
On Solvency, Solvency Assessments and Actuarial Issues

An IAIS Issues Paper (Final Version)

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0. Introductory comments

1. In the present paper various aspects to be taken into consideration when establishing a system for solvency requirements and solvency assessments are discussed in some detail.
2. The background for the paper is given in chapter 1, while chapter 2 gives an overview of the main objectives and goals of the paper. Some of the topics not covered by the paper are listed in chapter 3. Chapters 4, 5 and 6 describe the theoretical basis of the regulations and other supervisory measures concerning solvency and solvency assessment. The basic definitions and common features of solvency regulations are given in chapter 4. The various aspects of risk classification and risk control are described in chapter 5, while chapter 6 gives an outline of the basic principles for solvency regulations as well as a classification (and comparison) of the applied methods. Chapters 7 and 8 comment briefly on accounting and valuations issues and actuarial issues, respectively.
3. A brief overview of the solvency regulations presently being applied in jurisdictions or groups of jurisdictions with a long tradition for regulating the insurance industry is given in chapter 9.
4. Finally, the purpose of chapters 10 and 11 is to describe some general principles regarding solvency assessments and to indicate some alternatives regarding the further work in this area, respectively.
5. A glossary of solvency and solvency-related terms is given in annex 1, while annex 2 gives some information regarding the IASC Insurance Project.

1. Background

1. At the 4th Annual Conference in September 1997 the IAIS adopted the paper “Insurance Supervisory Principles”. The paper describes some general principles that identify subject areas that should be addressed in the legislation or the regulations laid down by the insurance supervisors or other competent bodies in each jurisdiction, and that provide a framework for more detailed international standards.
2. The IAIS paper on insurance supervisory principles has devoted a separate chapter to “Prudential Rules”, where the first paragraph reads as follows:

Insurance companies, by the very nature of their business, are exposed to risk. Insurance companies should meet prudential standards established to limit or manage the amount of risk that they retain.

The chapter on prudential rules is subdivided into five sections covering Assets, Liabilities, Capital Adequacy and Solvency, Derivatives and “Off-Balance Sheet” Items as well as Reinsurance. As to the section on Capital Adequacy and Solvency, the standard on insurance supervisory principles points out that

[t]he requirements regarding the capital to be maintained by companies which are licensed or seek a license in the jurisdiction, should be clearly defined and address minimum levels of capital or the levels of deposits that should be maintained. Capital adequacy requirements should reflect the size, complexity, and business risks of the company in the jurisdiction.

3. The purpose of the present paper is to discuss within a broader context the general principles on capital adequacy and solvency as laid down by insurance supervisory principles. The readers' attention will be drawn to aspects relevant for standards on technical provisions and reinsurance, on matching of assets and liabilities, and on assessing and covering various kinds of investment risks.

4. It is presupposed that the principles discussed in the present paper are relevant for evaluating the solvency of life insurance undertakings, non-life (or general) insurance undertakings as well as reinsurance undertakings. Whether the principles will be directly applied with respect to reinsurers may, however, depend on the degree of regulation of the reinsurance industry within the jurisdiction in question.

5. The present paper is a so-called "issues paper". Accordingly, the IAIS Technical Committee, the parent committee of the Solvency Sub-Committee, is to decide how and when to proceed from the issues paper toward specific supervisory standards on solvency.

2. Objectives/goals

2.1 The importance of solvency

1. The IAIS recognises that an effective system of insurance supervision will imply clear responsibilities and objectives for each insurance supervisor. It is important to ensure improved supervision of the insurance industry on a domestic as well as on an international level.

2. The implementation of solvency requirements – either as specific minimum requirements regarding solvency or as more general solvency standards – as well as methods for the prudent assessment of solvency which the insurance undertakings are required to follow, are critical within this context.

3. Moreover, it is of utmost importance that the insurance supervisors themselves apply appropriate and reliable methods in their evaluation of the solvency or overall solidity of insurance undertakings. This is especially important when analysing the various kinds of risks to which an insurance undertaking is exposed and the overall impact of such risks on an undertaking's financial strength.

2.2 Specific objectives for the present paper

4. As stated above, the present paper is seen as a so-called “issues paper”, from which to proceed in the direction of specific supervisory standards on solvency. The challenge of the entire project, and thus also the challenge of this particular issues paper, will be to strike a balance between the need for a general and flexible standard and the need for more detailed specific standards. When setting up a particular solvency system, certain factors within the context of the individual jurisdiction must be taken into account. A general standard does not necessarily need to state how these factors should be taken into account or how to implement a system in detail. Thus general standards should not prescribe specific methods regarding implementation.

5. The variety of supervisory cultures around the world must be considered. These cultures may have very different approaches to the various supervisory tasks – including solvency issues.

6. Finally, the standards under discussion should focus on supervisory issues related to solvency, and they should reflect both risk prevention measures and capital requirements. Solvency should be defined within a broad context, making the standards on solvency assessment an efficient tool for insurance supervisors worldwide.

7. From this perspective, the present issues paper provides guidance to insurance supervisors as to

- the classification of the various kinds of risks to which an insurance undertaking is exposed,
- the classification of the solvency measures which should be applied to cover or meet these risks, and
- the principles or methods which may be applied to assess the financial strength or the actual solvency of insurance undertakings.

The last point which comprises an overall assessment of the undertaking’s solvency, also includes assessments or evaluations of the impact on solvency of the various kinds of risks which are not covered by – or insufficiently covered by – specific solvency or capital requirements.

8. The various measures (requirements, standards etc.) discussed in the present paper will not necessarily be mandatory, nor do they pretend to be all-inclusive. The purpose is to bring to the attention of supervisors some key measures available as to the stipulation of solvency requirements as well as to the assessment of the overall solvency of insurance undertakings.

3. Topics not covered by the present paper

1. The present paper is devoted to solvency requirements and the solvency assessment of insurance undertakings, as separate legal entities, regardless of whether or not these undertakings are a part of an insurance group or a financial conglomerate. Thus, the question of

solvency requirements and solvency assessment of insurance groups and financial conglomerates as such is not covered by the paper. With respect to “solvency” of financial conglomerates, reference should be made to the Capital Adequacy paper written by the Joint Forum.

2. Another area not covered by the present paper, includes certain non-technical risks to which insurance undertakings are exposed. As understood here non-technical risks encompass all kinds of risks not included in the categories of technical risks or investment risks as described in chapter 5 of the present paper. Insurance supervisors must also be concerned about the following kinds of risks, although the list should not be seen as exhaustive:

- management risk, e.g. the risk associated with an incompetent management or a management with criminal intentions,
- risks connected with guarantees in favour of third parties, i.e. the potential strain on the economic capacity of an insurance undertaking caused by a call on a guarantee furnished for the purpose of the financial commitments of a third party, and
- general business risk, i.e. unexpected changes to the legal conditions to which insurance undertakings are subject, changes in the economic and social environment, as well as changes in business profile and the general business cycle.

4. Solvency rules – Basic terms and common features

4.1 Background

1. Solvency rules are a key element in the supervision of insurance companies. In jurisdictions with fully developed markets, very detailed and often complex rules can be found which provide supervisors with the means to assess the financial health of insurance companies on a regular basis.

2. Sometimes, these rules differ significantly, which is one reason why, among English-speaking countries, different terms have developed that denote the same object (synonyms), terms which in other countries may be unknown or not identified as synonyms. As the IAIS develops standards on the capital requirements applicable to insurance companies, important terms should be defined and synonyms should be identified so as to create a common basis of understanding. In order to meet this need, a glossary of solvency and solvency-related terms is attached as annex 1.

