A FRAMEWORK FOR THE REGULATION OF LONG–TERM INSURERS:

SOLVENCY ASSESSMENT AND THE ROLE OF THE STATUTORY ACTUARY

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A dissertation submitted to the Faculty of Science, University of the Witwatersrand, in fulfilment of the requirements for the degree of Master of Science.

Johannesburg, 2012

Aan my vrou, Joritha en my kleinspan: Dirkie, Peet, Suritha en Lené

DECLARATION

I declare that this dissertation is the result of my own work. To the extent usually and reasonably expected, assistance and peer review were received from my supervisor. The dissertation is being submitted for the degree of Master of Science in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University. I was employed by Hollard Life Assurance Company Limited during the period during which the dissertation was written.

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ABSTRACT

In this dissertation the theory of solvency assessment for long-term insurers is reviewed and how it evolved. Key international bodies and standards are identified and selected jurisdictions' solvency frameworks are reviewed. The South African framework required by legislation introduced in 1998 is compared to these standards. Solvency capital requirements, valuation methods and risk management standards are the key areas considered. The financial results of a model office according to the South African requirements are compared to the financial results modelled stochastically according to the identified international standards.

It is shown that the South African framework does not meet international standards. The key problem areas are the prescribed nature of the solvency capital requirement, the onerous treatment of policy cancellations and the treatment of new business.

The role of actuaries in solvency assessment is also investigated. South Africa's statutory-actuary role is compared with similar international roles. It is concluded that although similar international roles, notably the appointed actuary of the UK, have evolved the role of the statutory actuary has remained the same.

ACKNOWLEDGEMENTS

The author acknowledges the mentorship and inspiration from Professor RJ Thomson.

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CHAPTER ONE
INTRODUCTION

In early 2010, the South African regulator of long-term insurance announced that the local solvency assessment framework would be replaced with a framework similar to the European framework commonly referred to as Solvency II. At the time, Solvency II had not been implemented in Europe. The new framework would replace the one required by the Long Term Insurance Act, 1998[1] (LTIA). A project, known as the solvency assessment and management (SAM) project, was initiated. The SAM project involved representatives from the Financial Services Board (FSB), long-term insurers, professional and industry bodies. Since the early 2000s, other countries such as the UK, USA, Switzerland and Australia also have had major changes in their approaches to solvency assessment.

1.1 Aim of Research

In this dissertation the theory of solvency assessment of long-term insurers is investigated and how it evolved is analysed. The key international bodies and standards are identified and selected jurisdictions' solvency frameworks are reviewed. The South African framework required by the LTIA is assessed by comparing it to these international standards through the comparison of solvency capital requirements and risk management standards. Furthermore, the solvency position and profit recognition of a long-term insurer that writes only term-assurance policies are modelled according to the LTIA requirements. These results are compared to the results modelled stochastically according to the identified international standards.

Over the past decades, actuaries have played a key role in the solvency assessment of long-term insurers. For developed countries most jurisdictions have reserved roles for actuaries in the solvency assessment framework. South Africa is no exception. A statutory actuary is required by the LTIA.

[1] Act no. 52 of 1998 as amended, Republic of South Africa

The role of the statutory actuary is reviewed and compared to similar international roles.

1.2 Outline of Content

The theory of regulation is reviewed in Chapter 2. The economic theories of regulation, regulation for long-term insurers and types of regulation are considered. The chapter ends with the results of empirical studies and the effect of the global financial crisis of 2007.

For long-term insurers the determination of solvency is less straight forward than for other companies. This is mainly due to number of assumptions involved in the calculation of the value of policyholder liabilities. In Chapter 3 the definition of solvency and the meaning of solvency assessment are considered. The development of solvency assessment over the past century in Europe is presented and discussed.

The key international bodies that influence regulatory solvency frameworks are identified in Chapter 4, followed by a detailed consideration of local and other selected international solvency assessment frameworks in Chapters 5–12. In this part, the regulatory role of actuaries in solvency assessment is considered in Chapter 7. South Africa's statutory actuary role is compared with selected countries' roles of actuaries in similar positions

The South African solvency assessment framework is compared with international standards in Chapters 13–16.

Conclusions and recommendations are given in Chapter 17.

1.3 Methods

The main content may be grouped into two parts. The first part, Chapters 2–12, gives an overview of the theory of regulation, solvency assessment, international standards and South Africa's solvency framework. This part consists of literature reviews. These reviews include published and

unpublished work. It also includes references to professional guidance, standards and legislation. In Chapter 7 the role of the statutory actuary is considered and consists of a literature review and the results of a questionnaire sent by the South African regulator to selected countries' insurance supervisors.

The second part, Chapters 13–16, compares South Africa's solvency assessment requirements to international requirements. Two methods are used. The first method introduces a scoring system whereby the South African solvency assessment framework is rated by reference to the international criteria. The second method is the comparison of the financial results of a new long-term insurer modelled according to the local and international requirements. For the purposes of this dissertation, the financial results according to local requirements are modelled with a deterministic model, while the financial results according to international requirements are modelled stochastically.

CHAPTER TWO
REGULATION

Worldwide, the long-term insurance sector is renowned for its high level of regulation. Regulations exist for market conduct, financial arrangements, prices and many other areas. Falkena et al. (2001) use the term 'regulation' in:

> "...a generic sense that encompasses regulation (the establishment of specific rules of behaviour), supervision (the more general observation of the behaviour of financial firms) and enforcement (ensuring the rules are obeyed)."

Actuaries must be aware of these regulatory requirements, which are often constraints, in almost all disciplines in the long-term insurance industry. For example, pricing actuaries need to be aware of market-conduct regulation, price limits and capital requirements. Valuation actuaries must be cognisant to financial and reporting regulations. Indeed, in South Africa statutory actuaries have an obligation to notify the regulator in certain circumstances when legislation is breached.

This chapter firstly considers economic theory of regulation. Amongst others, reviews are made and conclusions are drawn from Booth (1997) and Klein (1995). Next in this chapter, regulation for long-term insurers is considered. Finally, the approach to insurance regulation is discussed with reference to the benefits of a particular type of regulation, namely 'contract regulation'.

2.1 Economic Theory of Regulation

Posner (1974) refers to economic regulation as:

> "taxes and subsidies of all sorts as well as to explicit legislative and administrative controls over rates, entry and other facets of economic activity."

To protect its own benefit, Stigler (1973) argues that regulation is mainly sought by an industry. Two alternative views exist. The first view is that regulation is necessary to protect the public or sub-sections of the public. The second view is that the political process is irrational and fraught with self-interest of politicians.

In this chapter more recent views are described on the theory of economic regulation with specific reference to the long-term insurance industry.

2.1.1 Market socialism

Booth (1997) defines 'market socialism' as the situation where the government owns productive resources. Prices are set by government according to marginal cost. In this sense, the government aims to simulate the outcome of an efficient market. Lange (1936) argues that the central planner, such as a government, will have the ability to raise or cut prices in response to supply and demand. In theory, the 'kind central planner' can therefore clear markets.

Shleifer & Vishny (1994) divide the theory into 'totalitarian socialism' and 'democratic socialism'. The former refers to the case where an ideal dictator, who is free from military and political challenges, is not concerned with unemployment, political competition or any other problems. A strictly rational dictator would only be concerned with the maximisation of personal wealth, for example building monuments. Shleifer & Vishny (1992) argued that shortages of goods occur because of the self-interested behaviour of the "ministry bureaucrats who set the planned prices and output". By creating shortages the managers or ministries could profit through bribes from rational consumers.

In democratic socialism, on the other hand, the government is extremely responsive to the will of the people. Shleifer & Vishny (1994) argue that this model will not maximise economic efficiency. Before an election for a new

government, the campaigning party will promise to serve the people and is likely to focus on popular themes. As a result, even where a government is democratically elected, self-interest will eventually lead to government interventions.

2.1.2 Freedom with publicity

Booth (1997) states that in neo-classical economics, consumers react in an efficient way to prices and product quality given their budget constraints. Product quality for long-term insurance companies would include the ability to pay claims. Under a standard set of assumptions, this model will maximise economic welfare.

One of the key standard assumptions is perfect competition. Where this assumption does not hold, this could be corrected by a so-called "freedom with publicity" regulatory framework. This means that government forces disclosure of information that in theory will result in consumers' rational behaviour that is consistent with behaviour in a competitive market.

Regulatory disclosure is common in the long-term insurance industry. In South Africa market-conduct and financial regulations that require disclosure exist. The policyholder protection rules[2] and the statutory actuary's statement[3] are examples.

Booth (unpublished) mentions that from 1870 to the mid 1990s this type of regulation had been closely followed by the United Kingdom of Great Britain and Northern Ireland (UK) insurers. The regulations do not necessarily prevent company failures because companies will make mistakes. Insurance failure may result in consumers' reassessing their risk or regulators' reassessing the regulations. An insurer failure is not necessarily a reason to

[2] Policyholder protection rules under the Long-term Insurance Act, Act no. 52 of 1998 as amended, Republic of South Africa
[3] Companies Act, Act No. 61 of 1973, Republic of South Africa

increase regulation. Over-regulation may stifle innovation and result in a sub-optimal economy that does not maximise economic wealth.

2.1.3 Public interest

Public-interest theory states that a benevolent government can fix market imperfection through regulation. These imperfections may be wider than for freedom with publicity. According to public-interest theory there are various justifiable reasons for government intervention in insurance business. Klein (2001) states that the owners of long-term insurers have a "diminished incentive to maintain a high level of safety." Booth (2007) asserts that this phenomenon is due to time inconsistency:

> "An agent (the insurer) makes a promise that it will prefer to break in the future."

Traditional reasons for insurance regulations are twofold. Firstly, Klein (2002) explains that it is costly for consumers to assess the quality and price of services associated with the financial strength of the insurer. Secondly, insurers may engage in risky strategies that may result in inadequate prices. This may result in price competition where the insurance sector takes on risk at prices that are too low. In the past, regulators typically introduced minimum price limits for products to prevent this occurrence.

Regulators may introduce maximum price limits. This may occur if there is not a competitive market or if consumer sophistication is insufficient.

2.1.4 Public choice

Public-choice theory explains the behaviour of those in government by considering their actions in an economic framework. Klein (2002) states that economic theory suggests that self-interested regulators aim to maximise political support rather than maximising economic efficiency. Regulators are government agencies. They will therefore be influenced by the aims and

ambitions of the ruling government. Booth (1997) explains that in a neo-classical economic framework a connection exists between success in promoting economic welfare and reward. As explained by Klein (op. cit.), this connection does not exist for politicians in the development of regulations. One way of obtaining public support is through price regulation. Numerous papers without any empirical evidence had been published to predict the possible effect of price regulation for insurance. Danzon & Harrington (2001), however, showed empirically that price controls increase cost for worker's compensation insurance. They have shown that rate suppression increases the cost of claims that will lead to higher premiums contrary to the regulator's initial intent. These results were both economically and statistically significant.

Consumer groups are expected to lobby for more regulations. Self-interested regulators will aim to satisfy these pressures. Referring to Meier (1988), Klein (2002) states that more regulation created this way negatively restricts the insurance industry in a way that does not promote industry interests. An example of regulations that have been implemented due to consumer pressure is the use of gender as a factor in the calculation of insurance premiums and benefits in relation to insurance contracts in Europe from 21 December 2012.[4]

Booth (unpublished) also refers to 'capture theory'. In this theory interest groups have control over policy makers that are responsible for the regulatory process. Regulations may therefore develop for the perceived benefit of the interest groups.

2.1.5 Austrian economics

An overview of 'Austrian economics' is given by Booth (1997). According to this theory a market never reaches the stage of an idealised model such as perfect competition. There is a constant process of trial and error in search of the most efficient economy. It is impossible for a regulator to have adequate

[4]Press release no 12/11,1 March 2011, Court of Justice of the European Union, Test-Achats case

information to improve the workings of the market. In this environment failures will occur but should serve as part of the learning process. The Austrian economists believe that a lightly regulated economy will not necessarily fall into a state of disorder.

2.1.6 Market fundamentalism

Soros (2009) refers to the term 'market fundamentalism' as the false belief that financial markets tend toward equilibrium and that random deviations can be attributed to external causes. To the advantage of the owners and managers of financial capital, this theory has been used to justify the existence of deregulated markets.

Avgouleas (2009) criticises the 'fundamental assumption of modern financial theory' that markets only move on the expectation of rational expectations, i.e. that asset prices are set by rational investors. This criticism stems from behavioural finance theory which challenges two aspects, namely:

- that certain observations cannot be explained by the assumption of rational behaviour; and
- that the corrective actions of arbitrage trading are limited due to a number of restrictions.

Stiglitz (2003) explains that the consequence of market fundamentalism is the existence of systemic risks. These risks are often ignored because "markets are intended to solve almost all problems." As a result, international crises have become regular events.

2.2 Regulation for Long-term Insurers

Klein (1995) states that the two primary categories for insurance regulation are solvency regulation and market regulation. The primary categories can be seen as protecting policyholders before and after entering into an insurance contract. The objective of solvency regulation is to ensure that long-term

insurers meet the regulatory standards and to notify the regulator if policyholder benefits may potentially be jeopardised. Market regulation includes a wide range of activities such as premium rates, policy design and underwriting practices.

Falkena et al. (2001) refers to two additional objectives of financial regulation, namely, securing systemic stability in the economy and ensuring institutional safety and soundness. Systemic stability encompasses a system where long-term insurers can operate competitively and have access to appropriate liquid financial instruments to conduct their business. Institutional safety and soundness include solvency and market regulation as described by Klein (op. cit.).

2.2.1 Benefit and protection of policyholders

The European Parliament has adopted a directive[5] that lays down the rules of insurance business in the European Community. Article 27 states that the main objective of supervision is the protection of policyholders and beneficiaries. This statement covers many areas, such as general market conduct, financial stability, investor confidence and fair treatment in terms of company discretion on behalf of its stakeholders. A critical aim is global financial stability.

Short-term insurance products, health-insurance products and group-life products are usually transferable from the original insurer to other insurers[6] without the reduction of benefits of policyholders with no incurred claims. The policyholders at risk and in need of supervisory protection in case of an insurer failure are the ones with incurred claims. Long-term insurance, on the other hand, may require the build-up of provisions from early durations of the policy to provide for benefits that may be payable at later durations. The build-up of provisions of a long-term insurance contract depends on the nature of the insurance contract including an annuity. Provisions are required for the

[5] General rules on the taking-up and pursuit of direct insurance and reinsurance, 2009
[6] International Actuarial Association, A global framework for insurer solvency assessment, 2004, page 10

savings element of endowment policies. Guarantees such as level future premiums, future insurability, surrender values and investment return may also require the build-up of provisions from early durations of the policy.

At inception, the full benefit of an insurance contract is payable in the future. Contingent benefits, such as a death benefit, may be payable after many years. This is unlike most goods and services where the benefit of the good or service is immediately available to the consumer, for example a hair-cut or food. The misappropriation of policyholder funds may have serious implications for the long-term savings industry such as low levels of savings, loss of policyholder benefits in full or in part on failure of a company and loss of confidence by investors.

Insurance products are generally more complex than other goods and services. There are various reasons for this complexity. Life cover, for example, is often not a tangible commodity that consumers can instantly enjoy, but is rather a necessary evil often required by third parties such as banks to protect a loan. However there are values that can be perceived by the consumer, such as the protection of dependants in the event of death of a breadwinner. The variety and different features of products may also make it difficult to compare value, for example:

- an individual-life cover product sold through an independent financial advisor that requires upfront medical evidence of the proposer's state of health;
- cover offered through a compulsory group scheme by an employer; and
- credit life offered by a bank to cover a loan that requires no underwriting.

Invalid comparisons with other financial products may also compromise the perceived value proposition of a long-term insurance product. An example of an invalid comparison is the comparison of the surrender value of a whole-life policy during the first few years with the accumulated amount of the same

premiums in a bank account. The consumer may inaccurately conclude that a bank account offers superior benefits if the cost of risk benefits and sales cost are ignored.

Another complication to the consumer is the existence of various long-term insurance products where discretion is exercised by the long-term insurer. Areas of discretion include the level of surrender penalties charged on withdrawal of a contract and bonus allocations to with-profits policies. Consumer confidence may easily be damaged without adequate disclosure and transparency at different stages throughout the term of a policy. Initiatives, such as the mandatory publication[7] of a company's "Principles and Practices of Financial Management" have been promoted by the Financial Services Board (FSB) to improve transparency.

Uncertain terms of a contract may also be harmful to consumer confidence. Deferred underwriting such as the exclusion of pre-existing conditions at claim stage is an example. Uncertainty may arise to the extent that a policyholder was aware of a medical condition or not.

These issues can all be addressed through legislation to ensure the protection of policyholders and beneficiaries.

2.2.2 Systemic stability

Systemic stability refers to the smooth running of financial markets to the extent that there are no shocks due to their own doing. An example for the long-term insurance industry may be adequate provision to pay future administration cost and expected benefit payments to policyholders. Systemic stability does not include external shocks to the financial markets such as, for example, terrorist attacks or political unrest.

2.2.3 Institutional safety and soundness

[7] FSB, Directive 147.A.i (LT), Governance of discretionary participation business, 2006

Institutional safety and soundness refer to a regulatory environment whereby long-term insurers can be sufficiently profitable, competitive locally and globally and adequately capitalised to cover overall risks faced by the industry. This includes long-term insurers that have sufficient level of solvency capital to withstand adverse risk events.

Another function of supervision is to oversee the exit strategy under failure of a long-term insurer. This may include the transfer of obligations to a third party, the closure of new business or the assumption of management for a recovery period.

2.3 Types of Regulation

Falkena et al. (2001) describes the spectrum of the approaches to financial legislation from highly prescriptive and rule-based on the one side to principle-based determined by long-term insurers' own internal assessments on the other side. The latter is termed 'contract regulation'. Effectively, the long-term insurer agrees principles and objectives with the regulatory agency that will be used in the future. This may be regarded as a 'contract' or agreement between the long-term insurer and regulatory agency.

The IAIS paper[8] (referred to as the 'IAIS common structure') described below is strongly biased towards contract regulation with emphasis on internal risk assessment and management by companies. Solvency II also highlights the importance of own risk assessment. Capital requirements under Solvency II are based on principles rather than prescriptive rules. An important change in the United States of America (USA) is the recognition of the benefits of contract regulation. Since 2006, the American Academy of Actuaries has presented and continued to interact with the National Association of Insurance Commissioners (NAIC) on principle-based reserving**.**

[8] The IAIS common structure for the assessment of insurer solvency, 2007

2.4 Advantages of Contract Regulation

Falkena et al. (2001) states the advantages of contract regulation. Below is more detail regarding these advantages under the following headings:

- flexibility to the regulator;
- cost-effective;
- wider range;
- spirit of regulation;
- benefit to the industry and ability to manage complex definitions; and
- coping with change.

2.4.1 Flexibility to the regulator

There may be more scope for the regulator to accept or decline actions of companies. The regulator is not prescribing a fixed set of rules that determine the regulatory regime. The individual companies themselves define their means of achieving the objectives of the regulator. These companies' objectives must be accepted by the regulator before implementation. The regulator may reject individual companies proposed methods or require adjustments.

On the other hand, the companies may tailor their principles and objectives in a way that fits the corporate culture of the long-term insurer. Collaboration rather than prescriptive rules may achieve the objectives of the regulator more effectively.

2.4.2 Cost-effective

It is argued by Falkena et al. (2001) that the regulated long-term insurer may reduce costs since while the insurer aims to achieve the regulator's objectives, it may do so taking into account its own circumstances. Principle-based

regulation may well reduce the number of failures of financial-services companies.

On the other hand, the regulator may need more resources to assess each long-term insurer's individual interpretation of its objectives and its means to achieve those goals. Additional rules must also exist for long-term insurers that do not successfully negotiate approaches that are acceptable to the regulator. These extra costs will ultimately be borne by the consumer of financial services products if the regulator recovers the cost from the long-term insurers.

2.4.3 Wider range

It may be possible for the regulator to cover a wide range of diverse companies without directly providing for each company's individual circumstances. An overly prescriptive regime may well stifle innovation.

2.4.4 Spirit of regulation

Principle-based regulation favours compliance with the intention of the objectives of the regulator. Rule-based approaches motivate companies to interpret the regulations in isolation and without regard to the regulator's objectives.

2.4.5 Benefit to the industry and ability to manage complex definitions

Clear objectives from the regulator may benefit the industry as a whole. An example is the concept of policyholder's reasonable expectation, which evolved to treating customers fairly. This concept is complex to define by a finite set of rules, but the principle is more readily understood.

2.4.6 Coping with change

Contract regulation may be more flexible to change than a rule-based environment. An example is the introduction of new products with new

features. The objectives of the regulator should still be met, but a rule based environment may be too rigid to manage such a situation.

2.5 Empirical Studies

Bennet et al. (1984) produced a comprehensive paper as the result of the work by the Faculty of Actuaries European research group. The study compares the regulatory frameworks of Denmark, France, Germany and Netherlands with each other and with the UK framework. The research considers:

- legislation;
- taxation;
- the market place;
- premium bases;
- assets and liabilities;
- profits and bonus systems; and
- the role of the actuary.

At the time of the research there was a common perception that the UK enjoyed minimal legislative controls and restrictions. The conclusion of the research was that this was not the case and that in some cases the UK had more controls than some of these European countries. Actuarial management was one of the most significant differences between the countries in the study. This is effectively additional and independent requirements imposed by the UK's actuarial profession on its members, rather than requirements from the legislator. The research group also concluded that despite the regulatory constraints of long-term insurance business in these countries the industry still managed to grow faster than inflation. This growth came from existing companies with minimal new entrants. Despite the limited number of new entrants, the research group argued that the flexibility of the UK legislation permitted individual companies to change strategies to allow for competitive innovation.

The Conference of European Insurance Supervisory Services (CEISS) has been in existence since 1949[9]. Members meet at least every two years for a day to exchange information regarding supervisory issues. The London Working Party (unpublished) (referred to as the 'Sharma report') presented a paper that examined the risks of insolvency. Twenty-one company failures were studied. A comprehensive list of risks and recommendations was put forward to the European Commission (EC). These were to be taken into account for the new European solvency framework. The study concluded that the cause of insolvency is not one event, but a chain of causes. Eventual financial distress is caused by a trigger event that is the result of all these causes. Regulations should focus on risk practices, internal processes and appropriate solvency capital.

Booth & Morrison (2007) argued for limited regulation. In the past, new regulations were the results of failed companies. By only focussing on failures will be a mistake if the effect on the long-term industry and its stakeholders are ignored. Plantin & Rochet (2007) confirms this view. Booth & Morrison (op. cit.) criticizes analysis of market failures by highlighting the unrealistic assumptions, in particular:

- perfect markets do not exist;
- regulators do not have perfect knowledge; and
- regulators are unlikely to work in the public interest.

The research compares the regulatory practices in the USA and the UK with a proposed system of regulatory competition. Regulatory competition could be defined as the ability of a long-term insurer to choose its regulatory framework. For example, a European company may operate from a different member country if those regulations are more suitable to its business plans. An important point that is highlighted by Booth & Morrison (2007) is that the UK had produced a much lower rate of company failure than the USA despite a comparatively lighter regulated insurance market. It is further stated that,

[9] Resolution of the conference of European insurance supervisory services, 1995

although the level of insolvencies cannot be considered as an indicator of the success of regulation, one can at least say that lighter regulation does not necessary mean an inevitable weakening of standards.

2.6 The 2007-2008 Global Financial Crisis

Avgouleas (2009) explains the causes of the global financial crisis that erupted in 2007. During the period from 1998 to 2007 the world economy entered a stable environment with relative low interest rates. Favourable macro-economic conditions, financial innovation and a large number of new market participants resulted in unwarranted growth of credit markets. The relaxation of global capital restrictions allowed large hedge funds, which were unregulated investment funds, to enter global credit markets. These hedge funds were capitalised through debt and, in turn, invested in a wide range of credit derivatives and financial structures. A common structure was the pooling of debt that was securitised by property. Hedge funds and other institutions acquired this debt from banks and mortgage originators. Credit ratings were obtained from well-known credit agencies to give an indication of the security of the expected debt repayments.

As a result of the on-selling of loans from the originator to third parties, underwriting standards deteriorated and credit was extended to individuals who could not afford it. Property prices increased significantly. Although the original loan extended by the bank was sold to a third party, the bank also lent money to them for funding these transactions. The banking sector had therefore not reduced their risk exposure to the original loans. When the defaults started to occur, property prices reduced significantly, creditors could not fulfil their obligations and credit extension virtually stopped. Worldwide, governments intervened to prevent a total collapse of the financial sector.

The main reasons for the global financial crisis were:

- unjustifiable underwriting practices;

- credit ratings that failed to highlight the risks of the ‘innovative’ financial structures;
- weak risk-management practices in large institutions; and
- inadequate regulatory policies.

As a result of the global financial crisis, regulatory changes are inevitable for the financial industry, including long-term insurers. New regulations are likely to include unregulated entities such as hedge funds. Avgouleas (2009) argues that it is key to regulate systemic risk—both nationally and internationally.

CHAPTER THREE
SOLVENCY ASSESSMENT

For solvency assessment the definition of 'regulation' by Falkena et al. (2001) encompasses all three aspects of regulation, i.e.:

- the establishment of rules of behaviour;
- the observation of the behaviour of long-term insurers; and
- enforcement.

Solvency assessment is, however, not only a regulatory requirement. Porteous & Tapadar (2008) considers asset allocation for financial firms based on an economic capital assessment. Two similar definitions of economic capital are given. One of these definitions states that economic capital is the "excess assets" that a firm needs to hold on a "realistic basis" to remain solvent over a "specified time horizon" with a "prescribed probability". This definition could intuitively be used for solvency assessment. The authors argue that four parties are interested in the economic capital of a company for different reasons, namely:

- firms, such as long-term insurers, require an economic assessment for efficient balance-sheet management to optimise profit;
- regulators should require that the amount of regulatory capital is at least equal to the amount of economic capital;
- rating agencies are interested how a firm's actual capital structure compares with the economic capital structure; and
- capital providers are interested in the safety of potential investment and are therefore also interested in the comparison between actual and economic capital.

In addition to the four parties mentioned by the authors, policyholders are interested in secure benefit payments.

This chapter gives an overview of solvency assessment.

3.1 The Definition of Solvency

The definition of solvency has evolved since the 1700's. Hägg (unpublished) describes a particular incident in Sweden. In 1724 a German merchant from Hamburg made a proposal to the Swedish government with the aim of establishing an insurance company. The company was to issue marine insurance. It would be well capitalised with large capital stock and thus be 'solvent'. For political reasons, the German was unsuccessful. It was only years later, in 1903, that the 'solvency principle' was set in the Swedish regulatory system to "safeguard the performance of all entered insurance agreements''.

Redington (1952) explains that there are three threats to long-term insurers' solvency. An insurer is solvent if assets exceed liabilities. The threats to solvency due to this definition are:

- mismatched liabilities;
- war risks; and
- guaranteed option values.

Ferguson (1976) describes the development of long-term insurers' solvency in the UK and the complexities in the determination of insolvency. The main difficulty is to specify the point where a long-term insurer should be wound-up. At the he wrote the paper, the UK had experienced a period of over fifty years with no long-term insurance company failures. The actuarial guidance at that time considered six factors that may affect the financial position of long-term insurers. The six factors are:

(a) premium rates of current and new business;
(b) the nature of contracts with particular reference to guarantees;
(c) the investment policy;
(d) future marketing plans;
(e) current and expected future level of expenses; and
(f) the extent of the long-term insurer's free estate.

Ferguson groups the six factors into three headings, namely:

- (a) and (b) – unsound premium rates;
- (d), (e) and (f) – expenses out of control; and
- (c) and (f) – asset failure.

The author highlights the point that the control of investments and the prevention of asset failure are crucial for the solvency assessment of a long-term insurer.

In October 1980, the Council of the Faculty of Actuaries set up a Working Party to investigate the criteria for solvency assessment of long-term insurers. Consequently, Hardie et al. (1984) investigated the interests of various parties in the solvency position of a long-term insurer. The parties are the prospective and current policyholders, management, shareholders and the supervisory authority.

Policyholders are mainly concerned that their claims are paid when they fall due. They would also be concerned that profit distribution is reasonable when compared with other companies in the case of discretionary participating policies.

Management and shareholders are concerned that claims are paid to policyholders when they fall due and that the company would be able to continue to operate properly. To address these concerns the terms of new business in the future for policyholders and the expected returns to shareholders must be satisfactory.

The supervisory authority is less concerned with the competitiveness of a company's bonus payments. The company's ability to pay claims to policyholders when they are due and its ability to maintain an effective solvency margin are highlighted as critical factors to the supervisory authority.

Hardie et al. (1984) makes a critical statement in ¶2.2.7: "The Working Party has taken the view that solvency must be a matter of probability." This view may be partially true, but does not recognise that solvency and risk management cannot be separated. A modernised version of the statement might state that solvency must be a matter of conditional probability—that is conditional on defined risk-management practices. This is because a regulatory framework:

> "…cannot just be about capital requirements; no amount of capital can substitute for the capacity to understand, measure and manage risk and no formula or model can capture every aspect of the risks an insurer faces." [10]

Choksi (2007) defines three types of insolvency, namely:

- balance-sheet insolvency—where liabilities exceed assets;
- cashflow insolvency—where debt cannot be paid when it is due; and
- bankruptcy—formally filed for by the distressed corporate through a legal process.

Regulators are concerned about balance-sheet and cashflow insolvency. They manage the financial wellbeing of long-term insurers through regular solvency assessments and ad-hoc information requests.

3.2 The Meaning of Solvency Assessment

The results of a solvency assessment may be different depending on the purpose of the assessment. The purpose can generally be grouped by the party that requires the results. Two bases are commonly referred to:

- a 'break-up basis' is the assessment of in-force business only; and
- a 'going-concern basis' is the assessment of in-force and future new business.

[10] Financial Services Authority, Solvency II: a new framework for prudential regulation of insurance in the EU, 2006

In the case of a wind-up, curators are interested firstly whether a long-term insurer is insolvent according to the 'balance-sheet insolvency' definition that is determined on a break-up basis. The result of this assessment will determine whether to file for bankruptcy or to secure an orderly run-off of the insurance portfolio.

Shareholders, rating agencies and management are interested in the financial strength of a long-term insurer, its ability to write new business and constraints from its capital structure. The assessment will be performed on a going-concern basis, with assets and liabilities valued fairly.

The past and current European development has influenced regulatory frameworks globally, including South Africa. The view of regulators has developed over time. To illustrate this development, the European solvency assessment for regulatory purposes is described below.

3.2.1 The 1979 European life insurance directive

Sandström (2006) gives an overview of how the European solvency framework developed over the last century. Building on the work of Professor T Pentikäinen in the 1950s, Champagne (unpublished) proposed measures for solvency assessment for long-term insurers. Most of the proposals were adopted years later in the first European solvency directive[11] (referred to as the First Life Directive).

According to Sandström (op. cit.), Campagne (unpublished) based his work on the principle that a long-term insurer would be solvent if the expected value of a loss is smaller than the value of the free assets. Campagne used data of long-term insurers from five European countries. His recommendation was that capital of 4% of the technical provision (policyholder liabilities) should be held to act as a 'buffer' against adverse experience. The buffer is termed the

[11] Directive 267 of 1979 on the coordination of laws, regulations and administrative provisions relating to the taking up and pursuit of the business of direct life assurance, Official Journal of the European Communities, L63/1

required solvency margin (RSM). Actual free assets are termed the solvency margin (SM). Insolvency will not necessarily occur if the SM is less than the RSM. The RSM is rather an early warning indicator for the regulator.

The First Life Directive adopted the recommended buffer of 4% of the policyholder liabilities. In addition, 0.3% of the sum at risk was required, so that:

$$\rho = 0.04V + 0.003R; \quad (1)$$

where:

ρ denotes the RSM;

V denotes the technical provisions; and

R denotes the sum at risk.

The sum at risk can be determined by:

$$R = S - V; \quad (2)$$

where S denotes the sum insured.

Allowance within limits for reinsurance was accepted. For term assurance a reduction of the second term in (1), was allowed.

Negative policyholder liabilities were not allowed. For net-premium valuations a Zillmer adjustment to reduce the value of liabilities was allowed. This is achieved by increasing the net premium by the Zillmer adjustment.

The Zillmer constant in this framework is determined by:

$$z = \min(0.035S, I); \quad (3)$$

where I denotes the actual initial expense.

For whole-life policies the Zillmer adjustment is then calculated by:

$$Z = \frac{z}{\ddot{a}_x}; \qquad (4)$$

where:

Z denotes the Zillmer adjustment that may be added to the net premium; and

$\ddot{a}_x$ is determined at the valuation interest rate less the assumed bonus loading where applicable.

Refer to Carroll (1975) for further detail regarding the net-premium valuation.

Over and above the result of the RSM, the First Life Directive also had restrictions on the assets that were allowed in determining the SM. Insolvency would occur if the SM was less than the guaranteed fund (GF). The GF is defined as:

$$F = {}^{\rho}/_{3}; \qquad (5)$$

There are still countries that use this method or principles from this method, for example Kenya[12], Mozambique[13] and India[14]. Until 1998, it was also the method used to calculate the regulatory capital requirement in South Africa.

3.2.2 The Müller report

The insurance committee of the EC requested the Conference of the Insurance Supervisory Authorities of the European Union Countries (CISA) to have the solvency regulations reviewed. A working group under the chairmanship of

[12] Insurance Act, 1984, Republic of Kenya
[13] Council of Ministers, Decree 42 of 2003, Regulations of financial guarantees
[14] Insurance Regulatory and Development Authority of India, circular 65, 2008

Dr H Müller produced a report[15] (referred to as the Müller report) with recommendations of changes to the regulations.

The Müller report concluded that solvency framework at that time was adequate, but made a few recommendations. The report stated:

> "The working group takes the view that the present solvency margin system has in essence proven its worth. However, some changes and additions are necessary."

The recommended changes were not fundamental. The report mentioned that long-term insurance failures would not have been prevented under stricter legislation. The most significant recommendation was to increase the minimum guaranteed fund, which is the minimum monetary amount a long-term insurer should hold. This increase should take into account inflation since the First Life Directive had taken effect 18 years earlier.

Members of the working group did not agree on the treatment of unit-linked investment business. Some of the working group members argued for a reduction in RSM from 4% to 0.25%. The conclusion was, however, that 4% was a sufficient but prudent margin.

The report also recommended restrictions to the assets that were allowed in demonstrating solvency.

A final recommendation was to clarify when a supervisor may intervene and what actions would be available to the supervisor.

3.2.3 The directives of 2002

Following the Müller report and further investigations, two life directives[16] were adopted by the European Parliament in 2002. The solvency requirements

[15] Solvency of insurance undertakings, CISA, 1997
[16] European Parliament and Council:

of the First Life Directive were altered to take account of these findings. The key changes were:

- assets had to be of those specified in the directive;
- quality and diversification of assets were specified;
- the minimum GF was increased to €3 million;
- the monetary amount of the minimum GF would increase with inflation determined with reference to the European index of consumer prices, but rounded to the nearest €100 000;
- a reduction to 1% of the technical liabilities (from 4% previously) for unit-linked business with guaranteed charges for more than five years; and
- a solvency margin of 25% of the previous year's operational expenses for unit-linked business with no guarantees.

