Discussion Draft of GN252

Economic Valuations of Life Insurance Business

12 May 2003

The attached Discussion Draft of a revised GN252 (DDGN252) sets out considerations that bear on an actuary's professional work in carrying out economic valuations of life insurance business. It is supplemental to and builds on the general framework set out in the Discussion Draft of GN 511, "Economic Valuations" (DDGN511) and should be read in conjunction with that Discussion Draft.

The reader of DDGN252 should recognise and keep in mind its purpose of providing supplementary, life insurance specific guidance to the more generic guidance provided in DDGN511. In some areas, minimal additional guidance is provided in DDGN252 as the issues are generic in nature appropriately dealt with in DDGN511. In this regard, sections of DDGN 511 have not been repeated in DDGN 252. This should not be viewed as a diminution of their importance or relevance in the context of the economic valuations of life insurance business.

DDGN252 represents a substantial revision to the existing GN252, sufficiently extensive that it would not be helpful for the reader for us to list the differences between DDGN252 and the existing GN252. DDGN252has been written to complement DDGN511 and so is intended to cover different material to the existing GN252. Its sections are structured to be consistent with DDGN511, rather than the existing GN252. Further, unlike the existing GN252, DDGN252 does not specify the valuation method that must be applied in determining economic values of life insurance business. Rather, it has been written to allow a range of appropriate methods to be used, and provides guidance on the selection of an appropriate method as well as the use of a number of methods.

The development of DDGN 252 presents an opportunity for debate and comment both at the IAAust Biennial Convention and subsequently. A concurrent session will be held at the convention to discuss DDGN252. In addition, written comments from practitioners are invited. Written comments should be addressed to Pauline Blight, convenor of the IAAust GN252 Committee at the address below and received by Friday 20 June 2003.

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GUIDANCE NOTE 252
ECONOMIC VALUATIONS OF LIFE INSURANCE BUSINESS

PURPOSE

This Guidance Note sets out considerations that bear on the *actuary's* professional work in carrying out *economic valuations* of *life insurance business*. It is supplemental to and builds on the general framework set out in GN 511, "*Economic Valuations*" and should be read in conjunction with that Guidance Note.

The Guidance Note is not intended to be comprehensive and is not, in itself, sufficient to allow an *actuary* who is inexperienced in the field to attempt an *economic valuation* of *life insurance business*.

HOW TO USE THIS GUIDANCE NOTE

This Guidance Note is supplemental to GN511. Users of this Guidance Note should also refer to the guidance provided in GN511 when using this Guidance Note.

Words that appear in italics are terms used throughout the Guidance Note with meanings as defined in the Definitions and Concepts section.

APPLICATION

This Guidance Note applies to all members of the profession involved in performing *economic valuations* of *life insurance business* where the member is providing actuarial advice as defined in the Code of Conduct and where GN511 is applicable. It does not apply in situations where GN511 is not applicable. The term *actuary* is used throughout this Guidance Note to refer to members to which this Guidance Note applies.

In the event of any ambiguities or inconsistencies between this Guidance Note and GN511, this Guidance Note will prevail for *economic valuations* of *life insurance business*.

Whilst only applying specifically to *life insurance business,* sections of this Guidance Note may be of assistance in determining *economic valuations* of portfolios of other similar financial products or services where the use of similar techniques is considered by the *actuary* to be appropriate.

Throughout this Guidance Note references are made to business transacted in Australia, Australian conditions and relevant Australian legislation. Such references should be interpreted appropriately in relation to business transacted overseas.

LEGISLATION

Actuaries performing *economic valuations* of *life insurance business* should be aware of the requirements of relevant legislation, related regulations and standards (legal or professional) in so far as they relate to the *economic valuation* being undertaken. In particular the *actuary* may need to consider the implications of the following:

- the Life Insurance Act 1995, related regulations and standards; and

- actuarial standards issued by the Life Insurance Actuarial Standards Board.

DEFINITIONS AND CONCEPTS

For the purposes of this guidance note the following expressions will be used with the meanings indicated:-

Actuary

A member who is a Fellow or Accredited Member of the Institute of Actuaries of Australia involved in performing *economic valuations* of *life insurance business* where the member is providing actuarial advice as defined in the Code of Conduct and where GN511 is applicable.

Approximate Valuation

A rough indication of the possible *economic value* of an economic asset, based on a limited analysis of the key drivers of *economic value*.

Asset Replication

The *method* whereby the *economic value* of economic assets, or part thereof, is determined by reference to the observable value of another economic asset or part thereof.

Capital Adequacy Requirements

The amount of minimum statutory capital required to be maintained within a *life insurance business* before any distribution can be made to *Proprietors*. In Australia, the minimum statutory capital requirement of the statutory funds of a life insurance company is known as the Capital Adequacy Requirement as defined under Actuarial Standard No. 3 issued by the Life Insurance Actuarial Standards Boards (LIASB).

Data

The raw information from which an economic *model* is built and a valuation is derived.

This includes but is not limited to accounting, statistical, transactional, documentary, and environmental materials. Information and *data* may be quantitative or qualitative, public or private, and includes third party opinions and verbal representations.

Discounted Distributable Profits

A valuation *method* where the *economic value* is calculated as the present value to the *proprietors* of future cash flows, after allowing for movements in shareholder capital required to support the business, discounted at a *risk-adjusted discount rate*.

Distributable Profits

The *Proprietors*' share of net cash flows over a particular period less any amounts carried to reserves, liabilities or provisions, including those required to meet any target surplus requirements.

Economic Valuation

The determination of an *economic value*.

Economic Valuation Date

The date in respect of which the *economic value* is determined.

Economic Value

The current cash equivalent (allowing for time and *uncertainty*) of all the future cash flow benefits (or costs) that are expected to be derived from ownership or use of an economic asset for a specified *Principal*.