3. This chapter is restricted to the introduction of some basic terms and common features in connection with solvency rules.

4.2 Basic definitions

4. Supervisors usually agree on the following very broad definition of solvency or financial health:

An insurance company is solvent if it is able to fulfil its obligations under all contracts at any time (or at least under most circumstances).

Even if this definition were unanimously agreed on, for the purpose of solvency assessment, it needs to be more formalised to make it operational.

5. Due to the very nature of the insurance business, it is not possible to guarantee solvency as defined above with certainty. In order to come to a practicable definition, it is necessary to make clear under which circumstances the appropriateness of the assets to cover claims is considered, e.g. is only written business (**run-off** basis, **break-up** basis) to be considered, or also future new business (**going-concern** basis), and if so, which will be the volume and the nature of this business, which time horizon is to be adopted, and what is an acceptable degree of probability of becoming insolvent.

6. However, a person looking at an insurance company from outside needs to find a quantifiable measure to assess its financial health. The most common assessment basis is the annual accounts an insurer has to present to the public, i.e. the set of statutory accounts to be established in accordance with accounting regulations, or a well-known and accepted accounting practice. Within such a framework, we can compute the amount of assets and the amount of liabilities and may consequently define the difference of these amounts.

7. Accordingly, it seems reasonable to introduce a more technical definition of an insurer's solvency margin, e.g. as follows:

*The **solvency margin** (surplus capital) of an insurance company is the surplus of assets over liabilities, both evaluated in accordance with regulations of public accounting or special supervisory rules).*

In this context it should, however, be stressed that an insurance company's solvency (or solvency position) is not fully determined by its solvency margin alone. In general, an insurer's solvency relies on at least the following three pillars:

- (i) a prudent evaluation of the technical provisions,
- (ii) the investment of assets corresponding to these technical provisions in accordance with quantitative/qualitative rules,
- (iii) the existence of an adequate solvency margin.

4.3 Common features of solvency regulations

8. **Solvency requirements** all over the world seem to have some common features. They require the insurer to maintain sufficient assets to meet obligations under most circumstances, i.e. they require a certain minimum amount of surplus of assets over liabilities. At given time intervals, the company has to prove that its **available solvency margin** i.e. the amount of capital elements which are considered as free capital for regulatory purposes, exceeds the **required minimum margin**. Thus, the regulatory system provides one or more *control levels*.

9. A **control level** or trigger point represents an amount requiring the intervention of the supervisor or imposing certain restrictions on the insurer if its *available solvency margin* falls short of this amount. The **solvency test** showing compliance with the domestic *solvency requirements* at a certain point in time (e.g. at the balance sheet date), may follow a static approach, i.e. by comparing amounts generated as ratios of balance sheet figures, or by

following a dynamic approach, i.e. an actuarial test based on certain assumptions as to the risk parameters of the existing and potential future portfolio.

10. The *control level* should ideally be set sufficiently high to allow intervention at an early enough stage in a company's difficulties for there to be a realistic prospect that this action might rectify the situation. It should certainly be high enough to ensure that if a company's failure is inevitable, it can be managed with a minimum of loss to policyholders. In other words, the *control level* should ensure with a very high probability that the insurer is able to meet its obligation over a certain period of time or sets the expected policyholder deficit to an acceptable low level. However, the views as to which level is acceptable may differ from jurisdiction to jurisdiction

11. Though there are common basic ideas behind the concepts of an insurer's solvency margin, the solvency regulations established in practice show the variety of ways in which minimum requirements can be imposed on insurance companies (see chapter 9).

12. All the assumptions which are basic for the solvency models depend on the economic, political and cultural environment in which the company is operating. Such assumptions implicitly reflect the answers to some or all of the following questions:

- Does a society attach greater importance to the integrity of an insurer's promise or does it leave more room for competitive and at the same time riskier behaviour?
- How does a society weigh the benefits against the risks of an insurance contract?
- How is the marginal benefit to consumers of increasing the minimum capital requirements weighed against the marginal cost of capital to the insurer?
- What might be the acceptable costs of solvency assessment? Are the much higher compliance costs of advanced scenario testing procedures outweighed by the probably more risk-adjusted results?
- Should an insurer be kept solvent at any rate?
- May we accept a high level of bankruptcy in favour of greater competition and provide a certain level of compensation by a guarantee fund?

13. These cultural differences in the attitude towards insurance contracts may present an obstacle to globally harmonised solvency regulations.

14. On the other hand, we find quite substantial differences in the legal environment which is the basis for solvency assessment (see chapter 9). Accounting rules originating in the general concept of commercial law differ much from country to country. Solvency regulations are not necessarily transferable to and applicable within another jurisdiction, especially if this jurisdiction uses different valuation bases for an insurer's balance sheet items. For valuation issues, we refer to chapter 7.

5. Risks and risk control

5.1 Preliminary remarks

1. The solvency margin should be considered the last resort after all other measures taken by the company to secure its financial stability have failed. To keep a solvent position in the broad meaning of the term, i.e. to enable a company to stay financially healthy in the long run, an insurance company needs to take account of the risks to which it is exposed and which may threaten its financial standing. What are these risks, and how can they be limited and controlled?

2. In this chapter, these risks are, first of all, classified according to their immediate impact on the solvency of an insurer. Secondly, preventive measures available to the company itself, and the extent to which these preventive measures may be supported or even required by a regulatory framework, will be examined. Thirdly, some features of reinsurance are highlighted from a direct insurer's viewpoint.

3. If an insurer is part of a financial group, its overall risk exposure depends to a large extent on intra-group relations (e.g. participations and other financial transactions) which may lead to dangerous risk concentrations. However, solvency on a group level is not an issue dealt with in this paper.

5.2 A classification of risks

4. The classification described and explained in the following is not the only one possible. It is not always possible to avoid overlaps among risk definitions, and individual risks are not independent of each other since certain parameters influence each other and may intensify each other's effects.

5. The various kinds of risk to which an insurer is exposed can be classified according to the following three broad categories:

- technical risks (liability risks), i.e. various kinds of risk which are directly or indirectly associated with the technical or actuarial bases of calculation for premiums and technical provisions in both life and non-life insurance, as well as risks associated with operating expenses and excessive or uncoordinated growth,
- investment risks (asset risks), i.e. various kinds of risk which are directly or indirectly associated with the insurers' asset management, and
- non-technical risks, i.e. is various kinds of risk which cannot in any suitable manner be classified as either technical risks or investment risks.

6. For reasons mentioned in Chapter 3 above, non-technical risks are not dealt with in this paper. The various elements comprising the technical risks and the investment risks are described in the following paragraphs.

5.2.1 Technical risks

7. Technical risks result directly from the type of insurance business transacted. They differ depending on the class of insurance. Technical risks exist partly due to factors outside the company's area of business activities, and the company often may have little influence over these factors. The effect of such risks – if they materialise – is that the company may no longer be able to fully meet the guaranteed obligations using the funds established for this purpose, because either the claims frequency, the claims amounts, or the expenses for administration and settlement are higher than expected.