The regular increase of the minimum GF would be reviewed annually but would occur only if the increase was more than 5%.

3.2.4 A new European solvency regime

In 1999, the EC's insurance committee confirmed[17] the implementation plan of the directives of 2002 discussed above. It also expressed the need to review the solvency regime after the implementation of these directives. This was the first time the new solvency framework was officially referred to as 'Solvency II'.

KPMG produced a comprehensive review[18] (referred to as the KPMG report) of the financial position of insurance undertakings from a regulatory point of view. The KPMG report was commissioned by the Internal Market

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- Directive 2002/12/EC, Amending Council Directive 79/267/EEC as regards the solvency margin requirements for life, 5 March 2002; and
- Directive 2002/83/EC, Concerning life assurance, 5 November 2002

[17] European Commission, Internal Market Directorate General, MARKT/2095/1999, The review of the overall financial position of an insurance undertaking (Solvency II review), 1999

[18] KPMG, Study into the methodologies to assess the overall financial position of an insurance undertaking from the perspective of prudential supervision, 2002

Directorate General of the European Commission. The study considered a wide range of methods and practices. It also compared the European Union's (EU's) insurance solvency framework with selected non-EU countries. The report covered the following key items:

- risk and risk models;
- technical liabilities;
- asset valuation;
- reinsurance;
- alternative risk-transfer arrangements and advance risk-reduction techniques;
- the effect of accounting changes; and
- the use of alternative supervisory methods.

The KPMG report and the Sharma report (discussed in §2.5) were two key contributions to the development of the Solvency II framework. The Solvency II framework is discussed in more detail in chapter 5.

3.2.5 A note on the determination of European policyholder liabilities

The First Life Directive did not specify a method to determine policyholder liabilities. (Policyholder liabilities are referred to as 'technical liabilities' or 'mathematical provisions'.) Instead, the method was to be in accordance with local requirements of member state supervisors. Most member states used the net-premium valuation method.

In 1992, the EC issued[19] minimum criteria for the valuation of policyholder liabilities. The criteria addressed the method and assumptions that had to be used.

[19] European Commission, Directive 92/96/EEC, The taking-up of the business of life assurance, Directive 92/96/EEC, 1992

Method

The determination of the policyholder liabilities must be calculated prospectively by prudent actuarial methods. Retrospective valuations are allowed if it can be shown that the result is at least as prudent as a prospective valuation. All contractual benefits must be allowed for. Expenses, including commission payments, must also be included and may be implicit, for example by reducing future premiums. For the determination of the discount rate, the method must take the assets held into account, although it is not specified how. Valuation methods must be consistent from year to year.

The liabilities must be calculated on a contract basis, i.e. per policy. Where the result of a policy liability is less than the surrender value, the liability must be increased to be at least equal to the surrender value. Approximate methods are allowed if it can be shown that the result is more prudent than the result of individual policy calculations

For liabilities, Exley, Mehta & Smith (1997) criticised the value obtained by the use of discount rates derived from a notional asset portfolio that is not a hedge portfolio. A hedge portfolio is a portfolio where the assets "behave in a way which is 'close' to a defined set of liabilities." A basic principle in deriving the economic price, or market price, is to ensure that the price of liabilities is consistent with that of equivalent traded assets. This is referred to as the 'law of one price'. The minimum criteria issued by the EC are inconsistent with the law of one price. One could argue that a regulator is interested in a value that is more conservative than the economic price for a liability. However, this may distort the intrinsic solvency position. Prudence should rather be explicitly held in the RSM.

Assumptions

The interest-rate assumption must be chosen prudently. Each European member state must determine a maximum allowed interest-rate assumption for liabilities that may arise in that state. For policies with interest-rate guarantees

the assumed interest rate must be limited to 60% of the yield on government bonds by the state in whose currency the contract is denominated. Valuators may assume a lower rate than the maximum rate. The interest rate used in the valuation of unit-linked contracts, single premium policies with a term less than eight years and with-profits business with no surrender values are not subject to the maximum interest rate, but the interest-rate assumption should still be prudent.

The ‘statistical elements’, such as mortality rates, must be set prudently.

The use of a constant interest rate to discount cashflows for all durations causes liability-price anomalies. Exley, Mehta and Smith (op. cit.) argues that the appropriate forward interest rates should be used instead. This approach has been adopted in Solvency II discussed in chapter 5.

CHAPTER FOUR
KEY INTERNATIONAL BODIES

This chapter identifies the main international organisations that influence insurance regulatory regimes or solvency standards.

4.1 The International Association of Insurance Supervisors

The key international association of supervisors of insurance business is the International Association of Insurance Supervisors (IAIS). Established in 1994, the IAIS represents insurance regulators and supervisors of 190 jurisdictions[20].

The IAIS has issued numerous principles, standards and guidance papers (PSG) around issues concerning regulators and supervisors of the insurance industry. Solvency is no exception. PSG exists on capital adequacy and risk practices.

4.2 The International Actuarial Association

Previously, the International Actuarial Association (IAA) was titled the *Comité Permanent des Congrès d'Actuaires*[21]. This organisation was established in 1895 and renamed the 'International Actuarial Association' in 1968. In 1998 the IAA was constituted and incorporated as an Association in accordance with Swiss law[22]. The seven aims of the IAA are stated in its statute and are mainly to promote the actuarial profession and skills globally.

The IAA has published guidance, papers and exposure drafts to assist actuaries of various practice areas. A comprehensive paper[23] on solvency measurement and principles has been published. This paper has been used extensively by various countries and supervisory organisations to assist in setting parts of the

[20] http://www.iaisweb.org/ accessed 2009
[21] International Actuarial Association, Decennial report, A profession poised for the future, 2008
[22] Statutes, approved 14 June 2008
[23] International Actuarial Association, A global framework for insurer solvency assessment, 2004

regulatory framework (see Chapter 9). It has also been used extensively in setting the IAIS common structure.

4.3 The International Accounting Standards Board

The International Accounting Standards Board (IASB) assumed the responsibility of setting accounting standards on 1 April 2001 from its predecessor body, the International Accounting Standards Committee (IASC). The standards were published as International Accounting Standards (IAS) by the IASC and are published as International Financial Reporting Standards (IFRS) by the IASB. Three of these standards are of specific importance to insurance, namely:

- IAS39 Financial instruments: recognition and measurement;
- IFRS4 Insurance contracts; and
- IFRS7 Financial instruments: disclosures.

4.4 The European Insurance and Occupational Pensions Authority (EIOPA)

In accordance with the new European financial supervision framework, EIOPA was established in January 2011 to replace the Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS).[24]

CEIOPS played a pivotal role in the first stage of developing the Solvency II framework.

The EC established CEIOPS in 2003[25]. In 2009 further provisions to the committee's role were established. The purpose[26] of CEIOPS was to advise

[24] Regulation (EU) no 1094/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Insurance and Occupational Pensions Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/79/EC, Official Journal of the European Union, L331/48, 2010
[25] European Commission, 2004/6/EC, Commission decision of 5 November 2003 establishing the Committee of European Insurance and Occupational Pensions Supervisors, 2004
[26] CEIOPS, Charter of the Committee of European insurance and occupational pensions supervisors (CEIOPS), 2009

the EC on policy issues regarding insurance and occupational pension schemes. In particular, the committee prepared draft measures for the implementation of EU directives. The committee was also tasked to ensure consistency in supervision between EU member countries and with other sectors such as banking.

CEIOPS consisted of members and observers. EU member countries were entitled to be represented as members and non-member countries as observers. Observers were typically countries that are part of the European Economic Area (EEA) such as Norway, Iceland and Liechtenstein.

The European system of financial supervision is an integrated network of national and European supervisory authorities that governs macro and micro prudential levels. This system includes three European supervisory authorities, namely one for the banking sector, one for the securities sector and one for the insurance and occupational pensions sector (EIOPA). In addition to the three specific areas, systemic risk is overseen by the European systemic risk board.

EIOPA is governed by its board of supervisors, which integrates the relevant national authorities in the field of insurance and occupational pensions in each member state. This is supported by the EU's national supervisory authorities, which have the expertise and information about insurance and occupational pensions matters. The authority is commissioned to monitor and identify trends, potential risks and vulnerabilities stemming from the micro-prudential level, across borders and across sectors.
EIOPA's objectives are:

- to better protect consumers, rebuilding trust in the financial system;
- to ensure a high, effective and consistent level of regulation and supervision taking account of the varying interests of all member states and the different nature of financial institutions;
- greater harmonisation and coherent application of rules for financial institutions and markets across the EU;

- to strengthen oversight of cross-border groups; and
- to promote coordinated European Union supervisory response.

4.5 *Comité Européen des Assurances* (CEA)

The CEA was established in 1953. The committee is a federation of national insurance associations from EU countries. Sandström (2006) states that this committee played a role in the 1960s to implement the First Life Directive. The committee's membership of over 30 associations has been stable over the past decade.

The mission[27] of the CEA is to:

- draw attention to strategic issues of insurance and reinsurance business;
- raise awareness amongst consumers and policy makers of the role of insurers and reinsurers in policy protection and economic growth; and
- promote a competitive market to the European consumer.

The CEA has expressed concern[28] about the large expected increase in regulatory capital for insurance companies as a result of the proposed Solvency II capital requirements.

[27] About the CEA, http://www.cea.eu accessed May 2010
[28] CEA, Why excessive capital requirements harm consumers, insurers and the economy, 2010

CHAPTER FIVE
SELECTED SUPERVISORY FRAMEWORKS

5.1 Solvency II

The Solvency II framework directive proposal[29] was adopted by the EC in July 2007. Following the publication of this proposal, a work plan has been agreed between the EC and CEIOPS, now EIOPA, for development, implementation and future work to be done on Solvency II. This initiative is a huge change to the European solvency framework discussed above. The initial target implementation date for EU countries was 31 October 2012[30], but has since been extended to 1 January 2013.

Solvency II is being created in accordance with the Lamfalussy[31] four-level process. Level one describes the framework principles—this involves the development of a European legislative instrument that sets out the necessary framework principles, including implementing powers for detailed measures at level two. The second level prescribes the implementing measures—at this level more detailed measures are developed to put the framework principles in operation. In the case of Solvency II the measures are prepared by the EC following advice from EIOPA. For level three additional interpretive guidance and common standards are developed (issued by EIOPA) with peer reviews of the reports issued in terms of the guidance to ensure consistency amongst practitioners. Lastly, in level four, consistent enforcement is ensured through more vigorous action by the EC and enhanced cooperation between the member states and their regulators.

[29] European Commission, Proposal for a directive of the European parliament and of the council on the taking-up and pursuit of the business of insurance and reinsurance (Solvency II), 2007
[30] Article 310 of EU directive "General Rules on the taking-up and pursuit of direct insurance and reinsurance", 22 April 2009
[31] Final report of the committee of wise-men on the regulation of European securities markets, 15 February 2001, chaired by Baron Alexandre Lamfalussy

The Level 1 Directive[32] (referred to the Solvency II directive) text was adopted by the European Parliament on 22 April 2009 and was endorsed by the Council of Ministers on 5 May 2009 concluding the legislative process for adoption. The remainder of the process is being developed with the aim to meet the target implementation date.

The Solvency II framework has the following three main components[33]:

- pillar 1 — quantitative requirements;
- pillar 2 — qualitative requirements and supervision; and
- pillar 3 — supervisory reporting and public disclosure.

The three pillars are not mentioned in the Solvency II directive, but are often used to explain the framework. These components are described in sections 5.1.1–3 below.

5.1.1 Pillar 1: quantitative requirements

Pillar 1 is an assessment that is based on an holistic balance sheet to set the solvency capital requirement and test whether the insurer has sufficient capital (own funds) to fulfil this requirement.

There are six sections:

- valuation of assets and liabilities;
- technical provisions;
- own funds;
- solvency capital requirement;
- minimum capital requirement; and
- investments.

In the Solvency II framework the valuation methods of assets and liabilities are vastly improved from those prescribed in the First Life Directive. Smith

[32] European Parliament, General rules on the taking-up and pursuit of direct insurance and reinsurance, 2009
[33] Commission of the European Committees, Explanatory memorandum, 2007/0143 (COD)

(1996) describes various valuation methods from financial economics that could be used by actuaries. Risk neutrality and cost of capital adjustments are two of these approaches that are used for the determination of the value of liability.

For the risk-neutral approach future cashflows are adjusted for risk by introducing probability theory. These cashflows are then discounted at the risk-free rate. Any profits or losses that arise by means of outperforming the government-bond market are purely speculative, since riskier investment strategies are utilised. This method is adopted in Solvency II– although, due to the major increase in the liabilities for annuities caused by the use of the risk-free rate, the discount rate has not been finalised.

Under the cost-of-capital-adjustment approach (COCAA) future cashflows are discounted at an expected earned rate. Capital is then allocated to absorb possible deviations from this expected earned rate. Before the future cashflows are discounted the cost of financing this supplementary capital is added to them. Smith (1996) argues that the supplementary capital should not be the regulatory solvency capital, which at the time did not take into account the nature of risk for a specific portfolio.

In the Solvency II framework some of the COCAA principles were introduced. For the determination of the value of liabilities the discount rate is not the expected earned rate, but rather the risk-free rate. Thus the cost of additional capital to absorb possible deviations from best-estimate cashflows is included as the risk margin component of the technical provisions.

There are, however, still inconsistencies with the law of one price. For example, the adjustment for risk under the risk-neutral approach does not take into account the creditworthiness of the insurer. This could easily be included by reducing the policyholder liabilities coupled with increased solvency capital requirements.

Valuation of assets and liabilities

The Solvency II directive has adopted the definition of fair value from international accounting standards. Article 74 states that:

> "assets shall be valued at the amount for which they could be exchanged between knowledgeable willing parties in an arm's length transaction; and liabilities shall be valued at the amount for which they could be transferred, or settled, between knowledgeable willing parties in an arm's length transaction."

It is not allowed to adjust the value of liabilities for an insurer's own credit risk. The definition includes the value of policyholder liabilities and other provisions. The requirement to report the value of assets and liabilities at fair-value is a significant change from the previous legislative framework. Assets were allowed to be valued at book value and occasionally revalued. In isolation, the value of assets and the value of liabilities will be more volatile under the new solvency framework. However, for a matched portfolio of assets and liabilities the profit that results from this volatility will be negligible.

Technical provisions

Technical provisions are the policyholder liabilities including any provisions for reinsurance. The method must be consistent with the fair-value definition of Article 74 of the Solvency II directive. Liabilities must be determined gross of reinsurance before the explicit expected value of reinsurance is taken into account. For the determination of the technical provisions the insurance portfolio must be grouped in homogeneous risk pools. In addition, the calculation of the technical provisions must:

- be the best-estimate value plus a risk margin;
- be based on applicable and relevant actuarial and statistical techniques;

- be a cashflow projection that takes into account the time value of money;
- make use of up-to-date market information;
- take into account all expected contractual future cashflows under the insurance contracts and the associated cost of administering the contracts; and
- take into account all financial guarantees and contractual options included in the insurance and reinsurance policies.

The Solvency II directive[34] defines the best estimate as follows:

> "The best estimate shall correspond to the probability-weighted average of future cash-flows, taking account of the time value of money (expected present value of future cash-flows), using the relevant risk-free interest rate term structure."

The Solvency II directive[35] further defines the risk margin as follows:

> "The risk margin shall be such as to ensure that the value of the technical provisions is equivalent to the amount insurance and reinsurance undertakings would be expected to require in order to take over and meet the insurance and reinsurance obligations."

Guidance will only be published during level 3 of the Lamfalussy process. The IAA (unpublished b) gives four possible methods of calculating the risk margin, namely:

- quantile methods;
- cost-of-capital methods;
- discount-related methods; and
- explicit assumptions.

[34] Article 76(2), Calculation of technical provisions
[35] Article 76(3), Calculation of technical provisions

The Solvency II directive prescribes[36] a cost-of-capital approach. This approach sets the risk margin equal to the opportunity cost of holding regulatory solvency capital that is necessary to support the technical provisions over the full term of the policies. . In the Swiss solvency framework (see below) the opportunity cost is prescribed as 6% per annum. For Solvency II, this opportunity cost has been adopted in the industry impact studies.

Own funds

In demonstrating solvency, an insurer must show that it has adequate funds of appropriate quality to cover solvency capital. To show that an insurer has appropriate quality of funds the European Parliament has adopted a tiered approached for the categorisation of available capital.

'Basic own funds' are defined as the value of assets less liabilities plus subordinated liabilities. Creditors of subordinated liabilities rank below policyholders in the case of insolvency. Assets covering these liabilities will therefore be available for payment to policyholders first in the event of a wind-up.

'Ancillary own funds' are funds that may become available and that are not shown on the balance sheet, such as:

- unpaid share capital;
- letters of credit and guarantees; and
- legally binding commitments to the long-term insurer.

Supervisory approval is required for these items to qualify for ancillary own funds.

'Own funds' are the total value of the basic own funds and the ancillary own funds.

[36] Article 76(5), Calculation of technical provisions

The capital is categorised into high-, medium- and low–quality. The criteria used to categorise the capital are:

- permanence;
- subordination;
- loss-absorbency;
- perpetuality; and
- absence of servicing costs.

For basic own funds tier 1 corresponds to high quality, tier 2 to medium quality and tier 3 to low quality. On the other hand, high quality ancillary own funds qualify for tier 2 capital and medium quality for tier 3.

Tier-2 and tier-3 items do not provide for full absorption of losses in all circumstances. It is not clear whether policyholders would rank before the providers of this capital in the event of a wind-up. For supervisory purposes this capital is limited in demonstrating solvency.

Solvency capital requirement

In demonstrating regulatory solvency, a long-term insurer has to cover the solvency capital requirement (SCR) at least with eligible own funds. Eligible own funds are determined by:

$$^{e}O = \sum_{i=1}^{3} T_i \qquad (6)$$

where T_i denotes total amount of assets classified in tier i.

For this purpose, the following conditions must hold:

$$T_1 > {}^{e}O/2; \text{ and} \qquad (7)$$

$$T_3 < \ 0.15 \ {}^{e}O \qquad (8)$$

In addition to these two conditions, 80% of the MCR must be covered by T_1. If these conditions are not met the value of the capital is limited for demonstrating solvency.

In determining the SCR the following principles must be followed:

- the long-term insurer must assume that it will continue as a going-concern;
- all in-force business must be included;
- the effect of new business over a twelve month period from the valuation date must be allowed for;
- all quantifiable risks must be taken into account;
- the result of the SCR must correspond to a "...value-at-risk of the basic own funds of an insurer subject to a confidence level of 99.5% over a one-year period"[37]; and
- risk-mitigating techniques may be allowed for.

The SCR for a long-term insurer is calculated by:

$${}^{S}C = \ {}^{B}C + \ {}^{O}C - L; \qquad (9)$$

where:

${}^{B}C$ denotes the basic SCR (BSCR);

${}^{O}C$ denotes capital for operational risk; and

L denotes the loss-absorbing capacity of the technical liabilities and deferred tax.

The BSCR is determined by the formula:

[37] Article 101(3), Calculation of solvency capital requirement

$$^{B}C = \sqrt{\sum_{i=1}^{3}\sum_{j=1}^{3}\rho_{i,j}C_iC_j}; \quad (10)$$

where:

$\rho_{i,j}$ is the correlation coefficient between C_i and C_j;

C_1 is the life underwriting risk result;

C_2 is the market risk result; and

C_3 is the counterparty default risk result.

The values of the correlation coefficient are prescribed as:

$$\rho_{i,j} = 0.25 \; \forall \; i \neq j; \text{and} \quad (11)$$

$$\rho_{i,j} = 1 \; \forall \; i = j. \quad (12)$$

The life underwriting result is calculated by:

$$C_1 = \sqrt{\sum_{i=1}^{7}\sum_{j=1}^{7} {}^{1}\rho_{i,j} \; {}^{1}C_i \; {}^{1}C_j}\,; \quad (13)$$

where ${}^{1}\rho_{i,j}$ is the correlation coefficient between ${}^{1}C_i$ and ${}^{1}C_j$ and from the Solvency II directive:

> ${}^{1}C_1$ denotes "the risk of loss, or of adverse change in the value of insurance liabilities, resulting from changes in the level, trend, or volatility of mortality rates, where an increase in the mortality rate leads to an increase in the value of insurance liabilities (mortality risk)";
>
> ${}^{1}C_2$ denotes "the risk of loss, or of adverse change in the value of insurance liabilities, resulting from changes in the level, trend, or volatility of mortality rates, where a decrease in the mortality rate leads to an increase in the value of insurance liabilities (longevity risk)";

$^1C_3$ denotes “the risk of loss, or of adverse change in the value of insurance liabilities, resulting from changes in the level, trend or volatility of disability, sickness and morbidity rates (disability–morbidity risk)”;

$^1C_4$ denotes “the risk of loss, or of adverse change in the value of insurance liabilities, resulting from changes in the level, trend, or volatility of the expenses incurred in servicing insurance or reinsurance contracts (life expense risk)”;

$^1C_5$ denotes “the risk of loss, or of adverse change in the value of insurance liabilities resulting from fluctuations in the level, trend, or volatility of the revision rates applied to annuities, due to changes in the legal environment or in the state of health of the person insured (revision risk)”;

$^1C_6$ denotes “the risk of loss, or of adverse change in the value of insurance liabilities, resulting from changes in the level or volatility of the rates of policy lapses, terminations, renewals and surrenders (lapse risk)”; and

$^1C_7$ denotes “the risk of loss, or of adverse change in the value of insurance liabilities, resulting from the significant uncertainty of pricing and provisioning assumptions related to extreme or irregular events (life catastrophe risk).”

The market risk result is calculated by:

$$C_2 = \sqrt{\sum_{i=1}^{6}\sum_{j=1}^{6} {}^2\rho_{i,j}\ {}^2C_i\ {}^2C_j} \qquad (14)$$

where:

$^2\rho_{i,j}$ is the correlation coefficient between ^2C_i and ^2C_j; and

from the Solvency II directive:

$^2C_1$ denotes "the sensitivity of the values of assets, liabilities and financial instruments to changes in the term structure of interest rates, or in the volatility of interest rates (interest rate risk)";

$^2C_2$ denotes "the sensitivity of the values of assets, liabilities and financial instruments to changes in the level or in the volatility of market prices of equities (equity risk)";

$^2C_3$ denotes "the sensitivity of the values of assets, liabilities and financial instruments to changes in the level or in the volatility of market prices of real estate (property risk)";

$^2C_4$ denotes "the sensitivity of the values of assets, liabilities and financial instruments to changes in the level or in the volatility of credit spreads over the risk-free interest rate term structure (spread risk)";

$^2C_5$ denotes "the sensitivity of the values of assets, liabilities and financial instruments to changes in the level or in the volatility of currency exchange rates (currency risk)"; and

$^2C_6$ denotes "additional risks to an insurance or reinsurance undertaking stemming, either from lack of diversification in the asset portfolio, or from large exposure to default risk by a single issuer of securities or a group of related issuers (market risk concentrations)."

The correlation coefficients for underwriting risk and market risk are not prescribed in the Solvency II directive, but will be prescribed in supplementary legislation for long-term insurers that do not use an internal model.

The counterparty default-risk result, C_3, must reflect the expected loss from exposure to third parties over the twelve-month period from the valuation date. The long-term insurer is allowed to take account of collateral or other securities held that will lower the loss in the event of a default.

Operational risk must be taken into account to the extent that it is not reflected in the BSCR. For unit-linked policies the operational risk must be a function of the annual expenses. The operational risk result is limited so that:

$$^{O}C \leq {}^{B}C/3. \qquad (15)$$

To be consistent with the result of the BSCR any deferred tax that will not be payable should the losses occur may be used to reduce the value of the SCR. Also, discretionary benefits that are allowed for in the technical provisions may not be payable. These amounts may also be used to reduce the SCR, but are limited to their expected loss-absorbing capacity.

Subject to approval, a long-term insurer is allowed to use an internal model for the whole SCR assessment or parts of the assessment.

Minimum capital requirement

The minimum capital requirement (MCR) is the absolute minimum capital required before authorisation to operate as a long-term insurer is withdrawn. The result must be submitted quarterly to the national supervisor of the member states. There are three parts to the calculation:

(a) a linear function;

(b) monetary limits; and

(c) relative limits.

a) Linear function

The first part is determined as a linear function of the technical provisions, premiums, capital-at-risk, deferred tax and administration expenses. The calculation of the linear function must correspond to a value-at-risk of the eligible basic own funds subject to a confidence level of 85%. There is not a prescribed formula in the Solvency II Directive. Initially, a formula will be prescribed by the supervisory authorities. To assess the effect of implementing Solvency II, the following formula was used to determine the result of the linear function:

$$M_L = max(\sum_{i=1}^{2} \alpha_i T_i, \beta T_1) + \sum_{i=3}^{5} \alpha_i T_i + \gamma C. \qquad (16)$$

where: α_i is a prescribed proportion;

β is positive prescribed proportion;

T_i is the technical provision amount for business of type i;

γ is a prescribed proportion; and

C is the captial sum at risk.

The business types, i, are:

1 – with-profits business with guaranteed benefits;

2 – with-profits business with future discretionary benefits;

3 – unit-linked business without guarantees;

4 – unit-linked business with guarantees; and

5 – other business.

b) Monetary limits

For long-term insurers and reinsurers a minimum amount of €3 200 000. A captive reinsurer has a minimum of €1 000 000.

c) Relative limits

As a minimum, the result of the linear function is adjusted to be at least 25% of the SCR. As a maximum, the result is limited to 40% of the SCR.

The MCR is then set as the maximum of (a) and (b), subject to the relative limits.

Investments

Long-term insurers are required to invest prudently in the best interest of their policyholders. Assets that cover the technical provisions must be consistent with the nature and term of liabilities. Further, the Solvency II directive requires that the assets covering the SCR and MCR must be of appropriate security, quality, liquidity and profitability.

5.1.2 Pillar 2: qualitative requirements and supervision

Insurers have to show that adequate governance structures and processes are in place to manage risk that may face the entity. For internal models, the long-term insurer must demonstrate that the model is embedded in the decision-making process.[38] The supervisory review process is the overall process conducted by the supervisory authority in reviewing the insurance and reinsurance undertakings. The supervisory authority may prescribe additional capital ('capital add-ons') if an undertaking's risk profile is riskier in their opinion than the solvency capital requirement of Pillar 1 suggests.

5.1.3 Pillar 3: supervisory reporting and public disclosure

Pillar 3 specifies the requirements of regular reporting to the supervisory authority and the nature and content of disclosure of the undertaking to the public.

[38] Article 120, Use test

5.2 Swiss Solvency Test

The Federal Office of Private Insurance (FOPI) is tasked with protecting policyholders in Switzerland[39]. Mr H Lüthy, director of FOPI in 2002, investigated the Swiss supervisory regime with the support of a task force. The result of this work was the Insurance Supervisory Act, 2004[40] (ISA).

For all insurers operating from Switzerland, insurance statutory solvency has to be assessed by means of the Swiss Solvency Test (SST). This assessment is mandatory since 1 January 2006 and must be performed in accordance with the ISA and the Insurance Supervision Ordinance[41]. The SST has incorporated some of the features published by the IAA[42], such as:

- the expected shortfall as risk measurement;
- a 'total balance sheet' approach;
- a one-year time horizon; and
- explicit risk margins.

These are also consistent with the IAIS's common structure for the assessment of insurer solvency discussed below. An additional aim of the SST is to be coherent with Solvency II, although Solvency II was not yet finalised at the time.

Two capital assessments are required, namely a 'statutory assessment' for minimum solvency capital and a 'target–capital' assessment calculated by means of the SST. The assessment of minimum capital is simple and gives the minimum threshold that an insurer needs to hold. The target capital is a risk-based market-consistent assessment based on a hybrid of company-specific experience and regulatory prescription of parameters. The target capital serves as an early-warning measure to the supervisor.

[39] White Paper of the Swiss Solvency Test, 2004
[40] Swiss Federal Act of 17 December 2004 on the supervision of insurance companies
[41] Swiss Federal Ordinance of 9 November 2005 on the supervision of private insurance companies
[42] A global framework for insurance solvency assessment, 2004

The aim of the SST is to calculate the net asset value market-consistently and to determine whether this value is sufficient to allow the insurer to continue as a going concern. This requires a projection of assets and liabilities up to a one-year time horizon. The net asset value in the SST assessment is termed[43] 'risk-bearing capital' (RC) and the minimum economic capital is termed 'target capital' (TC). Consistent with the aim, the RC is determined market consistently. This market-consistent valuation method must be in accordance:

> "... with and not at variance with information that can be gleaned from trade in liquid financial markets." [44]

Where a market value exists for an instrument, this must be used as the basis of valuation and is referred to as the 'marking-to-market' method. Otherwise the market-consistent value is to be determined by applying a suitable market-consistent model.

Long-term insurance liabilities are often not traded in a liquid market and will not satisfy the above definition. In this case, the value of liabilities is to be calculated on a discounted-cashflow method. For assumptions, best estimates must be used. No margins for prudence are allowed.

The TC consists of two parts. The first part is based on the results from standard models and scenarios prescribed by the regulator. The required capital is determined from the standard models. The measure to determine the required capital is the expected shortfall at a 1% probability level. This measure is used in Chapter 30–see equation (33) for the definition. The models determine the results for market risk, insurance risk and credit risk separately. The result of each model is a probability distribution of the RC in one year's time, with the exception of credit risk. The expected shortfall of each model is aggregated. It is assumed that each risk is normally distributed with prescribed volatilities. The regulator has prescribed scenarios in addition

[43] Technical document on the Swiss solvency test, 2006, FOPI
[44] Swiss Solvency Test, Circular 2008/44, Swiss financial market supervisory authority

to the standard models to cater for the non-normality of certain risks. The results are added to the total shortfall from the standard models.

The second part of the TC is capital required to cover the market-value margin (MVM) in one-year's time. The MVM is defined as the cost of capital to cover the regulatory capital (first part of TC) over the lifetime of the insurance liabilities. The cost is prescribed as 6% per year of the regulatory capital.

This addition to the TC is calculated as:

$$\frac{M}{1+r_1} = i\left(\frac{K_1}{1+r_1} + \frac{K_2}{1+r_2} + \frac{K_3}{1+r_3} + \cdots\right); \qquad (17)$$

where:

M	is the market value margin in one-year's time;
r_t	denotes the risk-free return from time zero to time t;
i	is the yearly capital cost; and
K_t	denotes the regulatory capital at time t.

FOPI encourages insurers to develop internal models to project the RC based on the company's experience. Internal models are subject to approval. It is a requirement that the insurer is able to show that the bases of the models are embedded in the operational framework of the company. More appropriate scenarios may also be used if the company can demonstrate that they are more reasonable.

The SST is based on a modular approach whereby the results of each standard model and scenario are aggregated into the final result. This allows an insurer to add additional models or scenarios without redeveloping the whole framework.

Some risks are dealt with through qualitative measures rather than quantitative analysis. Operational risk is one such risk. FOPI is interested in an active approach by insurers in managing and monitoring potential causes of operational risk. FOPI may prescribe additional capital if an insurer is unable to satisfy the regulator on their approach to operational risk.

5.3 The UK's Individual Capital Assessment

Since the introduction of the Financial Services and Markets Act, 2000 (FSMA), the UK has undergone significant regulatory changes. The FSMA empowers the Financial Services Authority (FSA) to make binding rules and issue guidance as the regulator of the financial services industry[45]. During the development process, the FSA has considered international accounting standards and other supervisory frameworks such as Solvency II. Solvency II had not been finalised and implementation was expected in 2008 at the time the FSA implemented the UK's solvency capital requirements known as the 'realistic-balance-sheet' approach. Muir & Waller (unpublished) describes this approach as a "realistic market consistent" valuation of assets and liabilities. The expected date of implementing Solvency II has been deferred several times and may be deferred again beyond the current implementation date of1 January 2013. Compliance to the Solvency II regime will require further changes in the UK.

The UK approach is commonly referred to as the 'twin peaks' approach based on Basel II's three-pillar framework. Pillar one requires certain long-term insurers called 'realistic basis life firms' to calculate the solvency capital as the maximum of the regulatory peak and the realistic peak. A realistic basis firm is defined as a long-term insurer, which has with-profits insurance liabilities that are, or have been at some time since 31 December 2004, equal to or in excess of £500 million.[46] The regulatory peak is determined on a prescribed statutory basis that includes margins of prudence and allows admissible assets only. Admissible assets are the values that are permitted

[45] Financial services and markets Act, United Kingdom, 2000, part X, sections 138–143
[46] Financial Services Authority, FSA Handbook

according to prescribed rules. The realistic peak requires a best-estimate approach to liabilities and solvency capital with a fair-value approach to all assets, including the values of assets that are not permitted under the regulatory peak.

Pillar two requires a long-term insurer to carry out its own assessment of the amount of capital it should hold. The assessment must be consistent with the risk the long-term insurer is facing and must take into account the controls and procedures that are in place to manage those risks. A wider range of risks are considered in this pillar and higher capital requirement is expected than in pillar one. The results of this approach, the individual capital assessment (ICA), are not disclosed to the public but only on request to the FSA.

Finally, the FSA will review the ICA periodically. Following its review the FSA may require additional capital which it considers appropriate. 'Individual capital guidance' is the FSA's guidance on what it considers an adequate level of capital to be to meet regulatory objectives.

5.4 The Dutch Financial-assessment Framework

The Dutch central bank, *De Nederlansche Bank* (DNB), and the pension and insurance council, *Pensioen- & Verzekeringskamer* (PVK), merged in October 2004. The merged organisation kept the name DNB. Den Butten (unpublished) gives the history of the development to a new regulatory framework. Supervision was divided between the DNB and PVK before the merger. From 1 January 2007, the DNB has set a new solvency framework for pension funds and insurance business. The framework is a risk-based determination of the financial position through a solvency assessment framework named '*financieel toetsingskader*' (FTK) which literally means 'financial assessment framework'. The assessment relies on a fair-value approach to both assets and liabilities. Bragt, Steenhouwer & Waalwijk (unpublished) demonstrated that the Solvency II solvency requirements may be more onerous than the FTK for certain conditions. The standard solvency

test of the FTK determines the amount of capital that is required with a 99.5% confidence level and is determined by the formula:

$$\sqrt{S_1^2 + S_2^2 + 2\rho S_1\ S_2\ + S_3^2 + S_4^2 + S_5^2 + S_6^2}; \qquad (18)$$

where:

S_1 denotes the interest rate risk;

S_2 denotes equity risk;

S_3 denotes currency risk;

S_4 denotes commodity risk;

S_5 denotes credit risk;

S_6 denotes the insurance risk; and

ρ denotes the correlation coefficient between interest-rate and equity risk.

