpretation of data

19. As is common in actuarial work, in SBP work Members must make assumptions regarding the future value of various modelling parameters after taking into account (among other things) historical data. In doing so, it is important to consider the extent to which such data can be relied upon. In particular, when examining any data described in section G.3 above for this purpose, it is important to consider:

(a) the period over which the data was collected and the significance of the sample size;

(b) whether the business conditions in the valuation period are expected to be sufficiently similar to those during the period over which the data was gathered;

(c) whether any rates of forfeiture or early exercise were influenced by the share price movements over the period examined; and

(d) whether historical dividend levels are a reasonable indication of future levels (for example, when special dividends have been recently paid).

H. Choice of valuation method

20. The main methods which are likely to be used by Members can be classified as:

(a) analytical / formula-based methods (for example, Black-Scholes);

(b) static numerical models (for example, binomial or lattice models); and

(c) dynamic numerical models (for example, Monte Carlo simulation techniques).

Selection of the most appropriate valuation method is a matter requiring judgment and a working knowledge of each. There may exist some circumstances in which the method to be used is prescribed by the relevant legislation and/or accounting standard(s).

21. In exercising judgment regarding the most appropriate valuation method to use, Members are reminded to give consideration to the ability of the method to cope with the particular features of the SBPs being valued. Particular factors which would normally be considered include:

(a) statutory or legal requirements;

(b) how allowance is to be made for any performance hurdles;

(c) the term of the SBP, and the need to allow for variations in key assumptions (for example, volatility, risk-free discount rate) over the life of the SBP;

(d) the ability of the method to allow for dividends (either as fixed payment amounts at specified times or as a dividend yield);

(e) the possibility of early exercise of the SBPs, due to termination of employment, optimal exercise strategies, or other factors;

(f) the ability of the method to allow for dilution effects (if these are likely to be significant);

(g) how allowance is to be made for any lack of liquidity (if required);

(h) the ability to reproduce any results obtained; and

(i) the level of technical precision that is appropriate for the purpose of the valuation.

22. It is important to:

    (a) comment on the appropriateness of the method in the valuation report, having regard to the above factors, and any other factors which Members believe are relevant; and

    (b) identify any limitations of the method used, taking into account the purpose of the valuation.

23. It is recognised that, in certain circumstances, Members may be requested to perform a valuation using a particular method, or may be constrained to use a method by a particular standard or legislation. Where this is the case, Members are strongly encouraged to seek to make the client aware of the fact that the specific valuation being carried out may not be appropriate for purposes other than those specified.

I. Assumptions

24. Regardless of the valuation method adopted by Members, there are a number of basic assumptions that will normally need to be considered, including:

    (a) interest rate;

    (b) dividend allowance;

    (c) volatility;

    (d) exchange rates;

    (e) early exercise;

    (f) exit/forfeiture rates; and

    (g) inter-relation of relevant variables.

25. The assumptions adopted should be consistent with the valuation method used, as well as internally consistent.

26. Best practice would be to state all material assumptions (whether explicit or implicit), including any assumptions made due to shortcomings in data available to the Member. Equally, best practice is to describe the approach used to determine the assumptions and any qualifications as to their appropriateness.

27. In setting the assumptions, regard should be had to:

    (a) available historical data;

    (b) current market information (for example, implied volatilities);

    (c) additional information provided by the company;

    (d) changes to the regulatory and/or tax environment; and

(e) any concentration of SBPs in an individual or individuals which may affect the use of general decrement and exercise rates.

Where relying on historical data, Members should bear in mind the comments made in section G.4 above.

28. As assumption setting is necessarily imprecise, Members are encouraged, where appropriate, to examine and comment on the sensitivity of the valuation results to changes in the various assumptions.

J. Simplified methods

29. It is recognised that there will be circumstances in which it is appropriate to use a simplified method to determine an (approximate) SBP value.

30. Members will need to use professional judgment to decide whether a simplified method is appropriate, taking into account the circumstances of the valuation and the purpose for which the advice is being given.

31. Where simplified methods are used, Members are strongly encouraged to make appropriate disclosures, and comment on the expected impact on the results (if this can be reasonably quantified).

K. Reporting

32. Where providing a written report on an SBP valuation, best practice is to draw notice to the purpose of the valuation and, where relevant, state that the valuation may not be appropriate for other purposes.

33. The assumptions and method should be stated clearly and their derivation explained. Any limitations of the method or assumptions should also be clearly stated.

34. Where a Member is required to use specific assumptions or methods (other than to comply with specific standards or legislation), best practice is for the Member to clearly state the circumstances, discuss whether or not the assumptions and methods are appropriate, and describe any limitations identified.

35. Annexure A to this Technical Paper provides a general checklist to guide Members as to the matters that would normally be considered in preparing a valuation report in this area. However, the checklist should not be considered exhaustive.

Annexure A: Checklist

1. **Identification:**
   - Purpose and circumstances of the valuation
   - Date of valuation
   - To whom the report is addressed
   - Name and qualifications of the Member
   - Date of the report

2. **Data:**
   - Design of SBPs
   - Company structure
   - Other data
   - Source
   - Accuracy

3. **Valuation method:**
   - Description
   - Appropriateness
   - Limitations

4. **Assumptions:**
   - Derivation
   - Appropriateness
   - Limitations

5. **Results:**
   - Valuation results
   - Sensitivity to changes in assumptions (if appropriate)

6. **Reporting:**
   - Statements required under external standards or legislation

END OF TECHNICAL PAPER