8. When considering the technical risks, it may be worthwhile to distinguish between “current risks” and “special risks”. Current risks consist of the following elements:

- risk of insufficient tariffs or miscalculations leading to premiums that are too low to cover the insurer's expenses related to claims, claims handling and administration,
- deviation risk, i.e. the risk emerging when the actual development of claims frequencies, mortality, interest rates, inflation etc. does not correspond to the bases of premium calculations,
- risk of error, i.e. the risk depending on the quality of the basis of computation and arising due to the lack of knowledge about the development of the expected insured risk,
- evaluation risk, i.e. the risk of technical provisions being insufficient to meet the liabilities of the insurer,
- reinsurance risk, i.e. the risk of insufficient reinsurance covers or a failure of reinsurers to pay their part of the overall liabilities (or incurred claims) evaluated on a gross basis,
- operating expenses risk, i.e. the risk of actual or future expenses exceeding – to a considerable degree – the corresponding amount as estimated by using the bases of calculation, and
- risks associated with major or catastrophic losses or accumulation of losses caused by a single event.

9. As to the special risks, they can be considered to consist of the following:

- risk of excessive or uncoordinated growth, leading to a rapidly increasing claims ratio or an aggravated expenses ratio, and
- liquidation risk, meaning that an insurer's funds are not sufficient to meet all liabilities in cases of discontinuation or run-off of major parts or the whole business (previously written by the company).

10. Technical risks do not include matters willfully caused by management: The risk, for instance, arising if premiums are charged which have consciously been calculated too low in order to take market shares from competitors. This is a management risk and part of non-technical risks that are not dealt with in this paper.

5.2.2 Investment risks

11. Investment risks concern the performance, returns, liquidity and structure of an insurer's investments. Such risks can have a substantial impact on the asset side of the balance sheet and the company's overall liquidity, and potentially can lead to the company being over-indebted or insolvent.

12. The investment risks may be classified as follows:

- depreciation risk, i.e. the risk associated with a depreciation of the value of investments due to various changes in the capital markets, to changes in exchange rates or to the non-payment by the debtors of the insurer (e.g. the credit and market risks),
- liquidity risk, i.e. the risk emerging when the insurer fails to make investments (assets) liquid in a proper manner as its financial obligations fall due,
- matching risk, i.e. the risk emerging when the future cash flows generated by assets do not coincide with (or do not cover) the cash flow demands of the corresponding liabilities in a suitable manner,
- interest rate risk, i.e. the risk associated with falling prices of fixed-interest securities due to an increase in market interest rates as well as the reinvestment risk related to falling market interest rates,
- evaluation risk, i.e. the risk that investments are being evaluated at a disproportionately high price,
- participation risk, i.e. the risk related to the holding of an ownership or a financial interest in other companies and the possibilities of being affected by financial difficulties within the latter companies, and
- risks related to the use of financial derivative instruments and especially the credit, market and liquidity risks associated with those instruments.

5.3 Risk control and risk prevention methods (risk mitigation)

13. Firstly, there are external factors that shape a company's solvency profile. These include macroeconomic factors, natural and environmental factors, and political and social factors, all of which influence risk exposure. Most important, of course, are the company's business strategy and its management decisions. The regulatory framework within which management must operate, imposes limits on business policy.

14. For the long-term financial health of a company, appropriate measures to analyse, control and – as far as suitable – limit the risk exposure are crucial. Such measures normally include measures taken within the company and regulations imposed on the insurer by law or special action of the supervisor.

15. The risk prevention methods or risk mitigation should consider the importance of certain kinds of risk depending on an insurer's size and kind of business (i.e. the investment risk is more important for life than for non-life insurance).

5.3.1 Company measures (measures available to the company)

Business strategy – Technical risks

16. The overall economic function of insurers is to assume risks an individual or a company is not able to bear, bundle these risks and reduce volatility by combining (similar) risks.

17. Statistics show that, at least theoretically and when certain basic conditions are present, the more homogeneous and larger the portfolio, the better the technical risks combined in a portfolio can be predicted and thus calculated.

18. Realisation of such risks may be triggered by factors found on a macroeconomic or political–social level, such as insufficient experience on new markets (e.g. caused by lack of statistics), technical progress, inflation, environmental conditions, change of consumer behaviour (claims awareness) or demographic changes. However, the management’s business strategy determines considerably the extent to which the company exposes itself to particular risks.

19. Management strategies can directly influence and limit exposure to technical risks by using preventive measures in the following areas:

- tariffication, e.g. prudent calculation of premiums, premium adjustment clauses, surcharges for increased risks, premium rebates as an incentive to avoid losses),
- policy conditions, e.g. exclusion of risks or termination of loss–prone contracts by insurers,
- underwriting policy, e.g. target groups, diversification of risks in a single contract, spreading of risks,
- supporting the insured to prevent losses, e.g. industrial risks, and
- reinsurance, e.g. fixed–sum, excess–of–loss or stop-loss contracts.

20. The most important instrument of risk prevention or risk mitigation regarding foreseeable obligations under contracts in–force is an adequate allocation of the provisions. Furthermore, it might be suitable to establish equalisation provisions for volatile risks.

21. It is not always possible to avoid some technical risks such as the risk of error or deviation risk (as becomes obvious from its definition). Some technical risks can only be avoided at the price of not carrying on certain types of business (e.g. new risks for which sufficient statistical data are not available, or long–term life–insurance contracts which may be subject to a reverse tendency in mortality). Also catastrophe or major losses risk is not generally avoidable. The most important means of risk prevention or risk mitigation in these cases are a quantitative limitation by taking out adequate reinsurance (see below).

Business strategy – Investment risks

22. Investment risks are also to a great extent attributable to macroeconomic, social or political factors which influence interest rates, stock exchange quotations and currency exchange rates, or simply the intransparency of markets or unforeseeable governmental decisions. But

again, the management of an insurer can limit exposure to these risks by the taking of appropriate measures, e.g. prudent evaluation, spreading and diversifying of assets, and a proper asset–liability matching. For this purpose, derivative instruments may also be used.

23. The standard on asset management, including procedures for asset–liability matching, is being developed by the IAIS Investment Sub–Committee and will not be dealt with further in this paper. As to derivatives, reference is made to the respective IAIS standard adopted in December 1998.

Risk management systems

24. Another important factor is the risk management of a company. If efficient control systems are in place to monitor risk exposures, a company will be able to adapt more quickly to a changing market situation, i.e. it faces a lower probability of ruin in a given time horizon dependant on its risk management system. To be aware of a company’s risks, management should also control the profitability of the individual lines of business on an on–going basis. Actuaries can play a dominant role in this context.

25. An efficient risk management system should ensure that both existing and future (i.e. potential) risks are identified and measured as completely as possible. The system should rely on comprehensive data bases to indicate any risks jeopardising the insurer’s existence as early as possible (Early Warning System). Causes of risks should be analysed and their scope assessed. The insurer should establish internal policies on how to manage risks which are identified, analysed and measured.

26. Risk management systems should be in line with an insurer’s business strategy because the degree to which a company’s activities are exposed to risks is largely determined by the strategy chosen. Consequently, the actual risk situation should be reassessed at regular intervals and compared to existing risk strategy so that appropriate revisions can be made.

27. A risk management system may be supplemented by a monitoring system comprising organisational safety measures, internal controls as well as comprehensive checks (especially the internal audit) in order to assess, and if necessary adjust, the effectiveness of measures of the risk management system.

28. Effective management reporting and control systems support internal management decision making within an insurance company. Such systems should be seen as an integral component of a company’s overall risk management strategy in that they foster a company’s identification, analysis and measurement of risk.

29. Controlling comprises the target–oriented co–ordination of planning, information supply, monitoring and testing (“square of activities”). It aims at establishing and maintaining the insurer’s ability to react, adapt and co–ordinate. Risk controlling, in this framework, may include, inter alia, the following functions:

- supporting the insurer’s management by providing it with information relevant to decisions about existing and potential risks,

- supporting the management in risk-related planning, and in controlling and monitoring risks,
- allocating responsibilities,
- fixing risk limits,
- fixing a maximum ruin probability, and
- risk reporting.