The formula is similar to the capital adequacy requirement (CAR) formula used in South Africa (see equation (22) below).

5.5 The USA's Framework

According to statutory valuation law in the USA policyholder liabilities have to be calculated according to the commissioners reserve valuation method (CRVM). This method prescribes assumptions for long-term insurers, in particular mortality and interest rates assumptions. The method has been in use for over 150 years and has virtually been unchanged[47].

Regulatory solvency capital is calculated according to a formula known as the risk-based capital (RBC) method. Let R denotes the RBC result. The equation[48] is of the form:

[47] Sandberg, D presentation at the Life Section Seminar, Actuarial Academy of Actuaries, Mexico, 2007

[48] NAIC, Risk based capital general overview, 2009

$$R = R_1 + R_2 + \sqrt{(R_3 + R_4)^2 + (R_5 + R_6)^2 + R_7^2 + R_8^2 + R_9^2}; \quad (19)$$

where:

R_1 denotes asset risk associated with affiliates;
R_2 denotes business risk associated with growth of new business;
R_3 denotes asset default risk including reinsurance exposure;
R_4 denotes interest-rate risk;
R_5 denotes credit risk;
R_6 denotes market risk;
R_7 denotes insurance risk;
R_8 denotes health-provider-credit risk; and
R_9 denotes business risk associated with health expenses.

The values of the risk factors, R_i, are either directly from the statutory accounts or the result of a prescribed calculation.

The result of the RBC is compared with the net asset value after adjustments. This is done by dividing the adjusted net asset value (ANAV) by the RBC. The regulator has specified options depending on the relative size of the ANAV to the RBC. These options are:

- to take no action if the ANAV is greater than twice the RBC;
- to require additional reporting from the long-term insurer;
- to demand an action plan with the additional reporting; and
- to take management control if the ANAV is less than the RBC.

In June 2005 the American Academy of Actuaries (AAA) presented the first draft[49] of a principle-based reserving framework in the USA to the NAIC. The approach has been developed to address the inadequacies of the rule-based

[49] Conceptual framework of a principle-based approach for life insurance products from the American Academy of Actuaries' Universal Life Work Group, June 2005

approach that was in place at that time such as the treatment of guarantees for investment-type products.

Ten principles were put forward

- all material risks must be provided for in the valuation method—higher risks should result in higher reserves;
- the method will apply to all individual-life products;
- deterministic modelling may be used in some instances, but stochastic modelling will be necessary for products with material 'tail risk';
- assumptions are based on a blend of company experience and prescribed rules;
- parameters of deterministic models are based on best estimates;
- appropriate governance should be in place, such as peer review, together with regulatory review;
- appropriate controls, limits and caps will be applied to actuarial judgement;
- assumptions will change at each valuation date to reflect the best estimates at that time;
- the statutory reserve should be based on the actual risks a company faces—short-comings of models should be acknowledged; and
- genuine risk-management strategies may be taken into account.

The proposed framework was a major change to the rule-based approach with prescribed formulae and assumptions. One of the major changes is the move from assumptions that are fixed over the period of a contract to assumptions that are market-related.

Subsequent to the AAA's draft the NAIC has announced[50] the adoption of a "Solvency Modernization Initiative" in June 2008. A work plan was announced that included a risk-based approach to the determination of solvency capital and reserves. The recognition of international developments

[50] News release, Regulators adopt solvency work plan, San Francisco, 2 June 2008

would form part of the initiative with special consideration to the European regulatory framework, Solvency II. Other jurisdictions that were to be studied in the development of the USA's regulatory framework are Canada, Australia and Switzerland.

The Life and Health Actuarial Task Force, a committee of the NAIC, has released a comprehensive exposure draft[51], which was adopted in December 2009. This valuation manual is made up of numerous independent modules, which cover minimum reserves, the requirements for modelling and assumptions, reporting, documentation and formats of reporting. Implementation of principle-based reserving is planned to start in 2010 with implementation in 2012[52].

5.6 IAA Global Framework

IAA (unpublished) describes the management of risk similar to the control cycle used by the Institute of Actuaries of Australia. A three-pillar approach, similar to the Basel II frameworks for banks is used to address risk. As far as possible, the IAA's solvency framework requires the use of a long-term insurer's own data and experience. This framework was used in the development of the SST and Solvency II frameworks.

5.6.1 Pillar 1: Minimum financial requirements

Pillar 1 aims to ensure that appropriate technical provisions (policyholder liabilities) are raised with appropriate assets covering liabilities (including non-technical provisions). In addition, a minimum amount of capital is required to serve as a buffer to protect solvency.

The IAA recognises five specific types of risk, namely:

[51] Valuation Manual, Draft: 12/4/09, adopted by Life and Health Actuarial Task Force, 12/4/09
[52] Towers Perigrin, Emphasis 2008/1, A principles-based reserves and capital standard II, pages 14-17,2008

- underwriting risk;
- market risk;
- credit risk;
- operational risk; and
- liquidity risk.

A suggested approach calculates the capital requirements for each line of business. The capital requirement is then determined for the company as a whole by recognising interdependencies amongst lines of business.

Each line of business, *i*, will require capital of:

$$\gamma_i = \mu_i + k\sigma_i; \tag{20}$$

where:

μ_i is the mean loss or best-estimate liability;
$k\sigma_i$ is the capital requirement;
σ_i is the standard deviation of the loss outcome; and
k is a factor reflecting the probability or confidence level.

The company's solvency capital can then be determined as:

$$\Gamma = \sqrt{\sum_i \gamma_i^2 + \sum_{i \neq j} \rho_{i,j}\gamma_i\gamma_j}; \tag{21}$$

where $\rho_{i,j}$ is the correlation coefficient between line of business *i* and *j*.

The IAA's proposed formula recognises the interdependence of risk by the correlation coefficient, $\rho_{i,j}$.

5.6.2 Pillar 2: Supervisory review process

Pillar 2 is required over and above pillar 1, since all risks cannot be analysed quantitatively. It therefore aims to ensure that insurers have adequate capital

resources to support all the risk in their business confirmed through independent review by the supervisor or a third party. The result of the review may be supervisory intervention through additional capital requirements or managerial intervention. Pillar 2 also serves to encourage insurers to develop better risk-management techniques that are based on their own experience.

5.6.3 Pillar 3: Measurements to foster market discipline

Pillar 3 focuses on market discipline through disclosure, both public and to the supervisor only.

CHAPTER SIX
THE SOUTH AFRICAN INSURANCE REGULATORY FRAMEWORK

South Africa has an institutional and legal framework for financial supervision. The legislation, which affects the financial services industry including the long-term insurance industry, is mainly governed by two state departments. The long-term insurance industry is regulated by various acts and regulations. Nienaber & Reinecke (2009) give a detailed overview of legislation for long-term insurance in South Africa.

6.1 The Government Structure for Insurance

In South Africa, there are two ministries that are directly responsible for the financial sector, namely the National Treasury, and the Department of Trade and Industry.

6.1.1 The National Treasury

The National Treasury is responsible for the management of South Africa's national government finances. The Constitution[53] of South Africa mandates the National Treasury to promote:

- "transparency";
- "accountability"; and
- "the effective financial management of the economy."

The Minister of Finance heads the National Treasury. Various divisions exist to carry out the mandate.

The Minister of Finance has appointed the FSB as regulator of financial institutions in South Africa, with the exception of banking, which is

[53] Act no. 108 of 1996, Republic of South Africa, Section 215(1)

administered by the Reserve Bank of South Africa. The functions of the FSB stated in the Financial Services Board Act, 1990[54] are:

- to supervise compliance with laws regulating financial institutions and the supply of financial services;
- to advise the Minister on matters regarding financial institutions and services; and
- to promote education programmes through financial institutions to inform and educate users and potential users of financial products and services.

The Policy Board for Financial Services and Regulation is an advisory statutory body established in terms of the Policy Board for Financial Services and Regulation Act, 1993[55]. The advisory body has no executive powers—its main task is to advise the Minister of Finance on matters about the regulatory framework for financial services. A secondary objective is to ensure competitive neutrality in the financial legislation.

Other bodies affecting the long-term insurance industry include the Financial Intelligence Centre and Financial Services Advisory Committees.

6.1.2 The Department of Trade and Industry

The Minister of Trade and Industry has appointed the Registrar of Companies to be responsible for the administration of the Companies Registration Office (CRO). The CRO administers all companies including long-term insurers.

The National Credit Regulator (NCR) was established by the National Credit Act, 2005[56] (NCA). For long-term insurance business issued as protection for credit agreements, the NCR requires long-term insurers to complete returns. The NCA has prescribed some limitations on credit-life business such as prohibiting single-premium credit-life policies.

[54] Act no. 97 of 1990 as amended, Republic of South Africa, Section 3
[55] Act no. 141 of 1993 as amended, Republic of South Africa
[56] Act no. 34 of 2005 as amended, Republic of South Africa

6.2 Long-term Insurance Legislation

Key to the prudential regulation of long-term insurers is the LTIA. The LTIA is described in sections 6.2–6.3. Various other acts are applicable to the management of long-term insurers. A list of acts directly affecting the solvency of long-term insurers is shown in Appendix B for completeness.

6.2.1 The Long-term insurance act

The LTIA consists of nine parts, additional schedules and regulations that govern the long-term insurance industry.

The nine parts are described below in sections 6.2.2–6.2.10. The schedules and regulations are discussed in section 6.3.

6.2.2 Administration of the Act

The first part of the LTIA establishes a Registrar and sets out its duties and powers. It also states arrangements on fees payable to the Registrar and reporting requirements to the Minister.

An advisory committee is also established under this section with the obligation to investigate any matter concerning the long-term insurance industry on its own initiative or on request of the Minister or Registrar.

6.2.3 Registration of long-term insurers

Long-term insurance business may only be conducted by entities registered. The Registrar may limit the type of business a long-term insurer may enter into, for example limiting the amounts for sums assured and premiums or the type of benefits that may be underwritten. Certain words are reserved and may not be used in the name of a business unless the business is registered as a long-term insurer or the Registrar has approved the name.

6.2.4 Business and administration of long-term insurers

Part three of the LTIA describes the general administration of a long-term insurer and limitations with regard to its capital structure.

The registrar must be notified of appointments and resignations of directors.

A long-term insurer is compelled to have an actuary in service at all times. A statutory actuary is also required, who may be the same person as the actuary, fulfilling certain duties such as certifying the financial soundness of the long-term insurer and providing the Registrar with information. The statutory actuary must be a Fellow of the Actuarial Society of South Africa and must be approved by the Registrar. The role of the statutory actuary is further discussed in Chapter 7.

An internal audit committee of at least three persons is required. This committee reports to the Board of Directors on internal systems and controls and financial reporting. It is also responsible for the promotion of communication to other staff members. The majority of the members of the committee must not be employed by the long-term insurer.

Long-term insurers are not allowed to raise debt capital without approval of the Registrar. Any controlling stake in a long-term insurer's equity shares must be approved by the Registrar.

6.2.5 Financial arrangements

A long-term insurer must be financially sound at all times by having appropriate assets backing the policyholder liabilities and having sufficient capital to fulfil its capital adequacy requirements. In addition, a long-term insurer must have enough capital to generally conduct its business.

Dividends are payable only when the statutory actuary has certified that the long-term insurer has sufficient assets to maintain a financially sound condition.

6.2.6 Compromise, arrangement, amalgamation, demutualisation and transfer

Policyholder liabilities may be transferred only to another long-term insurer after approval of the High Court of South Africa or if the Registrar is satisfied that policyholders have been notified of the transfer and accepted the transfer in writing.

6.2.7 Judicial management and winding-up of long-term insurers

There are conditions on which the Registrar may act to protect the policyholders. These conditions include material misrepresentation to members of the public and failure to comply with provisions within the LTIA. Actions that may be taken by the Registrar include notification to the long-term insurer, to which the long-term insurer must reply within 30 days, and placement of a long-term insurer under judicial management.

6.2.8 Business practice, policies and policyholder protection

Part seven stipulates the general conduct required when selling a policy.

The statutory actuary must be satisfied that policies sold are actuarially sound. This includes being satisfied with the premium, benefits and other values such as expenses and any bonus declarations to benefits. Any comparisons between different policies must be actuarially justified to the satisfaction of the statutory actuary.

Consumers must have a choice when a policy is required as part of a loan agreement or any other agreement that may require security. No valuable consideration may be offered as an inducement to a potential consumer to

enter into a long-term insurance contract. A summary of the policy must be furnished to the policyholder illustrating expected benefit payments, premiums payable and general terms of the policy.

Remuneration to intermediaries is limited, generally by type of product.

Rules are stipulated on how to enter into a valid long-term insurance contract. The first premium must be paid, or an arrangement to pay the first premium must be made, before a policy is valid. The policyholder must be notified if a premium was not paid. Limited time is available to the policyholder to rectify the situation.

Misrepresentation or failure to disclose information may not necessarily result in an invalid policy, unless the nature of the information has a material effect on the assessment of the relevant risk for such a policy.

Benefits to minors are limited. For members of the defence force policy benefits may also be limited.

Policyholders are generally protected against unfair terms.

6.2.9 Offences and penalties

Part eight deals with persons who do not comply with the LTIA and stipulates maximum penalties payable.

6.2.10 Transitional and general provisions

The transitional provisions were mainly intended for the efficient changeover from the previous to the current Act.

6.3 Schedules and Regulations

The schedules are mainly concerned with the determination of asset and liability values. The Insurance Amendment Act, 2003[57] introduced capital adequacy requirements in addition to liabilities of a long-term insurer when it demonstrates that it is financially sound.

The calculation method is not specified in the Act, but the Insurance Amendment Act, 2003 states that:

> "The values of assets, liabilities and the capital adequacy requirement shall be deemed to have been calculated in terms of this Schedule if the requirements set out in this Schedule and the requirements prescribed by the Registrar, after consulting the Actuarial Society of South Africa, have been complied with in making the calculations."

In November 2004, the FSB clarified the requirements of the Act by issuing Directive 140.A.ii (LT)[58]. The calculations of policyholder liabilities should be based on the statutory valuation method supplemented by professional guidance notes (PGNs) issued by the Actuarial Society of South Africa, specifically PGN 104[59]. Asset and liability values, other than those for policyholder liabilities, should be calculated in accordance with the "South African Statements of Generally Accepted Accounting Practice". These requirements were officially prescribed by the Registrar by issuing Board Notice 72[60] (referred to BN 72).

[57] Act no. 17 of 2003, Republic of South Africa, Section 29
[58] FSB, Directive 140.A.ii (LT), Prescribed requirements for the calculation of the value of the assets, liabilities and capital adequacy requirements of long-term insurers, 2004
[59] Actuarial Society of South Africa, PGN 104, Life offices – the valuation of long-term insurers, version 7, 2008
[60] FSB, Board Notice 72, Prescribed requirements for the calculation of the value of the assets, liabilities and capital adequacy requirements of long-term insurers, 2005

6.3.1 Determination of policyholder liabilities

The requirements for policyholder liabilities and solvency are stated in the LTIA and BN 72 and PGNs issued by the Actuarial Society of South Africa. The value of policyholder liabilities may be determined prospectively or retrospectively. Assumptions must be set on a best-estimate basis that takes into account recent experience. These assumptions should be modified for expected future changes. Compulsory margins are added to the best-estimate assumptions to introduce a minimum level of prudence. Compulsory margins on the main assumptions are shown in Table 1.

Table 1. Compulsory margins

Assumption	**Margin**
Mortality	7.5% of mortality rate
Morbidity	10% of morbidity rate
Medical	15% of incident rate
Lapse	25% of probability of lapse
Terminations	10% of termination rate
Surrenders	10% of probability of surrender
Expenses	10% of renewal expense amount
Expense inflation	10% of inflation rate
Investment return charge	25 basis points

The compulsory margins must be applied so that the policyholder liabilities increase. Typically, annuity business would require a reduction of the mortality rate as opposed to assurance business, which would require an increase of the mortality rate.

A long-term insurer is not allowed to include future voluntary premium increases in the policyholder liability calculations if these reduce the liabilities. Future voluntary premium increases and the resulting benefit increases are commonly specified at sales stage to policyholders. These increases are agreed upfront and occur automatically, unless the policyholder cancels the increase. This omission may be viewed as a further compulsory margin that introduces more prudence.

Discretionary margins are allowed. These may be included if the statutory actuary believes that:

- the compulsory margins are insufficient for prudent reserving; or
- to release profits consistently with policy design or company practice.

These two conditions give the statutory actuary ample freedom to add discretionary margins. However, an implicit restriction exists through BN 72 that requires the insurer to "define", "quantify" and "give reasons why" discretionary margins have been added. Practically, this requirement is enforced in the FSB's annual return for long-term insurers where all discretionary margins must be defined, quantified and motivated.

Negative liabilities may arise at early durations of risk policies, priced to make a profit, if initial expenses are high compared with the size of the recurring premium. For with-profit business, a negative bonus stabilisation reserve may be held against liabilities in times of depressed asset value.

PGN 110 sets guidance how the provision for embedded derivatives such as policy guarantees should be determined. Stress-testing of economic scenarios is also required in the determination of CAR. This guidance is classified as 'best practice' and is not mandatory for statutory actuaries.

In conclusion, the determination of policyholder liabilities is based on long-term insurers' own experience and may be adjusted upwards for company practice or where the statutory actuary believes that compulsory margins are not sufficient

6.3.2 Determination of solvency capital

Solvency capital must be determined by the provisions set in the LTIA, by the requirements in BN 72 and by the guidance in PGN 104. The prescribed calculations include the option of an internal model approved by the FSB instead of the prescribed CAR calculation.

CAR before adjustments is the maximum of three components:

- minimum CAR (MCAR);
- termination CAR (TCAR); and
- ordinary CAR (OCAR).

MCAR is specified in BN 72. This value is the minimum capital that must be held by all long-term insures irrespective of the result of an internal model or the result of TCAR and OCAR. This minimum is set to be the maximum of R10 million or 13 weeks operational expenses.

The IAIS Solvency & Actuarial Issues Subcommittee has issued principles[61] of capital adequacy and solvency. Principle 8 requires regulators to set out a minimum threshold of solvency capital "to provide a minimum assurance of the financial capacity and soundness of the insurer."

This minimum should take into account the intended risk of the business and should not be available to fund set-up costs. The MCAR does not explicitly take into account the intended risk to be covered and therefore does not entirely fulfil the requirements of the IAIS's published principles. The LTIA[62] does, however, give the FSB the right to prescribe a different method if the result of the CAR calculation is not satisfactory to the registrar. In addition, BN 72 states that the statutory actuary must increase the level of CAR where he or she perceives the prescribed minimum value to be inadequate. There is no guidance for the statutory actuary to follow when he or she assesses whether the prescribed minimum values are adequate.

The remainder of the CAR calculation is specified in PGN 104. TCAR equals the sum of lapse CAR and surrender CAR, where:

- lapse CAR is the amount required to ensure that no policy liability is negative; and

[61] IAIS, Principles on capital adequacy and solvency, Tokyo, 2002
[62] Schedule 3, section 6

- surrender CAR is the amount required to ensure that no policy liability is less than its surrender value.

The intermediate ordinary capital adequacy requirement (IOCAR) is calculated as:

$$I = \sqrt{a^2 + b^2 + c_{\mathrm{i}}{}^2 + c_{\mathrm{ii}}{}^2 + c_{\mathrm{iii}}{}^2 + d^2 + e^2 + f^2 + (g + 0.5h)^2 + 0.75h^2} + i; \quad (22)$$

where

a denotes the lapse risk component;

b denotes the surrender risk component;

c_{i} denotes the mortality risk component;

c_{ii} denotes the morbidity risk component;

c_{iii} denotes the medical risk component;

d denotes annuitant fluctuation mortality risk component;

e denotes mortality, morbidity and medical assumption risk component;

f denotes the expense risk component;

g denotes the investment risk component;

h denotes the credit risk component; and

i denotes other risk component.

In the IOCAR calculation each individual risk component is assumed to be independent with the exception of g and h. PGN 104 has a prescribed formula to set the minimum value for each risk component except for i. i is set by the statutory actuary if he or she has identified other material risks that are not provided for by the standard risk components.

OCAR is determined by:

$$O = \frac{I}{1 - k}; \quad (23)$$

where:

$$k = \sqrt{(g + 0.5h)^2 + 0.75h^2}; \quad (24)$$

Management actions may be taken into account to reduce the result of the CAR formulae. Management actions are mitigating actions that will reduce the loss in case of an adverse event. The management actions may be applied to either the TCAR or any component of the IOCAR. These actions are allowed only if:

- the board of directors have approved them;
- the action plans are realistic;
- policyholder guarantees are expected to be honoured; and
- they are not contrary to policyholders' reasonable benefit expectations.

The statutory actuary must increase the capital where it is perceived to be inadequate using the minimum requirements described above. Future new business is not included in the prescribed CAR calculation, but forms part of the statutory actuary's obligation to consider the future financial position of the long-term insurer.

In summary, long-term insurers have the right to:

- determine solvency capital using an internal model approved by the FSB;
- use the prescribed CAR formulae to determine regulatory solvency capital;
- use management actions to reduce the result of the standard formulae;
- increase the CAR where the statutory actuary perceives the CAR to be inadequate using the standard prescribed approach; and
- apply for dispensation from the FSB to hold a lower amount of capital.

CHAPTER SEVEN
THE ROLE OF THE STATUTORY ACTUARY

In South Africa, long-term insurers are required to have at all times an actuary that is referred to as the 'statutory actuary'[63]. Although the LTIA specifies the legal requirements of this role, the Actuarial Society of South Africa stipulates additional responsibilities. In this chapter the appointment, the role and a comparison of the statutory actuary with similar appointments in other international constituencies are discussed.

7.1 The Appointment of the Statutory Actuary

For each long-term insurer the LTIA[64] requires the statutory actuary to be an individual. Firms, such as consulting and audit firms, may be contracted by long-term insurers, but the appointment must be a named individual.

7.1.1 Application and termination

All appointments have to be approved by the registrar. The Actuarial Society of South Africa requires statutory actuaries to have valid practice certificates. Practically, an applicant applies for a practice certificate before the application to the registrar.

Once an actuary has been appointed for a statutory role, there are no further requirements by the registrar, although, in the case that a statutory actuary is not concerned fit and proper to fulfil his or her duties, the registrar may terminate this position. The Actuarial Society of South Africa laid down two additional obligations. The first is to comply with its continuous professional development (CPD) scheme. For statutory actuaries the CPD scheme has more onerous requirements than for other actuary members. The second obligation is the renewal of the practice certificate. Practice certificates are valid for only three years.

[63] Long Term Insurance Act, Act no 52 of 1998, Republic of South Africa, Section 20(1)
[64] Section 20(3)

A statement of reasons has to be submitted to the registrar on the termination of the appointment of a statutory actuary. If the departing statutory actuary believes that the particular long-term insurer is not, or may not be, financially sound, an additional statement must be submitted to the registrar that states his or her concerns.

7.1.2 Minimum requirements

The minimum requirements to be appointed as a statutory actuary are stipulated in the LTIA. Supplementary to these requirements the registrar has additional conditions. These conditions include the minimum professional standards laid down by the Actuarial Society of South Africa.

The LTIA[65] requires a statutory actuary to:

- be a natural person;
- be a permanent resident of South Africa;
- be a fellow of the Actuarial Society of South Africa;
- have adequate practical experience after qualification as an actuary; and
- be approved by the registrar.

The FSB's application form[66] lists additional requirements. The statutory actuary must have a valid practice certificate issued by the Actuarial Society of South Africa. Actuaries that have been found guilty of professional misconduct or criminal offences are not eligible to be statutory actuaries.

For the application of practice certificates the Actuarial Society of South Africa has additional requirements. First-time applicants have to have at least five years' relevant work experience, of which three years have to be after

[65] Section 20(3&4)
[66] FSB, Application by a long-term insurer for approval of the appointment of a statutory actuary in terms of section 20(4) of the Long-term Insurance Act, August 2007

qualification as a fellow actuary. At least one year of the last three years of relevant work experience must be in South Africa. For existing long-term insurers the departing statutory actuary must confirm in writing that in his or her opinion the applicant has the necessary knowledge, skills and experience. As mentioned in section 7.1.1 the applicant must also comply with the Actuarial Society of South Africa's CPD scheme. If the applicant does not meet all the requirements, the Actuarial Society of South Africa may issue a qualified certificate. A qualified certificate will specify the conditions on which an applicant may practise as a statutory actuary. An example of such a condition is a peer review by an independent actuary.

An additional requirement is applicable for subsequent renewal of a practice certificate. This is an experience requirement. The statutory actuary must have signed off the FSB's statutory returns for at least two years.

7.2 The Role of the Statutory Actuary

The duties of the statutory actuary are mainly prescribed in legislation and professional guidance from the Actuarial Society of South Africa. These duties are related to aspects that may affect the financial soundness of a long-term insurer. The main aspects are:

- valuation methods of assets and liabilities;
- choice of assets;
- pricing and policy design;
- bonus allocations for with-profits policies;
- policy alteration rules; and
- dividend declaration.

7.2.1 Duties specified in the LTIA

The LTIA[67] requires that a long-term insurer's statutory actuary notifies the board of directors as soon as he or she becomes aware that the long-term insurer is not financially sound. To be financially sound a long-term insurer must have enough assets to cover its liabilities and CAR. Assets must also be appropriately diversified and be of the types specified in the Act[68]. The statutory actuary must be satisfied that the assets are:

> "...proper and suitable having regard to the nature of its various liabilities and the time when, the place where, and the manner in which, it is required, or expects to be required, to meet those liabilities..."

If the statutory actuary believes that a long-term insurer is breaching or is likely to breach the condition to be financially sound, he or she must notify the board of directors. A report must be submitted with the notification that details the factors that cause concern. The statutory actuary must also notify the registrar if the financial soundness of the long-term insurer is materially prejudiced. After 30 days, the statutory actuary must be satisfied that the board of directors have taken reasonable steps to rectify the financial soundness of the long-term insurer. If the statutory actuary is not satisfied the registrar must be notified immediately.

Before a dividend is declared, the LTIA[69] requires the statutory actuary to certify that the proposed dividend will not cause the long-term insurer to become financially unsound.

Another duty of a statutory actuary is to make sure that the returns and reports to the FSB are properly drawn up and comply with the requirements of the LTIA.

[67] Section 20(2.b.i)
[68] Section 31
[69] Section 29(5)

Apart from the duties that are directly applicable to the valuation of assets, liabilities and solvency capital, the statutory actuary has also duties to support sound business practice. The first of these duties is to ensure that policies are actuarially sound. Although the term 'actuarially sound' is not defined, the LTIA[70] refers to three specific aspects that the statutory actuary must be satisfied with. These aspects are:

- the relationship between premiums, benefits and other values;
- the distinction between premiums, benefits and other values; and
- bonus allocations.

Bonus allocations have to be in accordance with a long-term insurer's principles and practices of financial management (PPFM). The PPFM are required to be approved by the board and available on a long-term insurer's website.

The statutory actuary must also be satisfied that there are adequately documented rules for the failure of premium payments. These rules must include the conditions when a policy will be cancelled or will be made paid-up.

Finally, the rules for the values of all alterations must be to the satisfaction of the statutory actuary. In particular, the surrender bases must be in accordance with the regulations[71], which require a basis that is approved by the statutory actuary for the determination of these values.

For the above duties the LTIA[72] gives the statutory actuary rights to information. The rights include attending and speaking at the long-term insurer's general meetings and board meetings.

[70] Section 46
[71] Long Term Insurance Act, Act no 52 of 1998 as amended, Republic of South Africa, Regulation 5
[72] Section 20(8)

7.2.2 Duties specified in the Companies Act, 1973

For long-term insurers the Companies Act, 1973[73] requires the statutory actuary to include a report in the annual financial statements "in accordance with a guideline issued by the Actuarial Society of South Africa". This guideline is PGN 103[74] and is discussed in more detail in the next section.

7.2.3 Professional duties

For professional matters, the Actuarial Society of South Africa has issued various standards and guidance. The Actuarial Society's standards[75] refer to the repealed UK's professional conduct standards[76] with minor adjustments. In the UK, the Institute and Faculty of Actuaries has replaced the professional conduct standards with the actuaries code. The Actuarial Society of South Africa has not directly adopted this code.

Guidance is in the form of PGNs and covers the following:

- long-term insurers;
- retirement funds;
- health care;
- short-term insurers;
- reports on the effect of AIDS;
- continuous professional development;
- educational matters; and
- guidance that is general in nature.

The following PGNs are directly applicable to long-term insurers' statutory actuaries:

[73] Act no. 61 of 1973 as amended, Schedule IV, Part 1.B (14)
[74] PGN 103 version 4, The report by the statutory actuary in the annual financial statements of long-term insurers, 2005
[75] Actuarial Society of South Africa – professional conduct standards, 2004
[76] The Professional Affairs Board, professional conduct standards, version 2, 2004, UK

- PGN 103[77]—the report by the statutory actuary;
- PGN 104[78]—the valuation of long-term insurers;
- PGN 106[79]—guidance for statutory actuaries;
- PGN 109[80]—acquisitions; and
- PGN 110[81]—embedded derivatives.

For statutory actuaries compliance with PGN 103 is mandatory. To comply with the requirements specified in the Companies Act, 1973, this PGN states the minimum information that must be certified by the statutory actuary in the annual financial statements. The minimum information required is snapshots of the balance sheets that comply with accounting standards and with regulatory requirements. Any differences must be reconciled and explained. The effect of changes to assumptions and valuation methods must be disclosed. The CAR and CAR cover must be disclosed with a statement whether the statutory actuary believes that the long-term insurer is in a financially sound position and is expected to remain so for the foreseeable future.

PGN 104 is also mandatory for statutory actuaries and gives guidance for the valuation of assets, liabilities and CAR. PGN 110 gives further guidance on the valuation method of embedded derivatives. This guidance note is classified as best practice.

To assist with the interpretation of statutory actuaries' duties specified in the LTIA, PGN 106 provides detailed guidance. This guidance note is classified as best practice.

Statutory actuaries that are involved in acquisitions of long-term insurers may be faced with conflicts of interest. On the one hand they have to act in the best

[77] The report by the statutory actuary in the annual financial statements of long-term insurers
[78] Life offices—the valuation of long-term insurers
[79] Actuaries and long-term insurance in South Africa
[80] Life insurance company take overs
[81] Allowance for embedded derivatives

interest of policyholders. On the other hand they will be providing advice to the directors who must act in the best interest of shareholders. PGN 109 provides guidance for actuaries that are involved in these types of takeovers.

7.3 The Actuarial Society of South Africa's Investigation

The Actuarial Society of South Africa's statutory-actuary task force issued a report[82] after a review of the role of the statutory actuary. Reasons for the review included the changes in the role of the appointed actuary in the UK, the onerous burden on an individual acting as statutory actuary and to recommend solutions where conflicting interest may arise. The focus of the review has been on the governance process with specific reference to the relationships between the board of directors, management and the regulator, the statutory actuary's role in these relationships and potential conflicting interests. Recommendations are given for the following categories:

- product design and pricing;
- distribution and advice;
- apportionment of surplus;
- financial reporting;
- regulatory solvency and capital requirements; and
- risk management and sustainability.

Although recommendations were given for each category these recommendations could be summarised as follows:

- legislation must clarify who is responsible;
- the board of directors should be responsible for each category except for regulatory solvency and capital requirements; and
- the actuary should play an advisory role in each category, but be responsible for regulatory solvency and capital assessment.

[82] Report of the role of the statutory actuary task force, July 2010

To deal with conflicting interests the report does not require a split role as in the UK. The report recommends that the statutory actuary should not be eligible as a director. This view is in contrast with the view described by Johnston (2006) and the practice in the UK. It is also stated that, in the short term, remuneration should ideally not be linked to the long-term insurer's financial performance, but no recommendation was made in this regard. Instead, it was recommended that financial interests of the statutory actuary in the long-term insurer should be disclosed yearly to the board of directors and to the regulator. The report acknowledged that there is no individual regulatory role in the Solvency II framework, but stated that there are advantages to have a statutory actuary and recommended that the FSB's SAM project must consider to include a regulatory role for actuaries.

7.4 Similar International Positions

The statutory actuary may often be faced with conflicting interest. Distinction must be made between two conflicting interests and a conflict between an actuary's duty and an interest. For the former the actuary has to decide which conflict is more in his (or hers) interest and decide accordingly. The problem arises when a duty is in conflict with an interest. Regulators and professions are particularly concerned with the latter. Furthermore, conflict may arise between the desires and requirements of shareholders, policyholders and employees of the long-term insurer. Remuneration policies that are linked to the financial performance of the long-term insurer may encourage premature recognition of profit by reducing the policyholder liabilities. The statutory actuary, who may be a member of senior management, is faced with the conflicting task to protect policyholders on the one hand and to maximise profits for shareholders on the other hand. For pricing, the statutory actuary is responsible for policies to be actuarially sound. With no definition in the LTIA of 'actuarially sound' the question arises whether premium rates that may result in super-profits are actuarially sound. The expected premiums for these policies should be more than sufficient to cover benefits and yield good returns to shareholders. Internationally, these potential conflicting interests have been differently dealt with in different locales. This section investigates

the approaches implemented by other jurisdictions. In section 7.4.1 the appointed-actuary approach is described. The responses of other international regulators to an FBS questionnaire with additional information from other sources are analysed in section 7.4.2.

7.4.1 The appointed actuary

Johnston (1989) states that:

> "A paper about the Appointed Actuary is essentially a paper about prudential supervision of life insurance companies."

From 1974 to 2005 all long-term insurers in the UK had to appoint an actuary responsible for financial monitoring and the protection of policyholders. This requirement was from the Insurance Companies Act, 1973. Dayken (1999) explains that this Act did not introduce the term 'appointed actuary', but that the term was generally used for this position. The appointed actuary had to monitor aspects that might have affected the financial position of a long-term insurer, for example:

- product design;
- methods of marketing;
- volumes of business;
- premium rates;
- options and guarantees;
- surrender values and paid-up values;
- investments held and changes in investment policy;
- derivative exposures;
- current and likely levels of expenses;
- current and likely future tax bases;
- reinsurance arrangements;
- claims handling policy; and
- any contingent liabilities.

Although the Act required UK long-term insurers to appoint an actuary, the duties were prescribed mainly in the form of professional guidance.

The position of the statutory actuary in South Africa and that of the appointed actuary in the UK are in essence the same. In 2005, the appointed-actuary approach was replaced with a different approach. Three positions were created to deal with the potential conflict of interest namely, the actuarial-function holder, the with-profits actuary as to the reviewing actuary. South Africa did not follow this change. The question arises what the role of actuaries should be for regulatory solvency purposes.

After the failure of Equitable Life in the UK an inquiry was ordered by the UK Government (House of Commons). The Penrose report[83] was the result of this inquiry. Issues that were identified by Lord Penrose that concerned the actuarial profession included:

- a lack of comprehensive professional standards;
- an over-reliance on the role of the appointed actuary;
- a lack of scrutiny, review and independent audit of actuarial calculations;
- ineffective disciplinary procedures; and
- a reluctance to challenge fellow actuaries.