Existing Business

Life insurance business which is in force on the *economic valuation date*.

Future Business

New *life insurance business* expected to be procured, on certain assumptions, after the *economic valuation date*.

Life Insurance Business

Life insurance business as defined in the Life Insurance Act 1995, as amended or re-enacted from time to time excluding Friendly Society business.

Market Value

An estimate of a potential market price of an economic asset:
– for a specific seller or range of sellers of the economic asset;
– for a specific buyer or range of buyers of the economic asset;
– with a set of specific market conditions; and
– at a specific time.

Method

The computational technique by which the *economic value* is calculated. A *method* is likely to include the use of one or more *models*.

Model

An analytical representation of how factors present in the real world are assumed to behave, interact and produce future outcomes.

Models enable a decision-maker to better understand the dynamics and uncertainties of the economic asset in its environment.

Model Points

A set of sample items of *data* (e.g. contracts, policies, claims) that provide a sufficiently accurate representation of the full population of such *data* items for use in the particular *economic valuation model*.

Principal

The person, persons or organisation which commissions an *economic valuation.*

Proprietors

Those who are entitled to the *distributable profits* of the *life insurance business* where the nature and extent of that entitlement is defined for the purposes of the *economic valuation*.

Risk-Adjusted Discount Rate

A risk-adjusted rate of return used to calculate the present value of projected cash flows.

Risk Free Return

The investment return that could be achieved over a given time period with certainty. This return represents only the time value of money with no compensation for *uncertainty*.

Risk Neutral Methods

Methods for determining *economic values* whereby projected cash flows are adjusted for *uncertainty* such that investors would be indifferent between taking on the *uncertainty* for the adjusted projected compensation and not taking on the *uncertainty*.

Roll Forward Valuation

An *economic valuation* at a date other than that in respect of which key *data* has been captured and detailed *models* produced.

Uncertainty

Any doubt about future outcomes, whether or not expressed, quantifiable or based on empirical evidence.

CLASSIFICATION

This Guidance Note is issued because a trial period is required before a Professional Standard is produced. In general, the *actuary* is expected to disclose any departure from this Guidance Note but departure from the Guidance Note is not, in itself, unprofessional conduct.

FIRST ISSUED

This Guidance Note was first issued in November 1993 as "Guidance Note 252 – Actuarial Appraisals of *Life Insurance Business*". It has been substantially revised and released in a form to supplement GN511 in [2003].

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1. INTRODUCTION

1.1 Background

This Guidance Note provides guidance in relation to the *economic valuation* of *life insurance business*, which is supplemental to and builds on the general framework set out in GN511.

1.2 Economic Valuations of Life Insurance Business

Most life insurance policies are issued on the expectation on the part of both the purchaser and the seller that the contract will remain in force for a number of years.

Both parties have expectations as regards future payments to each other. While the purchaser's obligations to make future payments are voluntary, those of the life insurance company are not. In addition the life insurance company expects to incur costs in administering its *existing business* in the future. Accordingly, reserves must be established to meet the *policy liabilities* and *capital adequacy requirements* necessary for a company to be able to fulfil its obligations.

From the point of view of the life insurance company, the existence of the long term contract enables it to structure its terms in such a way that an excess of expenses over revenues at the outset of a contract may be recouped by an expected excess of revenues over expenses throughout the life of the contract. This situation means that, at any point in time, the *existing business* of a life insurance company represents an asset of value which could be sold.

The capacity of a life insurance company to derive profits from future business is also a potentially valuable asset. The value of such a capacity must also be taken into account in determining the *economic value* of a *life insurance business*.

2. PROFESSIONAL CONSIDERATIONS

2.1 Market Valuations

There are many factors affecting the *market values* of *life insurance business* which are not necessarily encompassed within the *economic valuation* process. An *economic valuation* can give a value which is calculated correctly, based on reasonable assumptions and useful for the purpose intended, without validating to the *market value* of the business.

In Australia purchases and sales of *life insurance business* occur infrequently and there is only a small number of listed life insurance companies, making market *data* difficult to obtain. When a transaction does occur it is unusual for full details regarding the price to become public knowledge. Even when a value appears in the press it cannot necessarily be relied upon in assessing the actual price paid relative to the results of any associated *economic values* which may have been performed as the terms and conditions of the transaction are unlikely to be known.

2.2   Actuarial Standards

The Life Insurance Actuarial Standards Board (LIASB) has issued a number of actuarial standards under the Life Insurance Act 1995. The *actuary* should consider the requirements of these standards where relevant, in particular for the determination of *capital adequacy requirements* and *policy liabilities* if required in determining the *economic value*.

2.3   Working with Other Parties

Where an *actuary* is asked to perform an *economic valuation* of *life insurance business* as a component part of a larger *economic valuation*, this Guidance Note applies to the *life insurance business* component of the *economic valuation* for which the *actuary* takes responsibility.

3.   GENERAL FRAMEWORK

3.1   Approximate Valuations

When undertaking an approximate *economic valuation* of a *life insurance business* the *actuary* should consider the key drivers of *economic value* for each line of business being valued. Examples of key drivers of *economic value* may include:

- for unbundled investment business:
  — funds under management; and
  — the margin of fees less expenses;

- for lump sum risk business:
  — premium income; and
  — the margin of premiums less claims and expenses;

- for annuity business:
  — current market yields available on appropriate assets; and
  — mortality experience in the case of lifetime annuities;

- for traditional business and business with significant guarantees, such as investment account business, the *actuary* will need to exercise judgement and it may be that in some situations it is not possible to identify suitable drivers to enable an *approximate valuation* to be determined. In which case the *actuary* should consider whether or not it is appropriate to attempt to perform an *approximate valuation*.