5.3.2 Regulatory framework

30. As to the important issue of preventing or reducing various risks, insurers are not left to their own devices. To put it modestly and positively: The regulatory framework and the control when these provisions are adhered to have a central support function.

31. One of the primary aims of insurance supervision is to ensure that an insurer is able at any time to fulfil all its obligations towards the insured. Consequently, preventive measures mentioned earlier cannot in many cases simply be left to the discretion of an insurer's management, because they are required by supervisory regulations either in a general or in a detailed, specific format. Of course, there are differences between the supervisory systems as to which areas are covered by detailed regulations, which ones are covered by merely general guidelines, and which are not covered at all. However, many countries have regulations in place to reduce the above mentioned risks.

32. In regard to technical risks, general prudential principles are usually established by law, and these have to be met when the company determines the amount of the technical provisions. Supervisors may also require premiums for new business to be sufficient, on reasonable actuarial assumptions, to enable assurance companies to meet all their commitments, and, in particular, to establish adequate technical provisions. Supervisors may be entitled to prescribe statistical bases of premiums, have the right of prior approval of rates for certain lines of business, or may limit retention in proportion to the volume of business or the available solvency.

33. As to investment risks, requirements regarding the admissible types of assets covering the technical provisions, as well as diversification and spreading of these assets may be laid down in supervisory regulations. Furthermore, provisions as regards the use of derivatives may be in place. Again, reference is made to the ongoing work of the IAIS Investments Sub-Committee and the above mentioned IAIS standard on derivatives, cf. paragraph 23.

34. As management errors, criminal behaviour of directors or shareholders' inappropriate intervention vis-à-vis the management by their nature cannot be compensated by solvency requirements, one of the most important components of the regulatory framework is to have a continuous oversight of the probity and competence of the top management and the shareholders (fit and proper issues). However, this is dealt with in other IAIS papers (e.g. the licensing standard).

35. It is useful to promote the establishment and development of internal risk-based monitoring for insurers. This can help insurers recognise tendencies jeopardising their existence early and thus enable them to assess their current and future solvency. Internal risk-based

monitoring can support insurance supervisors in their most important duty, which is to ensure that obligations under insurance contracts can be met at any time. The supervisor should check the effectiveness of an insurer's systems of internal risk-based monitoring.

5.3.3 Reinsurance

36. An insurer's reinsurance cover deserves special attention because of the varying impact on the company's financial health.

37. On the one hand (see paragraph 19 above), reinsurance cover is an inevitable tool for the insurer to reduce its risk exposure as regards certain features of its technical risks. On the other hand, reinsurance cessions might be a burden to the solvency of the cedent as two kinds of risk remain inherent:

- The reinsurance cover might prove insufficient to adequately handle the risk in question because reinsurance needs have not been precisely identified. This might result in relevant clauses of the reinsurance contract being inappropriate.
- A reinsurer might prove to be unable or unwilling to pay its part of the liabilities or the claims incurred which can put the insurer's liquidity at risk and even cause its bankruptcy.

38. Like other risks dealt with in paragraphs 7 to 12 above, reinsurance risk should be monitored/controlled by both management and supervisors.

39. In order to limit and – as far as possible – prevent the risks mentioned, the directors of the insurer will have to assess properly

- the needs for reinsurance cover according to the various aspects of the risks to be ceded and their appropriate reflection in the features of the reinsurance contract as concluded for each line of business, and
- the reinsurer's security or creditworthiness, i.e. its ability, financially and administratively, to pay legitimate claims and its reliability to do so and to do so promptly.

40. The assessment of a reinsurer's security or creditworthiness by the insurer's directors has become an important issue in international discussions among supervisors. As this issue is being considered by the IAIS Sub-Committee on reinsurance, it is not further dealt with in this paper.

41. In many jurisdictions, supervisors take reinsurance risks into account in different ways, e.g. in the framework of accounting (valuation of receivables, deposit of the reinsurer's part of liabilities), or in the framework of solvency requirements (taking into account only a limited part of ceded business to reduce the required margin or requiring free capital in proportion of reinsurance receivables).

42. Insurance supervisors must be cautious in recognising reinsurance arrangements which are entered into primarily to grant the ceding insurer relief from regulatory requirements, including solvency requirements, while providing for little or no real transfer of risk. For it is the actual transfer of insurance risk from the insurer to a reliable and creditable reinsurer that

enables an insurer to manage its exposure on business written, given the insurer's available solvency margin.

43. Types of risks transferred may vary. For example, there is a transfer of underwriting risk when a real possibility exists that losses and expenses recoverable by the ceding insurer will exceed the consideration received by the reinsurer, thus resulting in an underwriting loss to the reinsurer. Transfer of timing risk is present in a property and casualty transaction when the reinsurer risks a reduction in investment income due to accelerated loss payments if anticipated loss patterns are not borne out in the development of recoverable losses under the reinsurance agreement. For life insurance policies, transfers of morbidity, mortality, or lapse risks should be significant. Credit, disintermediation and reinvestment risks may be significant for annuities.

44. Without a transfer of risk significant to the insurer's insurance business, reinsurance agreements that simply provide favourable effects to the ceding insurer's balance sheet or profit and loss statement may mask the true obligations and risk exposure of the insurer. Such financing arrangements may smooth reported income and reduce volatility in available solvency margin. However, the favourable effects may be minimal, transient and temporary, and cannot be relied upon as evidence of actual or long-term financial strength and solidity. If such financial arrangements are allowed to affect financial statements, their existence should be fully disclosed to prevent uninformed reliance on a potentially misleading or distorted statement of financial condition.

5.3.4 Disclosure of information about risk exposures

45. An insurance company should publicly disclose qualitative and quantitative information about its risk exposures, taking into account a degree of confidentiality needed to preserve the access to proprietary information provided to supervisors. Together with the disclosure of an insurance company's capital position, information about its risk exposure helps illustrate whether an insurance company will be able to remain solvent in times of stress. Transparency regarding the insurance company's risk profile provides information about the stability of an institution's financial position and the sensitivity of its earnings to changes in market conditions. In discussing each risk area, an institution should present sufficient qualitative (e.g. management strategies) and quantitative (e.g. position data) information to help stakeholders in the market understand the nature and magnitude of its risk exposures. In principle, disclosed material information should be checked by qualified independent professionals.

46. The effective disclosure policy encourages an insurance company to take a sound risk management policy and consequently functions as a useful measure for the risk prevention of an insurance company.

6. The purpose of solvency requirements

6.1 The objective of a minimum statutory solvency requirement

1. The structure, size and complexity of the insurance industry make it difficult for consumers, brokers, analysts, competitors and other interested parties to adequately assess the institutional risk of the provider of insurance products and services in relative or absolute terms. A risk assessment of the insurer may be a critical element in the decision to purchase an insurance product or service. The customer is buying a promise of a future benefit and needs assurance that the promise can be fulfilled.

2. The main purpose of the supervision of insurance in general is to ensure that insurers have the capacity to meet their obligations to pay the present and future claims of policyholders. It is also of great value to make information on the financial soundness of insurers known to the insurance market.

3. To reduce the risk of failure for insurers, insurance supervision has the core requirement that insurers should maintain sufficient assets to meet obligations under a wide range of circumstances. Such a requirement is often described as the statutory minimum solvency requirement and may have the following purposes:

- Reduce the likelihood that an insurer will not be able to meet claims as and when they fall due.
- Provide a buffer so that the losses of the policyholders can be limited in the event of the failure of the insurer.
- Provide an early warning for regulatory intervention and early corrective action, taking into account that the supervisor may have access only to incomplete information, and that corrective action may be subject to delays.
- Promote the confidence of the general public in the financial stability of the insurance sector.