Following the Penrose report, the UK government requested Sir Derek Morris to conduct a wide-ranging independent review of the actuarial profession. The result was a report commonly referred to as 'the Morris review'. [84]

The review identified a number of weaknesses in the framework of self-regulation by the actuarial profession, including:

- "professional standards that have been weak, ambiguous or too limited in range, and perceived as influenced by commercial interests";

[83] Rt Hon Lord Penrose, Report on the Equitable Life inquiry, 2004
[84] Sir Derek Morris, Morris review of the actuarial profession, 2005

- "an absence of pro-active monitoring of members' compliance with professional standards"; and
- "a profession that has been too introspective, not forward-looking enough and slow to modernise."

The report acknowledged that certain functions are appropriate to be reserved through legislation to actuaries, but cautioned that a professional monopoly may be created with a tendency to over-rely on advice received. The review supported the introduction of three roles that replaced the appointed-actuary approach, but also recommended that the policyholder liabilities are audited as part of a long-term insurer's overall audit. South Africa did not follow any of these changes.

7.4.2 The FSB investigation

The FSB created a task force to review the role of the South African statutory actuary. The task force completed their investigation in 2008. The results and recommendations were not published. A questionnaire was sent to the regulators of six countries, namely:

- Australia;
- Canada
- the Netherlands;
- Singapore;
- the UK; and
- the USA.

The questionnaire and the responses were made available to the author. Information from the responses was supplemented with information from the applicable jurisdiction's legislation and professional guidance. See Appendix D for the FSB's questionnaire. Appendix E gives a summary comparison of each country's approach to the regulatory role of the actuary responsible for the financial position of a long-term insurer.

The aim of the FSB was to establish:

- who is responsible for the financial soundness of a long-term insurer;
- for the responsible persons, what the responsibilities are;
- how independence is ensured; and
- how conflicts are resolved.

The responsibility to ensure that a long-term insurer is financially sound differs between the assessed countries' jurisdictions. Although the board of directors are in all cases responsible for the risk management of the long-term insurer, it is only in the USA and the Netherlands where the board of directors are responsible for the value of liabilities. The board of directors are accountable to the shareholders of the long-term insurer. Shareholders are generally interested in sustainable profits. Senior management is usually incentivised on the financial performance of the company. From agency theory, the conflicting interests between shareholders and management and the related issues that arise are known as the 'principal-agent problem'. This theory is well documented—see Laffont & Martimort (2002). For determining the financial position of a long-term insurer, the question how to secure independence is more important than who is responsible.

Internationally, there are three distinct ways that have been adopted to deal with independence and the financial position of a long-term insurer. The Netherlands has adopted the certification of the financial position by an independent actuary. This actuary is not allowed to be employed by, own shares in or have any financial interest in the long-term insurer that is assessed. It is the responsibility of management to set the valuation assumptions and to perform the valuation. The certifying actuary is effectively acting as a specialist auditor.

In the USA the assumptions and methods are prescribed by the regulator. It is the appointed actuary's role to make sure that these assumptions and methods are used. The actuary may be employed by the long-term insurer. A peer review by independent actuaries is not required, but the results are audited.

The third case is where the actuary is responsible for the assumptions and valuation result. This includes where the actuary recommends the basis to the board of directors for approval. The reason why the latter case is included is that in all cases the actuary has a whistle-blowing duty if the actuary does not agree with the basis. South Africa's approach falls in this category.

Johnston (1989) was clear that the appointed actuary's position should be a senior position, even a director, in the organisation. This view is the opposite of the practice in the Netherlands. In the UK, the actuarial function holder is still allowed to be on the board of directors after the change from the appointed-actuary approach to the split-role approach.

The Solvency II directive[85], which was adopted after the FSB investigation, requires that all insurers have an actuarial function, with duties to:

- coordinate the calculation of policyholder liabilities;
- ensure that the methods, models and assumptions are appropriate for the policyholder liabilities;
- assess the quality and reliability of the data used to determine the policyholder liabilities;
- compare actual experience with assumptions;
- express an opinion on the reliability and adequacy of the policyholder liabilities;
- comment on the overall underwriting policy;
- comment on the adequacy of reinsurance arrangements;
- contribute to the effective implementation of the risk-management system; and
- assist with the solvency capital calculations.

[85] Article 48(1)

There is no requirement that the actuarial function is overseen by an actuary or one person. The Solvency II directive[86] specifies that the persons carrying out the functions must:

> "...have knowledge of actuarial and financial mathematics, commensurate with the nature, scale and complexity of the risks inherent in the business of the insurance or reinsurance undertaking, and who are able to demonstrate their relevant experience with applicable professional and other standards."

An apparent omission in the list of duties is the responsibility for investments. The Solvency II directive requires that investments should be selected on a prudent-person principle where assets are chosen to best match liabilities. This responsibility does not form part of the actuarial function.

Internationally, the management of conflicting interest is dealt with in different ways. By introducing a statutory position for the responsibility and accountability for the valuation of liabilities, solvency capital and the underlying assumptions, conflict may arise. This is because the board of directors' interests are more aligned with shareholders. A statutory position must balance policyholder and shareholder interests. In addition to the statutory position, the UK introduced a with-profits actuary who must ensure that with-profits policyholders are treated fairly. This actuary reviews the recommendations of the actuarial function holder to the board of directors. The limitation of discretion in the USA has meant that conflicting interest is not an issue for the appointed actuary. Even more so for the Dutch certifying actuary who is not employed, incentivised or has any financial interest in the long-term insurer's financial performance.

[86] Article 48(2)

7.5 Conclusion

In South Africa, the role of the statutory actuary is in essence the same as the UK's appointed-actuary role. This role has an arduous responsibility. The statutory actuary is central to the solvency assessment because the statutory actuary reports on and provides assurance to the board of directors and the FSB on the financial soundness of a long-term insurer. The statutory actuary has responsibilities in every aspect that may have an effect on the financial soundness of a long-term insurer. In addition to the legislative requirements, prescribed by professional guidance, the statutory actuary is expected to assess whether regulatory capital requirements are sufficient. If this responsibility is correctly discharged, it may significantly strengthen the solvency assessment framework. Investigations in the UK have criticised this approach and warned against a monopoly that reserves roles for actuaries.

Internationally, the approach of actuaries in long-term insurers' solvency assessments has taken different forms. To deal with some of the issues related to the appointed-actuary approach, changes have been implemented in the UK. Member states of the EU have also introduced a new approach, where the actuarial function does not place the responsibility on one actuary. Despite these developments, the South African approach has not changed.

There are advantages from the statutory-actuary approach. The responsibility for the financial soundness of a long-term insurer is clearly the responsibility of one person. By being involved in every aspect of the cycle of a policy, consistency in risk management can be achieved. These aspects include policy design and pricing, policy alteration rules, valuation of liabilities and solvency capital, investment policies and dividend declaration.

There are also disadvantages from the South African approach. For large long-term insurers this role may be too onerous for one person, although the approach may work well for small and medium undertakings. Conflicts of interests may arise if the statutory actuary's remuneration is based on the long-

term insurer's financial performance. Conflict may be more complex if the statutory actuary is also a member of the board of directors.

More important than the role of the statutory actuary is the approach to solvency assessment. There is more than one approach that may be appropriate for the assessment and management of a long-term insurer. It is important that the solvency assessment framework is clearly defined and that regulations and guidance exist to clarify the legal requirements and the role of professionals in fulfilling their duties.

CHAPTER EIGHT
THE INTERNATIONAL ASSOCIATION OF INSURANCE SUPERVISORS' COMMON STRUCTURE FOR THE ASSESSMENT OF INSURANCE SOLVENCY

The IAIS common structure describes a principle-based approach to solvency supervision that sets out the main elements of such a structure and their interdependencies. A framework has been put forward in collaboration with the IAA. The structure has three levels namely:

- preconditions;
- regulatory requirements; and
- supervisory assessment and intervention.

The efficiency of the structure of supervision is further dependent on the quality and adequacy of institutional reporting to the supervisor as well as public disclosure. A description of the structure is set out in chapters 9–11, followed by a critique thereof in chapter 12. South Africa's long-term insurers' solvency requirements and approach are compared to the IAIS's standards in chapters 13–16. Although all three levels are considered, the focus is on level 2.

CHAPTER NINE
LEVEL 1: PRECONDITIONS

The first insurance core principle[87] states three conditions that are required for effective insurance supervision, namely:

- a policy, institutional and legal framework for financial-sector supervision;
- a well developed and effective financial-market infrastructure; and
- efficient financial markets.

The IAIS acknowledges that these elements are not defined or controlled by insurance supervisory authorities in most international jurisdictions. Good laws are not enough and support of a legal system that enforces the law is required.

9.1 The Essential Criteria

The financial-sector policy framework must be publicly disclosed. This may be through policy statements by government. Statements should include the "institutional and legal framework" that exists for financial-sector issues.

For financial market infrastructure there must be "an efficient and fair legal and court system" whose decisions are enforceable. In addition, comprehensive and transparent accounting, actuarial and auditing standards must exist, that are documented and consistent with international standards. Disclosure of these standards must be in such a format that stakeholders can make informed decisions based on the disclosures. Professional standards must be available, including fit-and-proper criteria for individuals in key positions such as an appointed actuary. The supervisory authority, insurance industry and general public must also have access to basic economic, financial and social statistics.

[87] IAIS, Insurance core principles and methodology, 2003

Lastly, long-term and short-term investment opportunities must be available to ensure an efficient financial market.

9.2 Conditions for Supervisory Authorities

The second tier of conditions pertains to the supervisory authority. These conditions, from the IAIS common structure, require the supervisor to have adequate powers to:

- command the assessment and management of the risks insurers are exposed to;
- protect policyholders by setting regulatory requirements for individual insurers; and
- instruct an insurer to hold more capital to reduce risk if necessary.

The IAIS common structure focuses on risk management and the understanding of risk exposure by the insurer. Management and understanding of risk imply a prospective approach with dynamic financial analysis over a period in excess of one year.

CHAPTER TEN
LEVEL 2: REGULATORY REQUIREMENTS

The regulatory requirements cover three aspects, namely financial, governance and market-conduct requirements. The IAIS common structure focuses on the financial requirements. Each aspect is described below.

10.1 Financial Requirements

The IAIS common structure requires long-term insurers to determine the value of assets and liabilities consistent with a 'fair-value' approach. The approach is discussed below under the following headings:

- a robust and risk-sensitive solvency regime;
- financial requirements appropriate to the type of risk;
- risk characteristics and components;
- total balance sheet approach;
- valuation and market consistency;
- determination of current estimate;
- role of technical provisions and capital;
- underwriting risk in technical provisions and capital;
- asset–liability mismatch risk in technical provisions and capital;
- time horizon for calibration of technical provisions and capital;
- capital requirements and diversification between risk factors;
- cost-of-capital and percentile approaches for the determination of the technical provisions; and
- use of standardised and more advance approaches, including internal models.

10.1.1 A robust and risk-sensitive solvency regime

The aim of a solvency regime should be to ensure that insurers' obligations are met. Various scenarios should be taken into consideration, including a going-

concern basis and the effect of different levels of new business, including closure of new business.

Key objectives of the IAIS in developing the common structure for the assessment of insurer solvency are enhanced transparency, comparability and the harmonisation of global insurance solvency assessment. A risk-based solvency regime is a fundamental requirement to fulfil this aim. To achieve this aim, insurers must manage their own risks and show adequate robustness in normal and adverse circumstances.

10.1.2 Financial requirements appropriate to the type of risk

The solvency regime must be sensitive to risk. It must be clear which risks lead to financial requirements. The level of prudence must be disclosed in the requirements. Risks should be assessed individually and in addition their interdependence should be taken into account. The methods may be quantitative, qualitative or a combination of both.

The IAIS acknowledges that it is not always straightforward to quantify risks into a financial requirement, but that development of improved methodologies should be encouraged.

10.1.3 Risk characteristics and components

The risks in an insurance portfolio should be categorised according to the characteristics of these risks, for example whether a risk may be reduced by diversifying the portfolio or through hedging.

10.1.4 Total balance sheet approach

The solvency regime should recognise the interdependence between assets, liabilities, capital requirements and capital resources. Risk assessment should therefore be an overall approach recognising the effect of risks on all components of the balance sheet.

10.1.5 Valuation and market consistency

Valuation of assets, liabilities and risk exposures should be based on information that is identifiable and observable in financial markets and generally available data on insurance risks, which may include a company's own experience data.

There are various ways to determine the value of insurance obligations. The principle is that the valuation of the obligation should be market-consistent and arbitrage-free. Different techniques for market-consistent valuations exist, for example, the observed price if traded in a liquid market.

Often a deep, liquid market for insurance obligations does not exist. It is important that the values of the same liability should have consistent values in a solvency regime. Some components of insurance obligations, such as administration expenses, will depend on a company's own business practice and may therefore be different from those of other companies. Other components of policyholder liabilities are independent of the insurer and should therefore be equal in value.

Risk margins must be included where the amount and timing of future obligations are uncertain. These margins are defined to be the amount necessary in addition to the best estimate so that an insurer would be prepared to take on or retain the obligation.

The amount of policyholder liabilities should be calculated prospectively taking into account the risk characteristics of the underlying insurance portfolio. The time value of money should be recognised. Discounting of future obligations should be at the risk-free discount rate consistent with the timing and cashflow being valued. The risk-free rates should take into account the term structure of interest rates derived from an appropriate zero-coupon yield curve.

10.1.6 Determination of current estimate

The principle is to derive parameters using best estimates at the date of valuation that are market-consistent.

10.1.7 Role of technical provisions and capital

Clear definitions of technical provisions and capital are required. Where technical provisions, or insurer obligations, are based on a market-consistent valuation that includes risk margins, capital is required for further protection in case of adverse experience. Items such as a provision for mismatching should be included as capital and not as technical provisions.

10.1.8 Underwriting risk in technical provisions and capital

The IAIS has adopted a definition of underwriting risk from a report[88] by the IAA. The definition is:

> "Underwriting is the specific insurance risk arising from the underwriting of insurance contracts. The risks within the underwriting risk category are associated with both the perils covered by the specific line of insurance and with the specific processes associated with the conduct of the insurance business."

For the purpose of calculating the value of technical provisions, the risk portfolio should be assumed to be fully diversified. Any additional amounts required as a result of an undiversified risk portfolio or voluntary exposure by the long-term insurer should be reflected as capital.

[88] International Actuarial Association, A global framework for insurer solvency assessment, 2004, page 179

10.1.9 Asset–liability mismatch risk in technical provisions and capital

As mentioned in the previous paragraph, a voluntary exposure, for example to mismatch assets to liabilities, should be reflected in capital. However, sometimes ready matching is not available, for example at longer durations. Such uncertainty should be dealt with by adding a margin to the current estimate in determining the technical provisions, rather than increasing the solvency capital.

10.1.10 Time horizon for calibration of technical provisions and capital

Technical provisions must be calculated over the full term of exposure to risk of the long-term insurer. The projection for a whole-life policy may therefore be for many future years.

Two periods are important for the computation of the capital requirement. The first period is the period over which a shock is applied to a risk factor or group of risk factors. The shock period is typically shorter than the term of the policies and is often taken as a one-year period. The second period is the period over which the shock has an effect on the insurer. The length of the period depends on the type of shock that is applied; for example a once-off shift in mortality will result in the revaluation of the technical reserves over the full term of the policies as opposed to a natural disaster, which may have a once-off effect.

The technical provisions are calculated at a certain time using information available at that time. This is also applicable to the risk margin included in the technical provisions reflecting uncertainty. In a shock scenario, the change in information may have an effect on the size of the risk margins and should be reflected in the calculations.

10.1.11 Capital requirements and diversification between risk factors

The capital requirement should reflect the risk exposure of a long-term insurer to risk. Diversification between risk factors may be taken into account where this can be substantiated with satisfactory rigour.

10.1.12 Cost-of-capital and percentile approach for the determination of the technical provisions

The IAIS considered two approaches for the computation of technical provisions, namely the 'cost-of-capital approach' and the 'percentile approach'.

The cost-of-capital approach considers the risk–return requirements to set the risk margin of the technical provisions. This is done on the basis that sufficient capital is required to run off a portfolio of policies. The cost of the risk is measured as the cost of holding the capital to support the portfolio over the term of the policies, i.e. the return required by investors in addition to the risk-free rate of return. A pre-condition of this approach is that the capital requirement is risk-sensitive.

The percentile approach aims to meet policyholder obligations with a predefined level of certainty. A fixed level of certainty over different classes of policies has the advantage of equity between different classes of business in the sense that the same level of protection is applied to policyholders. Assets to cover discretionary benefits of with-profit policyholders may be used to offset capital requirements if the assets are available to absorb losses in adverse scenarios.

The IAIS acknowledges that further investigation is necessary and that other methods may be considered. Subsequently, the IAA has released a

comprehensive paper for the determination of technical provisions and risk margins[89].

10.1.13 Use of standardised and more advance approaches, including internal models

The IAIS encourages long-term insurers to use internal models with adequate reporting and risk-management programmes.

10.2 Governance Requirements

It is of key importance to the IAIS to have sound governance policies to supplement the financial requirements discussed above. Some risks may be managed through governance requirements only rather than by setting regulatory financial requirements.

Two levels of governance requirements are acknowledged in the IAIS common structure. The first is associated with the board of directors. The members of the board of directors must have the appropriate level of technical expertise, experience and reputation. Risk policies and measures should be established and appropriately documented. Clear and open communication concerning honest and lawful behaviour to staff members is essential.

The second is governance for management. Management is responsible for implementation of system and controls and reporting to the board of directors. Insurers should make use of properly skilled staff and professionals such as actuaries with the suitable skills and experience to manage the risk programme.

[89] International Actuarial Association, Measurement of liabilities for insurance contracts: current estimates and risk margins, 2010

10.3 Market-conduct Requirements

Some risks may be better addressed through market-conduct requirements than through financial requirements. The aim of market-conduct requirements is that customers enter into suitable insurance contracts. The customer should have a clear understanding of the terms of a policy at the point of sale including how an insurer will use its discretion.

Rigorous market-conduct policies and procedures are closely linked to the solvency position of a long-term insurer. Policy liabilities may arise through miss-selling practices that may have further consequences on other existing business as a result of a damaged reputation.

The solvency regime should clearly define how to deal with potential and current customers in different circumstances and should allow scenarios that may cause the setting of additional solvency capital.

CHAPTER ELEVEN
LEVEL 3: SUPERVISORY ASSESSMENT AND INTERVENTION

The supervisory authority should have a range of measures that trigger intervention at different stages. The measures should take into account the overall risk position of the insurer. Corrective action should be implemented by the insurer to restore inadequate risk management.

Additional capital prescribed by the supervisory authority may be imposed if the insurer does not meet the quantitative or qualitative regulatory requirements, including governance and market-conduct requirements. Additional capital should also be considered where supervisory assessment shows inadequate capital levels to specific risk exposures by the standard regulatory requirement.

11.1 Public Disclosure and Transparency

For supervisory purposes, disclosure and transparency of the above elements are essential. Distinction should be made between public disclosure and disclosure to the regulator by long-term insurers. Information that is commercially sensitive may require disclosure to the regulator; for example information that is associated with innovation.

Disclosure should include measures of financial strength, expected future development and material assumptions. The supervisor should take into account the disclosure requirements of accounting standards and the way they are applied.

Supervisors must ensure that the information is meaningful and presented in a user-friendly way.

CHAPTER TWELVE
A CRITIQUE OF THE IAIS COMMON STRUCTURE

The IAIS common structure sets the framework of supervision for insurers with principles on various matters. More guidance and further explanatory notes will be necessary to give practical guidelines to supervisors in different countries and jurisdictions. Principles, such as market-consistent valuation of assets and liabilities are radical changes to current solvency requirements of some countries. The emphasis on risk management in addition to financial requirements is another area of change. Compared with the IAIS's common structure some jurisdictions or supervisors, like India's Insurance Regulatory and Development Authority (IRDA), have a very prudent rule-based approach[90]. Policyholder liabilities are determined prudently and solvency capital requirements are calculated with simple formulae. Supervisors like these are likely to take some time before transforming successfully to principle-based and risk-based approaches.

A critical aspect of determining the value of liabilities in a prospective calculation is the discount rate of future cash flows. The IAIS common structure prescribes the rate to be the risk-free rate of return. To be consistent with the law of one price, risk-free rates should only be used if the cashflows are risk neutral. The Association of British Insurers (ABI) has determined that the use of risk-free rates as the discount rate would increase liabilities to such an extent that more than £57.16 billion additional capital would be required for UK insurers. This is close to the total market capitalisation of the industry at the time.[91] Such costs will destabilise the industry as a whole.

One of the key aspects that the IAIS common structure is not addressing is the assessment of group companies. The solvency assessment on an individual basis for companies in a group may restrict the success of this structure if the

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[90] The Insurance Act no. 4 of 1938, Section 64VA of India & IRDA's Circular No:065

[91] Letter addressed to the Chancellor Alistair Darling dated 12 August 2009 from Mr S Haddrill, director-general of ABI

group structure is not acknowledged as a single economic entity. Risk diversification across group companies will not be recognised resulting in the inefficient allocation of capital for companies in a group structure. In addition, minimum capital requirements for some entities within the group may artificially increase the group's solvency capital requirement. The IAIS has issued two documents[92] on group supervision. These documents lack detail for implementation and further work is necessary.

Solvency II is the EU's project to create a harmonised system of risk-based prudential regulation in the European Economic Area. The European Parliament has adopted a directive[93] that sets the framework for regulation. The main aims for the Solvency II project are:

- improved protection of policyholders;
- increased competitiveness of EU insurers; and
- improved allocation of capital resources.

These aims are all to be achieved in a proposed risk-based solvency environment. The calculation of the solvency capital requirement is based on either a 'look-through' or an 'aggregate-deduction' basis for group companies in the EU as described in the technical specifications.[94] These terms are now referred to as the 'accounting-consolidation' and 'deduction-aggregation' methods. The deduction-aggregation method calculates the group solvency as the difference between the sum of the aggregated free assets in the group and the aggregated solvency capital requirements in the group. The supervisor considers the group structure as a single entity on the accounting-consolidation method, although each insurance company must cover its own SCR, without consideration of possible diversification benefits from other insurers in the group. This means that a group of companies is not allowed to hold the

[92] IAIS,
- Principles applicable to the supervision of international insurers and insurance groups and their cross-border business operations,1999
- Principles on group-wide supervision, 2008

[93] General rules on the taking-up and pursuit of direct insurance and reinsurance, 22 April 2009

[94] CEIOPS-DOC-23/07, Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS), December 2007

regulatory capital in a holding company on behalf of its subsidiaries. Since the holding company of an insurance group will also have to meet the group's SCR, it is important how this capital requirement is determined. For the holding company, diversification between subsidiaries is allowed and holding company SCR will therefore be lower than the sum of the individual insurers' SCR. The recognition of a group structure is an improvement to the IAIS's common solvency structure.

Another aspect that is not explicitly dealt with by the IAIS's common solvency structure is the potential occurrence of negative policyholder liabilities. Policy design that allows high initial capital outlay that is recovered through future premiums may result in negative policyholder liabilities after the first premium has been paid. Market-consistent valuation methods may also show these policyholder liabilities as negative during the early durations. Many countries' regulations do not permit negative policyholder liabilities. Some jurisdictions have a more stringent requirement that no expected negative cashflows, after taking into account the release of reserve, are allowed in any future year. This means that since the best estimate reserves are negative but set to zero for supervisory purposes, any net negative cash flow in this period will require an additional provision resulting in a reserve greater than zero.

The main reason why supervisory authorities do not allow negative reserves is the uncertainty of the level of lapses or cancellations during the early durations of such policies. This disallowance will result in an increase of the total remaining policyholder liabilities, which may potentially reduce the financial strength of a company. This may be addressed by setting solvency capital requirements to take into account scenarios such as severe withdrawals during the early years. Severe withdrawal scenarios may vary from 100% withdrawals of such policies to less stringent scenarios. In determining the solvency capital, the FSB requires long-term insurers to assume that all policies with negative liabilities withdraw on the valuation date.[95] On the

[95] FSB, Board Notice 72 of 2005 & PGN104 Life Offices – Valuation of long-term insurers

other hand, for determining solvency capital a severe scenario will be inconsistent with the set confidence level.

A related issue is the discretion that the valuator may use in setting assumptions, calculating solvency capital and other areas such as zeroising negative reserves or using approximate methods for policyholder liabilities. The principle that policyholder liabilities must be market-consistent suggests that no discretion may be used in calculating the reserves. This may be impractical in some cases, such as for small schemes or where policy data are not credible. There may also be an element of discretion in setting best-estimate assumptions, for example, the anticipation of how future experience may be different to the most recent experience. More guidance and further research on this subject are required by the IAIS.

A potential difficulty is the validation of risk margins when technical liabilities are set. The value of most technical liabilities will be known with certainty only when being transferred to another party such as an insurer or reinsurer. There are, however, no deep liquid markets with publicly available prices for all types of technical liabilities. Transfers to reinsurers may be on other bases than the market price for the technical liabilities, for example, a proportion of the risk may be ceded to the reinsurer for a proportion of the premium charged to the policyholder. The premium rates to policyholders may have been set at a certain time and may not accurately reflect the current price of the risk being borne by the insurer.

The calculation of the size of the risk margins by using techniques such as stochastic modelling will most likely result in the placement of different values on the technical reserves between long-term insurers, unless the valuation models and parameter calibration are prescribed. Different values are inconsistent with the principle of a single price for a technical liability stated in the IAIS's common solvency structure. Prescribed models and parameter calibration are against the principle of assessing "own risk"[96]. The

[96] The IAIS Common structure for the assessment of insurer solvency 2007, Structure element 3

IAIS acknowledges that no market-consistent price readily exists for most insurance obligations. More guidance and further research are required on the topic.

The challenges of validating the risk margins and valuation of insurance obligations in the absence of readily available market prices are also applicable to the valuation of other instruments where no traded market values exist, such as unlisted equity and property.

The IAIS briefly discusses the issues associated with governance processes and controls such as those relating to the board of directors and to management in the structure document. Further guidance[97] is provided by the IAIS. The guidance is given on the establishment and on-going operation of an insurance company and related undertakings as a single economic entity (enterprise) and its importance from a supervisory perspective. The emphasis is on risk- and capital-management policies, practices and structures and the implementation thereof within the insurance group. Eight key features are identified with guidance, namely:

- governance and an enterprise-risk-management framework;
- risk-management policy;
- risk-tolerance statement;
- feedback loop;
- own risk and solvency assessment;
- economic and regulatory capital;
- continuity analysis; and
- the role of supervision.

The Organisation for Economic Co-operation and Development (OECD) has over 30 member countries, including the USA and the UK. Their aim is to promote policies to raise the standard of living in member countries, to grow

[97] Guidance paper on enterprise risk management for capital adequacy and solvency purposes, October 2007

economically and to expand world trade, while maintaining financial stability[98].

The organisation published the OECD Principles of Corporate Governance in 2004. These principles are grouped under the following:

- ensuring the basis for an effective corporate governance framework;
- the rights of shareholders and key ownership functions;
- the equitable treatment of shareholders;
- the role of stakeholders;
- disclosure and transparency; and
- the responsibilities of the board.

The IAIS's guidance on enterprise risk management does not disregard the OECD's principles, but rather gives a framework in which the OECD's principles can be met.

Further guidance by the IAIS should be issued to address the following:

- market conduct;
- transition from other methods to market-consistent methods;
- dealing with interdependence between assets, liabilities and capital; and
- dealing with insufficient data, for example, to model operational risk.

[98] The OECD brochure, 2008

CHAPTER THIRTEEN
COMPARISON OF THE SOUTH AFRICAN REGULATORY FRAMEWORK WITH THE IAIS COMMON STRUCTURE
LEVEL 1: PRECONDITIONS

The preconditions required by the IAIS are:

- a well developed and effective financial-market infrastructure; and
- efficient markets.

These preconditions are discussed in more detail below.

13.1 A Well Developed and Effective Financial-market Infrastructure

The IAIS has published[99] a set of five principles to ensure that supervision is effective. The five principles require supervisory authorities to:

- have "adequate powers, legal protection and financial resources to exercise their functions and powers";
- be "operationally independent, notably from political authorities and from insurers";
- be "accountable and transparent in the exercise of its functions and powers";
- hire, train and maintain "sufficient staff with high professional standards"; and
- treat "confidential information appropriately."

The FSB complies with these conditions. It is an independent organisation that is empowered by law to regulate all financial services institutions (except banks) and to promote consumer confidence. Operationally, the FSB is

[99] IAIS, A new framework for insurance supervision, 2005

independent from the government, although it is accountable to the Minister of Finance. It employs actuaries, accountants and other professionals.

South Africa has a well developed and effective financial-market infrastructure. Information is continuously published by the public and private sectors. The South African Reserve Bank publishes daily information regarding money-market, capital-market, and currency and gold prices. Equity- market information is published by a news service[100]. Exchanges exist for the trading of equities, fixed-interest instruments and derivatives.

13.2 Efficient Financial Markets

The IAIS does not define the meaning of 'efficient financial markets'. For the purposes of this dissertation it is assumed that the term is used to refer to information-efficiency, rather than allocation-efficiency as defined by Smith (1962) or operational efficiency sometimes used by economists (e.g. Dimson & Mussavian, 1998).

Fama (1970) defines an efficient market as one in which "trading on available information fails to provide abnormal profit." Three categories are identified, namely the weak, semi-strong and strong forms of efficiency. Bhana (unpublished), Da Silva (unpublished) and Kelly (unpublished) concluded that prices of listed equities were slow to react to information and that the market was inefficient. Later studies such as Mabhunu (unpublished) have shown that the behaviour of listed equities satisfies the weak form of efficiency after the JSE Securities Exchange (JSE) imposed the requirement to release announcements via SENS in October 1997.

For the weak form of market efficiency, the preconditions for insurer solvency assessment in South Africa as required by the IAIS are therefore satisfied.

[100] Security Exchange News Service (SENS)

CHAPTER FOURTEEN
COMPARISON OF THE SOUTH AFRICAN REGULATORY FRAMEWORK WITH THE IAIS COMMON STRUCTURE
LEVEL 2: REGULATORY REQUIREMENTS

For South African long-term insurers, solvency requirements are stated in the LTIA. The overarching requirement is that a long-term insurer remains 'financially sound' at all times. An insurer must have assets that are sufficient to provide for the liabilities and to generally conduct business.

The LTIA states that the method of calculating values of assets and liabilities must be on the financial-soundness method described by the Actuarial Society of South Africa's guidance in concurrence with the FSB. The order of priority is stated in Board Notice (BN) 72 issued by the FSB. The highest priority is given to any requirement stated in the LTIA, followed by requirements stated in BN 72 and then by the guidance notes issued by the Actuarial Society. This guidance is mainly set out in PGN 104[101] and PGN 110[102]. Various board notices and directives issued by the FSB exist with additional requirements. The key requirements are prescribed in:

- Board Notice 72 of 2005[103];
- Directive 139.A.i (LT) [104];
- Directive 140.A.ii (LT)[105];
- Directive 140.B.iii (LT)[106];
- Directive 141.A.i (LT)[107]; and
- Directive 145.A.i (LT)[108].

[101] Actuarial Society of South Africa, PGN 104, Life offices – the valuation of long-term insurers, version 7, 2008
[102] Actuarial Society of South Africa, PGN 110, Allowance for embedded investment derivatives, version 2, 2008
[103]FSB, Board Notice72, Prescribed requirements for the calculation of the value of the assets, liabilities and capital adequacy requirement of long-term insurers, 2005
[104] FSB, Directive 139.A.i (LT), Amendments to the Long-term Insurance Act, 1998, 2003
[105] FSB, Directive 140.A.ii (LT), Prescribed requirements for the calculation of the value of the assets, liabilities and capital adequacy requirement of long-term insurers, 2006
[106] FSB, Directive 141.B.iii (LT), Application of SA GAAP to the requirements – differences between the annual financial statements and the long-term insurance return, 2004
[107] FSB, Directive 141.A.i (LT), Directive on investment in shares of the insurer's holding company, 2003

The LTIA allows the FSB to gather information from long-term insurers. This information is provided through standard quarterly and annual returns.

The question arises how the above framework of South Africa compares with the requirements of the IAIS.

The South African regulatory framework is compared below with the IAIS common structure, which is described in Chapters 7–11. The IAIS common structure can be categorized in:

- a robust solvency regime;
- a risk-based solvency regime; and
- valuation principles.

In this chapter, this comparison is discussed for these categories. To avoid repetition of the same points, each of these categories is divided in sub-categories that are at a more granular level than discussed in the previous chapters. For example, the requirement of a 'total-balance-sheet approach' is considered in various sub-categories, namely:

- solvency capital;
- recognise the interdependence of risk;
- valuation of assets; and
- valuation of liabilities.

For this example, points made under the last two sub-categories are also applicable to 'valuation and market consistency'.

The FSB is assessed and scored against these requirements. The scores are defined as a number that indicates whether the FSB has met, partially met or have not met the requirement:

[108] FSB, Directive 145.A.i (LT), Disregarding amounts representing negative liabilities in respect of long-term policies when calculating the value of assets according to ¶4(iv) of schedule 3 to the Long-term Insurance Act, 1998, 2004

1 - this requirement or feature is not met;
2 - traces of this requirement or feature may be present, but not necessarily robust; and
3 - the requirement or feature is fully met or present.

14.1 A Robust Solvency Regime

To fulfil the requirements of a robust solvency regime the regulator has to consider well defined and disclosed measures of a long-term insurer's financial strength. The regulator must show that there are:

- a high degree of certainty that insurance obligations can be met;
- a specified probability level of the overall safety required;
- transparency;
- comparability of long-term insurers' short-term solvency positions; and
- comparability of long-term insurers' long-term solvency positions.

14.1.1 A high degree of certainty that insurance obligations can be met

The measure 'a high degree of certainty that insurance obligations can be met' requires the long-term insurer to meet obligations of the existing book of in-force policies in various scenarios including the potential effect of new business.

The statutory valuation method (SVM) described in BN 72 and PGN 104 requires the insurer to consider existing policies on a going-concern basis when calculating policyholder liabilities and capital adequacy requirements. Dardis et al. (unpublished) verified that certain of the risk components of the capital requirements are prescribed to "provide protection to the 95th percentile." This level of protection is over the duration of all policies, as opposed to a protection at the 99.5% percentile over a one-year period for Solvency II–which gives a similar level of protection. For additional protection, there are restrictions on the value of assets that are independent of

the valuation methods for the values of policyholder liabilities and capital requirements. These restrictions apply to prohibit concentrations of assets by type and counter party. For the lapse and surrender risk components the policyholder liabilities and capital must be sufficient to cover a 'run-on-the-bank' scenario. This requirement is more onerous than the requirements for other risk components.