In each case the impact of releases of current reserves should be considered, if appropriate to the *method* being used.

If the approximate *economic valuation* is being derived using a price/earnings multiple approach, earnings should be normalised by removing the impact of experience losses not expected to be repeated over the longer term; and normalising investment earnings on retained profits, consistent with long term investment return expectations. Alternatively, a multiple of operating earnings (excluding investment income on retained profits) may be used, with the value of net assets at the valuation date added to the result.

As a reasonableness check on the results of an *approximate valuation*, the *actuary* may wish to compare the results to relevant information that may be available in company accounts. For example, where life insurance policy liabilities have been determined under the Margin on Services methodology, the approximate *economic value* may be compared to the present value of future profit margins. In performing this comparison the *actuary* should be aware of the following and adjust as appropriate:

- the Margin on Services present value of future profit margins is not adjusted for the *uncertainty* of achieving these profits and so may be overstated relative to its *economic value*;

- the Margin on Services present value of future profit margins shown in the accounts may not allow for the future profits in respect of *life insurance business* valued by accumulation *methods*,

which may be a significant source of value for some *life insurance businesses*;

- The Margin on Services present value of future profit margins excludes profits expected to be generated from business that is not inforce at the valuation date, and the definition of inforce business may vary between the two valuations (for example regarding the treatment of recurring premiums); and

- The Margin on Services value of future profit margins may have been determined using a different set of assumptions from those relevant for the *economic valuation*.

3.2   Roll-forward Valuations

Roll-forward valuations for *life insurance business* should take into account:

- the expected increase in value to be released over the roll-forward period (in accordance with how this is defined in the valuation *method* being used) including the effect of changes in capital requirements (if relevant to the valuation *method*);

- any dividends or capital injections over the roll-forward period;

- deviations in operating experience over the roll-forward period from that expected in the base *economic valuation*. The most important of these are likely to result from differences in:
  — expenses;
  — claim payments;
  — investment earnings;
  — terminations; and
  — new business;

- the value at the end of the roll-forward period of new business written over the roll-forward period;

- differences in *existing business* volumes and mix at the end of the roll-forward period compared to those projected under the base valuation, allowing for new business over the period; and

- changes in the value of *existing business* and projected new business at the end of the roll-forward period as a result of any changes to assumptions that might be appropriate. Changes to assumptions may result from material changes in the experience and outlook of the individual company, the market or the industry

over the roll-forward period. The following assumptions should be considered:
— investment returns;
— discount rates (if relevant to the valuation *method*);
— expenses;
— termination rates;
— mortality/morbidity rates; and
— capital requirements, if relevant to the *method* being used.

If using approximate *methods* to adjust for the impact of changes in assumptions at the end of the roll-forward period, the *actuary* should take care to allow for the cumulative effects of varying assumptions, whereby the combined effect of changing two or more assumptions may be different from the sum of the individual effects. In addition, the *actuary* should consider the impact of any non-linearity of the results, for example as a result of investment guarantees.

4.   PURPOSE, USE AND SCOPE

4.1   Scope of Economic Asset

4.1.1 Components and Boundaries of the Economic Asset

When valuing separately components of an economic asset, the *actuary* must take particular care to ensure that the assumptions, *data* and *methods* used are consistent to avoid:

- double counting elements of *economic value*; and/or

- missing elements of *economic value*.

When valuing only a component of an overall business, the *actuary* must consider the extent to which other components of the business may impact the value of the component under investigation and what plans the business may have for these other components.
In respect of *life insurance business*, issues may arise where:-

- the *economic value* of future new business is valued/disclosed separately from that of *existing business*; and/or

- the business being valued is part of a larger group and derives *economic value* from leveraging the capacity of the wider group, for example where distribution or cost synergies exist within a group.

4.1.2 Future New Business

There can often be considerable subjectivity regarding the definition of new business and hence assumed new business volumes. The new business volumes on which the *economic value* of new business is based must be:

- consistent with the definition of *existing business*, so that there is no double-counting or omission of business; and

- consistent with the expense analysis used to determine new business and renewal expense assumptions.

In addition, the *actuary* should strive to use new business volumes that are consistent with published new business volumes, unless any discrepancy is disclosed.

Whilst the definition of new business will typically depend on the information systems available within a particular *life insurance business*, it may be considered good practice to define new business as increases in business volumes that require effort and/or action from the sales force. Under this definition the following would be considered new business:

- increases to sums insured that are not contractual, automatic or had not been previously agreed to;

- new mandates in respect of corporate superannuation business; and

- recurring premiums in respect of investment business, to the extent they are not contractual, automatic, or previously agreed to.

Under this definition, the following would not typically be considered new business and so would be included in the value of *existing business*:

- contractual or automatic increases to sums insured;

- new members in existing corporate superannuation business; and

- contractual or automatic recurring premiums.

In most circumstances it will be necessary for entities to evolve and change in order to keep writing profitable new business into the future. The *actuary* should consider the impact of expected future

market conditions on profit margins assumed in respect of future new business.

4.1.3 Implications of Corporate Structure

The *actuary* should be aware of the corporate structure in which the *life insurance business* is being written and consider the implications of this for the *economic valuation*. Depending on the purpose of the *economic valuation*, it may be appropriate to include in the *economic valuation* profits or losses generated by related companies, such as:

- service companies;

- distribution companies; or

- investment companies.

Where the *life insurance business* is being written within a group company structure, the *actuary* should consider the group's plans with respect to other businesses within the group and the potential impact of these on the *economic value* of the business being valued. In particular, the *actuary* should consider the potential impact on the capacity to distribute business and on the projected unit costs of the *life insurance business*.