4. It is also well understood that a requirement of a statutory minimum solvency should have a dynamic basis or approach. This means that the solvency assessment should have some relevance to the ability of the insurer to continue to be able to sustain new business after the point in time at which the current solvency situation is assessed.

5. The statutory minimum solvency requirement is not designed to completely eliminate the risk of institutional failure and the requirement must in practice be kept within bounds. At some level, the marginal benefit to policyholders and other creditors of increasing the minimum requirement is outweighed by the marginal cost of capital to the insurer. It is often difficult to avoid that such costs are ultimately passed on to policyholders in the form of higher premiums or reduced benefits. From the point of view of efficiency, the minimum statutory solvency requirement should thus, in theory, be set at an equilibrium value in the sense described. Lack of data and suitable models makes this task difficult. There are also differences in legislative and supervisory traditions as regards the attitude to the role of mathematical and statistical models. In practice, the determination of minimum requirements seems to be based

on experience with or without explicit reasoning and modelling based on risk theory. In the latter case, the initial aim may be set as some acceptable level of probability of ruin or level of resilience, but in the end, the final requirement will often be the result of some kind of a muddling-through process, balancing different interests in a less formal manner.

6.2 Types of statutory minimum solvency requirements

6. There is a variety of ways in which statutory minimum solvency requirements can be designed and imposed on insurers; some important ones are outlined below. The approaches can be said to fall into two groups: fixed ratios and risk-based capital on one hand, and tests based on more extensive risk or ruin theoretic modelling of the whole business on the other. In addition and as a complement, there are the more versatile tools of scenario testing and dynamic solvency analysis.

7. Under the fixed ratio model, requirements are pegged to a fixed proportion of some basis or proxy of exposure to risk, often an item from the insurer's balance sheet or profit and loss account. Examples are choices of a percentage of premiums written or a quota of the outstanding claims provisions. In practice, the corresponding proportions or ratios involve some degree of arbitrariness, a single ratio often being used for a wide range of activities and having been determined on the basis of general data.

8. A fixed ratio of premiums is a natural point of departure in non-life insurance. Written premiums are an acceptable proxy for the exposure to risk, especially for types of insurance that have rather quick settlement of claims. Such a ratio is part of the solvency requirements of the European Union and Australia. The ratio applied may reflect the overall volatility of risks, but may also be more fine-tuned and may be differentiated between different classes of business. The ratio may also be lowered for premium volumes exceeding some threshold value, e.g. in the European Union, taking into account that the relative risk in a large portfolio of independent risks is lower than in a smaller portfolio.

9. A fixed ratio of the provisions for outstanding claims is natural in non-life insurance for measuring reserving risk, especially for types of insurance with a slow ratio of settlement of claims. This is used in Australia. The European Union rules use a fixed ratio of the average claims cost, averaged over three years in general, but over seven years for credit, suretyship, storm and hail insurance. The larger of such a ratio and the aforementioned ratio of premiums determines the solvency requirement.

10. For life insurance, fixed ratios may be applied to measures of exposure relevant to the risk at hand. The technical provisions for life insurance contracts may be a basis for measuring the exposure to the risk of guaranteeing yields on contracts. For contracts offering benefits at death, the sum at risk, i.e. the sum that the insurer must add to the technical provisions in case of death, is a better base for the exposure to adverse deviations in the mortality assumptions. For the mortality risk of annuities, i.e. the risk of underestimating life expectancies, the technical provisions may be a better exposure measure.

11. The fixed-ratio approach has the benefit of being simple to describe and to calculate. However, from a theoretical point of view, the fixed-ratio approach has some drawbacks, to some extent also shared with the risk-based capital approach:

- A general approach may not adequately respond to different risk profiles of individual insurers, notably in non-life insurance.
- To the extent exposure is based on historical data, there is no explicit dynamic, forward looking basis for the approach.
- A general model may be vulnerable to the choice of exposure basis and respond illogically, e.g. by increasing requirements in response to stronger premiums or safer technical provisions, and decreasing requirements with rebates on premiums or with weaker reserving.

12. In response to the coarseness of the simpler fixed-ratio models, risk-based capital models have been developed. The minimum requirement is then built up from a number of lower level ratios, relating to a refinement of risk elements, e.g. different insurance classes, long-tail risks and risks on the asset side. Exposure bases such as premiums or provisions can be adjusted to some extent for deviations from market standards. In addition, some efforts are usually made to take interaction between the lower level ratios into consideration. Still, the level of detail must strike a balance between what is practicable and what ratios can be assessed with adequate data and models; otherwise this approach will be difficult to implement and its adequacy will be cast in doubt.

13. Risk-based capital is presently a characteristic of solvency practices in Japan and the United States, but refined risk factors are also known e.g. in Canada as regards investments. As mentioned, it is in many ways a refinement of the fixed-ratio approach, using similar exposure measures, such as premiums, technical provisions or asset amounts. A useful aspect of risk-based capital as applied in the United States and Japan, and not in itself depending on the more refined approach to risks, is the integrated system of control levels or trigger points. The idea is to prescribe certain actions or procedures at fixed levels in excess of the 100 per cent level of fulfilment. Such a system of control levels is of course compatible with other solvency practices and is used, at least informally, elsewhere.

14. Under risk or ruin theoretic approaches, the main criterion is to preserve an acceptably low probability of ruin or failure over some time horizon, ranging from a few years to 30 or more. In addition to the approximations that must be made in order to find workable models, some degree of arbitrariness lies in the choice of such probabilities and horizons. Simpler variants of this approach may be implicit in the use of fixed ratios and risk-based capital. Here focus is, however, on a more explicit approach, usually dynamic in the sense that it builds on models for future development under some assumptions, models describing the potential variation or volatility of insurance activities. An important example is the risk theoretical solvency test used in Finland. Within a framework laid down by the supervisory authorities, a company can calculate its solvency requirement. The basis is a model approach reflecting many facets of risks, and in several ways reminiscent of the modelling activities now tried out by many major banks. The modelling process that is required may give deeper insight into the insurance processes, but there may be considerable problems:

- The models used to describe experience may be too general and the underlying processes may be poorly understood, such as business and rating cycles.

- Some aspects may not have a meaningful statistical description or analysis, such as rare events or future changes in market behaviour or legislation.
- Model approximations may be so extensive that the value or relevance of calculated or simulated values may be insufficient.

15. Under the supplementary approach using a scenario survivorship model or dynamic solvency analysis, the insurer is required to test its solvency against a range of adverse conditions in the form of prescribed scenarios. The scenarios may apply to either the existing business or there may be some consideration of new business over a chosen time period. The choice of scenarios and time period where new business is considered, involve a degree of arbitrariness. The approach is clearly dynamic and gives insight into the insurance process, but some drawbacks are:

- It may be difficult to find scenarios that are both predictive for the individual risk profile of an insurer and that can be tested using available data.
- Compliance costs can be high, as testing usually requires substantial computer modelling.

16. Scenarios and dynamic solvency analysis have seen an important development primarily in Canada and the United States, and steps have been taken to give such approaches a formalised framework for supervisory purposes.