There is no explicit consideration of the potential effect of future new business. The FSB monitors long-term insurers by assessing information from the standard quarterly and annual returns. Statement G5[109] in the annual return requires the statutory actuary or alternate to certify that:

- taking into account new business, the statutory actuary expects the result of the SVM to be favourable in one year's time;
- new business terms will not endanger the financial soundness of the company; and
- the reserves and capital are adequate given the company's marketing and new- business plans.

In addition to the above requirements, the statutory actuary is required to consider the appropriateness of the compulsory margins, discretionary margins and CAR requirements (see chapter 8). If this duty is appropriately discharged, it significantly increases the certainty that policyholder liabilities will be met.

These methods for calculating the values of policyholder liabilities, solvency capital, the restrictions on asset values and the duty of the statutory actuary to include additional discretionary margins, give a high degree of certainty that insurance obligations can be met. The duty of the statutory actuary to certify the financial-soundness valuation and the frequent submission of information to the FSB give additional confidence. The overall score allocated is therefore 3.

[109] FSB, LT2010, Statement G5, Report in respect of financial soundness, 2010

14.1.2 A specified probability level of the overall safety required

PGN 104 states in ¶6.1 that the solvency requirement is set so that the minimum assets a long-term insurer is required to hold in excess of its liabilities is based on an "approximate [*sic*] 95% confidence level". The PGN further states in ¶6.10.3.1 that mortality is based on a 95% confidence level over a one-year period. This contradicts previous paragraphs which indicate that the confidence level is over the duration of the insurance portfolio.

There is no explicit confidence level specified to determine the policyholder liabilities. This is partly due to discretion that may be used when calculating the policyholder liabilities, for example, the statutory actuary may zeroise negative policyholder liabilities. The solvency capital methodology provides for this discretion through different rules. The statutory actuary is required to consider the sufficiency of the components of the solvency capital. If there is any evidence that the risk of the underlying portfolio is more than the risk assumed in PGN 104, the statutory actuary should consider increasing the solvency capital. BN 72 and PGN 104 specify conditions that may be more onerous than an overall targeted level of a 95% confidence interval. Examples are the requirement to hold an absolute minimum of the greater of R10 million and 13 weeks' operational expenses, and the requirement to assume a 100% run-on-the-bank scenario if negative liabilities are allowed. This may result in a solvency capital level that exceeds the 95% confidence level.

PGN 104 allows management actions to reduce the CAR result. An example is the reduction of future bonuses for with-profit policyholders after a fall in asset values. Management actions and the ability of the statutory actuary to add discretionary margins to the policyholder liabilities may have a significant effect on the confidence level associated with the solvency assessment.

This requirement may be seen as partly meeting the IAIS's requirement since the minimum level of solvency is defined. The contradiction in PGN 104

regarding the time horizon of the confidence level needs clarification by the Actuarial Society of South Africa. The score allocated is thus 2.

14.1.3 Transparency

Transparency involves enhancing and improving standards in the assessment of insurers worldwide. The IAIS common structure states that long-term insurers should make information public to:

> "enhance market discipline and provide strong incentives for insurers to conduct their business in a safe, sound and efficient manner which treats policyholders fairly."

The IAIS also states that:

> "Information provided to the supervisor and subject to confidentiality supports and fosters openness on commercially sensitive issues between the supervisor and the insurer**."**

The objective is to establish whether the South African regulatory environment encourages transparency of long-term insurance companies' solvency information according to international standards and guidance.

The requirement to be transparent may be met through disclosure of information. The IAIS has published numerous guidance and standards regarding disclosure requirements. Insurance Core Principle 26[110] states that:

> "The supervisory authority requires insurers to disclose relevant information on a timely basis in order to give stakeholders a clear view of their business activities and financial position and to facilitate the understanding of the risks to which they are exposed."

[110] IAIS, Insurance core principles and methodology, 2003

Detailed standards and guidance are given in:

- IAIS Standard on disclosure concerning investment risks and performance for insurers and reinsurers (October 2005);
- IAIS Standard on disclosure concerning technical performance and risks for non-life insurers and reinsurers (October 2004);
- IAIS Guidance paper on public disclosure by insurers (January 2002); and
- IAIS Guidance paper on investment risk management (October 2004).

Disclosure may be grouped into two categories, namely 'public disclosure' and 'disclosure to the supervisor'.

Public disclosure

The IAIS guidance[111] states that "risk disclosure is critical to the operation of a sound market". Disclosure is of interest to policyholders and investors. Policyholders are concerned with the long-term insurance company's ability to pay claims as they fall due, whereas investors require at least a fair return on their investment.

The guidance by the IAIS addresses the quality of disclosure and what should be disclosed. Supervisors have an important role to encourage insurers to disclose adequate and timely information to market participants.

The quality of disclosure is further categorised in:

- relevance:
- timeliness;
- accessibility;
- comprehensiveness;
- reliability;
- comparability; and

[111] IAIS, Guidance paper on public disclosure by insurers, 2002

- consistency.

This is explained further below.

Relevance–information is deemed relevant if it is material in the decision-making process of an investor or policyholder.

Timelines–it is desirable that information is released in a timely fashion to reflect the true picture of the state of affairs, while allowing enough time to be at an acceptable level of accuracy.

Accessibility–access to information should be affordable. Electronic means of disclosure such as the internet are strongly encouraged.

Comprehensiveness–disclosure should be broad enough to give informed market participants adequate information to understand the inherent risks of the long-term insurer's business in order to make well-versed investment decisions.

Reliability–disclosed information should also reflect the true nature of events that may be relevant to the stakeholders. In particular, it should reflect the economic substance and legal result of transactions. Enough details should be disclosed to give the full picture of the related event. Presentations of disclosure should take the form of generally accepted national and international standards for the ease of comparability among long-term insurers. An example is the IASB's IFRS 7[112].

Comparability–in addition to the quality of disclosure, the content of public disclosure must be meaningful to stakeholders. In order to make valid comparisons to other long-term insurers, sufficient detail should be published so that the accounting and actuarial policies, methods and underlying assumptions are easily understood.

[112] IASB, IFRS 7: Financial Instruments: Disclosures

Information to explain the appropriateness of assets, liabilities and solvency-capital values should be shown, including the valuation methods and underlying assumptions. Any material changes in the underlying assumptions with the financial effect should be disclosed.

The recent past and expected future performance should be disclosed. A profit and loss account must be included with additional reports to explain:

- the nature and sources of surplus;
- investment performance; and
- changes in equity.

Factors that influence the variability of results and the future strategy and outlook should be discussed.

Consistency–methods and assumptions used by long-term insurers should be consistent between time periods. Any changes should be disclosed together with the financial effect of the change.

Useful disclosures are the strategies for managing risk and the effectiveness of those strategies. The disclosures should enhance stakeholders' understanding of the stability and viability of the long-term insurer. Sensitivities and stress-testing results should be disclosed. The risk areas that should be addressed are typically risks relating to the policyholder liabilities, assets and other areas that may have a bearing on the long-term insurer's ability to meet its obligations. The presentation of information should be qualitative and, where appropriate, quantitative to help market participants understand the nature and potential result of the material exposures to risk and how the long-term insurer manages these exposures.

Stakeholders should be provided with information about the insurer's business, management and corporate governance. The information might include board structure, the structure of ownership, strategic alliances, the regulatory framework etc.

Public disclosure in South Africa

The IAIS advocates that a supervisor should encourage public disclosure by long-term insurers. Financial reporting disclosures are mainly under the control of the Registrar of Companies in South Africa. The Registrar of Companies together with professional bodies such as the South African Institute of Chartered Accountants (SAICA) determines the minimum disclosure requirements for companies' published financial results.

The Accounting Practices Board (APB) was established to issue 'statements of general accepted practices' (GAAP) and, 'general recommended accounting practices' (GRAP). Another function is to make recommendations to the government, Independent Regulatory Board for Auditors or to the Standing Advisory Committee in terms of the Companies Act 1973[113]. The APB was established by the following bodies:

- the South African Institute of Chartered Accountants;
- the Independent Regulatory Board for Auditors;
- the Johannesburg Stock Exchange;
- the Association of Chambers of Commerce of South Africa;
- *die Afrikaanse Handelsinstituut*;
- the South African Federated Chamber of Industries;
- the Chamber of Mines of South Africa; and
- the Steel and Engineering Industries Federation of South Africa.

These bodies all have representation on the APB.

South Africa has been harmonising its statements of GAAP with international standards since 1993. From 1 January 2005, the APB has adopted international financial reporting standards without amendments[114] as local GAAP. The statements include IASs issued by the IASC and IFRSs issued by the IASB, the successor of the IASC.

[113] Act No. 61 of 1973, Republic of South Africa
[114]SAICA, Circular 7, 2004

The reporting standard for policyholder liabilities is IFRS 4[115]. The standard specifies that all policy contracts need to be specified as either insurance or investment contracts. Insurance contracts are to be valued according to local GAAP and investment contracts according to IAS 39[116].

Insurance contracts are subject to a liability adequacy test in terms of IFRS 4. The purpose of the test is to ensure that the liability held is sufficient to meet all expected future obligations under the contract, including guarantees and options. Future obligations are estimated using current estimates of future cash flows. If the test shows that the liability is inadequate, the entire shortfall needs to be recognised as a loss. The financial soundness valuation (FSV) as set out in PGN 104 satisfies this requirement. It is also the basis for the statutory valuation method (SVM) used for the FSB. Investment contracts, however, are subject to valuation as stipulated in IAS 39. This valuation may show very different results to the FSV results.

IFRS requires:

> "… disclosure that identifies and explains the amounts in an insurer's financial statements arising from insurance contracts and helps users of those financial statements understand the amount, timing and uncertainty of future cash flows from insurance contracts."

In addition to this aim, IAS 1.17(c) requires that a reporting entity shall:

> "… provide additional disclosures when compliance with the specific requirements in IFRSs is insufficient to enable users to understand the impact of particular transactions, other events and conditions on the entity's financial position and financial performance."

[115] IASB, IFRS 4 – Insurance Contracts, 2005
[116] IASB, IAS 39 – Financial instruments: recognition and measurement, 2005

Another disclosure requirement from the Companies Act, 1973 is a statement in the annual financial report by the statutory actuary. The statutory actuary has to certify whether the long-term insurer is financially sound. This requirement is stated in the Companies Act, 1973[117]:

> "... in the case of a long-term insurer, a report by the Statutory Actuary shall be included in the financial statements, in accordance with a guideline issued by the Actuarial Society of South Africa."

Companies listed on the JSE are to abide by the JSE listing requirements. These requirements[118] demand companies to disclose 'relevant company information'. 'Relevant company information' is defined as company announcements and price sensitive company releases. The JSE has established an office called the 'Securities Exchange News Service'. All relevant company information received by the office is, after authentication and JSE approval, electronically communicated to the subscribers of the service. The service facilitates early, equal and wide distribution of information, and as mentioned in section 13.2, has improved the market efficiency from its previous inefficient form to weakly efficient.

The requirements for policyholder-specific information mainly stems from the LTIA. Comprehensive disclosure is required when concluding a long-term insurance contract. The policyholder protection rules[119] express these requirements in detail. For policies with benefits that have discretionary elements the principles and practices of financial management[120] must be disclosed on the website of the long-term insurer.

The above disclosure requirements satisfy the IAIS's requirements on the content of disclosure. However, a large part of the accounting standards on disclosure is principle-based rather than rule-based. Various interpretations and applications of these principles exist.

[117] Act no. 61 as amended, Republic of South Africa, Schedule 4, ¶14
[118] JSE listing requirements, 2003, Schedule 19
[119] Long-term Insurance Act, Policyholder protection rules, 2004
[120] FSB, Direct 140,A.i, Governance of discretionary participating business, 2006

The required level of quality relating to public disclosure is difficult to determine, since most of the disclosure requirements prescribed in IFRS 4 are principle-based, rather than rule-based. This has resulted in a large variety of practices by individual long-term insurers depending on their size and whether they are listed or privately held companies. Information published through SENS is aimed at investors in shares rather than policyholders. Policyholders will benefit from this information once market commentators interpret and publish the SENS announcement.

In conclusion, public disclosure in South Africa involves requirements by more bodies than just the FSB. These requirements generally follow international reporting standards governed by the Registrar of Companies through accounting practices and by the JSE listing requirements for listed companies. Disclosures through annual financial reporting are mainly aimed at shareholders and analysts, whilst information published through SENS is aimed at investors and market commentators. The FSB has issued limited guidance on public disclosure for long-term insurers.

Disclosure to the supervisor

Commercially sensitive information that is relevant for the assessment of solvency should only be disclosed to the supervisor.

Disclosure to the FSB

The LTIA gives the FSB the right to request and gather information. The information may be either routine or specific. Once-off requests may be industry- or company- specific. The information may be about the long-term insurer's shareholders[121], relating to its business[122], or if solvency minimum standards are breached[123].

[121] Long-term Insurance Act, part 3, section 27

The FSB's practice is to gather information through four summarizing quarterly returns and one comprehensive annual return. The quarterly returns contain:

- a revenue account;
- a financial position statement;
- movement and cashflow statistics; and
- an asset admissible statement.

The annual returns have the naming convention of the letters "LT" together with the calendar year since 2006, whereas before 2006 the returns were known as the LT2000 irrespective of the calendar year. These returns require detailed information regarding:

- management information;
- data;
- the valuation method;
- financial statements;
- assets;
- futures and options;
- general reports; and
- cell captives.

It is a requirement that the long-term insurer's auditors, directors, public officer and statutory actuary sign these statements.

The sections of the return are split between "available to public" and "not available to public". The question arises whether the FSB is entitled to publicise the information. As mentioned before, the FSB's functions are stipulated in the Financial Service Board Act, 1990[124] namely:

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[122] Long-term Insurance Act, part 3, section 36
[123] Long-term Insurance Act, part 3, section 35
[124] Act no. 97 of 1990 as amended, Republic of South Africa, section 3

- to supervise and enforce laws;
- to advise the Minister of Finance; and
- to promote programmes and initiatives by financial institutions to inform and educate users and potential users of financial products and services.

The functions specified do not give the FSB the explicit right to publish company-specific information. The Promotion of Access to Information Act, 2000[125] states that one of the objects of this Act is "...to give effect to the constitutional right of access to any information held by the State..." Subject to personal confidentiality, the Constitution of the Republic of South Africa[126] also states that everyone has access to:

- "any information held by the State; and
- any information that is held by another person and that is required for the exercise or protection of any rights."

The current practice of the FSB is to make available certain sections of long-term insurers' annual returns for a fee on request. In addition, information regarding industry valuation assumptions, assets, solvency capital etc. is available from its website. No information is made available to the public from the quarterly submissions.

The FSB requires copies of the annual financial statements with the submission of the annual long-term return.

Overall, long-term insurers publish a large quantity of financial information. Disclosures are generally regulated by the Registrar of Companies and the FSB. Financial reporting is also subject to professional standards set by professional bodies such as the APB and the Actuarial Society of South Africa.

[125] Act no. 2 of 2000, Republic of South Africa, part 1
[126] Act no. 108 of 1996 as amended, Republic of South Africa, section 32

The overall score allocated is therefore 3.

14.1.4 Comparability of long-term insurer's short-term solvency position

The requirement for comparability between local companies may be satisfied if consistent methods and the same assumptions are used to determine the values of assets, liabilities and solvency capital in such a way that the FSB can make valid comparisons between long-term insurers at any time. In addition, the solvency progression for similar business should develop consistently over time.

The LTIA requires assets to be valued on the method prescribed by the FSB after consultation with the Actuarial Society of South Africa. BN 72 issued by the FSB requires assets to be valued in accordance with local GAAP as applied in the annual financial statements. The ASP has adopted international standards as local GAAP. The statutory requirement, which is demanded by the FSB, is to value assets at fair value but to make certain adjustments, for example to the value of group undertakings. Group undertakings may be held only at the lower of fair value and net asset value for unlisted undertakings. Listed group undertakings may be shown as:

$$G = aN + \min(a, 0.2)\max(F - N, 0); \qquad (25)$$

where:

a is the proportion of the group undertaking held by the insurer;
N is the net asset value of the group undertaking; and
F is the fair value of the group undertaking.

The net asset value for regulated financial institutions is defined as the value of assets less the value of liabilities less the value of capital requirements. All long-term insures have to comply with these practices. In addition, the LTIA has a list of assets to be disregarded:

- current assets that remained unpaid for longer than one year;
- premiums outstanding for longer than 90 days;
- development costs;
- goodwill;
- negative liabilities;
- prepaid expenses; and
- reinsurance contracts.

Negative liabilities are allowed to be offset against positive liabilities. Similarly, reinsurance contracts will increase or reduce policyholder liabilities, rather than be accounted for as assets. The remainder of the items in the list above is to introduce a level of prudence in demonstrating solvency.

Assets used to show solvency in respect of non-linked liabilities have to be listed in the LTIA[127]. Assets that are not on the list, such as art, may not be used in statutory reporting. The main classes of assets, including derivatives, are on this list.

In demonstrating solvency, the proportions held in assets classes are limited[128]. Long-term insurers are, however, obliged to report on the values before and after these limits are applied. The FSB therefore has a fair picture of the value of these assets and is in a position to compare the value of assets of long-term insurers on the statutory and accounting bases.

The financial statements and long-term return to the FSB are reviewed by the long-term insurer's auditors. Asset values, with the exception of group undertakings and assets not permitted by the LTIA, may therefore be seen as broadly meeting the requirement to be comparable between long-term insurers.

[127] Long-term Insurance Act, schedule 1(3)
[128] Regulations to Long-term Insurance Act, part 2, section 9

BN 72 requires liabilities to be valued on the SVM. The method is described in PGN 104 and involves calculating the policyholder liabilities on a "prudently realistic basis". This approach requires assumptions to be determined on a best-estimate basis and prescribed compulsory margins to introduce a minimum level of prudence. Discretionary margins are allowed if the statutory actuary is of the opinion that the compulsory margins are insufficient for prudent reserving or to allow profit release consistent with product design or company practice. BN 72 requires all discretionary margins to be defined, quantified and explained.

Management actions that are allowed to reduce CAR may also make comparisons more difficult. However, all management actions and their financial effects have to be disclosed.

The current method enables the FSB to make comparison between long-term insurers valued at the same time. Adjustments may be necessary to take account of discretionary margins. Long-term insurers with different financial year-ends will not be directly comparable. This is due to the fact that all economic assumptions are based on the values derived at the market rates as at the valuation date. Similarly, long-term insurers that have their solvency levels calculated on different bases, as a result of their different relative exposure to lapse risk versus other risks will be difficult to compare.

Other variables may also be affected if market conditions change drastically over a period for companies that have financial year-ends that are different; for example, if economic conditions deteriorate drastically policyholders may not be able to afford premiums. Comparison of companies with the same financial year-end will however be valid. The FSB has the right to request additional information from long-term insurers with different financial year-ends. The score allocated is therefore 3.

14.1.5 Comparability of long-term insurer's long-term solvency position

The results of a 10-year model-office projection are used to consider the solvency development over time. The question to be answered is whether solvency is materially different if there is different but appropriate application of legislation for the same business.

The deterministic projection is done monthly and is based on a simple scenario where a life office only sells 15-year term-assurance policies where initial expenses exceed at least three months' premiums. No surrender values are payable. The initial sum assured is payable on death and there is no survival benefit. The premiums include a profit loading.

Assets backing the policyholder liabilities are assumed to be 50% in cash and 50% in equities. This causes a slight mismatch, but was chosen to produce higher capital adequacy requirement (CAR). Shareholders' initial assets are assumed to be invested in cash (20%), fixed-interest instruments (25%), property (25%) and equities (30%).

The valuation model and assumptions are given in Appendix A.

CAR is calculated according to PGN 104 and BN 72 – see below.

Three factors are considered to assess whether different solvency scenarios will result from exactly the same business over time. The factors are:

- new business volume;
- dividend philosophy; and
- discretion.

Corporate and policyholder tax are ignored.

The following illustrative projections explain the interactions further.

A comparison of a growing long-term insurer that allows negative liabilities with a long-term insurer that eliminates negative liabilities

The 15-year term with upfront expenses in excess of the initial premium generates negative policyholder liabilities in the early duration of a policy. This is due to the uneven incidence of expenses. For a policy, high initial expenses are followed by low administration costs while the premium charged is level for the duration of the policy. The high initial costs are recovered over the term of the policy. Since the value of the policyholder liability equals the discounted value of outflow less the discounted value of inflow, the premium portion to recover the initial cost will cause the policyholder liability at early durations to be negative. The discounted value of the premiums therefore exceeds the discounted value of claims and administration expenses for the early durations of the policy. As the cost of claims increases the policyholder liability also increases and eventually becomes positive. As mentioned above, negative liabilities are allowed in South Africa, but have onerous solvency capital requirements. The FSB has issued a directive[129] clarifying the requirements of the LTIA, which prescribes amounts to be disregarded when calculating the value of assets. Negative policyholder liabilities may be used to offset positive policyholder liabilities, outstanding claims and other current liabilities. For illustrative purposes it is assumed that the long-term insurer has sufficient current liabilities to allow negative policyholder liabilities.

The illustrative projections assume a new long-term insurer with share capital of R10 million issues 100 policies in month one and then increases the number of new business policies each month. See Appendix A for the new-business-volume assumptions.

[129] FSB, Directive 145.A.i (LT), Disregarding amounts representing negative liabilities in respect of long-term policies when calculating the value of assets according to Paragraph 4(iv) of schedule 3 to the Long-term Insurance Act, 1998, 2004

The statutory actuary has the discretion to eliminate negative policyholder liabilities. The lapse requirement in the CAR is reduced as a result of the elimination of negative reserves, but the policyholder liabilities are increased.

The CAR cover is defined as the free assets divided by the CAR, where the free assets are equal to the total assets less total liabilities. Dividends are paid so that the CAR cover after a dividend payment is equal to one, but are limited so that the free assets do not reduce below the initial capital injected by shareholders (in the illustrative projections R10 million).

The LTIA requires CAR cover to be at least one for assets and liabilities valued on the SVM. The projections below assume that it is not necessary to disregard any assets and that assets are of the right kind and within the allowed limits according to the LTIA.

Tables 1 and 2 below show the results of the model-office projection including the progression of CAR cover and value of in-force business over a 10-year period. Table 2 shows the SVM results if negative liabilities are allowed. Table 3 shows the results if negative liabilities are set to zero.

The ‘value of in-force’ is the expected future profit discounted at the risk discount rate. The value of the CAR is dependent on the ordinary CAR (OCAR), which in turn is dependent on the values of the intermediary ordinary CAR (IOCAR) and the ‘gross-up factor’. The derivation of these items is shown in section 6.3.2 and Appendix A.

The ‘CAR cover’ is a measure of financial strength and shows the number of times the shareholder assets (free assets) is covering the CAR.

The results of the above two projections and suggested improvements are discussed below.

The comparison of the results in Table 2 with those in Table 3 shows that the elimination of negative reserves increases policyholder liabilities. However,

the reduction in CAR is less than the value of the negative reserves since the lapse item in CAR is not additional to the other CAR items if the prescribed formulae are applied. Table 3 shows that the long-term insurer would not be financially sound in years 6, 7 and 8, even though the accumulated dividends paid to date were less than that for a long-term insurer that has allowed negative policyholder liabilities. This is not a desirable feature for a supervisor, shareholders and policyholders.

The main reason for the different solvency progressions shown in Tables 1 and 2 is that expected future profits are released earlier in the first projection without an equal increase in CAR. These profits can be paid as dividends. In the second projection, the expected value of future profit is shown as a

Table 2. A growing life office allowing negative reserves with a CAR cover target of at least 1

Year	1	2	3	4	5	6	7	8	9	10
Income statement										
Premium Income	773,180	2,289,274	4,594,950	9,531,408	20,993,567	41,935,172	71,237,765	106,721,574	149,737,056	202,413,492
Acquisition expenses	532,786	738,598	1,311,667	3,004,208	6,558,337	11,078,977	14,984,604	18,730,755	23,413,443	29,266,804
Operating expenses	71,379	215,192	438,002	913,567	2,013,783	4,039,956	6,927,214	10,506,107	14,926,559	20,415,865
Claims	426,710	1,284,547	2,605,319	5,421,205	11,941,069	23,930,801	40,936,593	61,863,444	87,536,165	119,263,449
Net Cashflow	-257,695	50,936	239,960	192,428	480,378	2,885,439	8,389,354	15,621,269	23,860,889	33,467,373
Increase in reserve	-808,201	-856,061	-1,406,935	-3,442,639	-7,482,320	-11,253,812	-12,127,453	-11,458,279	-11,023,163	-10,855,861
Investment return on reserve	-29,049	-91,416	-171,672	-336,693	-735,374	-1,458,557	-2,378,879	-3,288,120	-4,154,111	-4,995,564
Insurance result	521,457	815,581	1,475,223	3,298,373	7,227,324	12,680,694	18,137,928	23,791,428	30,729,941	39,327,670
Investment return on free assets	862,437	872,396	892,869	948,734	1,082,774	1,630,472	2,813,681	4,089,196	5,406,202	6,870,068
Profit before tax	1,383,894	1,687,977	2,368,092	4,247,107	8,310,099	14,311,166	20,951,609	27,880,624	36,136,143	46,197,737
Dividend paid	1,383,465	1,682,158	2,351,549	4,216,461	4,164,600	2,644,992	7,942,834	14,637,262	21,493,182	26,979,795
Retained profit	429	5,819	16,543	30,645	4,145,498	11,666,173	13,008,774	13,243,362	14,642,961	19,217,942
Balance Sheet										
Total assets	9,191,799	8,335,738	6,928,804	3,486,165	101,142	410,593	1,032,986	2,302,022	5,063,686	12,142,004
Policyholder liabilities	-808,201	-1,664,262	-3,071,196	-6,513,835	-13,996,155	-25,249,967	-37,377,420	-48,835,698	-59,858,861	-70,714,722
Shareholders account	10,000,000	10,000,000	10,000,000	10,000,000	14,097,297	25,660,560	38,410,406	51,137,721	64,922,548	82,856,726
Equity	3,156,387	3,216,680	3,295,412	3,606,789	5,689,271	10,184,010	13,336,210	14,560,520	14,613,340	14,390,664
Property	2,302,106	2,065,675	1,753,075	1,292,613	1,045,968	993,969	863,379	703,626	554,121	438,172
Fixed interest instruments	2,371,861	2,192,754	1,917,310	1,456,547	1,214,334	1,188,931	1,064,018	893,415	724,903	590,588
Cash	2,169,645	2,524,890	3,034,204	3,644,051	6,147,724	13,293,651	23,146,800	34,980,160	49,030,184	67,437,301
Value of in-force	385,780	874,352	1,736,590	3,754,158	8,137,741	15,320,129	24,611,523	35,799,132	49,434,733	66,161,910
TCAR	808,201	1,664,262	3,071,196	6,514,170	14,097,297	25,660,560	38,410,406	51,137,721	64,922,548	81,271,117
IOCAR	754,501	1,578,706	2,632,316	4,891,741	9,878,532	17,977,343	28,084,799	39,742,909	53,632,757	70,589,270
Gross-up factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
OCAR	885,623	1,853,064	3,089,777	5,741,860	11,595,286	21,101,562	32,965,556	46,649,687	62,953,401	82,856,726
CAR	**885,623**	**1,853,064**	**3,089,777**	**6,514,170**	**14,097,297**	**25,660,560**	**38,410,406**	**51,137,721**	**64,922,548**	**82,856,726**
Free assets before dividend	11,383,465	11,682,158	12,351,549	14,216,461	18,261,898	28,305,553	46,353,240	65,774,983	86,415,729	109,836,521
CAR cover before dividend	12.85	6.30	4.00	2.18	1.30	1.10	1.21	1.29	1.33	1.33
Dividend	1,383,465	1,682,158	2,351,549	4,216,461	4,164,600	2,644,992	7,942,834	14,637,262	21,493,182	26,979,795
CAR cover after dividend	11.29	5.40	3.24	1.54	1.00	1.00	1.00	1.00	1.00	1.00

Table 3. A growing life office eliminating negative reserves with a CAR cover target of at least 1

Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Income statement										
Premium Income	773,180	2,289,274	4,594,950	9,531,408	20,993,567	41,935,172	71,237,765	106,721,574	149,737,056	202,413,492
Acquisition expenses	532,786	738,598	1,311,667	3,004,208	6,558,337	11,078,977	14,984,604	18,730,755	23,413,443	29,266,804
Operating expenses	71,379	215,192	438,002	913,567	2,013,783	4,039,956	6,927,214	10,506,107	14,926,559	20,415,865
Claims	426,710	1,284,547	2,605,319	5,421,205	11,941,069	23,930,801	40,936,593	61,863,444	87,536,165	119,263,449
Net Cashflow	-257,695	50,936	239,960	192,428	480,378	2,885,439	8,389,354	15,621,269	23,860,889	33,467,373
Increase in reserve	0	0	0	335	100,807	309,452	622,393	1,269,036	2,761,664	5,492,709
Investment return on reserve	0	0	0	0	2,398	17,183	50,963	118,255	261,633	562,922
Insurance result	-257,695	50,936	239,960	192,092	381,969	2,593,170	7,817,925	14,470,488	21,360,858	28,537,587
Investment return on free assets	831,782	844,127	852,098	852,402	853,306	915,780	1,382,346	2,385,061	4,012,586	5,628,880
Profit before tax	574,087	895,063	1,092,059	1,044,495	1,235,275	3,508,950	9,200,271	16,855,549	25,373,444	34,166,467
Dividend paid	575,264	893,763	1,082,599	1,025,378	1,207,273	0	0	0	8,254,002	14,211,756
Retained profit	-1,178	1,301	9,460	19,117	28,002	3,508,950	9,200,271	16,855,549	17,119,442	19,954,711
Balance Sheet										
Total assets	10,000,000	10,000,000	10,000,000	10,000,335	10,101,142	13,859,513	23,495,212	41,147,598	60,077,755	84,040,401
Policyholder liabilities	0	0	0	335	101,142	410,593	1,032,986	2,302,022	5,063,686	10,556,395
Shareholders account	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	13,448,919	22,462,225	38,845,576	55,014,069	73,484,006
Equity	3,015,491	2,942,445	2,822,245	2,720,853	2,535,710	2,543,887	2,405,854	1,955,407	669,754	0
Property	2,478,041	2,384,462	2,255,322	2,144,248	2,005,556	2,102,299	2,203,709	2,310,011	2,105,538	1,810,713
Fixed interest instruments	2,553,128	2,531,153	2,466,610	2,416,188	2,328,384	2,514,655	2,715,827	2,933,093	2,754,475	2,440,559
Cash	1,953,339	2,141,940	2,455,822	2,718,711	3,130,350	6,288,078	15,136,835	31,647,064	49,484,302	69,232,733
Value of in-force	1,130,580	2,417,433	4,590,564	9,797,989	21,212,167	39,160,704	60,386,990	83,513,286	110,050,140	142,047,398
TCAR	0	0	0	0	0	0	0	0	0	0
IOCAR	681,486	1,430,775	2,326,261	4,134,772	8,097,155	14,731,552	23,468,149	34,023,053	46,868,892	62,604,239
Gross-up factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
OCAR	799,919	1,679,425	2,730,534	4,853,339	9,504,331	17,291,696	27,546,595	39,935,798	55,014,069	73,484,006
CAR	**799,919**	**1,679,425**	**2,730,534**	**4,853,339**	**9,504,331**	**17,291,696**	**27,546,595**	**39,935,798**	**55,014,069**	**73,484,006**
Free assets before dividend	10,575,264	10,893,763	11,082,599	11,025,378	11,207,273	13,448,919	22,462,225	38,845,576	63,268,071	87,695,762
CAR cover before dividend	13.22	6.49	4.06	2.27	1.18	0.78	0.82	0.97	1.15	1.19
Dividend	575,264	893,763	1,082,599	1,025,378	1,207,273	0	0	0	8,254,002	14,211,756
CAR cover after dividend	12.50	5.95	3.66	2.06	1.05	0.78	0.82	0.97	1.00	1.00

policyholder liability—the amount that eliminates the negative reserve. By introducing a measure that recognises that this amount is available to cover unexpected losses, a more meaningful comparison can be made. Such a measure that may be used to assess the financial strength of a company in conjunction with the CAR cover is defined as the embedded-value CAR cover (EVCC):

$$E = \frac{N + V}{C}; \qquad (26)$$

where:

N denotes the net asset value;
V denotes the value of in-force business according to PGN[130] 107; and
C denotes the CAR according to PGN 104 and BN 72.

V is effectively the discounted value of expected future profit. The embedded-value calculation in PGN 107 requires that the cost of capital is used to reduce the result. Note that this definition does not reduce $N + V$ by the cost of capital as in PGN 107. The reason is that the cost of capital is not a cashflow that will affect solvency.

Because more capital is available to absorb losses, a higher EVCC value of a long-term insurer implies greater financial strength.

For the two projections in Table 2 and 3, the progression of the EVCC compared with the progression of the CAR cover is shown in Table 4. Table 5 shows the difference in dividend payments.

[130] Actuarial Society of South Africa, PGN 107, Embedded value reporting, version 4, 2007

Table 4. CAR cover and EVCC development

Year	1	2	3	4	5	6	7	8	9	10
Allowing negative reserves										
CAR cover	11.29	5.40	3.24	1.54	1.00	1.00	1.00	1.00	1.00	1.00
EVCC	11.73	5.87	3.80	2.11	1.58	1.60	1.64	1.70	1.76	1.80
Eliminating negative reserves										
CAR cover	12.50	5.95	3.66	2.06	1.05	0.78	0.82	0.97	1.00	1.00
EVCC	13.91	7.39	5.34	4.08	3.28	3.04	3.01	3.06	3.00	2.93

Table 5. Comparison of dividend

Year	1	2	3	4	5	6	7	8	9	10
Allowing negative reserves	1,383,465	1,682,158	2,351,549	4,216,461	4,164,600	2,644,992	7,942,834	14,637,262	21,493,182	26,979,795
Eliminating negative reserves	575,264	893,763	1,082,599	1,025,378	1,207,273	0	0	0	8,254,002	14,211,756
Difference	808,201	788,396	1,268,950	3,191,083	2,957,327	2,644,992	7,942,834	14,637,262	13,239,180	12,768,039

Table 4 shows that the EVCC is larger for all durations when negative reserves are eliminated. The EVCC development for the different practices in the examples above confirms that for the same business, a long-term insurer that pays lower dividends will show greater financial strength.

Table 5 shows that the dividend payment is always higher for a long-term insurer allowing negative reserves than for a long-term insurer that eliminates negative reserves.

As shown in Tables 1 and 2, the solvency progression of similar long-term insurers may be different due to the FSB's adopted measure. This inconsistency may be fixed with relative ease by the introduction of measures such as EVCC. Currently, in the long term, the comparability of long-term insurers' solvency position may not be valid. The overall score allocated to long-term comparability is 1.

A summary of the scores with regard to a robust solvency regime is shown in Table 6.