Intra-group transactions can often be complicated and the *actuary* should take care to ensure that *economic value* is not double counted or omitted as a result of intra-group transactions. This is particularly important when the *actuary* is determining an *economic value* of a life insurance company to be used as a component in an *economic valuation* of the corporate group of which the life insurance company is a part. In these circumstances, the *actuary* should be aware of the valuation *methods* being used for certain other group companies to ensure that there is no double counting or omission of future expected profits or losses.

5.   VALUATION METHODS

5.1   Choice of Method

The *economic valuation* of *life insurance business* will usually require the use of a valuation *method* that involves the projection of future cash flows due to the long term contractual nature of the business and the wide variety and complexity of products. Simpler techniques will usually only be appropriate for *approximate valuations* or as a check on the results produced by other *methods*.

It is not the intention of this Guidance Note to prescribe the use of a particular *economic valuation method*. In choosing a *method*, the *actuary* should have regard to:

- the strengths and weaknesses of the *methods* available in the context of both the business being valued and the purpose and materiality of the valuation; and

- the considerations set out in Sections 5 and 6 of this Guidance Note, and in GN511.

Key *economic valuation methods* likely to be useful for *life insurance business* are discussed below.

5.1.1 Earnings and Volume Ratios

These *methods* benefit from simplicity and are easily understood by the wider audience of stakeholders.

They rely on:

- a high level of stability and predictability in the ratio between the *economic value* and the earnings/volume measure from past periods to future periods; and

- an ability to derive multiples that adequately allow for growth and *uncertainty* either by using the outcomes from more sophisticated techniques or by using observed industry multiples that are reflective of a particular *uncertainty* and growth profile.

Due to the complex nature of life insurance products, the existence of embedded options or guarantees and the effect that variations in business mix can have on *economic value*, these *methods* are unlikely to be suitable as the primary *economic valuation method* except in the most limited of circumstances. These circumstances may include:

- *approximate valuations*; and

- valuation of a small part of a business where any resulting error will not be material to the overall result.

These *methods* can also be useful as a rule of thumb check on the results of more sophisticated *methods* and assist in the communication of *economic valuation* results.

5.1.2 Discounted Distributable Profits

The key advantages of the *discounted distributable profits method* are that it:

- Produces projected cash flows and capital movements that are realistic and hence easy to understand and validate;

- utilises well established techniques and modeling practices;

- allows complex cash flows and interrelationships between cash flows to be reflected in the projection *model*(s); and

- facilitates *roll forward valuations* and the projection of *economic value* at future dates.

The *discounted distributable profits method* allows for *uncertainty* through the interaction of the risk *discount rate*, the earning rate on assets; and the quantum of capital assumed in the projection.

The *actuary* should take care to ensure that the overall charge for *uncertainty* in the *economic valuation* is appropriate given the characteristics of the business being valued and does not lead to misleading *economic valuation* results. In particular, in many cases it would not seem appropriate for the *economic value* of *life insurance business* to change as a result of a change in the assumed asset mix as at the *economic valuation date*. Should this result arise, the *actuary* should carefully consider whether the allowance made for *uncertainty* in the valuation is appropriate.

Where the assumptions contributing to the charge for *uncertainty* are set to be appropriate for the aggregate *life insurance business* being valued, the *actuary* should be aware that these will not necessarily give rise to appropriate charge for *uncertainty* for an individual line of business.

The *actuary* should pay special attention in applying this *method* in circumstances where:

- significant mismatches exist, for example: where annuities are backed by equities, or where fees are related to investment markets but expenses are not; or

- the potential liability outcomes of business being valued have an asymmetrical distribution and the existence of this asymmetry could have significant impact on value.

5.1.3 Deterministic Risk Neutral

The deterministic *risk neutral method* allows explicitly for the *uncertainty* in each cash flow in determining an appropriate charge for *uncertainty* in the *economic valuation*. This charge is therefore responsive to changes in the level of *uncertainty* in the business being valued. The *method* is particularly applicable where investment or market related gearing exists, be it:

- a mismatch between liabilities and backing assets, for example, annuities or other guaranteed liabilities backed by equities; or

- a mismatch between revenue and expenses, for example, an investment linked product where the revenue is based on funds under management and at least part of the expense base is fixed or based on the number of policies in force.

The *method* is also useful for determining an appropriate charge for *uncertainty* in respect of individual lines of business.

This *method* will not produce cash flow projections on a realistic basis. This means that projected cash flows will not be suitable for other purposes, such as business planning, and that the communication of the projection results to the *proprietors*, as well as their validation, may be more challenging.

In applying this *method* special care should be taken to ensure that the degree to which each cash flow is market related is understood and the projected cash flow is adjusted appropriately to be risk neutral, the following cash flows may require special attention in this regard: disability claim payments, lapses and expense.

5.1.4 Asset Replication

This *method* can be usefully applied wherever a replicating asset, or basket of assets, can be found for projected individual cash flows or a group of cash flows of *life insurance business*. It has particular application for assessing the value of market related guarantees or options embedded within *life insurance business*, where appropriate replicating assets exist.

The *method* may be difficult to apply to life insurance products, where there is significant risk and *uncertainty* inherent in cash flows due to lapse and insurance risks.

5.2   Stochastic Techniques

Stochastic techniques are particularly useful for valuing complex asymmetric outcomes.   They can also be valuable as a tool for understanding *uncertainty* and stress testing an *economic valuation*.

In applying stochastic techniques, care should be taken to ensure economic and probability *models* underlying the assumptions are well chosen and appropriately correlated to each other, taking into account the full spectrum of possible outcomes.   Correlations can change significantly between normal conditions and extreme conditions.

The results can often be particularly sensitive to the tail(s) of the assumed economic and probability distribution *models*.   As such, care is required to ensure that the modeling of extreme values is robust.