6.3 Some general conclusions

17. The approaches to statutory minimum solvency requirements fall into two groups: fixed ratios and risk-based capital on the one hand and tests based on more extensive risk or ruin theoretic modelling of the whole business on the other. The latter approach may be used as a supplement to the former method. A fixed ratio or risk-based capital approach may be seen as a common method for stipulating solvency requirements. Using this approach, the insurer is required to maintain a certain minimum amount of surplus of assets over liabilities. At given time intervals, the company has to prove that its available solvency margin, i.e. the amount of capital elements which are considered as free capital for regulatory purposes, exceeds the required minimum margin. The regulatory system provides one or more control levels (see sub-chapter 4.3).

18. The minimum statutory solvency requirement is one element of a larger conceptual framework involving solvency and financial health in the sense of the ability to fulfil commitments. Seen from the point of view of financial disclosure, the cornerstones of a satisfactory solvency are proper provisions for liabilities and sufficient resources for covering losses. Such resources may include items on the balance sheet, such as capital (equity, reserves), reinsurance ceded, but possibly sources not formally on the balance sheet, such as guarantees or the levy of additional contributions from members of a mutual insurance company. Seen in a wider perspective, solvency is founded on a well-managed business, with proper pricing and balancing of risks and suitable composition of portfolios of insurance contracts and assets. Also investment practices including the use of derivative instruments are usually seen as areas of special importance to solvency.

7. Accounting and solvency

1. There are several points of contact between accounting and solvency. This chapter tries to identify some of the aspects of accounting principles that are important for solvency. It also considers differences in approach between general accounting and solvency principles that need to be taken into consideration.

2. The annual accounts are important for solvency, since items of the annual accounts often serve as yardsticks or exposure measures of the risks to be met by the solvency requirements. In addition, the available capital can often be calculated on the basis of the own or free capital as it is defined by the annual accounts. It follows that it is important to know the underlying accounting principles in order to assess the strength of a given solvency requirement.

3. Like solvency requirements and assessment, accounting has its principles and fundamental approaches. It is true that there is some variation in the approaches to accounting principles, in particular as regards insurance. For undertakings in general, however, the main object of accounting is to give a true and fair view of the profit or loss of the year, and it is implicitly assumed that a sufficiently true and fair view of the financial situation will follow. One special point concerns valuation principles, in particular the time value of money as expressed by discounting, which should be symmetrical with respect to assets and liabilities. In addition, the annual accounts will contain information on important key ratios and review past performance. The annual accounts are expected to be transparent in the sense that sources of profit or loss can be traced and that the points of strength or weakness of the financial position are disclosed.

4. Variants of accounting principles do, as mentioned, occur for insurance. This is one reason for setting up the IASC project on international standards for insurance accounting.¹ Examples of such variant principles are more conservative or prudent approaches to the valuation of assets or liabilities. A prudent view of the balance sheet and the financial situation is often in focus, rather than a fair view of the annual profit or loss. Part of the background is the fact that many jurisdictions use a single set of annual accounts for several purposes: general accounting, taxation and as a basis for supervision and solvency analysis. The prudent approach has then become the leading approach in many cases. In other jurisdictions the different uses of the annual accounts have been found irreconcilable, and have led to separate accounting standards.

5. It has been indicated that solvency may be based on another approach and on a different set of principles than accounting. An indication of such differences of perspective lies in the emphasis that solvency puts on financial health or strength. This makes a clear difference when the planning horizon of the insurance company is long, as it is for long-term business, for lines with a long-tailed process of claims settlement and for highly volatile insurance classes, such as credit insurance or catastrophe cover. In these cases, it may be necessary to view profits and losses over a longer period, which means e.g. that profits are withheld and directed to equalisation provisions or reserves, and that claims at a later date can be covered

¹ Some information on the IASC Insurance Project is given in annex 2.

by these. From the point of general accounting, such smoothing of results is seen as a distortion of the true and fair view.

6. It is thus clear, that an assessment of solvency requirements that are based on items of the annual accounts must take the underlying accounting principles into consideration. If the exposure to risk is measured by the technical provisions or by the value of assets, the corresponding valuation method must be considered. A particular case is the difference between discounted and undiscounted provisions. If the available capital is taken as it occurs on the balance sheet, its size is likewise depending on the valuation method applied to assets and liabilities. In addition, some of the loss-covering resources may occur in disguise under technical provisions as margins or equalisation provisions.

7. One way out of this dilemma is to require additional and more suitable data for the solvency calculation or, as mentioned, require a special purpose statutory account. If an international standard of accounting were agreed upon, it would be necessary to decide on the need for additional information or statutory accounts. In fact, many analysts would need to seek information on the supervisor's solvency assessment and try to find out whether the solvency requirements would restrict the company's use of profits.

8. As a concluding remark it would be suitable to acknowledge a common interest behind general accounting and solvency assessment: disclosure and transparency. But it should also be borne in mind, that the solvency perspective may be longer than that of general accounting and that it depends on essential knowledge of the insurance business.

8. Actuarial issues

1. As already described in some detail in chapter 5 an insurance company is exposed to various kinds of risks and needs to take account of these risks in an appropriate manner. Accordingly, it is important for insurance companies to have access to professional expertise with relevant skills in mathematics, modern statistical models and methods (including risk theory) as well as economics and finance to ensure that these risks are analysed in a proper manner and adequate risk prevention methods are applied.

2. The most important areas related to solvency and solvency assessment of the insurance business where professional expertise as mentioned in paragraph 1 is needed, are the following:

- (a) Analysing of risks and pricing of insurance products.
- (b) Evaluation of the technical liabilities and estimation of necessary technical provisions.
- (c) Recommendations with respect to the risk prevention methods to be applied.
- (d) Evaluations regarding the need for a solvency margin and especially whether the available solvency margin should be higher than the required minimum.
- (e) Solvency assessment in the sense that is described in chapter 10 below.
- (f) Preparation of various kinds of reports to be submitted to the supervisory authority.

In a majority of jurisdictions, actuaries will normally be heavily involved in these areas, and will often have at least some of them as their main responsibility (e.g. (a), (b) and (f) in the list).

3. However, different regulatory traditions ascribe different levels of professional responsibility to the actuary. At one end of the regulatory spectrum is the substantive (or material) control approach whereby products have to be approved by the supervisor. Key judgements on adequacy and viability thus being taken by the regulatory authority, the scope for individual actuarial judgement is limited. In France, e.g., the insurance company actuary may approve the mortality tables used, but plays otherwise a relatively limited supervisory role. Responsibility for the proper pricing of products, establishing prudent technical provisions and exercising sound and prudent overall financial management, rests with the company's chief executive and the Boards of Directors. Direct supervision is exercised through a strong level of on-site inspection carried out by a flying squad of technician supervisors, with accounting and actuarial skills, who not only review the financial statements of their allocated companies, but pay extended visits to the companies to review their systems and controls, approve their technical bases and methodologies and audit a sample of their calculations

4. At the other end of the regulatory spectrum is the UK Appointed Actuary approach. A remarkable aspect of this system is the extent to which the responsibilities of the actuary are spelt out in professional guidance, rather than in legislation or direct requirements of the insurance supervisory authority. Deregulated insurance markets place additional demands on the actuarial profession, leading to effective solutions along the lines of the Appointed Actuary system and its many variants. It seems likely that solutions of this general type will become increasingly widespread, necessitating high levels of actuarial education and professionalism, and requiring the active support and involvement of professional associations of actuaries in each country. The role of the actuary will progress steadily away from historic evaluation of the liabilities to monitoring the adequacy of assets to meet the liabilities on a continuous basis, with a strong forward-looking role report to the Boards of Directors on future financial condition, thus playing a key role in the identification of risk and its successful management.