Table 6. Scoring the FSB with regard to a robust solvency regime

Measure	Score
A high degree of certainty that insurance obligations can be met	3
Specified probability level and explicitly indicating the overall level of safety required	2
Transparency	3
Comparability – short term	3
Comparability – long term	1

14.2 Risk-based Solvency Regime

To assess whether the South African framework conforms to the IAIS's requirements for a risk-based solvency regime, the following points are considered in detail below:

- a framework for the management of a long-term insurer's own risk;
- the inclusion of all risks in the solvency assessment;
- explicit determination and disclosure of prudence;
- the recognition of interdependence of risk; and
- qualitative and quantitative aspects of the solvency assessment.

14.2.1 A framework for the management of a long-term insurer's own risk

The IAIS has argued that the regulatory regime should support the management of a long-term insurer's own risks under normal and adverse circumstances. The responsibility for risk management is that of the long-term insurer, while it is the supervisor's role to see that this responsibility is met. The IAIS emphasises that a long-term insurer should demonstrate that the management of these risks is implemented for example, when:

- premium rates are set;
- policyholder liabilities are determined; or
- economic capital is calculated.

The management of a long-term insurer's own risk in the South African context is considered by investigating two aspects, namely whether the current legislation encourages long-term insurers to manage its own risk and whether there are any restrictions in doing so. The limitations are considered for the following:

- premium rates and underwriting;
- discretionary benefits and policyholder charges;
- other policy benefit restrictions;
- policyholder liabilities and solvency capital; and
- other sources of capital.

Own-risk management

The LTIA does not address risk-management for long-term insurers. Minimum governance structures are prescribed, namely that long-term insures must have:

- a public officer[131];
- an external auditor[132];
- a statutory actuary[133]; and
- an audit committee[134].

The duty of the public officer is to ensure that the long-term insurer complies with the LTIA. This duty is not described in any detail and may be view as a role to ensure compliance, rather than to manage risk.

The external auditor is required to ensure that the statements submitted to the regulator are accurate and has no duty regarding risk management.

The role of the statutory actuary is discussed in Chapter 8. The statutory actuary plays a vital role in the solvency assessment and management of a long-term insurer. In terms of risk management, the statutory actuary is responsible for:

- the value of liabilities calculated on best-estimate assumptions;
- the value of solvency capital, but adjusted if it is judged that the prescribed assumptions are inadequate;
- the adequacy of new business premium rates;
- recommending bonus declaration for with-profits policies;
- assessing the effect of dividend declarations; and
- making sure that policy alteration and premium collection rules are actuarially sound.

[131] Section 16
[132] Section 19
[133] Section 20
[134] Section 23

Although these functions are very important in terms of risk management, the question arises whether the duties of the statutory actuary are the only requirements for sound risk management. A shortcoming of the LTIA is that sound risk management is not defined.

The audit committee is responsible to assist the board of directors with the evaluation of the adequacy and efficiency of the internal systems and controls, accounting practices, information systems and auditing and actuarial valuation processes. It also has the duty to facilitate communication between the board of directors, management and the statutory actuary. These functions are also very important in terms of risk management, but do not define a risk-management framework.

In conclusion, the LTIA defines roles and duties that are important in the management of a long-term insurer's risk. The Act, however, does not include a well-defined risk-management framework. There is also a lack of definitions, for example 'adequacy and efficiency of the internal systems and controls' is not defined. Dependency on the statutory actuary as custodian of the financial-soundness of the long-term insurer in itself introduces the risk of key person dependency, i.e. the risk that the statutory actuary will leave the long-term insurer and not be easily replaceable.

The allocated score is 1.

Premium rates and underwriting

Premium rates and underwriting are generally not limited by the LTIA. However, the LTIA[135] states that when a company registers as a long-term insurer, the FSB may limit the amount of premium that a long-term insurer is allowed to receive. This condition does not, however, limit the ability to charge appropriate premium rates. It is rather a condition that the FSB may impose to limit new business strain in order to protect the solvency of a newly registered company. The LTIA further requires that the statutory actuary must ensure that the premiums charged as well as the distinction between premiums, benefits and other values are actuarially sound. Further to this section, the Actuarial Society

[135] Section 10(a)

of South Africa through PGN106[136] requires that the statutory actuary formally sign off all new products confirming that they do not have a materially adverse effect on the financial soundness of the long-term insurer. Premium rates are allowed to be written on terms that need support from the free assets only if the statutory actuary has informed the board of directors and indicated the limits on future volumes that may be prudently accepted.

According to the LTIA[137], third parties are allowed to determine premiums on behalf of a long-term insurer by means of binder agreements, only if the long-term insurer has a written agreement that states the conditions and basis of calculation of the premiums.

From an underwriting point of view the statutory actuary should ensure that the requirements of the Promotion of Equality and Prevention of Unfair Discriminations Act, 2000[138] are complied with. This Act does not limit the right of the long-term insurer to underwrite or refuse a policy to a person, provided it is not unfair and on prohibited grounds. Prohibited grounds are defined in this Act[139] as:

- race, sex, pregnancy, marital status, ethnic or social origin, colour, sexual orientation, age, disability, religion, conscience, belief, culture, language and birth; and
- any other ground where discrimination based on that other ground causes or perpetuates systemic disadvantage, undermines human dignity or adversely affects the equal enjoyment of a person's rights and freedoms in a serious manner that is comparable to discrimination on a ground in the point above.

The common differentiation of premium rates by age and gender are not a contravention of this act provided that "the discrimination reasonably and

[136] Actuarial Society of South Africa, PGN 106, Actuaries and long-term insurance in South Africa, version 3, 2005
[137] Section 49(a)
[138] Act no. 4 of 2000 as amended, Republic of South Africa
[139] Section 1

justifiably differentiates between persons according to objectively determinable criteria, intrinsic to the activity concerned."[140]

The industry body, the Life Offices Association (LOA), now incorporated into the Association for Savings and Investment SA (ASISA), announced that from 1 April 2007, 29 member companies waived their right to repudiate claims caused by AIDS-related diseases for life and disability policies[141]. All member companies were requested to waive this condition, effectively limiting their underwriting freedom. Although most companies conformed to the request two companies, Clientele Life and Pinnafrica Life, only did so for policies that were in-force for five years or longer, demonstrating that companies are still able to manage their own affairs.

The legal and professional requirements that the statutory actuary has to ensure that premium rates are actuarially sound and the fact that there is almost no limitation to charge premiums consistent with the risk taken fulfil the IAIS requirement.

Discretionary benefits and policy charges

Discretionary benefits and policy charges are not specifically limited by the LTIA, while surrender values are subject to limits specified in regulation 5.

Section 46(1) of the LTIA states:

> "A long-term insurer shall not
>
> a) enter into any particular kind of long-term policy unless the statutory actuary is satisfied that the premiums, benefits and other values thereof are actuarially sound;

[140] Section 14(2c)
[141] Joint media release of the LOA and AIDS Law Project ALP, 27 March 2007

b) make a distinction between the premiums, benefits or other values of different long-term policies unless the statutory actuary is satisfied that the distinction is actuarially justified; or

c) award a bonus or similar benefit to a policyholder unless

i) it is done in accordance with the principles and practices of financial management of the long-term insurer; and

ii) the statutory actuary is satisfied that it is actuarially sound and that a surplus is available for that purpose."

The responsibility is placed on the statutory actuary to ensure that benefits and premiums are actuarially sound and justified. The term 'other values' is vague. It is not specified whether these values include only those values disclosed to the policyholder or any other values such as those used in pricing. It is reasonable to assume that this term will at least include policy charges, since policy charges will have a direct effect on surrender and maturity values. The LTIA has no definitions for the terms 'actuarially sound' and 'actuarially justified'. These terms are not intuitive. No guidance exists locally from the FSB, the Actuarial Society of South Africa or the Accounting Standards Board to assist with the interpretation.

Section 46(2) of the LTIA states:

"For the purposes of subsection (1)(c)(i) "principles and practices of financial management" means a statement approved by the board of directors of the long-term insurer setting out the discretion retained by the board of directors and the parameters within which that discretion must be exercised in respect of long-term policies where the long-term insurer has to exercise its discretion in awarding a bonus or similar benefit."

Requirements of the principles and practices of financial management (PPFM) are further laid-down in an FSB directive[142]. Principles are defined as "enduring statements of overarching standards" that are not expected to change in the long term. Any change must be communicated to the FSB and to policyholders three months in advance.

Practices are defined as the "specific approach" that a long-term insurer applies when managing participating policies and must be in enough detail to a knowledgeable observer to understand the possible risks associated with such a policy. Notice should be given to policyholders, but this may be done within a twelve month period after the change.

The PPFM attempts to define the application of discretion in such a way that policyholders' reasonable benefit expectations are clearly understood, specifically for with-profit policies. This document does not, however, guarantee the long-term insurer that unexpected liabilities may not arise due to different interpretation of the PPFM. In addition, it may limit the company to apply discretion in extreme situations in order to maintain solvency if the PPFM does not adequately describe the actions available to the long-term insurer in such conditions. The limitations introduced by a long-term insurer's PPFM are not a limitation due to legislation, but rather an operational risk.

Surrender benefits of investment-type policies are subject to maximum values stipulated in the LTIA, effective from 1 December 2006. This regulation follows after the Statement of Intent (SOI) was signed by the Minister of Finance, the LOA and the five largest life offices on 12 December 2005. This regulation and the SOI effectively limit the ability of a long-term insurer to charge the policyholder upfront for any initial costs incurred by the company. These costs may not be recoverable from other policyholders or other future charges and could therefore result in losses to the long-term insurer if policies are surrendered at early durations. Although the SOI and this regulation are applicable to all in-force and new business policies the initial charges allowed

[142] FSB, Directive 147.A.i (LT),Governance of discretionary participating policies, 2006

were higher until 1 January 2009, after which these maximum charges were reduced. This phased approached gave long-term insurers time to redesign new policies while limiting the potential loss on older policies that were surrendered. This regulation is therefore not seen as a major limitation to life offices in managing their own risks.

There are no other direct limits on charges for long-term insurers. The main risk is how long-term insurers disclose the charges to their policyholders and to what extent the disclosure may limit the long-term insurer's ability to review charges. This is particularly important for long-term insurers that sell predominantly linked policies. The policyholder protection rules (PPR) were issued by the Minister of Finance under the LTIA and was in force from 1 July 2001. The rules specify that the charges must be disclosed to prospective policyholders at proposal or quotation stage. These include the nature of the charges, e.g. whether the charges are reviewable. This is also applicable to the rules issued that are effective from 30 September 2004 for direct marketing and fund policies.

One could argue that the required disclosure does limit the long-term insurance company to some extent. This is because other considerations, such as competitive pressure may reduce the scope by which a company could mitigate risks. On the other hand, the requirement to have a documented approach, which is publicly available, to the financial management when it comes to the use of discretion, may promote an acceptable approach to risk management. The legal framework does not prevent long-term insurers from managing their own risks relating to discretionary benefits and policyholder charges, although there were interim limitations with the adoption of minimum surrender values. The introduction of interim measures may be seen as partly limiting the long-term insurer, but overall risk management of discretionary benefits are not limited.

Other policyholder benefit restrictions

Other policyholder benefit restrictions are not directly regulated and do not inhibit the long-term insurer's ability to manage its own risk. There are, however, other considerations that may be an indirect restriction on long-term insurers to compete for business. One of these indirect restrictions is the CAT standards promoting practices of fair charges (C), access (A) to insurance products and fair terms (T) that originated from the Financial Sector Charter (FSC).

The FSC is a transformation charter in terms of the Broad-based Black Economic Empowerment Act, 2003[143]. The Charter came into effect in January 2004 as a result of the financial sector summit hosted by the National Economic Development and Labour Council (Nedlac). The FSC was voluntarily developed by the financial sector, which includes banks, long-term insurers, short-term insurers, reinsurers, managers of formal collective investment schemes in securities, retirement funds, etc. Parties to the negotiations were government, business, labour and community constituencies. The FSC was signed on 20 August 2002 by 11 representative bodies of the financial industry.

The FSC sets transformation targets over periods of time that will be used to score companies on their transfer of black economic empowerment. Specific areas are:

- human resource development;
- procurement policies;
- enterprise development;
- access to financial services;
- empowerment financing;
- ownership in the financial sector;
- control in the financial sector;
- shareholder activism; and

[143] Act 53 of 2003, Republic of South Africa

- corporate social investment.

A prescribed scorecard must be completed annually by financial institutions and is used by:

- companies to track their own progress;
- the FSC council to track progress of the industry;
- government to award contracts to financial institutions; and
- the private sector to award contracts to financial institutions.

The long-term insurance industry has developed minimum standards for products to fulfil the requirements of the FSC. These products may be marketed as 'Zimele products' and cover the following:

- member-only funeral insurance;
- member and family funeral insurance;
- parent funeral cover;
- credit life;
- life cover; and
- physical impairment cover.

The products include limits on underwriting and premium rates. Examples of underwriting limitations are the waiver of waiting periods in the absence of medical underwriting and no HIV/AIDS exclusions[144].

Long-term insurers may choose not to adopt these standards. In the long run this may limit their ability to write business in certain sections as the score cards are being an integral part in the awarding process of both public and private sectors. This may be seen as an indirect limitation in managing a long-term insurer's own risk.

[144] http://www.asisa.co.za/index.php/zimele-product-standards.html accessed January 2010

Policyholder liabilities and solvency capital

Policyholder liabilities and solvency capital were considered in Chapter six. The determination of policyholder liabilities is based on long-term insurers' own experience and may be adjusted upwards for company practice or where the statutory actuary believes that compulsory margins are not sufficient. For the determination of solvency capital, a long-term insurer is entitled to manage its own risk, and the regulatory requirements are not a limitation. Management actions are allowed to reduce CAR. The statutory actuary has also the obligation to increase CAR if he judges that the standard formula does not provide for capital at a 95% confidence level. Furthermore, the MCAR does not necessarily reflect the risk of a long-term insurer, but insurers have the right to apply for relaxation of these limits if they are perceived to be unduly onerous.

Other sources of capital

Other sources of capital for long-term insurers are limited. The LTIA does not allow a long-term insurer to borrow without the approval of the FSB and complying with conditions that the FSB may specify. Conflict may arise in case of a wind-up between the different providers of capital, namely policyholders, shareholders and providers of loan capital. The FSB has granted permission to specific long-term insurers to raise debt on the condition that the issue is subordinated to policyholders.

A long-term insurer with rapid new-business growth may require additional capital to fund new business while protecting the solvency position. New business will have to be limited if the initial strain threatens solvency.

The limitation of borrowing without the approval of the registrar may be seen as limiting the management of a long-term insurer's own risk. There are, however, other means by which the long-term insurer may mitigate this problem; for example the long-term insurer may:

- redesign products to be less capital intensive upfront;

- raise more share capital through a rights issue;
- issue preference shares;
- enter into a financial reinsurance contract; or
- raise debt after approval from the FSB.

The limitation of borrowing without approval is therefore not a major limitation, but still a limitation.

In conclusion, there is no major limitation of the ability of a long-term insurer in South Africa to manage its own risk when determining:

- premium rates and underwriting terms;
- discretionary benefits and policyholder charges;
- other policy benefit restrictions;
- policyholder liabilities and solvency capital; and
- access to other sources of capital.

This section has considered two aspects, namely whether the South African framework support a long-term insurer to manage its own risk and whether there are any limitations in managing its risks. Although, there are no major restrictions to manage a long-term insurer's own risk, the LTIA does not promote proactive risk management. With no definition of risk management, one would expect long-term insurers to have inconsistent practices of and approaches to risk management. The allocated score is 1.

14.2.2 Inclusion of all risks in the solvency assessment

The IAIS common structure, element 3 states that:

> "A solvency regime should address all relevant potentially material risks, including underwriting risk, credit risk, market risk, operational risk and liquidity risk. All risks should, as a minimum, be addressed by the insurer in its own risk and capital assessment."

To mitigate risks, regulators generally require a long-term insurer to have:

- technical provisions (or policyholder liabilities);
- capital; and
- a corporate governance structure.

The IAIS defines technical provisions as the amount required by the long-term insurer to fulfil its obligation towards the policyholders and beneficiaries over the life-time of a policy. This obligation includes honouring full benefit settlement to policyholders and beneficiaries and the associated cost.

Capital on the other hand serves as a buffer to safeguard the policyholders by securing the technical provisions with a higher level of confidence. The capital also differs from the liabilities in that it belongs to the capital providers subordinated to the policyholders.

The IAIS further states that the following options are available to a supervisor to address risks:

- regulatory financial requirements that range from sophisticated risk-sensitive requirements to simple ratios or nominal minimum requirements;
- quantitative limits to risk exposures;
- qualitative requirements; and
- additional quantitative or qualitative requirements arising from supervisory intervention.

Qualitative measurements will be addressed through corporate governance requirements.

Ryan et al. (2001) describes a systematic approach to identify risks faced by an insurer. The paper focuses on non-life companies, although the approach is equally applicable to long-term insurers. Traditionally, risks may be classified in three main categories, namely:

- underwriting risk;
- asset risk; and
- other risk.

In turn, each category is further divided into sub-categories.

The KPMG report shows methods to assess the overall financial position of an insurance undertaking from the perspective of prudential supervision. Table 7 below shows the key risks and financial components as identified in the report. If a risk event occurs, it may have a financial consequence. In Table 7 the 'financial component' is where the risk event will most likely have an effect.

Table 7. Key risks and financial components

Key Risk	**Financial component**
Underwriting risk	premiums, claims experience, technical provisions, reinsurance
Credit risk	debtors, reinsurance recoveries, investments
Reinsurance risk	claims recoveries, technical provisions
Matching risk	investment return, investments
Provisioning risk	claims experience, technical provisions
Jurisdictional and legal risk	claims, technical provisions
Interest rate risk	investment return, investments, technical provisions

The Sharma report investigated the underlying causes that resulted in insurance company failures. The report was the outcome of The London Working Group tasked by the EU Insurance Supervisors Conference. A comprehensive catalogue was put together identifying the main risks.

The types of risks identified by the IAA (unpublished) are:

- underwriting risk;
- market risk;
- credit risk;
- operational risk; and

- liquidity risk.

Similarly to the Solvency II framework, the IAA measures the first four risks quantitatively, while liquidity risk is dealt with qualitatively. These risks are the same as those promoted by the IAIS and are consistent with the detailed lists published by KPMG (2002), the Sharma report and Ryan et al. (2001).

There is not a coherent framework to address risk for long-term insurers in South Africa as described by IAA (unpublished). The main focus of current legislation is on matters dealt with in pillar one.

Schedule 3 of the LTIA states:

> "The values of assets, liabilities and the capital adequacy requirement shall be deemed to have been calculated in terms of this Schedule if the requirements set out in this Schedule and the requirements prescribed by the Registrar, after consulting the Actuarial Society of South Africa, have been complied with in making the calculations."

These requirements prescribed by the registrar are formalised in BN 72, supplemented by more details by the Actuarial Society of South Africa's PGN 104. In determining the liabilities, the risks explicitly considered in PGN 104 are:

- mortality, including the effect of AIDS;
- morbidity;
- medical claims;
- lapses;
- surrenders;
- termination for disability income benefits in payment;
- expenses;
- investment return;
- policyholder behaviour; and
- tax.

Each assumption, except for policyholder behaviour and tax, has a prescribed compulsory margin. Best-estimate assumptions of the considerations are adjusted for the compulsory margin by adding or subtracting the margin from the best-estimate assumption so that the resulting policyholder liability increases.

Policyholder behaviour includes the take-up of future options by the policyholder and potential liabilities due to policyholders' reasonable expectations.

The following items have to be considered when determining the solvency capital, CAR:

- lapses;
- surrenders;
- mortality;
- morbidity;
- risk associated with medical claims;
- annuitant mortality fluctuation;
- assumption risk associated with mortality, morbidity and medical claims;
- expenses;
- future expected investment returns;
- capital value of assets;
- credit risk; and
- operational and other risks.

Each item has a prescribed formula except for 'operational and other risks'. The statutory actuary has to consider the appropriateness of the underlying assumptions that resulted in the prescribed formulae. Additions to each individual component must be made where the company's portfolio is materially different. Responsibility for any other material risk, including operational risk, is left to the discretion of the statutory actuary.

PGN 104 states that future new business is excluded from CAR, but that it is up to the statutory actuary to monitor the potential effect of future new business on the free assets.

Most of the risks considered by the IAIS and described by the literature mentioned above are captured with PGN 104. However, apparent omissions are liquidity risk and the potential effect of new business. The guidance note makes provision for risks not explicitly mentioned.

IAA (unpublished) states the supplements to capital that will typically be assessed under pillars two and three.

The supplements are:

- corporate governance;
- risk management;
- investment policy and asset liability matching;
- stress-testing;
- risk-sharing and participating business;
- actuarial peer review;
- policyholder protection funds; and
- the supervisory approach.

In the LTIA[145], provision is made for a part of the supervisory review process consistent with pillar two of the IAA:

> "…if the Registrar is not satisfied that the value of an asset, a contingent liability or the capital adequacy requirement calculated in terms of this Schedule reflects a proper value, the Registrar may –

[145] Schedule 3(6)

> a) direct the insurer to appoint another person, at the cost of the insurer, to place a proper value on that asset, contingent liability or capital adequacy requirement; or
>
> b) direct the long-term insurer to calculate the value in another manner which the Registrar determines and which will produce a proper value."

The FSB requires a risk report from the company's directors and management through the annual long-term returns[146]. The report is limited to specific questions and is not as comprehensive as the framework required by the IAIS and the IAA.

Material risks under pillar one are captured within the South African framework. However, unlike Solvency II, the SST and IAA guidance, the capital requirements associated with new business are not included in the solvency capital assessment. An apparent omission is the consideration of liquidity risk, although the statutory actuary is expected to consider all 'other risks'. The overall score allocated is therefore 2.

Explicit determination and disclosure of prudence

The IAIS common structure requires that:

> "... the solvency regime is explicit on how, for each of the risks that attract a financial requirement, individually and in combination, prudence is reflected in these requirements."

BN 72 and PGN 104 require that, in the determination of liabilities, compulsory prescribed margins must be added to or subtracted from best-estimate assumptions so that the policyholder liability increases. If the statutory actuary is of the opinion that the prescribed margins are inadequate, discretionary margins must be added.

[146] Long-term Insurance Act, Act no.52 if 1998, Long Term Return, Statement G10 & G11 (2009)

BN 72 further states that a long-term insurer must in its annual return to the FSB:

- define all explicit and implicit discretionary margins;
- quantify all explicit margins; and
- disclose full detail of the reasons why they have been added.

The FSB's annual long-term return[147] requires disclosure of other reserves and discretionary margins. The statutory actuary (or alternate statutory actuary) is required to sign the statement, while the long-term insurer's auditor has to initial the statements.

The requirement of explicit determination and disclosure of prudence is adequately met and the allocated score for this item is 3.

Recognise the interdependence of risk

Cornerstone 4 of the IAIS common structure states:

> "A total balance sheet approach should be used to recognise the interdependence between assets, liabilities, capital requirements and capital resources and to ensure that risks are fully and appropriately recognized."

This approach is consistent with IAA (unpublished) which states:

> "...an insurer's financial strength for solvency purposes requires appraisal of its total balance sheet on an integrated basis under a system that depends on realistic values, consistent treatment of assets and liabilities and does not create any hidden surplus or deficit."

[147] Statement C4, supported by statement C4.1 of 2009

In the South African framework, the interdependence of the risk factors is recognised in equation (22). Further, as part of the interdependence of risks, equation (22) does not allow for non-linearity, i.e. the fact that the prescribed correlations will not be appropriate in the case of a stress event. All risks, with the exception of credit risk and investment risk, are assumed to be independent. The assumption of independence for most risk factors is a simplification that could be improved in the standard formula. Where possible, correlation should be calculated using a long-term insurer's own data and experience. The score allocated is 1.

Qualitative and quantitative aspects

The IAIS specifies that quantifiable risks should be included in technical provisions, solvency capital or both. Qualitative aspects refer to a framework of risk management that includes governance.

An FSA discussion paper[148] states that a regulatory framework:

> "…cannot just be about capital requirements; no amount of capital can substitute for the capacity to understand, measure and manage risk and no formula or model can capture every aspect of the risks an insurer faces."

The LTIA have specific requirements regarding corporate governance. The Act requires a long-term insurer to have:

- a public officer;
- external auditors;
- a statutory actuary; and
- an audit committee.

[148] Financial Services Authority, Solvency II: a new framework for prudential regulation of insurance in the EU, 2006

The public officer is responsible for compliance by the long-term insurer with the LTIA. Communications to a long-term insurer from the FSB are generally addressed to the public officer. The transferral of policyholder liabilities between long-term insurers requires court approval. The public officer must certify all copies to the court to confirm that they are 'true and correct'.

A long-term insurer is required to have one or more auditors. The auditors have to fulfil their duty in accordance with the Companies Act, 1973[149] and the Auditing Profession Act, 2005[150]. An auditor is not required to examine or express an opinion about certificates or reports by a statutory actuary.

All long-term insurers are required to have a statutory actuary approved by the registrar. The role of the statutory actuary is considered in detail in Chapter 7.

The audit committee must consist of at least three members, of whom two should be independent non-executive directors. According to the LTIA, the role of the committee in terms of a long-term insurer is to

- "assist the board of directors in its evaluation of the adequacy and efficiency of the internal control systems, accounting practices, information systems and auditing and actuarial valuation processes applied in the day-to-day management of its business";
- facilitate and promote communication and liaison;
- "recommend the introduction of measures which the committee believes may enhance the credibility and objectivity of financial statements and reports concerning the business of the long-term insurer"; and
- advise on matters referred to the committee by the board of directors.

[149] Act no. 61 of 1973 as amended, Republic of South Africa
[150] Act no. 26 of 2005, Republic of South Africa

The IAIS does not give detailed guidance regarding qualitative requirements in the IAIS common structure. Detailed requirements are given in a risk-management guidance paper[151]. The risk-management framework must:

- be led by the board of directors and senior management;
- be appropriate to the nature, complexity and size of the business;
- be integrated in the operations so that it promotes the desired behaviour;
- identify and manage relevant and material risks;
- be appropriately documented;
- maintain a risk-tolerance statement that sets and defines quantitative and qualitative tolerance levels for each relevant and material risk;
- be flexible so that it is responsive to change;
- include an 'own risk and solvency assessment';
- include the determination of regulatory and economic capital; and
- include the assessment of risk over the long term.

These points are more comprehensive than the obligations of the audit committee specified in the LTIA.

The qualitative requirements are adequately dealt with in the LTIA. As mentioned in section 14.2.1, a long-term insurer must determine policyholder liabilities and CAR. In addition the LTIA requires a long-term insurer to maintain assets of sufficient quantity and quality to be 'financially sound at all times'.

Although the qualitative requirements are fulfilled, the quantitative requirements are less than those stipulated by the IAIS. The overall score allocated is 2.

Table 8 shows the measures and the scores, rating the FSB, that are relevant to the setting of financial requirements considering risk when demonstrating solvency.

[151] IAIS, Guidance paper on enterprise risk management for capital adequacy and solvency purposes,2007

Table 8. Risk-based solvency regime

Measure	Score
Management of long-term insurer's own risk	1
Include all risks	2
Explicit determination and disclosure of prudence	3
Recognise interdependencies of risk	1
Qualitative and quantitative aspects	2

14.3 Valuation Principles

The valuation principles are assessed by considering the following points:

- the valuation method of assets;
- the valuation method of liabilities;
- the time horizon; and
- the regulatory capital philosophy.

14.3.1 Valuation of assets

For the valuation of assets (and liabilities) the IAIS has adopted the following:

> "the solvency regime requires a valuation methodology which makes optimal use of and is consistent with information provided by the financial markets and generally available data on insurance technical risks."

As mentioned above, the FSB requires local long-term insurers to value assets compliant to local GAAP. SAICA has adopted international accounting standards and practices as local GAAP. For reporting purposes, the valuation method of assets is described in IAS 39[152].

[152] IASB, IAS 39, Financial instruments: measurement and recognition, 2005

‘Financial assets’ must be categorised into the following categories:

- assets at fair value;
- held to maturity;
- loans and receivables; or
- available for sale.

A financial asset is defined as:

> “An asset that is:
>
> (a) cash;
>
> (b) an equity instrument of another entity;
>
> (c) a contractual right:
>
> (i) to receive cash or another financial asset from another entity; or
>
> (ii) to exchange financial assets or financial liabilities with another entity under conditions that are potentially favourable to the entity; or
>
> (d) a contract that will or may be settled in the entity’s own equity instruments and is:
>
> (i) a non-derivative for which the entity is or may be obliged to receive a variable number of the entity’s own equity instruments; or
>
> (ii) a derivative that will or may be settled other than by the exchange of a fixed amount of cash or another financial asset for a fixed number of the entity’s own equity instruments. For this purpose the entity’s own equity instruments do not include instruments that are themselves contracts for the future receipt or delivery of the reporting entity’s own equity instruments.”

Depending on the category, the value of asset is measured either at ‘amortised cost’ or ‘fair value’.

Amortised cost is defined as follows:

> "The amortised cost of a financial asset or financial liability is the amount at which the financial asset or financial liability is measured at initial recognition minus principal repayments, plus or minus the cumulative amortisation using the effective interest method of any difference between that initial amount and the maturity amount, and minus any reduction (directly or through the use of an allowance account) for impairment or uncollectability"

For a contract with term n valued at time t the definition can be expressed as:

$$ {}^{A}V_t = {}^{A}V_0 - \sum_{i=1}^{t} R_i + \sum_{i=t+1}^{n} C_i p_i v^{i-t} - I_t \quad \text{for t} = 1,2,..,n; \qquad (27) $$

where:

R_i denotes the principal repayment at time i;
C_i denotes the contractual cashflow at time i;
p_i denotes the probability of payment associated with C_i;
v^{i-t} is the discount factor at the originally determined interest rate; and
I_t denotes any impairment[153] at time t.

Initial recognition is generally at fair value. 'Fair value' is defined as:

> "The amount for which an asset could be exchanged or a liability settled, between knowledgeable, willing parties in an arm's length transaction."

The interest rate is determined by solving the equation of value where the initial recognition equals the expected discounted value of future cashflows, i.e.:

$$ {}^{A}V_0 = \sum_{t=1}^{n} C_t p_t v^t; \qquad (28) $$

where:

[153] Determined in accordance with IAS 36, Impairment of assets, 2006

$$v = \frac{1}{1 + j_t} \tag{29}$$

and j_t is the effective yearly interest rate for year *t*.

Once the interest rate i is determined it stays fixed for subsequent valuations. In the case where more than one interest rate satisfies the equation, the rate that reasonable and appropriately reflects the risk should be used. It may be that the estimates of future cashflows change over time. These changes are allowed in determining the value of an asset.

A long-term insurer has discretion when it classifies the assets into one of the four categories mentioned above. For example, a listed government bond may be classified as an asset at fair value, held to maturity or available for sale. Assets classified as 'held to maturity' are valued on the amortised cost method. Assets classified as 'assets at fair value' or 'available for sale' are valued at 'fair value'. There may be significant differences between the values of the amortised-cost method and the fair-value method. This is because the interest rate is constant for the amortised-cost method as oppose to the result of the fair-value method which is based on information that is observable in the market at the time of valuation. For matching liabilities, a long-term insurer is likely to choose a method that will be consistent with the valuation of the liabilities. For shareholder assets long-term insurers may chose methods to reduce volatility, which would suggest classifying the bond as a 'held-to-maturity' asset.

For assets with embedded derivatives the valuation is split for the 'host' contract and the embedded derivative. The host contract is categorised in one of the four categories mentioned above, while the embedded derivative is valued at fair value.

In addition to the requirements of the accounting standards, the FSB has prescribed limitations on the values of group undertakings. For listed group undertakings the long-term insurer may only show a maximum of 20% of the fair value. The value of unlisted group undertakings is limited to the net asset

value. For regulated financial entities the net asset value must be reduced for the solvency capital.

The discretion of long-term insurers to choose a method may introduce inconsistencies between insurers. It may also introduce inconsistencies in the valuation methods of assets and liabilities. As mentioned above, the FSB has also limited the value of group undertakings. The IAIS requires "a valuation methodology which makes optimal use of and is consistent with information provided by the financial markets and generally available data on insurance technical risks". This requirement is clearly not met.

The overall score is 1.

14.3.2 Valuation of liabilities

The IAIS allows three methods for the calculation of liabilities, namely:

- results from observed market prices;
- cashflow methods; and
- replicating portfolios.

Supplementing the market-consistent approach mentioned above, the IAIS has adopted the following principle[154] for policyholder-liability valuations:

> "Insurance contracts are written in the expectation that obligations under them will be settled with the claimant or beneficiary. The vast majority of obligations are discharged by insurers through settlement of insurance contracts rather than the transfer of obligations to another insurer."
>
> "In the absence of deep liquid secondary markets that provide sufficiently robust values of insurance obligations, elements of insurance obligations should be valued using cash flow models or other methods

[154] IAIS, The IAIS common structure for the assessment of insurer solvency, Structure element 5, 2007

that reflect the settlement of the insurance obligations and accord with principles, methodologies and parameters that the market would expect to be used. Such valuations could be considered to be market consistent".

"Such valuations provide consistency with the other elements of the balance sheet for which reliable market values are available and with the assessments made by market participants of value and risk."

Where a deep liquid market exists for trading insurance liabilities, the observed prices may be used to determine the value of policyholder liabilities. Most insurance liabilities will, however, not be traded in such conditions. In these cases, policyholder liabilities should be determined as the expected discounted value plus a risk margin. All expected future contractual cashflows are projected on a best-estimate basis and then discounted at the risk-free interest rate. When discounting cashflows, the term structure of interest rates should be taken into account. The IAIS requires that the risk margin has to be determined by a methodology that is based on "market consistent valuation principles and reflects the uncertainty or unavailability of market information."

No risk margins are required for a liability portfolio where the future cashflows can be exactly met in all circumstances by the proceeds from an asset portfolio. The liabilities are thus matched by a replicating asset portfolio.

To demonstrate solvency to the registrar, South African long-term insurers have to determine their policyholder liabilities in accordance with the SVM. This method requires:

- liabilities to be determined by a prospective method, or retrospective calculation if it can be shown that the result is at least equal to the prospective result;
- the use of best-estimate assumptions;
- the addition of prescribed compulsory margins to the best-estimate assumptions; and

- that contractual premiums and benefits and any potential payments, which may arise due to policyholders' reasonable expectations, are valued;

Compulsory margins have to be added to best-estimate assumptions over the full term of the portfolio. For contracts where rates are reviewable, the compulsory margins are required only over the guaranteed period. In addition to the prescribed compulsory margins, discretionary margins are allowed. These could be added if the statutory actuary believes that the compulsory margin is insufficient for prudent reserving or to allow profit recognition consistent with the product design.

For the interest-rate assumption, PGN 104 requires that the statutory actuary must ensure that the return assumptions of all asset classes are mutually consistent with each other and consistent with market yields of fixed-interest securities. The interest-rate assumption must reflect the expected returns on a portfolio of assets that are appropriate to cover the liabilities by term, nature and duration and appropriately allow for tax. For annuity business, the interest-rate assumption must reflect the term structure of interest rates of appropriate assets covering the liabilities reduced by an allowance for credit risk.