6.   SELECTION OF MODEL

6.1   Introduction

In most cases, the determination of an *economic value* of *life insurance business* will require the use of one or more of each of the following types of *model*:

* Cash flow *model*(s), usually the most visible *model*(s), with outputs from the probability, economic and risk *models* usually being required as inputs;

* probability *model(s)* for contingencies such as mortality, morbidity and lapse/surrender rates, with deterministic decrement tables being the most common form used;

* economic *model(s)* for the determination of economic assumptions such as investment earnings and inflation rates, these may be deterministic or stochastic; and

* risk *model(s)* will be required to value the cost of risk. This may be, for example, the capital asset pricing *model* used to set risk *discount rates* for discounted distributable profit valuations, or the use of risk adjusted cashflows for risk neutral valuations.

6.2   Cash Flow Models

There are a number of particular issues that need to be considered in modeling life insurance cash flows.

6.2.1 Policy Terms and Conditions

The contractual terms and conditions under which *life insurance business* is written are often complex and care needs to be taken to ensure that material contract terms and features are appropriately reflected in the cashflow *model*.

Such terms and features may include:

- product fees;

- premium rates;

- surrender terms and charges;

- benefit payment conditions (in particular disability definitions);

- additional benefits after a defined period of time or as a result of the occurrence of a specified event;

- interrelationships between individual product features; and

- management discretions, for example in relation to bonus/crediting rates and surrender values.

Subject to materiality considerations, segments of business with different characteristics, or a different expected emergence of profit over time should be modeled separately.

Particular care needs to be taken to ensure that any policyholder options and guarantees are appropriately handled in the *model*. While policyholder options and guarantees are primarily associated with participating business, they can also be present in non-participating business. For example: non-participating investment account business and unit price guarantees.

6.2.2 Participating Business

Participating products commonly provide the life insurer with a certain amount of discretion with respect to:

- the accrual of policyholder benefits via bonus / crediting rates; and

- the level of guarantees on surrender or maturity, for example reversionary versus terminal bonuses, use of *market value*

adjusters, limited deferral of surrender payments, surrender basis for conventional business (subject to legislative minimum).

However, there are significant legal and other restraints on the allocation of profit, limiting the shareholders' share of participating business profit; and the distribution of retained profits. The *economic valuation* should reflect the implications of these constraints on the shareholders' ability to extract value from the *life insurance business*.

The *economic valuation* should reflect the manner in which participating business discretions may be expected to be exercised. Care should be taken when undertaking stochastic projections that the manner in which such discretions are assumed to be exercised in extreme situations is representative of the likely situation in reality.

Participating business in most cases will represent an asymmetric risk to the shareholders of the life insurance company. The materiality of this asymmetry should be considered by the *actuary* when selecting an appropriate valuation *method* to use for this business.

6.2.3 Existing and New Business

For most lines of long term *life insurance business* with significant acquisition expenditure and/or capital requirements it will be important that new business cashflows are projected separately from those arising from business in force at the valuation date.

6.2.4 Tax Environment

The cash flow *model* should appropriately reflect the way in which taxation impacts the flow of profit and value to the *proprietors*, for example:

(a)   while Australian superannuation business is taxed as virtual pooled superannuation trust and complying annuity business as exempt business, this does not apply to either the shareholder capital supporting them nor the shareholder profits arising therefrom;

(b)   the shareholders' entitlement to imputation credits resulting from corporate tax paid; and

(c)   the value to the shareholders of any accumulated shareholder imputation credits at the *economic valuation date*.

6.2.5 Capital Requirements

Certain *economic valuation methods* require the future capital requirements of the business to be projected in the cashflow *model*. Where capital requirements are projected, they should be consistent with the *economic valuation method* and risk *model*(s) being used. For example, if using the *discounted distributable profits method* with the Capital Asset Pricing Model as the risk *model*, projected capital requirements should be consistent with the determination of the risk *discount rate*.

6.3 Probability Models

Life insurance cash flows are commonly subject to a range of contingencies, including:

* mortality;

* morbidity;

* lapse and surrender; and

* premium dormancy, premium change and/or additional premium.

These are usually modeled using deterministic probability *models* eg mortality tables.

There may be significant *uncertainty* as to the assumptions that should be used to reflect these contingencies.   In particular, *uncertainty* will be greater in cases where:

* there is a lack of credible *data* (eg lapse rates for new products, mortality/morbidity *data* for new risk products); or

* it is expected that historical experience may not be representative of future experience (eg following a merger or acquisition, or a significant change in management practice).

In most cases, the impact on value is symmetric and therefore a deterministic *model* will usually be sufficient to determine the economic cost of the risk. However, where the impact of *uncertainty* on value is asymmetric, then more sophisticated probability *models* may be required.

6.4   Economic Models

A robust economic *model* is a key factor in the determination of the *economic value* of many life insurance products. However, the considerations involved in selecting and building economic *models* are not specific to *life insurance business* and so the *actuary* is referred to the guidance provided in GN511 in this regard.

6.5 Risk Models

Risk *models* are required to provide inputs required for the determination of the impact on the *economic value* of taking on risk in *life insurance business*. The form of risk *model* selected must be consistent with the valuation *method* adopted.

6.5.1 Earnings and Volume Ratios

The impact of risk on value is allowed for in these *methods* via the selection of the multiplier. Multipliers should be selected bearing in mind the following features of the business:

- future growth prospects;

- risk profile; and

- the sustainability of current profit margins.

If multipliers are selected by comparing or benchmarking to market and/or other published valuations, then the *actuary* should take care to ensure that the business characteristics, including risk profile, of the comparative businesses are sufficiently similar to those of the business being valued. If this is not the case, adjustments to observed multipliers may be required.