5. Regardless of regulatory traditions, the role of the actuary, both within the insurance companies and in the position of supervisor, is critical to the maintenance of financially sound insurance companies. Dependant on traditions within the different jurisdictions, however, the term "actuary" in this context does not necessarily relate to membership in certain professional associations, or to certain university degrees. What is essential, is to ensure that the insurance undertakings possess the competence and qualifications required for risk identification and control. Mathematicians and economists with insight in and experience from the insurance business may play this part as well as "actuaries" in the narrow sense of the word.

9. A survey of some solvency practices

9.1 Aim and scope of the survey

1. Although practical solutions may differ, there are several areas that any system of solvency regulation and supervision must address. The aim of this survey is to identify a number of such areas and describe how they are reflected in the solutions chosen in some jurisdictions. It will focus on the following subjects:

- Solvency aspects of accounting and reporting standards
- Solvency or capital requirements
- Definition of resources available for covering losses
- Risk limitations and credit given to reinsurance cover
- Control levels and routines
- Insurance guaranty systems/policyholder protection plans.²
- Role of the actuary

9.2 European Economic Area

2. The European Economic Area (EEA) consists of the 15 European Union (EU) member states (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and United Kingdom.) and, in addition, Iceland, Liechtenstein and Norway. All EEA member states adhere to the EU framework and in particular to the common rules on insurance. Through a political process, directives are adopted by the European Union and are to be implemented into the legislation of each member state. In the preparatory stages and in the on-going revision work, the European Commission, the member states and the supervisory authorities are all involved. At various stages the opinion of the industry associations is sought.

9.2.1 Accounting and reporting standards

3. There is an EU directive on annual accounts and consolidated accounts for insurance undertakings, which has been in force in member countries since 1995–1996. This directive does not mean a full harmonisation of public accounting, but it does fix terminology and structure to a large extent. The directive offers options on many points, notably the choice between historical cost and actual value for assets, on condition that the result of applying the complementary principle is disclosed in a note. There are no common reporting standards, with the exception of some mandatory notes to the annual accounts, mainly specifying premiums, claims and expenses for ten groups of non-life insurance classes and requiring some premium data for life insurance. Public accounts are complemented, however, by annual and more frequent returns to the supervisory authority, as prescribed in the different national legislations.

4. As to technical provisions, most local traditions can be accommodated within the system. This means that some member states with mandatory equalisation provisions count them as part of technical provisions, whereas other will have equalisation reserves counted as reserves and thus part of the resources for covering losses. In non-life insurance, the main practice is to show undiscounted provisions for claims outstanding, but the directive allows member states to permit discounting of such provisions, within a certain framework. In life insurance reference is made to actuarial principles as regards the technical provisions.

² A brief description of the various policyholder protection plans are included in the survey. However, this subject is not evaluated further in the present issues paper. The Sub-Committee realises that the question of whether a protection plan should be established or not is a controversial issue in many jurisdictions.

5. It should be pointed out that many of the member states have a tradition of using basically the same accounting principles for several purposes: taxation, general accounting, and supervision.

6. Most member states have some reporting of reserve development (run-off analysis) in non-life insurance and some have some kind of sensitivity analysis of asset values.

9.2.2 Definition of capital requirement: Required solvency margin

7. The system used in the EEA is a relatively simple solvency system aiming at a certain harmonisation, as a support for a mutual trust in solvency supervision among the member states. One part is the minimum capital requirement, called minimum solvency margin, which uses fractions of some measure of risk exposure. This means that factors are applied to

- premium volumes and average claims costs in non-life insurance, and
- mathematical provisions and sums at risk in life insurance.

8. There may be scale effects, in particular the effect that the volatility in a portfolio of insured risks that can be considered independent or negatively correlated, increases at a slower pace than the average claim when the portfolio grows. This is reflected in the application of lower factors for the part of the exposure that exceeds a certain threshold.³

9. For small volumes the minimum solvency margin as defined above is not sufficient and so is reinforced by a requirement expressed in an absolute amount of Euro, the so-called minimum guarantee fund.

9.2.3 Definition of capital and surplus: The available solvency margin

10. The EU approach to measuring the capital available has some limitations. It was designed when there was not yet any attempts to harmonise annual accounts and even less to harmonise the principles of evaluating items on the balance sheet. Secondly, it was deemed desirable to allow the incorporation of certain off-balance resources for covering losses, with permission of the supervisory authorities.

11. Items that are free of liabilities to policyholders or creditors constitute a measure of the resources available for covering losses. In addition, intangible assets are explicitly excluded. Typical items included in the list of admissible items are share capital (guarantee capital in mutual companies), reserves and balanced profits. Since no reference is made to the valuation principles used, some credit for hidden reserves may be given due to underestimation of asset values, with permission of the supervisory authorities.

³ The so-called premium index uses gross premium income P as a measure of exposure. The factors applied are 0.18 for the part of the portion of premium not exceeding 10 million euro and 0.16 for the excess over that amount, if any. In formulas, this can be written as

$$0.18 \cdot \min(P, 10 \text{ M}) + 0.16 \cdot \max(P - 10 \text{ M}, 0).$$

The corresponding formula for the so-called claims index is

$$0.26 \cdot \min(S, 7 \text{ M}) + 0.23 \cdot (S - 7 \text{ M}, 0),$$

where S is the average claims cost (i.e. claims incurred, in contrast with claims paid) over the last three years.

12. In general, a member state may decide to allow the inclusion of subordinated debt, at least as part of the margin, provided certain restrictions are followed. In non-life mutual companies, part of the margin may correspond to the right to require additional contributions from members of the mutual.

13. In some cases a higher quality is required for items to be counted against the lower control level, the guarantee fund.

9.2.4 Risk limitations and credit given to reinsurance cover

14. The effect of reinsurance may be given credit in calculating the required solvency margin if a member state chooses to do so, but the reduction must not exceed 50 per cent for non-life insurance and 15 per cent for life insurance. Some member states do not give credit for reinsurance at all or only if a corresponding deposit of premiums is made as security for future claims on the reinsurer.

15. There is no common set of rules for limitation of risks insured and there are few examples of explicit limits of self-retention. A general requirement is the existence of an acceptable reinsurance program, and it is assumed that this requires a proper control and management of the risks insured.

16. As an exception, Sweden requires a limitation to be entered in the articles of association of the company. One common set of rules is a self-retention limit of 10 per cent per risk and 20 per cent per event in relation to the capital or loss-covering resources of the company.

9.2.5 Control levels

17. The system of control levels could be described in terms of the required minimum solvency margin and the guarantee fund. The amount of the guarantee fund is defined to be one third of the required solvency margin.

18. If the available solvency margin falls between the two control levels, a plan for the restoration of a sound financial position shall be submitted to the supervisory authority for approval.

19. If the available solvency margin falls below the lower level, a short-term finance scheme shall be submitted to the supervisory authority for approval.

9.2.6 Policyholder protection plans

20. There is no common approach to policyholder protection plans or guarantee funds. The United Kingdom and Norway have a long experience with such plans, whereas most other member states have no or only restricted experience, sometimes limited to certain kinds of compulsory insurance. The subject has, however, attracted more attention recently, e.g. in France, Ireland and the Netherlands, where such plans have been introduced.

21. Policyholder protection plans are usually designed to protect both life and non-life insurance consumers. As a rule, there are limits to the level of protection. Contributions are usually flat rate contributions levied after a company failure.

9.2.7 The role of the actuary

22. There is no common approach to the role of the actuary, but the importance of actuarial methods and practices is implicitly acknowledged in the directives for the insurance area.