The SVM may show significantly different results compared with the results with a method consistent to the IAIS approach. The main reasons are that:

- the interest-rate assumption used in the SVM is not necessarily risk-free;
- the compulsory margins are prescribed and do not reflect the risk of the underlying portfolio;
- discretionary margins may be used to release profit consistent with the profit recognition of the product design; and
- the SVM does not allow for determining the value of liabilities by referencing a replicating asset portfolio.

The allocated score is 1.

14.3.3 Time horizon

In calculating the liabilities, the IAIS requires the projection period to be long enough to cover the policy term. PGN 104 requires that all contractual expected benefits should be valued. Compulsory margins have to be added to best-estimate assumptions over the full term of the portfolio. The allocated score is 3.

14.3.4 Regulatory capital philosophy

Factors that should be considered when calculating the solvency capital to demonstrate solvency to the regulator, such as the inclusion of all risks and risk sensitivity, are discussed above. In addition to those factors, the IAIS has two further requirements for the calculation of regulatory capital. The first requirement is that a lack of diversification of the underlying insurance portfolio should be reflected in the regulatory capital. Diversification refers to the pooling of risk by insuring sufficient volume for low volatility of cashflows. Policyholder liabilities will not be affected by the lack of diversification as greater volatility in an insurance portfolio should result in higher regulatory capital. The second requirement is for an insurance portfolio where the liabilities are not matched by assets. Mismatch-risk exposure must be covered by the regulatory capital and not by policyholder liabilities.

In South Africa, the risk components of OCAR that are affected by the requirement of diversification are:

- lapses;
- surrenders;
- mortality;
- morbidity;
- health;
- longevity for annuities;
- expenses; and
- credit risk.

According to PGN 104, the lapse and surrender components in OCAR assume a doubling of cancellations. Additions have to be considered if:

- the trend of lapses has been worsening over time;
- the actual experience fluctuates significantly from year to year; or
- the 'base level' is higher than that assumed in PGN 104.

There is no diversification benefit for large portfolios or for portfolios that have actual experience lower than the base level.

The prescribed formulae for determining the required capital of mortality, morbidity, health and longevity for annuities are functions of the number of policies. These formulae are consistent with the IAIS requirement for diversification of risk.

The expense-risk component is equal to 10% of the previous year's renewal expenses. PGN 104 states that for a mature long-term insurer the expenses may fluctuate about 10% from the expenses used in the budget process. An exceptional overrun may be 20%. Additions must be considered if:

- new business volume has deviated by more than 20% from previous budgets;
- the new business volume is growing materially and expenses are unpredictable; or
- a new type of product has been launched with a different expense structure to existing contracts.

The approach in PGN 104 does take into account the nature of uncertainty of the expense assumption. For expenses, pooling of risk to reduce volatility is not applicable as for mortality and other similar insurance risks. The approach to expenses is consistent with the intention of the IAIS.

For credit risk, factors are applied to the exposure according to a prescribed table. PGN 104 requires that the "actuary should consider the extent to which the portfolio is diversified and increase the allowance for credit CAR if necessary..." This is in line with the IAIS principle.

Future shortfalls due to the mismatch of liabilities are covered by the investment-risk component in OCAR. Prescribed scenario testing is required to show the movements in asset and liability values. Any shortfall is recorded as a component of the investment CAR. This is consistent with the IAIS's second requirement mentioned above.

The South African framework fulfils the requirements of the IAIS, except for lapses and surrenders. For this exception, the local requirements are more onerous than those of the IAIS. For companies with rapid new business growth and high upfront expenses, this may have a significant effect on the overall regulatory capital. The overall score allocated is 2.

The summary of the scores allocated for valuation principles is shown in Table 9.

Table 9. Valuation principles

Measure	**Score**
Valuation method of assets	1
Valuation method of liabilities	1
Time horizon	3
Regulatory capital philosophy	2

14.4 Conclusion

The South African approach to the IAIS Level 2 regulatory requirements has areas that comply (a score of 3), areas that need improvement (a score of 2 or 2.5) and areas that do not comply at all (a score of 1). Table 10 below shows the summary of all the scores allocated in this chapter.

Table 10. Summary of scores

	Score
A robust solvency regime	
A high degree of certainty that insurance obligations can be met	3
A specified probability level and explicit level of safety	2
Transparency	3
Comparability – short term	3
Comparability – long term	1
Risk-based solvency regime	
Management of long-term insurer's own risk	1
Include all risks	2
Explicit determination and disclosure of prudence	3
Recognise interdependencies of risk	1
Qualitative and quantitative aspects	2
Valuation principles	
Valuation method of assets	1
Valuation method of liabilities	1
Time horizon	3
Regulatory capital philosophy	2

CHAPTER FIFTEEN
COMPARISON OF THE SOUTH AFRIFCAN REGULATORY FRAMEWORK WITH THE IAIS COMMON STRUCTURE LEVEL 3: SUPERVISORY ASSESSMENT AND INTERVENTION

In chapter 11 the following criteria were considered for supervisory assessment and intervention:

- the availability of a range of measures to assess solvency;
- the ability of the supervisor to prescribe additional capital; and
- disclosure.

In this chapter the South African solvency framework is compared with the first two criteria. 'Disclosure' was discussed in detail in section 14.1.3 and will not be considered again.

15.1 The Availability of a Range of Measures

The IAIS common structure states[155] that:

> "There should be a number of solvency control levels which trigger different degrees of intervention by the supervisor in a timely manner. The solvency regime should have due regard to the coherence of the solvency control levels and any corrective action that may be at the disposal of the insurer and of the supervisor, including options to reduce the risks being taken by the insurer as well as to raise more capital."

Subject to the requirements of appropriate assets, the LTIA[156] only requires a long-term insurer to have assets which total value exceeds the aggregate value of the liabilities and CAR. There are no other official measures or guidance to indicate when the FSB will get involved in a long-term insurer's affairs. This involvement may include a request for more information, discussions with

[155] Structure element 14
[156] Section 29, 1–4

senior management, an instruction to cease new business and to get directly involved with the management for an interim period. Examples of solvency assessment frameworks that clearly define control levels are the SST, the USA's CRVM and Solvency II. These frameworks are all discussed in chapter 5.

The South African framework does not have a range of measures with transparent consequences if thresholds are breached. The FSB may well have internal 'triggers' that will result in action. Since the CAR cover is a common industry measure and regularly reported to the FSB, these triggers are likely to be dependent on the CAR cover. It is therefore desirable that these triggers should be communicated to the long-term insurance industry.

An example of a more transparent regime is the following actions:

- no action by the FSB if the CAR cover exceeds three;
- the right to request more information if the CAR cover is two or more but below three;
- the right to request a corrective plan if the CAR cover is one or more but below two; and
- judicial management if the CAR cover is below one.

The FSB should also investigate the trend of the CAR cover. Generally, a reducing CAR cover is not desirable.

In conclusion, South Africa's current solvency assessment framework does not have the required range of measures for solvency assessment. It is not clear how the FSB will intervene if there is evidence that a long-term insurer's financial strength is deteriorating. It may be simple to implement measures as a function of the existing CAR cover measure.

15.2 The Ability of the Supervisor to Prescribe Additional Capital

The IAIS describes two scenarios that may require a supervisor to instruct a long-term insurer to increase its solvency capital requirement. The first scenario

is when a long-term insurer fails to show that it has adequate risk-management procedures. This additional capital requirement should be held until the supervisor is satisfied that the risk-management procedures have been satisfactorily improved. Once the supervisor is satisfied that these procedures are adequate the additional capital requirement should be withdrawn. In this scenario, long-term insures are incentivised to improve their risk management process.

The second scenario is when a supervisor does not believe that the long-term insurer's capital requirement satisfies the specified safety level. This may occur, for example, when a long-term insurer has a different risk profile than that assumed in the standard CAR formula.

For the above two scenarios, the South African solvency framework for long-term insurers does not give the FSB the right to directly increase the CAR. The LTIA[157] gives the registrar the authority to intervene if the value of the CAR is unsatisfactory. The registrar may instruct a long-term insurer to appoint another person for the CAR calculation or prescribe an alternative method. Since the method is not described the registrar may, however, effectively instruct a long-term insurer to increase the CAR by, for example, an amount or by applying a factor. The major shortcoming of the South African framework for solvency assessment is that there is no requirement to have risk-management practices embedded in the Act. There is also no definition for 'an unsatisfactory value'. Practically, it would be difficult for the registrar to prescribe an additional capital requirement without a breach of insurance legislation. Governance required by the Companies Act, 1973[158] and principles, such as those from King III[159], are not under the direct control of the FSB.

[157] Schedule 3 (6)
[158] Act No. 61 of 1973, Republic of South Africa
[159] Institution for directors in Southern Africa, King report for South Africa, 2009

CHAPTER SIXTEEN
AN ILLUSTRATIVE COMPARISON OF SOUTH AFRICA'S CAPITAL ADEQUACY REQUIREMENT WITH SOLVENCY CAPITAL DETERMINED ACCORDING TO INTERNATIONAL STANDARDS

In this chapter the financial development according to the South African regulatory requirements for the simple portfolio described in section 14.1.5 is compared with solvency capital requirements derived from principles stated by the IAIS and the IAA. A stochastic model is used for economic and insurance risks. The effect of expected future new business is also included. For the solvency capital requirement derived from these principles the focus is on the capital requirement of an efficient long-term insurer and hence no need for the supervisor to prescribe additional capital.

Below the following matters are discussed:

- the basic principles of the solvency capital calculation;
- the description of the model;
- the results; and
- conclusions.

16.1 The Basic Principles of the Solvency Capital Calculation

Various international principles and solvency frameworks have been discussed in chapters 5 and 9. In modelling the financial progression according to the IAA and IAIS's principles, the following points are taken into account:

- the liabilities are determined by discounting best-estimate cashflows at the risk-free rate;
- for the liabilities a margin is determined by the cost-of-capital approach;
- for the solvency requirement the expected surplus is modelled over a one-year time horizon;
- the effect on the expected future surplus of one year's new business; and
- the interdependence of risks.

16.2 Description of the Model

A model-office projection for the simple portfolio of 15-year term-assurance policies described in chapter 15 is performed. The model in chapter 15 is referred to as Model 1. Model 2 is described in this section. For these models the cashflows are assumed to be identical with the exception of dividend payments. Dividend payments are dependent on the solvency capital requirement. These payments reduce the assets held by the long-term insurer. Any difference in dividend payments will therefore also result in differences in investment returns.

In Model 2 the policyholder liabilities are determined deterministically. There are no prescribed or compulsory margins as required by the FSB. Instead, a risk margin is added to the best-estimate liability. The risk margin is determined on the cost-of-capital approach—see equation (17) in §5.2.

The Model 2 solvency capital requirement (SCR) is determined stochastically. The expected surplus is projected over a one-year time horizon. To determine the SCR, Sandström (2006) describes three risk measures that may be used, namely:

- the traditional standard deviation principle;
- the value-at-risk; and
- the expected shortfall or conditional tail expectation.

These measures are consistent with the IAA and IAIS's principles. For a variable, X, the expected shortfall measure is defined as:

$$E(S) = E[X|X > Z]; \tag{30}$$

where:

$Z = \inf\{x \in R: P(X > x) \leq \alpha;\}$; and

$0 \leq \alpha \geq 1$.

In Model 2 the SCR is determined as the expected shortfall (ES) with $\alpha = 0.01$.

To determine the expected shortfall at the end of each financial reporting year the expected surplus is projected for a one-year period from the valuation date. This projection is performed by Monte Carlo simulations. The following items are determined stochastically and further discussed below:

- investment returns;
- inflation;
- mortality;
- policyholder behaviour; and
- new business profit margins.

For investment returns and inflation various models have been proposed. Thomson (1996) developed a linear transfer function model for modelling inflation with dividend growth as input. Maitland (2010) criticises this model in that the model "suffers from a number of statistical problems and estimation errors." In particular, mean reversion creates unrealistic risk-adjusted returns and gives rise to predictability. Predictability violates the efficient-market-hypothesis theory.

Non-linear models such as the regime-switching model of long-term equity returns proposed by Hardy (2001) were considered. Although Hardy's two-state model is a practical model for equity returns, it lacks the consideration of other variables such as inflation and interest rates. For the purposes of the economic variables in Model 2, Maitland's (2010) model is used. This model projects inflation, equity returns, long-term and short-term interest rates. Each one of these four economic variables has two states similar to Hardy's (2001) regime-switching model. For equities a volatile and stable state is modelled. For the other three variables high and low-rate states are used. The advantage of Maitland's (2010) model is that the correlation between the four economic variables and their states are taken into account. See Appendix C for the assumptions.

Maitland (2002) showed through principle components analysis that most of the variability in yields from the South African yield curve is explained by only two factors. From a statistical point of view, the South African yield curve could be reconstructed from the short rate and the long-bond yield.

To determine the discounted value of the liabilities at the end of the one-year-projection period, a risk-free yield curve is required. This curve is derived from Maitland's (2010) model output, the zero-year nominal yield and 20-year nominal par yield, as input into Cox, Ingersoll & Ross' (1985) model.

It must be noted that for regulatory purposes there may be other considerations than purely academically acceptable models. The IAA (unpublished) states that:

> "To develop standardised approaches for market risks (or other risks for that matter) requires judgment and supervisory tradeoffs depending on the supervisor's choice of approximation and its method of application. Ideally, the conservatism inherent in a standardised approach should incent insurers to use (to the extent they are able) more advanced methods in the future."

For regulatory purposes, there is no uniformly accepted method to model policyholder behaviour. Generally, for the effect of lapses on the SCR a prescribed shock is applied. There is little evidence of what an appropriate shock would be for a given confidence level. South Africa's PGN 104 suggests a reasonable assumption is the doubling of lapses in distressed circumstances, but allowance for discretion is made for more onerous scenarios.

To allow for the interaction between the economic environment and policy behaviour in Model 2 the level of lapses are set depending on the state of the economy. The state of the economy is defined to be good, neutral or bad and is dependent on the four states from Maitland's (2010) model. Low inflation and low equity volatility are assumed to be positive for policyholders and therefore the state of economy is set as 'good'. For high inflation and high equity volatility the state of the economy is assumed to be 'bad'. Other combinations

are assumed to be 'neutral'. It is assumed that the best-estimate lapse experience is expected in the good economic state. For the bad economic state a doubling of lapses are assumed consistent with PGN 104. A 50% increase in lapses is assumed for the neutral economic state.

For a single policy a lapse in a year may be seen as a Bernoulli event. The number of lapses for a portfolio may therefore be modelled with the Binomial distribution. For a large portfolio it may be shown that the number of lapses is approximately Normally distributed. In Model 2 the number of lapses is assumed to be Normally distributed with different means and variances for each state of the economy.

For modelling mortality, the IAA (unpublished) states that four factors should generally be taken into account, namely:

- the level;
- the trend;
- the volatility; and
- extreme events like pandemics.

In Model 2 the level, volatility and pandemics were taken into account. In addition, the effect of selective withdrawals was allowed for by assuming that due to a worsening economy additional lapses are exposed to only non-natural deaths. The definition of 'non-natural deaths' is taken as the definition used by Statistics South Africa's research on the causes of death[160]. In other words, if the economy deteriorates only healthy individuals will lapse their life cover if they are in financial difficulty. The remaining portfolio's mortality will therefore deteriorate.

New business is included and it is assumed that the expected and actual volume is equal. For determining the SCR, all policies are assumed to commence half way through the time horizon, i.e. in six months' time after each financial year.

[160] Statistics South Africa, Mortality and causes of death in South Africa,1997–2003: findings from death notification, 2005

The profit margin in the premium is dependent on the economic conditions at the point of sale. In good economic conditions it was assumed that competition would be higher and that premium rates have to be reduced.

In Model 2 the capital requirement for operational risk was set equal to the operational risk requirement in Model 1.

A detailed description of the SCR calculation and assumptions are provided in Appendix C.

16.3 The Results

The financial progression of Model 2 is significantly different to that of Model 1. Overall, dividend payments are lower in Model 2 because of higher solvency capital requirements. A contributing factor is the inclusion of expected new business in Model 2. By excluding new business the SCR and CAR are reasonably consistent for the first few years. The consistent results in the first few years are coincidental. This is because the result of the CAR is determined only by the onerous lapse scenario in the TCAR component, while the SCR is determined by including all the risk factors. The CAR is equal to the negative liabilities until year 9. From year 10 onwards the CAR is determined by the OCAR as oppose to the TCAR. Table 11 shows the yearly solvency capital requirements for Model 1 & 2 and the SCR excluding the effect of new business.

The individual components for the SCR and OCAR are note worthily different. Table 12 shows a comparison of these components. Note that the investment component for OCAR has been adjusted for the effect of the asset shock on current liabilities. For the two models the mortality components are similar. However, the lapse and investment components differ significantly. In Model 2 it is assumed that lapses are independent of the value of the policyholder liability. Offsetting effects are possible for policies with different durations; for example, if lapses increase for policies that have been in force for longer periods, capital requirements will be reduced because the liabilities are positive.

Model 1 does not recognise any favourable effects as a result of deteriorating lapse experience.

The investment capital requirements are different for various reasons. For example, the asset shocks prescribed by PGN 104 are less severe than those suggested by Maitland's (2010) model. PGN 104 prescribes a 30% reduction of the value of equities where Maitland's (2010) model suggests a 57,3% reduction for the economy if it is in a good state and a 40,8% reduction if the economy is in a bad state. Another reason is that Model 2 uses a risk-free yield curve which is determined stochastically. From this yield curve the risk-free rates are used to determine the policyholder-liability values at the end of the one-year projection period. The rates are independent of the assets held. For Model 1 an asset shock is performed at the valuation date; i.e. at the beginning of the one-year projection period. To determine the surplus, policyholder liabilities are recalculated on the expected best-estimate assumptions for this adverse scenario. The effect on the surplus is particularly dampened because the discount rate is determined with reference to expected returns on assets. For the adverse scenario, the value of equities is reduced, but the value of cash remains unchanged. This scenario results in a higher portion of cash and a lower portion of equities that cover the liabilities for the sample portfolio. With cash-interest rates lower than expected equity returns the resulting discount rate is also lower. For the simple portfolio, a lower discount rate has the result of policyholder liabilities that are more negative. This change in policyholder liabilities has therefore an increase effect on the surplus with no capital requirement. For Model 1 the only capital requirement is for the current-liability mismatch.

Table 11. Comparison of the CAR with the SCR

t	1	2	3	4	5	6	7	8	9	10
CAR	885 623	1 853 064	3 089 777	6 514 170	14 097 297	25 660 560	38 410 406	51 137 721	64 922 548	82 856 726
SCR	3 733 541	4 131 888	6 618 268	11 814 768	21 797 388	36 138 790	57 623 880	86 824 252	123 443 310	169 372 300
SCR[161]	3 779 214	4 005 362	4 602 291	6 998 167	13 329 167	25 249 764	43 351 066	69 533 770	104 824 384	150 100 578

Table 12. Comparison of Risk Components

t	1	2	3	4	5	6	7	8	9	10
Model 1										
New business	0	0	0	0	0	0	0	0	0	0
Mortality	921 139	1 964 751	3 263 340	5 744 079	10 812 656	18 945 188	29 343 143	41 545 137	56 058 420	73 522 215
Lapse	323 280	665 705	1 228 479	2 605 668	5 638 919	10 264 224	15 364 162	20 455 088	25 969 019	32 508 447
Investment[162]	-176 059	-355 547	-647 214	-1 369 845	-2 939 738	-5 255 977	-7 643 239	-9 744 879	-11 598 913	-13 245 953
Model 2										
New business	-45 673	126 526	2 015 977	4 816 601	8 468 221	10 889 026	14 272 814	17 290 482	18 618 926	19 271 722
Mortality	229 650	596 336	1 714 699	4 823 583	10 758 001	19 435 298	30 180 466	41 955 049	54 522 984	67 231 534
Lapse	80 871	135 533	50 572	204 601	956 087	1 219 249	1 186 712	477 271	437 251	-719 857
Investment	3 468 693	3 273 493	2 837 019	1 969 983	1 615 079	4 595 217	11 983 888	27 101 450	49 864 149	83 588 901

Table 13. Comparison of Liabilities

t	1	2	3	4	5	6	7	8	9	10
Model 1	-808 201	-1 664 262	-3 071 196	-6 513 835	-13 996 155	-25 249 967	-37 377 420	-48 835 698	-59 858 861	-70 714 722
Model 2	-236 170	-1 591 092	-3 395 423	-8 004 540	-18 385 429	-34 911 299	-52 888 692	-70 407 979	-88 647 089	-108 211 001

[161] SCR excluding new business
[162] For CAR negatives are eliminated

16.4 Conclusion

For the simple portfolio described in section 14.1.5 the solvency capital requirements determined by the South African method (CAR) and by the international standards method (SCR) are significantly different. A clear difference is the inclusion of new business for the SCR calculation. If new business is excluded, the development of CAR and SCR is similar. This consistency is coincidental if one considers the individual risk factors. CAR is dominated by the onerous capital requirement for lapses. The SCR recognises offsetting effects for lapses. As a result the lapse requirement was significantly lower than that required for CAR. The investment risk factor also differs significantly. This is because the CAR is determined by prescribed scenarios that are less onerous than that suggested by non-linear models such as Maitland's (2010) model. International standard methods require that the liabilities are determined independent of the actual assets held. For a portfolio that is mismatched this may be more onerous when the SCR result if compared with the CAR result. The only risk factor that showed a similar progression was the mortality risk factor.

CHAPTER SEVENTEEN
CONCLUSION

In this chapter the conclusions are summarised for the theory of solvency assessment, the South African solvency assessment framework and the role of the statutory actuary.

17.1 Solvency Assessment

For most developed countries, long-term insurance is highly regulated. Although theories such as Austrian economics suggest that no regulation is required in the long term, other theories maintain that some form of regulation is required to ensure customer protection. Over-regulation may stifle innovation and result in a sub-optimal economy that does not maximise economic wealth. Regulatory frameworks designed from the freedom-with-publicity theory may be more flexible than prescriptive laws. This form of regulation has proven to be successful in the UK. To ensure sufficient controls in such a framework, principle-based regulation may assist regulators. This form of regulation, also referred to as contract regulation, places the obligation on the long-term insurer to prove that it is complying with the principles of the law.

For long-term insurers, stakeholders are interested in different forms of solvency assessment. Shareholders, rating agencies and management are interested in the financial strength of a long-term insurer, its ability to write new business and constraints from its capital structure. The assessment will be performed on a going-concern basis, with assets and liabilities valued fairly. Supervisors may be interested in both a break-up basis and a going-concern basis. The former basis is required to ensure that existing policyholders' benefits are protected while the later basis is important to secure systemic stability.

Regulators' approach to solvency assessment has evolved over the last century. In the UK, for example, valuations were performed by formulae in only five-yearly intervals in the early 1900s. The aim was to show that a long-term insurer had assets that exceeded liabilities. In the early 1980s the actuarial profession stated that solvency assessment must be a matter of probability**.**

Since then, regulators have developed sophisticated frameworks to determine whether a long-term insurer may continue as a going concern, should limit or cease new business, should transfer their insurance business to a third party or be forced to file for bankruptcy. The emphasis is not only on the strength of a long-term insurer's balance sheet, but also on its risk-management framework.

The determination of solvency capital requirement has also developed from simple formulae to more complex risk-based assessments. The later includes the solvency capital requirement that is determined quantitatively and qualitatively. Examples of jurisdictions that require a risk-based assessment are those of the Netherlands, Switzerland, UK, and the USA. The expected adoption of Solvency II in 2012 for Europe means that all European long-term insurers will be subject to a risk-based solvency assessment.

The two key international bodies that set standards and influence regulatory frameworks are the IAIS and the IAA. The IAIS has issued numerous standards, principles and papers for insurer's solvency assessment. The IAA gave assistance for some of these issues. The FSB is a member of the IAIS. Another important role player in the long-term insurance industry is the IASB which sets international accounting standards.

17.2 South Africa's Solvency Assessment Framework

South Africa's regulatory framework for long-term insurers was assessed against the IAIS' three-level requirements. Although the focus was on the level 2 regulatory requirements, all three levels were assessed.

It was shown that South Africa has a well-developed and effective financial-market infrastructure and that the efficient-market criterion is satisfied.

It was also shown that there are areas in the regulatory regime where the South African solvency assessment framework either satisfy, partially satisfy or do not satisfy the IAIS's criteria. The main areas where improvements are required are

the valuation methods of asset and liabilities and the consistent financial development of long-term insurers in the long run.

From a supervisory assessment and intervention perspective, South Africa's current solvency assessment framework does not have the required range of measures for meaningful solvency assessment. It is not clear how the FSB will intervene if there is evidence that a long-term insurer's financial strength is deteriorating. Improvement may be as simple as to implement measures based on a function of the existing CAR-cover measure.

In Chapter 16 it was shown that for the simple portfolio of term-assurance policies, the solvency capital requirements determined by South African requirements and that required by international standards are significantly different. A clear difference is the treatment of new business. Other factors that are treated differently are lapse risk and investment risk. The only risk factor that showed a similar progression was the mortality risk factor.

17.3 The Role of the Statutory Actuary

In South Africa, the role of the statutory actuary is in essence the same as the UK's former appointed-actuary role. This role carries an arduous responsibility. The statutory actuary has responsibilities in every aspect that may have an effect on the financial soundness of a long-term insurer. Investigations in the UK have criticised this approach and warned against a monopoly that reserves roles for actuaries. Notwithstanding these findings the local statutory-actuary approach has remained the same.

Internationally, the approach of actuaries in long-term insurers' solvency assessments has taken different forms. Member states of the EU have introduced an approach where the actuarial function does not place the responsibility on one actuary. It is a possibility that these changes may be adopted in the SAM project in South Africa.

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APPENDIX A
MODEL-OFFICE PROJECTION

A.1 Description of Method

In this appendix, the balance sheet, the income statement, CAR and other information are determined by an illustrative model-office projection. The output of the model-office projection for these items is monthly for a ten-year period. The model-office projection is made by projecting a single policy deterministically for a new long-term insurer with no other insurance business. New business volume is included for each month of the ten-year term. Each new business policy is assumed to have the same expected outcome as the projected single policy.

Policyholder liabilities and CAR are set according to the requirements of the LTIA, BN 72 and PGN 104. The model includes the option to set policyholder liabilities to zero if they are negative. For each cohort of policies this is achieved by a check at each projection period.

An asset portfolio is specified for the policyholder liabilities and the remainder of assets that cover the CAR and shareholder assets.

Although the projection is done monthly, the annual results are presented in the main text.

Dividends are paid at the end of each year according to the set dividend policy.

A.2 The Policy Projection Model

The policy projection model determines the expected cashflow, investment return on the policyholder liabilities and profit per month. It is assumed that all cashflows are incurred at the end of the month. Let Π_t be the expected profit at duration *t*. Then:

$$\Pi_t = P_t + R_t - E_t - C_t - \Delta V_t; \quad \text{(A1)}$$

where

P_t denotes the expected premium at duration *t*;

R_t denotes the expected investment return on assets covering policyholder liabilities;

E_t denotes the expected expenses at duration *t*;

C_t denotes the expected claims at duration *t*; and

ΔV_t denotes the expected change in policyholder liabilities at duration *t*.

A.2.1 Expected cashflow

The expected cashflow components are determined by:

$$P_t = P\, l_{x+s,t}; \quad \text{(A2)}$$

$$E_t = e(1 + j^{(m)})^{\mathrm{t}}\, l_{x+s,t} \text{ for t} > 1; \quad \text{(A3)}$$

$$E_1 = I + e(1 + j^{(m)})\, l_{x,1}; \quad \text{(A4)}$$

$$C_t = S(aq)^{(m)}_{x+s,t} l_{x+s,t}; \text{ and} \quad \text{(A5)}$$

$$I_t = i^{(m)} V_{t-1} \quad \text{(A6)}$$

where:

P denotes the contractual premium;

s	denotes the curtate duration in years for duration *t*;
$l_{x+s,t}$	denotes the proportion of survivors aged $x + s$ at duration *t*;
e	denotes the renewal expense per month at inception;
$j^{(m)}$	denotes the monthly renewal-expense inflation rate;
I	denotes the initial expense;
S	denotes the sum assured;
$(aq)_{x+s,t}^{(m)}$	denotes the dependent monthly mortality rate for a life aged $x + s$ at duration *t*;
$i^{(m)}$	denotes the monthly effective investment return; and
V_t	denotes the policyholder liabilities at duration *t*.

A.2.2 Best-estimate survivor probabilities

The survivor probabilities for the expected cashflow are determined by:

$$l_{x,0} = 1; \tag{A7}$$

$$l_{x+s,t+1} = l_{x+s,t}\left\{1 - \left((aq)_{x+s,t}^{(m)} + (aw)_t^{(\mathrm{m})}\right)\right\} \text{for t} \geq 1; \tag{A8}$$

$$(aq)_{x+s,t}^{(m)} = q_{x+s,t}^{(m)}(1 - 0.5\, w_t^{(m)}); \tag{A9}$$

$$(aw)_t^{(m)} = w_t^{(m)}(1 - 0.5\, q_{x+s,t}^{(m)}); \text{ and} \tag{A10}$$

$$q_{x+s,t}^{(m)} = 1 - (1 - q_{x+s,t})^{\frac{1}{12}} \tag{A11}$$

where:

$q_{x+s,t}^{(m)}$	denotes the independent monthly mortality rate for a life aged $x + s$ at duration t;
$q_{x+s,t}$	denotes the independent annual mortality rate for a life aged $x + s$ at duration *t*;

$(aw)_{\mathrm{t}}^{(\mathrm{m})}$ denotes the dependent monthly withdrawal rate at duration *t*; and

$w_t^{(m)}$ denotes the independent monthly withdrawal rate at duration *t*.

A.2.3 Investment return on reserves

The monthly investment return is determined by:

$$i_m = (1+i)^{\frac{1}{12}} - 1; \qquad \text{(A12)}$$

where:

i denotes the yearly effective valuation discount rate of interest.

i is determined by the equation

$$i = \alpha_C i_C + \alpha_G i_G + \alpha_E i_E + \alpha_P i_P; \qquad \text{(A13)}$$

where:

$$\sum_i \alpha_i = 1; \qquad \text{(A14)}$$

and

i_C is the expected yearly effective return of cash;
i_G is the expected yearly effective return of gilts;
i_E is the expected yearly effective return of equities;
i_P is the expected yearly effective return of property;

α_C is the proportion of policyholder assets invested in cash;
α_G is the proportion of policyholder assets invested in gilts;
α_E is the proportion of policyholder assets invested in equities; and
α_P is the proportion of policyholder assets invested in property.

The expected investment return on reserves is then determined by:

$$R_t = i_m V_{t-1}. \tag{A15}$$

A.2.4 Expected change in policyholder liabilities

The expected change in reserve (or policyholder liability) is the change in the expected regulatory or FSV reserve. The FSV requires compulsory margins to increase the reserve. These compulsory margins are expected to be realised as future profit. The change in reserve is calculated as follows:

$$\Delta V_t = V_t - V_{t-1}; \tag{A16}$$

$$V_t = {}^{\mathrm{F}}_{L}V_t L + \varepsilon_{\mathrm{t}}{}^{\mathrm{F}}_{E}V_t + \gamma_{\mathrm{t}}{}^{\mathrm{F}}_{C}V_t - \gamma_{\mathrm{t}}{}^{\mathrm{F}}_{P}V_t; \tag{A17}$$

$${}^{\mathrm{F}}_{L}V_t = -\min\left(\varepsilon_{\mathrm{t}}{}^{\mathrm{F}}_{E}V_t + \gamma_{\mathrm{t}}{}^{\mathrm{F}}_{C}V_t - \gamma_{\mathrm{t}}{}^{\mathrm{F}}_{P}V_t, 0\right); \tag{A18}$$

$$\gamma_t = \frac{l_{x+s,t}}{{}^{\mathrm{F}}l_{x+s,t}} \tag{A19}$$

$$\varepsilon_{\mathrm{t}} = \frac{l_{x+s,t}(1+j^{(m)})^t}{{}^{\mathrm{F}}l_{x+s,t}(1+\delta_e)\left\{1+j^{(m)}(1+\delta_j)\right\}^t}; \tag{A20}$$

$$v = \frac{1}{1+\ {}^{\mathrm{F}}i_m} \tag{A21}$$

$${}^{F}i_m = (1+i(1+\delta_i))^{\frac{1}{12}} - 1; \tag{A22}$$

$${}^{\mathrm{F}}_{P}V_t\ = P\sum_t\ {}^{\mathrm{F}}l_{x+s,t}v^t; \tag{A23}$$

$${}^{\mathrm{F}}_{E}V_t\ = e\sum_t\ {}^{\mathrm{F}}l_{x+s,t}(1+\delta_e)\left\{1+j(1+\delta_j)\right\}^t v^t; \text{ and} \tag{A24}$$

$${}^{\mathrm{F}}_{C}V_t\ = S\sum_t\ {}^{\mathrm{F}}l_{x+s,t}\ {}^{\mathrm{F}}(aq)^{(m)}_{x+s,t}v^t; \tag{A25}$$

where at duration t:

L denotes the lapse reserve indicator;

${}^{\mathrm{F}}_{L}V_t$ denotes the FSV lapse reserve;

${}^{\mathrm{F}}_{E}V_t$ denotes the FSV expense reserve;

${}^{\mathrm{F}}_{C}V_t$ denotes the FSV claim reserve;

${}^{\mathrm{F}}_{P}V_t$ denotes the FSV premium reserve;

γ_{t} denotes the scaling factor that removes compulsory mortality margins;

ε_{t} denotes the scaling factor that removes compulsory mortality, expense and inflation margins;

${}^{\mathrm{F}}i_m$ denotes the FSV effective discount rate per month;

δ_e denotes the compulsory expense margin;

δ_i denotes the compulsory investment-return margin; and

δ_j denotes the compulsory inflation margin.

The scaling factors, denoted by γ_t and ε_t, are necessary to remove the compulsory margins up to duration *t*. $I_L$is used to allow or eliminate negative reserves.