6.5.2 Discounted Distributable Profits

Discounted distributable profits valuation *methods* allow for risk by discounting future expected profits at a risk adjusted rate of return. The purpose of the risk *model* is therefore to set an appropriate *risk-adjusted discount rate*. The most common risk *model* used by actuaries in the life insurance sector is the Capital Asset Pricing *model*. When using this or other risk *models* in association with the *discounted distributable profits method*, the *actuary* should take care to ensure that the resulting risk *discount rate* is appropriate taking into account:

- the risk profile of the business being valued (in particular the degree of market-related risk in the business); and

- the level of capital projected to be held within the business.

In particular, when determining *economic valuation* results under various scenarios (for example different asset or reinsurance profiles) the *actuary* should seek to ensure that the assumed *risk-adjusted discount rate* appropriately reflects the level of risk of the particular scenario, so that changes in the risk profile of the company alone do not result in changes in the *economic valuation* result.

6.5.3 Deterministic Risk Neutral

Risk neutral or certainty equivalent *methods* allow for risk by adjusting projected future cashflows to be "risk neutral", the purpose of the risk *model* is to provide these risk neutral cashflows for use in the cashflow *model*. The key requirements of a risk *model* for use with risk neutral or certainty equivalent valuation *methods* are that it:

- appropriately identifies all cashflows that should be adjusted for risk; and

- determines an appropriate risk adjustment for each of these.

In determining the risk adjustment that should be made to each cashflow, the *actuary* should take into account the market related or systemic risk rather than the total risk of the cashflow. This may require the *actuary* to develop *data* relating to the correlation of various cashflows with market movements. The *actuary* should consider the market related risk associated with each of the cashflows being projected, including:

- asset-related cashflows;

- lapses;

- claim payments;

- expenses; and

- taxation.

The application of risk-neutral or certainty equivalent valuation techniques to life insurance is only a relatively new area of practice for actuaries. As such, it is to be expected that historical *data* for use in calibrating the risk *models* may be less complete than the *actuary* would wish or less complete than that required to implement other *methods*. In such situations, the *actuary* should use his or her best judgement to

calibrate *models* as well as possible, and consider the use of alternative *methods* to verify the reasonableness of results produced using such *models*.

6.5.4 Asset Replication

Under an *asset replication* valuation methodology, a market-based allowance for the impact of risk on *economic value* is reflected in the observed price of the replicating asset. As such, no explicit allowance for risk is required.

6.6 Consistent and Arbitrage Free Models

The *actuary* should take care to ensure that each *model* used is internally consistent, consistent with any other *model* used, and free of arbitrage. In particular, the *actuary* should guard against potential inconsistencies between:

- the risk profile of the business, the capital requirements projected in the cash flow *model* and the risk *discount rate* from the risk *model*, resulting in artificial changes to *economic value* as a result of changes in risk profile (for example in regard to asset mix) under the *discounted distributable profits method*;

- the economic *model* and risk *model*, for example inconsistent investment return assumptions and risk *discount rates*, or between investment return assumptions and asset values;

- the assumed exercise of discretions in the cash flow *model* and the economic *model*; and

- the economic *model* and the probability *models* in respect of lapse rates and morbidity rates.

7. DATA

7.1 Introduction

Due to the relatively complex nature of life insurance operations, the *data* required to perform an *economic valuation* can be quite detailed and is typically obtained from a number of different sources.

Further, the veracity of the valuation result is very reliant on the accuracy and consistency of the underlying *data* making *data*

verification a particularly important step in the *economic valuation* process for *life insurance business*.

7.2   Sources of Data

Data required to perform an *economic valuation* of *life insurance business* may be obtained from sources both within the business being valued and from outside the business.

7.2.1 Internal Data Sources

Typical sources of *data* from within the business being valued include:

- Financial Condition Reports prepared by the Appointed Actuary;

- financial statements and internal management accounts;

- experience investigations prepared by actuarial or product management teams;

- business forecasts and marketing plans;

- current and pending product pricing & commission structures, key policy terms and conditions;

- policy and product *data*, including both *existing business* and movement *data*;

- asset mix and asset value details;

- underwriting and claims management processes;

- reinsurance arrangements;

- reserving basis and processes; and

- taxation basis and position.

7.2.2 External Data Sources

Data sources available externally may include:

- Relevant publicly available information concerning the company, including general purpose and statutory financial statements, analyst information packs and product disclosure material;

- Returns and information prepared for the regulator;

- Relevant information from industry studies and other sources such as consultants and reinsurers; and

- Sales performance and market share information.

7.3   Data Verification

In relation to *life insurance business* there are particular areas where accurate and statistically relevant *data* can be difficult to obtain or where *data* may be distorted or not relevant for the future.

Examples include:

- *data* relating to the experience of newer or emerging products; and

- significant changes in management or operating practices, such as underwriting or claims management practices, rendering past experience only partially relevant.

The suitability of the *data* and nature of the reliance that can be placed on this *data* should be determined bearing in mind the purpose of the *economic valuation*.

Where *data* is being used for a different purpose or in respect of a different time period from that for which it was originally collected, the *actuary* should validate it as being suitable for use in respect of the intended different time period or purpose. In particular, parameters such as discontinuance and disability can vary significantly over time and therefore related *data* should be updated on a regular basis.

Data obtained from multiple sources should be checked for consistency. Examples may include:

- Policy and product statistics obtained from actuarial and other product or marketing sources; and

- Claims *data* from actuarial, claims administration and accounting sources.

7.4   Analysis and Application

The nature of the *data* required will depend on the valuation *method* adopted. For example, where a risk neutral *method* has been adopted it is important to gather *data* that addresses potential correlations between operating characteristics, such as lapses and morbidity claims, with economic parameters.

If *data* access or availability is restricted then simpler valuation *methods* or *models* may need to be employed. Any limitations of the *data* or the *methods* or *models* employed should be clearly articulated to the *Principal*.

8.   BUILDING MODELS, SETTING ASSUMPTIONS

8.1   Building Models

The construction of a suitable *model* will depend on the choice of valuation *method* and the nature and scope of the *economic valuation* being undertaken. The choice of *model* will influence the types and details of assumptions that need to be determined.

8.2   Setting Assumptions

There are a number of characteristics of *life insurance business* that require particular attention when setting assumptions for *economic valuation* determination purposes.   The significance of particular assumptions will depend upon the *method* and *model* chosen. Not all of the following assumptions will necessarily be required for all *models*.

8.2.1 Expenses

The *actuary* should ensure that expense assumptions are consistent with current expense levels and, where appropriate, management business plans.

The following should also be considered in setting expense assumptions for *life insurance business*:

(a)   the reasonableness of management business plans and the consistency of these plans with the current expense base. Depending on the assumption set chosen, valuation adjustments may be required to allow for any short to medium term overruns/ underruns;

(b)   the extent to which non-recurring expenses should be excluded. This will depend upon the extent to which the *actuary* is comfortable that these expenses will not be repeated either implicitly or explicitly into the future. In this respect it should be recognised that businesses will generally be required to maintain an adequate level of capital expenditure into the future to continue as viable operations;

(c)   the extent to which production, administration or overhead capacity is in excess of that required for the volumes of in force and new business;

(d)   the fixed and variable nature of the expense base and the appropriateness of drivers used to *model* this base. For example, number of policies, premiums, funds under management;

(e)   the reasonableness of the modeled expense base throughout the projection period, both in absolute terms and relative to other projected items such as profit, revenue and other drivers of the business being modeled; and

(f)   an appropriate allowance for future expense inflation.

The basis for the expense assumption set chosen should be clearly disclosed to the *Principal* including the extent to which future synergies or expense savings have been allowed for.

8.2.2 Commission

Commission and related compensation assumptions should be based on the actual or anticipated experience of the business being modeled. In some cases, these assumptions will be based on past history. In other cases, including those where the commission arrangements may be more complex, a detailed review of agency contracts and company practices may be necessary.

8.2.3 Reinsurance

Where relevant to the valuation *method* employed, consideration should be given to the extent to which reinsurance arrangements impact the risk profile of the business and the related allowance for *uncertainty* made in the *economic valuation*.

Often reinsurance contracts have a component that is more in the nature of a financing transaction than risk transfer. Where a financing component exists the *actuary* should ensure that the effects of this on both risk and projected cash flows are appropriately allowed for in the valuation so that the reinsurance does not inappropriately increase the *economic valuation* result.

8.2.4 Options for the Company

In setting the assumptions, the *actuary* should consider actions available to the company. Assumptions should reflect the manner in which options available to the company are expected to be exercised in the future, however, the *actuary* should be wary of assuming departure from established company practice without good reason.

Assumptions about future management actions should be consistent with the other assumptions and with market context and practice.

Examples of such options are:

- the exercise of discretions in the setting of variable policy charges, bonus rates and surrender value bases; and

- revision of non-guaranteed premium rates, conversion terms.

8.2.5 Mortality and Morbidity Rates

Mortality and morbidity assumptions will usually be expressed relative to a chosen industry mortality or morbidity table with adjustments reflecting the organization's own experience, where credible, and the experience of other comparable entities.

The potential for future changes, whether favourable or adverse, should also be taken into account. This may include management actions such as changes to contract pricing and design, underwriting and claims management practices.

8.2.6 Policyholder Lapse/Surrender/Premium Dormancy Rates

These assumptions should have regard to the experience of the business and that of comparable companies within the industry.

The effect of lapses or non-renewal, premium change and premium dormancy on flexible-premium products should be considered in the evaluation of historical experience and the development of the *actuary's* assumptions as to future anticipated experience.

In addition, the *actuary* should consider the following:

- the potential impact of economic conditions on persistency levels;

- the potential short term and long term impacts of recent or planned changes to price levels or commission structures;

- the potential short term impacts of merger, acquisition or business migration activity; and

- the potential impact of product features such as exit fees, particularly where these vary over the life of the product.

8.2.7 Rates of Investment Return

These assumptions should be consistent with the economic *model* employed.

8.2.8 Inflation

For *life insurance business*, inflation assumptions may apply to expense cash flows, sum insured levels in line with client take-up rates and policy fees where stipulated in the policy terms and conditions. The inflation assumptions used should be consistent with any other economic assumptions employed.

8.2.9 Taxation

Historically the taxation basis of life companies has changed frequently. Whilst it is likely that changes will occur in the future, the current basis, allowing for any recently enacted legislation which is yet to come into force, should be assumed to apply in the future. Reliance on this assumption should be emphasised in the e*conomic valuation* Report.

The e*conomic valuation* should reflect:

(a) the assumed basis of apportionment of tax between statutory funds (where relevant);

(b) *proprietors'* entitlement to imputation credits resulting from dividends received and tax paid; and

(c) the value to the *proprietors* of any accumulated imputation credits at the valuation date.

8.2.10 Bonus and Crediting Rates

Where relevant, assumed future bonus and crediting rates should be consistent with assumed rates of investment return and capital growth. In forming an opinion on appropriate assumptions the *actuary* should consider:

- the bonus and crediting rate strategy of the business;

- whether or not this has been applied in the past; and

- the likelihood that it will be applied in the future.

8.2.11 Market Positioning

The assumptions should have regard to the size and growth prospects of the organisation's markets and the organisation's position in those markets, in particular:

(a)   competition within those markets;

(b)   the company's distribution *methods*, costs and future viability; and

(c)   any other relevant external factors.

They should also be reasonable in the light of the company's internal structure, in particular:

• the strength of its management; and

• its operating efficiency.