A.2.5 FSV survivor probabilities

The survivor probabilities and investment return for the expected FSV reserve are determined by:

$$ {}^{\mathrm{F}}l_{x,0} = 1; \qquad \text{(A26)}$$

$$ {}^{\mathrm{F}}l_{x+s,t+1} = l_{x+s,t}\left\{1 - \left({}^{\mathrm{F}}(aq)^{(m)}_{x+s,t} + {}^{\mathrm{F}}(aw)^{(m)}_{t} \right)\right\} \text{for t} \geq 1; \qquad \text{(A27)}$$

$$ {}^{\mathrm{F}}(aq)^{(m)}_{x+s,t} = {}^{\mathrm{F}}q^{(m)}_{x+s,t}(1 - 0.5\ {}^{\mathrm{F}}w^{(m)}_{t}); \qquad \text{(A28)}$$

$$ (aw)^{(m)}_{t} = {}^{\mathrm{F}}w_t(1 - 0.5\ {}^{\mathrm{F}}q^{(m)}_{x+s,t}); \qquad \text{(A29)}$$

$$ {}^{\mathrm{F}}q^{(m)}_{x+s,t} = \{1 - (1 - q_{x+s,t})^{\frac{1}{12}}\}\ (1 + \delta_m); \text{ and} \qquad \text{(A30)}$$

$$ {}^{F}w_t^{(m)} = w_t^{(m)}(1 + \delta_w); \qquad \text{(A31)} $$

where:

${}^{F}l_{x+s,t}$	denotes the proportion of FSV survivors for lives aged $x + s$ at duration *t*;
${}^{F}(aq)_{x+s,t}^{(m)}$	denotes the monthly FSV dependent mortality rate for a life aged $x + s$ at duration *t*;
${}^{F}q_{x+s,t}^{(m)}$	denotes the annual FSV dependent mortality rate for a life aged $x + s$ at duration *t*;
${}^{F}(aw)_t^{(m)}$	denotes the monthly dependent FSV withdrawal rate at duration *t*;
${}^{F}w_t^{(m)}$	denotes the monthly independent FSV withdrawal rate at duration *t*;
δ_m	denotes the compulsory mortality margin;
δ_w	denotes the compulsory withdrawal margin.

A.3 The Policy Projection Assumptions

A.3.1 General assumptions

Negative reserves are allowed by an indicator:

$$L = \begin{cases} 1 \text{ if negative reserves are eliminated;} \\ 0 \text{ if negative reserves are allowed.} \end{cases}$$

The model point is based on a life aged x where the assumed age is:

$$x = 41.$$

A.3.2 Economic assumptions

The valuation rate of interest is derived from the expected return on the underlying policyholder assets. For fixed interest the rate is always assumed to be risk-free. PGN 104 requires the rate on fixed interest to be reduced for credit risk. It is assumed that the liquidity risk premium is zero and that there are no other spreads between corporate and government bonds.

The valuation discount rate, *i*, and the monthly inflation rate, $j^{(m)}$, are set as:

i = 0,078; and
$j^{(m)}$ = 0,004 074.

The yearly inflation rate is assumed to be 0,05 and *i* is calculated with equation (A13).

Let r_f be the risk-free rate of return per year. The following assumptions are used to derive expected returns on asset classes:

$$r_f = 0{,}08;$$

$i_{\mathrm{C}} = r_f - 0{,}02;$

$i_{\mathrm{G}} = r_f;$

$i_{\mathrm{E}} = r_f + 0{,}02;$ and

$i_{\mathrm{P}} = r_f + 0{,}01.$

The risk-discount rate is determined by:

$r = r_f + 0{,}06.$

A.3.3 Cashflow assumptions

The cashflow inputs are:

S = 100 000;

I = 400; and

e = 10.

P was determined by formula with the assumptions above and a profit loading of 30%. The result is:

P = 109,80.

A.3.4 Survivorship assumptions

For the mortality assumptions:

$q_{\mathrm{x+s}}$ is from the mortality table SA85-95 Assured Lives Ultimate; and

$\alpha = 0{,}25.$

The withdrawal probabilities per month are:

$w_1 = 0{,}1;$

$w_2 = 0{,}05;$

$w_3 = 0{,}03;$

$$w_t = \begin{cases} 0{,}025 \ \ for\ t\ \epsilon\ [4{,}6]; \\ 0{,}015\ for\ t\ \epsilon\ [7{,}12]; \\ 0{,}01 for\ t\ \epsilon\ [13{,}24]; \text{and} \\ 0{,}05 for\ t\ \epsilon\ [25, \infty). \end{cases}$$

A.3.5 Compulsory margins

The required compulsory margins are:

δ_m = 0,075;

δ_w = 0,1;

δ_i = 0,002 5;

δ_j = 0,1; and

δ_e = 0,1.

A.4 Projection of the Portfolio

A.4.1 The model

The monthly portfolio output, which is based on new business sales per month, can be obtained by multiplying the matrix of expected cashflows, reserves and profit $\mathbf{P}_{5\times120}$ by a matrix representing the volume of new business sales $\mathbf{V}_{120\times120}$.

Let $g_s$be the new business growth in year *s* and:

$$\mathbf{P} = \begin{pmatrix} P_1\, P_2 \ldots P_{120} \\ E_1\, E_2 \ldots E_{120} \\ C_1\, C_2 \ldots C_{120} \\ \Delta V_1 \Delta V_2 \ldots \Delta V_{120} \\ I_1\ \ I_2 \ldots I_{120} \\ \Theta_1\, \Theta_2 \cdots \Theta_{120} \end{pmatrix}; \text{and} \qquad \text{(A32)}$$

$$\mathbf{A} = \begin{pmatrix} n_1 & n_2 & \cdots & n_{120} \\ 0 & n_1 & \cdots & n_{119} \\ 0 & 0 & \cdots & n_{118} \\ & & \vdots & \\ 0 & 0 & \cdots & n_1 \end{pmatrix}. \qquad \text{(A33)}$$

The portfolio output per month represented by the matrix $\mathbf{A}_{120\times120}$ is then:

$$\mathbf{A} = \mathbf{PV}$$

$$= \begin{pmatrix} P_1 & P_2 & \ldots & P_{120} \\ E_1 & E_2 & \ldots & E_{120} \\ C_1 & C_2 & \ldots & C_{120} \\ \Delta V_1 \Delta V_2 & & \ldots & \Delta V_{120} \\ R_1 & R_2 & \ldots & R_{120} \\ \Theta_1 & \Theta_2 & \cdots & \Theta_{120} \end{pmatrix} \begin{pmatrix} n_1 & n_2 & \cdots & n_{120} \\ 0 & n_1 & \cdots & n_{119} \\ 0 & 0 & \cdots & n_{118} \\ & & \vdots & \\ 0 & 0 & & n_1 \end{pmatrix} \qquad \text{(A34)}$$

$$= \begin{pmatrix} P_1 n_1 & P_1 n_2 + P_2 n_1 & \dots & \sum_{r=1}^{120} \sum_{s=1}^{r} P_s \, n_{r-s+1} \\ e_1 n_1 & e_1 n_2 + e_2 n_1 & \dots & \sum_{r=1}^{120} \sum_{s=1}^{r} e_s \, n_{r-s+1} \\ C_1 n_1 & C_1 n_2 + C_2 n_1 & \dots & \sum_{r=1}^{120} \sum_{s=1}^{r} C_s \, n_{r-s+1} \\ \Delta V_1 n_1 & \Delta V_1 n_2 + \Delta V_2 n_1 & \dots & \sum_{r=1}^{120} \sum_{s=1}^{r} \Delta V_s \, n_{r-s+1} \\ R_1 n_1 & R_1 n_2 + R_2 n_1 & \dots & \sum_{r=1}^{120} \sum_{s=1}^{r} R_s \, n_{r-s+1} \\ \rho_1 n_1 & \rho_1 n_2 + \rho_2 n_1 & \dots & \sum_{r=1}^{120} \sum_{s=1}^{r} \rho_s \, n_{r-s+1} \end{pmatrix}; \quad \text{(A35)}$$

where:

$$n_1 = n; \text{ and} \quad \text{(A36)}$$

$$n_t = n_{t-1}(1 + g_s)^{\frac{t-1}{12}} \; \forall \; t > 1. \quad \text{(A37)}$$

The initial cost I and the first month's renewal expenses e are incurred in the same month. I is included in E_1 to simplify the calculation so that:

$$E_1 = e(1 + j^{(m)})^{\mathrm{t}} \, l_{x+s,t} + I \quad \text{(A38)}$$

Alternatively, I could be included as a separate row in the matrix without adjusting the formula for E_1.

For each column j in **A** an entry denotes the expected income statement item at duration j.

The matrix approach could easily be extended to include other entries such as the value of in-force by including extra rows in **P**.

A.4.2 New-business volume

New-business volume assumptions are:

$n = 100$;
$g_1 = 0{,}25$;
$g_2 = 0{,}5$;
$g_3 = 1$;
$g_4 = 1{,}5$;
$g_5 = 1$;
$g_6 = 0{,}5$; and
$g_s = 0{,}25 \; \forall \; s \geq 7$.

A.4.3 Assets

Shareholder assets are augmented each month by the net cashflow from the insurance portfolio and investment return. On the other hand, the shareholder assets are reduced by dividend payments and transfers to policyholder reserves. Policyholder assets are equal to the policyholder liabilities at all times. The value of assets is equal to the value of shareholder assets and the value of policyholder assets.

Shareholder assets are not necessarily invested in the same asset classes as policyholder assets. The shareholder assets are calculated by:

$$ {}^{S}A_{t+1} = {}^{S}A_t + {}^{S}R_t + \Pi_t - D_t \qquad \text{(A39)}$$

where:

${}^{S}A_t$ is the expected value of shareholder assets at *t*;
${}^{S}R_t$ is the expected investment return of shareholder assets from t to $t + 1$;
Π_t is the expected profit from policyholders at duration *t*; and
D_t is the expected dividend payment to shareholders at duration *t*.

A.4.4 Asset assumptions

${}^{S}A_0$ is the start-up capital and assumed to be 10 000 000. Income from an asset class is assumed to be in cash and capital growth is not realised. Transfers to reserves are in the asset mix that covers the reserves, i.e. α_{C}, α_{G}, α_{E} and α_{P}. Dividend payments to shareholders are assumed to be cash.

The assumptions for the yearly income yields for each asset class are shown in Table A.1:

Table A.1. Yearly income yields

Asset class	**Yield**
Equity	0.035
Property	0.04
Gilts	0.08
Cash	0.06

Capital growth rates are determined by:

$$i_{\mathrm{C}} = \frac{i_{\mathrm{T}} - i_{\mathrm{I}}}{(1 + i_{\mathrm{I}})} \qquad \text{(A40)}$$

where:

i_{T} is the yearly expected total return; and

i_{I} denotes the expected income yield.

A.5 Capital Adequacy Requirement

A.5.1 Method

The CAR is calculated according to the LTIA, BN 72 and PGN 104. MCAR is excluded to illustrate the development of the CAR cover determined on the prescribed risk-based formula. However, dividend payments are limited so that the shareholder assets are at least equal to MCAR. The CAR is calculated at the end of each financial year.

A.5.2 The CAR model

The basic formula

The CAR is calculated by:

$$\theta_r = max\left({}^{T}\theta_r, {}^{O}\theta_r\right); \quad \text{(A41)}$$

where:

r is the projection year;

${}^{T}\theta_r$ denotes the TCAR at the end of projection year *r*; and

${}^{O}\theta_r$ denotes the OCAR at the end of projection year *r*.

Also:

$${}^{T}\theta_r = \max(V_t, 0); \text{ and} \quad \text{(A42)}$$

$${}^{O}\theta_r = \frac{{}^{I}\theta_r}{1 - k_r}; \quad \text{(A43)}$$

where:

${}^{I}\theta_r$ denotes the intermediate ordinary capital adequacy requirement (IOCAR); and

k_r denotes the prescribed gross-up factor for projection year r.

$$^{I}\theta_r = \sqrt{\sum_i x_{i,r}^2 + (x_{5,r} + \frac{1}{2}\, x_{6,r})^2 + \frac{3}{4} x_{6,r}^2} + x_{7,r}; \qquad \text{(A44)}$$

where, at the end of projection year *r*:

$x_{1,r}$ denotes the lapse-risk component;

$x_{2,r}$ denotes the mortality-risk component;

$x_{3,r}$ denotes the mortality-assumption-risk component;

$x_{4,r}$ denotes the expense-fluctuation-risk component;

$x_{5,r}$ denotes the investment-risk component;

$x_{6,r}$ denotes the credit-risk component; and

$x_{7,r}$ denotes the operational-risk component.

The components

The Components of $^{I}\theta_r$ are:

$$x_{1,r} = 0.4\, ^{T}\theta_r; \qquad \text{(A45)}$$

$$x_{2,r} = \frac{\sum_r 45 p_r}{\sqrt{n_r}}\ ; \qquad \text{(A46)}$$

where:

p_r is the annual risk premium for projection year r; and

n_r is the number of lives during projection year r;

$$x_{3,r} = \frac{\alpha\, ^{FSV}_{C}V_{12r}}{3}; \qquad \text{(A47)}$$

$$x_{4,r} = 0.1E_r; \text{ and} \qquad \text{(A48)}$$

to determine $^{R}x_{5,r}$ let:

$$A_r = V_r; \qquad \text{(A49)}$$

where:

A_r is the value of assets at r; and

V_r is the value of policyholder liabilities determined according to PGN 104 at r.

In PGN 104 it is assumed that there are reductions in asset values of:

- 30% for equities;
- 15% for property; and
- 0% for cash.

For bonds, it is assumed that there is a 25% reduction in the yield to maturity. Determine the values of the assets, $A_r^{'}$, and liabilities, $V_r^{'}$, after the prescribed reduction in asset values.

$$^{\mathrm{R}}x_{5,r} = min(V_r^{'} - A_r^{'}; 0) \tag{A50}$$

To determine $^{\mathrm{W}}x_{5,r}$ it is assumed that equation (A49) holds. Determine the values of the assets, $A_r^{''}$, and liabilities, $V_r^{''}$, by reducing the expected future income of all asset classed by 15%.

$$^{\mathrm{W}}x_{5,r} = min(V_r^{''} - A_r^{''}; 0) \tag{A51}$$

To determine k_r consider the assets which cover the CAR amount. The same reduction factors as for the resilience test are applied to these assets. The value of the debt is reduced by the factors in Table A.2.

Let $k_{r,1}$ denotes the proportionate reduction at the end of projection year r of the assets that cover the CAR amount after applying the prescribed factors. Then:

$$k_{r,1} = \sum_i {}^{C}\alpha_{r,i}\ {}^{C}\beta_{r,i}; \qquad \text{(A52)}$$

where:

${}^{C}\alpha_{r,i}$ denotes the proportion of asset class *i* at the end of *r* that covers CAR; and

${}^{C}\beta_{r,i}$denotes the reduction factor at the end of *r* after the application of the resilience-test rules.

Let $k_{r,2}$ denotes the proportionate reduction of the CAR amount at the end of projection year *r* due to the credit risk. Then:

$$k_{r,2} = \sum_i {}^{C}\alpha_{r,i}\ {}^{C}\gamma_{r,i}; \qquad \text{(A53)}$$

where:

${}^{C}\gamma_{r,i}$denotes the reduction factor at the end of *r* after the application of the credit-risk rules.

Note that:

$${}^{C}\gamma_{r,i} = 0; \qquad \text{(A54)}$$

for instruments other than debt securities.

$$k_r = \sqrt{\left\{\left(1 - k_{r,1}\right) + \frac{1}{2}\left(1 - k_{r,2}\right)\right\}^2 + \frac{3}{4}\left(1 - k_{r,2}\right)^2}$$

$x_{6,r}$ is determined by multiplying the appropriate percentages in Table A.2 by the values of cash and gilts in each category. The credit–rating percentages are prescribed in PGN 104 and are shown in Table A.2.

Table A.2. Credit-rating probabilities

Credit rating or issuer	
Government	0%
AAA	1%
AA	1%
A	4.1%
BBB	5%
BB	13.6%
B	22.4%
CCC	44.8%

The probabilities for instruments with outstanding terms less than 12 months are reduced by applying the factor of 25%.

Table A.3 shows the assumed percentage holdings in gilts and cash, with the short-term reduction factor.

Table A.3. Investment grade mix

Rating or issuer	**Gilts**	**Cash**
Government	20%	0%
AAA	40%	50%
AA	40%	25%
A	0%	25%
BBB	0%	0%
BB	0%	0%
B	0%	0%
CCC	0%	0%
Total	100%	100%
Short-term reduction factor	100%	25%

Operational risk component is calculated by the formula:

$$x_{7,r} = 0.003P_{12s} \quad \text{(A55)}$$

A.6 Dividend Policy

CAR cover is defined as the shareholder assets divided by the CAR. The dividend policy is defined in terms of the CAR cover and initial share capital. The dividend payable at the end of each projection year r is set so that the share capital after the dividend is paid is not less than the initial capital or below the targeted CAR cover. The LTIA requires a minimum CAR cover of 1, which was used as the targeted CAR cover.

To meet the minimum CAR requirement consistent with the minimum monetary amount specified in the FSB's BN 72, initial shareholder capital is set at 10 000 000.

APPENDIX B

ACTS DIRECTLY AFFECTING LONG-TERM INSURERS

ACT

Companies Act (Act 61 of 1973)
Financial Services Board Act (Act 97 of 1990)
Pension Funds Act, 24 (Act 24 of 1956)
Friendly Societies Act (Act 25 of 1956)
Financial Intelligence Centre Act (Act no. 38 of 2001)
Financial Institutions (Protection of Funds) Act (Act 28 of 2001)
Financial Supervision of the Road Accident Fund Act (Act 8 of 1993)
Supervision of the Financial Institutions Rationalisation Act (Act 32 of 1996)
Long-term Insurance Act (Act 52 of 1998)
Inspection of Financial Institutions Act (Act 80 of 1998)
Financial Advisory and Intermediary Services Act (Act 37 of 2002)
Collective Investment Schemes Control Act (Act 45 of 2002)
The Securities Services Act (Act 36 of 2004)
Income Tax Act (Act 58 of 1962)
Value Added Tax (Act 89 of 1991)
National Credit Act (Act 34 of 2005)
Tax on Retirement Funds Act (Act 38 of 1996)
Exchange Control Amnesty and Amendment of Taxation Laws Act(Act 12 of 2003)

APPENDIX C
STOCHASTIC MODEL AND ASSUMPTIONS

To determine the solvency capital required for the term-assurance portfolio, a stochastic model was developed. At the end of each financial year the expected surplus is projected for one year on a going concern basis. For the economic variables a multi-state model is used and the term structure of interest rates is introduced. Policyholder behaviour and new business profit margins are assumed to be dependent on the state of the economic variables. For mortality the effect of pandemics is introduced. The base assumptions described earlier remain the same. Each of the main items of the model is described below.

C.1 Economic Model and Assumptions

For the economic variables Maitland's (2010) multiple-Markov-regime-switching model is used. Equity returns, long and short-term interest rates and inflation are derived from the basic equation:

$$y_t = c_{s_t} + \phi y_{t-1} + \varepsilon_t; \qquad \text{(C1)}$$

where S_t denotes the state of the economic variable at time *t*. The time unit *t* is measured in quarter years and the error term ε_t is normally distributed.

For each economic variable there are two states. Table C.1 shows the parameter values for each of these states and Table C.2 shows the correlation matrix.

Table C.1. Parameters for quarterly rates

	Inflation		Short-term interest rate		Long-term interest rate		Equity return	
S	1	2	1	2	1	2	1	2
c	0.0299	0.0944	0.0072	0.0234	0.0129	0.0214	-0.0333	0.01404
ϕ	0.2415	0.2415	0.8659	0.8659	0.8523	0.8523	0	0
σ	0.032995	0.032995	0.005074	0.015466	0.004082	0.008319	0.62057	0.30581

Table C.2. Correlation matrix

	Inflation	Short-term interest rate	Long-term interest rate	Equity return
Inflation	1	0.147	0.211	0.064
Short-term interest rate	0.147	1	0.179	-0.157
Long-term interest rate	0.211	0.179	1	-0.082
Equity return	0.064	-0.157	-0.082	1

Since there are four economic variables and two states for each state there is a total of 16 possible economic states. The 16 states and the transition probabilities from each state to another are shown in Tables C.3 and C.4.

Table C.3. Economic states

State	Inflation	Short-term interest rate	Long-term interest rate	Equity return
1	1	1	1	1
2	1	1	1	2
3	1	1	2	1
4	1	1	2	2
5	1	2	1	1
6	1	2	1	2
7	1	2	2	1
8	1	2	2	2
9	2	1	1	1
10	2	1	1	2
11	2	1	2	1
12	2	1	2	2
13	2	2	1	1
14	2	2	1	2
15	2	2	2	1
16	2	2	2	2

For the transition probabilities the columns in Table C.4 below show the current state of the economic variables and the rows show the next state. The probability in a cell therefore shows the probability of moving from the current state (column number) to the next state (row number).

Table C.4. Transition probabilities

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	0.76	0.07	0.02	0.00	0.26	0.04	0.00	0.00	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.00
2	0.21	0.92	0.01	0.03	0.12	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.66	0.17	0.00	0.00	0.08	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.12	0.73	0.00	0.00	0.02	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
5	0.01	0.00	0.00	0.00	0.44	0.14	0.03	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.00
6	0.00	0.00	0.00	0.00	0.08	0.36	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
7	0.00	0.00	0.13	0.02	0.04	0.01	0.60	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
8	0.00	0.00	0.01	0.03	0.00	0.03	0.10	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03
9	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.12	0.00	0.00	0.06	0.02	0.00	0.00
10	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.82	0.00	0.00	0.02	0.17	0.00	0.00
11	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.10	0.01	0.57	0.13	0.00	0.00	0.01	0.00
12	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.12	0.77	0.00	0.00	0.00	0.07
13	0.00	0.00	0.00	0.00	0.05	0.03	0.00	0.00	0.05	0.02	0.00	0.00	0.78	0.33	0.03	0.00
14	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.09	0.46	0.00	0.00
15	0.00	0.00	0.04	0.00	0.01	0.00	0.16	0.00	0.01	0.00	0.26	0.03	0.01	0.00	0.75	0.09
16	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.00	0.00	0.04	0.06	0.00	0.00	0.17	0.81

From the end of a financial year, the expected yield curve in one year's time is determined by the Cox-Ingersoll-Ross (CIR) model with input from Maitland's (2010) model. The CIR models the change in continuous interest rates by:

$$\Delta r = \alpha + (\beta - r)\Delta t + \sqrt{r}\sigma\varepsilon\sqrt{t}; \qquad \text{(C2)}$$

where

$\alpha = 0.07$ is the pull-back factor; and

β is the long-term equilibrium rate from Maitland's (2010) model.

To determine the yield curve deterministic short-term interest rates are used as an approximation by modelling r daily.

C.2 Mortality

The potential effect of pandemics was introduced by a loading to mortality rates in the event of a pandemic. The IAA[163] used an illustrative probability of 7.8% for the probability that one occurs in a year. This probability and a loading to the base mortality rates of 25% in the event of a pandemic are used.

C.3 Policyholder Behaviour

Policyholder behaviour is assumed to be dependent on the state of the economy. This behaviour is reflected in the lapse rates. Three economic scenarios are assumed for lapses, namely 'good', 'bad' and 'extremely bad' scenarios. The classification of the scenarios and the loadings to the base lapse rates are given in Table C.5.

Table C.5. Lapse loadings

State	Classification	Loading
1	Bad	0.5
2	Good	0
3	Bad	0.5
4	Good	0
5	Bad	0.5
6	Good	0
7	Bad	0.5
8	Good	0
9	Extremely bad	1
10	Bad	0.5
11	Extremely bad	1
12	Bad	0.5
13	Extremely bad	1
14	Bad	0.5
15	Extremely bad	1
16	Bad	0.5

C.4 New-business Margin

[163] International Actuarial Association, Stochastic Modeling: theory and reality from an actuarial perspective, 2010

The profit margins are assumed to be dependent on two economic scenarios, namely ‘good’ and ‘not good’. For the ‘good’ scenario it is assumed that competition through new entrants is fiercer and as a result the profit margin may vary uniformly between 20% and 30%. For the ‘not-good’ scenario margins are maintained between 25% and 30%.

APPENDIX D
THE FSB'S QUESTIONNAIRE ON STATUTORY ACTUARIES, 2007

Questionnaire regarding information on Statutory Actuaries

Definition:

"Statutory Actuary" means an actuary appointed or recognised by the regulator, with certain duties as prescribed in the Act and other sub-regulation governing life insurance (similar to the previous UK Appointed Actuary).

In the questions below, where we use the term "Statutory Actuary", please interpret this to be the equivalent role(s) as in your jurisdiction.

Questions:

1. Role of a Statutory Actuary

1.1 Please provide a brief description of the role of the Statutory Actuary as defined in your legislation pertaining to the regulation of life (long-term) insurers in your jurisdiction. (If the role is split into more than one role, please provide a brief description of each role.)

1.2 Please list the responsibilities (and scope thereof) of the Statutory Actuary. If the role is split into more than one role, please list the responsibilities of each role separately.

1.3 Please provide the name of the body responsible for providing guidance on the scope and specifics of the technical work provided by the Statutory Actuary (if different to the regulator) and if possible, the guidance/regulations specifying the work to be performed, and what powers of oversight this body has over the actuary.

1.4 If you follow a risk-based regulatory framework, please list the risks you are expecting the work of the Statutory Actuary to cover, and briefly which aspect of the scope covers these risks:

- Underwriting risk (including pricing and valuation estimation risk)
- Market/interest rate risk
- Credit risk

- Operational risk
- Concentration/group risk
- Liquidity risk
- Market conduct risk.
- Any other risk(s) not stated above

1.5 Who is responsible for the valuation assumptions used and the accuracy of the results of the valuation?

1.6 Who is responsible for risk management of the insurer?

2. Approval of a Statutory Actuary

In your jurisdiction:

2.1 What criteria need to be met for a person to be approved as a Statutory Actuary?

2.2 What is the process that needs to be followed by a person wanting to be approved as a Statutory Actuary?

2.3 How long does a person maintain his/her status as a Statutory Actuary?

2.4 Are there any other factors that could lead to a person losing his/her status as a Statutory Actuary?

2.5 What powers do you have to interrogate the work performed by a Statutory Actuary or to censure/discipline the Statutory Actuary?

2.6 What powers do you have and on what grounds will you remove a Statutory Actuary?

3. Relationship of the Statutory Actuary with the Insurer

In your jurisdiction:

3.1 Is the Statutory Actuary allowed to be an employee of the insurer for whom he/she signs off as Statutory Actuary?

3.1.1 If so, is the Statutory Actuary allowed to hold any shares or share options in either the insurer directly or any other related party (e.g. holding company, subsidiary, etc.)

3.1.2 If so, when is the size of the shares or share options deemed to be material/significant, such as to cause a possible conflict of interest?

3.2 Is the Statutory Actuary allowed to fulfil another senior role in the insurer, e.g. Chief Financial Officer, Chief Executive Officer, etc?

3.2.1 If yes, are there certain roles that a Statutory Actuary is not allowed to fulfil?

3.3 Is the Statutory Actuary allowed to be a director of the insurer or any of the related parties in the same group?

3.4 Are there any other limitations regarding the relationship of the Statutory Actuary with the insurer?

4. Reporting Structure

4.1 Who does the Statutory Actuary report to?

4.2 What is the relationship between the Statutory Actuary and the Board of the company for which s/he is doing work? More particularly, is s/he expected to attend Board meetings, allowed to attend Board meetings, entitled to see minutes and other documents from Board meetings, etc?

4.3 Is there a difference in treatment between an in-house actuary and a consulting actuary in terms of reporting structure? For example, if an external consulting actuary is appointed as a Statutory Actuary, to whom would s/he be accountable within the insurer? What access would s/he have to the Board, attendance at Board meetings, minutes of Board meetings, etc?

4.4 Are other mandatory governance structures required by law, e.g. an Actuarial Board Committee in addition to the Audit Committee?

5. Peer Review

5.1 Is there any mandatory peer review of the Statutory Actuary's work? If so, please give brief details regarding the requirements of the peer review (e.g. frequency, scope, etc.)

5.2 Is there any guidance provided around the scope and conduct of voluntary non-mandatory peer review of the Statutory Actuary's work? If so, please give brief details regarding the requirements of the peer review (e.g. frequency, scope, etc.)

5.3 What is the scope of the audit requirements in your jurisdiction with respect to the actuarial valuation? What is the nature of the sign-off provided by the auditors with respect to the actuarial valuation and the results of the valuation?

6. Conflict resolution

6.1 What process would be recommended to be followed, should the Statutory Actuary find him/herself in a conflict (whether s/he is an employee or an independent consultant), relating to any of the following (*inter alia)* :

6.1.1 Setting actuarial assumptions for a valuation.

6.1.2 Disagreements with the Board of Directors or Board Actuarial Committee which relate to matters under his / her ambit.

7. Other

7.1 Is there any other information regarding statutory actuaries in your jurisdiction that you feel might be of value to us?

APPENDIX E
SUMMARY RESULTS OF APPROACH TO STATUTORY ACTUARIES

Country	Australia	Canada	Netherlands	Singapore	South Africa	UK	USA
	Information from questionnaire or supplementary information						
Supervisory authority	APRA	OSFI	DNB	MAS	FSB	FSA	NAIC
Legislation	Life Insurance Act, 1995	Uniform Life Insurance Act, 1925	Financial Supervision Act and EU Directives	The insurance Act, 1966	LTIA	Financial Services and Markets Act, 2000	Federal and state regulation
Professional body	Institute of Actuaries Australia	Canadian Institute of Actuaries	Dutch Actuarial Association	Singapore Actuarial Society	Actuarial Society of South Africa	Faculty of Actuaries and Institute of Actuaries	American Academy of Actuaries and the Society of Actuaries
Is guidance provided?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Term for 'statutory actuary'	Appointed Actuary	Appointed Actuary	Certifying Actuary	Appointed Actuary	Statutory Actuary	Actuarial Function Holder(s)	Appointed Actuary
Appointed term of 'statutory actuary'	No specific term	No specific term	No specific term	No specific term	No specific term	No specific term	No specific term

Item	Who is responsible?						
Valuation assumptions	Appointed Actuary	Appointed Actuary	Board of Directors	Appointed Actuary	Statutory Actuary	Board of directors	Based on rules set by NAIC
Valuation result of liabilities	Appointed Actuary	Appointed Actuary	Board of Directors	Appointed Actuary	Statutory Actuary	Actuarial Function Holder(s)	Board of Directors
Premium adequacy	Appointed Actuary	Appointed Actuary	Board of Directors	Appointed Actuary	Statutory Actuary	Board of Directors	Board of Directors
Reinsurance	Board of Directors	Appointed Actuary	Board of Directors	Board of Directors	Board of Directors	Board of Directors	Board of Directors
With-profits discretion	Appointed Actuary	Appointed Actuary	Board of Directors	Appointed Actuary	Statutory Actuary	With-profits Actuary	Board of Directors
Risk management	Board of Directors	Board of Directors	Board of Directors	Board of Directors	Board of Directors	Board of Directors	Board of Directors

Country	Australia	Canada	Netherlands	Singapore	South Africa	UK	USA

	Information from questionnaire or supplementary information						
Who does the responsible actuary report to?	Board of Directors	Board of Directors	Board of Directors and DNB	Public Officer	Board of Directors	Board of Directors	Board of Directors
Is a written report of the financial position required to the board of directors required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Does the responsible actuary have a 'whistle blowing duty' to the regulator?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Position	**Is the responsible actuary allowed to be in the position?**						
Shareholder	Yes	Yes	No	Yes	Yes	Yes	Yes
CEO	No	No	No	No	No	No	Yes
Director	No	Yes	No	Yes	Yes	Yes	Yes
Employee	Yes	Yes	No	Yes	Yes	Yes	Yes

Review	**The work of the statutory actuary**						
Is peer review a requirement?	No	Yes	No	No	No	No	No
Does peer review guidance exist?	Yes	Yes	No	No	No	Yes	No
Is an audit review required?	Yes	Yes	Yes	No	No	Yes	Yes

Conflict resolution							
What is the regulatory required action for unresolved conflict?	Notify regulator	Notify regulator	None	None	Notify regulator	Notify regulator	Notify regulator
Does regulatory or professional guidance exist?	Yes	Yes	No	Yes	Yes	Yes	Yes

Acronyms

APRA	–	Australian Prudential Regulation Authority
OSFI	–	Office of the Superintendent of Financial Institutions
DNB	–	*De Nederlandsche Bank*
MAS	–	Monetary Authority of Singapore
FSB	–	Financial Services Board
FSA	–	Financial Services Authority
NAIC	–	National Association of Insurance Commissioner

SUMMARY OF ACRONYMS

ACRONYM	TERM
AAA	American Academy of Actuaries
ABI	Association of British Insurers
ANAV	Adjusted Net Asset Value
APB	Accounting Practices Board
ASISA	Association for Savings and Investment SA
BN	Board Notice
BSCR	Basic Solvency Capital Requirement
CAR	Capital Adequacy Requirement
CAT	Fair Charges, Access and Terms
CEA	*Comité Européen des Assurances*
CEIOPS	The Committee of European Insurance and Occupational Pensions Supervisors
CEISS	Conference of European Insurance Supervisory Services
CIR	Cox-Ingersoll-Ross
CISA	Conference of the Insurance Supervisory Authorities of the European Union Countries
COCAA	Cost-of-capital-adjustment Approach
CPD	Continuous Professional Development
CRO	Companies Registration Office
CRVM	Commissioners Reserve Valuation Method
DNB	*De Nederlansche Bank*
EC	European Commission
EEA	European Economic Area
EIOPA	European Insurance and Occupational Pensions Authority
ES	Expected Shortfall
EU	European Union
EVCC	Embedded-value CAR Cover
FOPI	Federal Office of Private Insurance
FSA	Financial Services Authority
FSB	Financial Services Board
FSC	Financial Sector Charter
FSMA	Financial Services and Markets Act, 2000
FSV	Financial Soundness Valuation
FTK	*Financieel Toetsingskader*
GAAP	Statements of General Accepted Accounting Practices
GF	Guaranteed Fund
GRAP	General Recommended Accounting Practices
IAA	International Actuarial Association
IAIS	International Association of Insurance Supervisors
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IASC	International Accounting Standards Committee
ICA	Individual Capital Assessment

IFRS	International Financial Reporting Standards
IOCAR	Intermediate Ordinary Capital Adequacy Requirement
IRDA	Insurance Regulatory and Development Authority
ISA	Insurance Supervisory Act, 2004
JSE	JSE Securities Exchange
LOA	Life Offices Association
LTIA	Long Term Insurance Act, 1998
MCAR	Minimum Capital Adequacy Requirement
MCR	Minimum Capital Requirement
MVM	Market-value Margin
NAIC	National Association of Insurance Commissioners
NCA	National Credit Act, 2005
NCR	National Credit Regulator
Nedlac	National Economic Development and Labour Council
OCAR	Ordinary Capital Adequacy Requirement
OECD	Organisation for Economic Co-operation and Development
PGNs	Professional Guidance Notes
PPFM	Principles and Practices of Financial Management
PPR	Policyholder Protection Rules
PSG	IAIS Principles, Standards and Guidance
PVK	*Pensioen- & Verzekeringskamer*
RC	Risk-bearing Capital
RBC	Risk-based Capital
RSM	Required Solvency Margin
SAICA	South African Institute of Chartered Accountants
SAM	Solvency Assessment and Management
SCR	Solvency Capital Requirement
SENS	Security Exchange News Service
SM	Solvency Margin
SOI	Statement of Intent
SST	Swiss Solvency Test
SVM	Statutory Valuation Method
TC	Target Capital
TCAR	Termination Capital Adequacy Requirement
UK	United Kingdom of Great Britain and Northern Ireland
USA	United States of America