In addition, the *actuary* should consider the sustainability into the future of projected profit margins and in particular whether there should be an allowance for future margin squeeze.

8.2.12 Impact of Change in Nature of Business

The e*conomic valuation* should take into account any changes that are expected to occur in the nature of the business conducted by the business.

Such changes could include:

(a)   different business plans;

(b)   different bonus and crediting rate strategies;

(c)   cost structure changes;

(d)   heavy voluntary discontinuances;

(e)   contract repricing or redesign; and

(f)   revision of investment policy.

Where these expected changes result from assumptions regarding future management decisions and actions, these should be agreed with the *Principal* and stated in the *economic valuation* report.

The assumptions should allow for the costs associated with the assumed changes in the nature of the business.

8.3   Model points

Model points are frequently used as part of the cash flow *model* of particular products within a life insurance entity. It is important that the number of *model points* chosen reflects the diversity in pricing, potential performance of the product and the materiality and purpose of the valuation.

Individually underwritten risk products tend to display a diversity of premium rating and performance characteristics relating to factors such as age, sex, smoker status, underwriting acceptance status, period since inception and occupation. It would be usual for detailed *models* with many *model points* to be required to adequately represent all of these characteristics.

In the case of group risk schemes, the nature of the underwriting and premium rating processes, together with any experience refund arrangements that may apply, can mean that less detailed *models* with fewer *model points* may be appropriate.

8.4   Testing the model

One or more of the following types of *model* are typically used to determine an *economic valuation* of *life insurance business*: cash flow, probability, economic and risk.

It is important to confirm the reliability and consistency of these underlying *models*.

It may be possible to gain access to other *models* maintained by the *life insurance business* for management and other purposes. It is likely that the Appointed Actuary will have *models* of products for use in determining policy liabilities. In addition, there may exist related *models* used for business planning purposes.

Results from *models* developed for determining *economic valuations* should be validated against the results from other *models* allowing for the different purposes and uses. For example, while *models* used in determining policy liabilities can share many similarities with *models*

developed for *economic valuations*, the treatment of expenses can differ.

9.   ANALYSIS OF RESULTS

9.1   Introduction

Analysis of the valuation results is important to assist in communicating the valuation results to the *principal* and to assist in verifying the accuracy of the valuation results.

In analysing the valuation results, consideration should be given to the consistency of the results against other information available from within the business, potentially including:

- reported profits;

- management business plans and related projections;

- management pricing projections and analysis; and

- financial statements and management accounts.

9.2   Components of Value

For *life insurance business*, the following components of value should normally be disclosed, where consistent with the valuation *method* employed:

- adjusted net assets;

- value of *existing business*;

- value of new business; and

- value of franking credits (if relevant to the valuation *method* used).

The adjusted net assets should be consistent with the valuation *method* employed and the other components of the total valuation result.   In some circumstances it may be useful to reconcile the adjusted net assets to the net assets shown in published financial statements.

Where appropriate, the valuation results should also be disclosed by major lines of business. Lines of *life insurance business* may ordinarily include:

- traditional (eg. whole life, endowment);

- risk (eg. yearly renewable term insurance, disability income insurance);

- retirement income (eg. lifetime annuities, allocated pensions);

- investment linked savings;

- investment account savings; and

- corporate/group.

Within these product lines, results in respect of participating business would normally be disclosed separately.

9.3 Analysis of Change in Value

The analysis of change in value in respect of *life insurance business* should generally identify, as a minimum:

- the effect of changes in the valuation *method and model.* This could include changes in *methods*, *model* enhancements and corrections;.

- value expected to emerge over the period;

- experience variations in *operating experience* over the period;

- the effect of changes in the valuation *assumptions*. Details of the effect of the more material individual *assumption* changes should be shown separately. In respect of *life insurance business*, the key potential assumption changes will normally include :
  — investment earnings rate and inflation;
  — risk *discount rate* (if relevant to the valuation *method* employed);
  — decrement or claim rates eg. mortality, morbidity;
  — lapse or surrender rates;
  — expenses, both initial and renewal;
  — new business growth and profitability; and
  — profit sharing;

- growth in business volumes and change in the mix of business;

- the effect of a change in *capital adequacy requirements* (if relevant to the valuation *method* employed); and

- any capital transfers into or out of the business, including dividends.

9.4   Key Drivers of Change in Value

The key drivers of *economic value* for the main lines of *life insurance business* are discussed in Section 3.

Additional consideration should be given to other business and environmental factors including:

- sustainability of future profit margins;

- distribution dynamics; and

- economic and market level growth.

The key value drivers may be different for *existing business* and future new business.

9.5   Analysing and Portraying Uncertainty

9.5.1 Stochastic Modeling and Simulations

Stochastic modeling can be used to demonstrate the impact of investment market *uncertainty* on valuation results. This can be particularly relevant for products such as immediate annuities and those products with significant embedded guarantees or options.

9.5.2 Scenario Testing

For *life insurance business*, the particular combinations of assumptions to test would typically include:

- surrender rates and investment earnings;

- initial expenses and sales volumes;

- investment earnings and sales volumes; and

- surrender rates and claim rates.

9.5.3 Sensitivity Testing

For *life insurance business* the following sensitivities may be particularly important:

- the assumed rates of investment return;

- expense rates;

- lapse and surrender rates;

- new business volume, growth and mix;

- mortality/morbidity; and

- the risk *discount rate* (depending on the valuation *method* employed).

9.5.4 Stress Testing

The stress testing scenarios that may be particularly relevant for *life insurance business* include:

- a significant correction in investment markets;

- mass or 'shock' lapses; and

- a significant increase in expenses.

10. COMMUNICATION AND DISCLOSURES

The communication and disclosure requirements are outlined in the GN511.

END OF GUIDANCE NOTE 252