23. There is a dividing line between member states as regards the view on a statutory actuary. Some see the actuary as having a special relation with the supervisory authority. Others see all responsibility as resting with the general manager and the Board of Directors, and do not require a separate responsibility for the actuary towards the supervisor. Another difference can be observed concerning the role of the organisations of actuaries. In some member states, such organisations are actively issuing guidelines on the duties of the actuary. Elsewhere, such organisations restrict themselves to ethical principles and continued education. An umbrella organisation for the actuarial societies of the member states, known as Groupe Consultatif, has done much to improve the possibilities of finding a minimum standard for full membership that would be the basis for mutual acknowledgement of actuarial competence.

24. Irrespective of the view on the role of the actuary, member states show a genuine interest in what actuarial methods and practices can achieve in the area of control and management of risk and solvency. This includes approaches such as sensitivity analysis, scenario testing, asset-liability models and other dynamic approaches to solvency.

9.2.8 Developments

25. During the last five years, the EU solvency regulation has been submitted to revision exercises by supervisory authorities in the so-called Müller Group and by the European Commission. Looking back on up to 20 years of experience with solvency rules, the Müller Group could, in agreement with the industry, say that the system had worked reasonably well. In addition, it seemed to be a common experience, that for the failures that have occurred, stricter capital requirements as such would not have reduced the failure risk by much more.

26. The ongoing revision exercise has not yet been finalised, but additional measures of long-tail risks have been on the agenda, as have the question of refined risk classification. Focus in later years has in practice been on such issues as fit and proper management, the responsibility of the Board of the company, internal control and risk management. In some member states there are also supplementary systems in force for equalisation reserving (e.g. Denmark, Germany, Iceland, Sweden, United Kingdom) or minimum overall reserving (notably Finland and Norway). Such systems usually refer to models and empirical evidence of claims distributions and of correlation between consecutive years or between lines of business.

27. It should finally be mentioned that the solvency of insurance groups and of financial conglomerates has been the subject of study and discussions. A recent EU directive on insurance groups is to be implemented no later than 1 July 2000.

9.3 United States

28. In the United States, the insurance industry is regulated by the individual states. Regulators in 55 territorial jurisdictions, including the 50 states, have independently come together to form the National Association of Insurance Commissioners (NAIC). One result of the activities of the NAIC is the development of common fundamental concepts upon which statutory financial accounting and reporting standards are based. These concepts have been “codified” as statutory accounting principles. Another result is that 49 of the 50 states have documented compliance with a system for sound solvency regulation developed by the NAIC. In all, the NAIC provides a detailed framework covering all essential aspects of solvency.

29. The solvency requirements that have been developed cover a great many aspects. Those that will be focused on in this paper include accounting practices and reporting standards, capital and surplus requirements, authority to mandate corrective action, reinsurance regulation, actuarial opinions, and guaranty fund laws.

9.3.1 Accounting and reporting standards

30. In contrast with most traditions in the EU, separate accounting methods have been developed in the United States for tax purposes, general purposes and supervisory purposes. Statutory accounting is used by insurance companies to report their financial condition to state insurance regulators. Statutory accounting is based on statutory accounting principles, which have been codified to produce a comprehensive guide for use by supervisory officials, insurance undertakings, and independent auditors (certified public accountants) throughout the United States. Solvency, conservatism, consistency and recognition are the focus of statutory accounting. It therefore incorporates significant provisions for adverse deviations. These provisions include a stricter view on which assets are admissible and how to value the admissible assets, and a cautious view as to the recognition of emerging profits, as compared with other accounting principles.

31. A special feature is the establishment and reporting of an interest maintenance reserve and an asset valuation reserve for life and health insurers; these are designed to provide a margin for fluctuations in asset value or for changes in the general level of interest rates.

9.3.2 Capital requirements

32. Capital requirements consist of two types: statutory minimum capital and surplus requirements, and risk based capital requirements. Statutory minimum capital and surplus requirements represent the minimum required solvency margin. If a company drops below the required minimum level of capital and surplus, intervention is triggered. Each state sets its own minimum level, and many states have separate and distinct minimums for capital and surplus.

33. Risk-based capital (RBC) computations specify a minimum amount of capital based on the company's size and risk profile. The formulas used depend on whether the insurance

undertaking is a life and health insurer or a property and casualty insurer. Major risk categories are:

- Asset risk.⁴
- Interest rate risk (life insurance) and health credit risk (accident and health insurance).
- Underwriting risk.⁵
- Credit risk (unrecoverable reinsurance of property and casualty insurance).
- Other business risk.

The computation of RBC includes adjustments for a correlation between risks and inherent additional risks in certain types of activity.

34. In life and health insurance, the RBC components are summed directly, but in property and casualty insurance, they are additionally transformed, to reflect certain risk-reducing effects that may be present.

9.3.3 Definition of capital and surplus: Total adjusted capital

35. The total adjusted capital (TAC) is compared with the calculated RBC as of the balance sheet date. TAC consists of company capital, surplus, asset valuation reserve, voluntary investment provisions and 50 per cent of the dividend commitments and relevant amounts of the subsidiaries.

9.3.4 Risk limitations and credit given to reinsurance cover

36. There is a standard that limits the net amount of risk to be retained by a property and liability company. An individual risk should not exceed 10 per cent of capital and surplus.

37. The views on reinsurance cover are quite developed. Evidence of risk transfer is required before liabilities on the balance sheet can be reduced with respect to reinsurance ceded. The amount of credit given to the reinsurance cover can be limited, both in general and based on the amount of security held. Reinsurers can become accredited in a state to allow the ceding company the maximum benefit of reducing its technical provisions. If the reinsurer is not accredited, the ceding company can still reduce its liabilities to the extent funds are held in trust for the ceding company, or the assuming company issues a letter of credit to the ceding company, or funds are withheld by the ceding company. In addition, the reinsurance agree-

⁴ For asset risk, the individual groups of assets are examined separately. The contribution to RBC is expressed as a percentage of balance sheet value, with the percentage typically ranging from 0 to 30. The assigned percentages or factors increase in relation to the perceived risk of the asset, based on considerations such as potential for default or decline in market value. United States Treasury Bonds, for instance, receive a 0 per cent factor, whereas common shares receive a 30 per cent factor and real property a 10 per cent factor. Concentration of risk by issuer may incur additional RBC penalties.

⁵ For underwriting risk in property and casualty insurance, each line of business is examined separately. Moreover, underwriting risk is assessed using two RBC components, respectively based on written premiums and provisions ("reserves"). The premium-based component, with the contribution to RBC expressed as a percentage of net written premiums, reflects the risk that premiums will be insufficient to settle corresponding future claims. The reserve-based component, with the contribution to RBC expressed as a percentage of the provision for outstanding claims, reflects the risk of adverse development in excess of expected investment income. Both components are calculated with reference to market experience as well as company experience. Additional adjustments to RBC are made, such as a contribution based on rapid premium growth.

ment must be in writing, and contain specific terms that address an insolvency of the ceding company.

9.3.5 Control levels

38. The total adjusted capital is compared with the risk-based capital and the value of the ratio between the two is a control variable that also triggers intervention. The most rigorous rights of intervention, mandatory control of the insurance undertaking by supervisory officials, occurs when the ratio lies below 70 per cent. There are also higher control levels which requires less severe intervention.

9.3.6 Insurance guaranty (Policyholder protection plans)

39. There are model acts for the arrangement of an insurance guaranty association, differing in scope as regards life and health insurance and certain property and liability insurance. The purpose is to protect policyholders in case of the insolvency of an insurer, with limits. In most states, membership in the guaranty association is required of every licensed insurance undertaking.

9.3.7 The role of the actuary

40. Every life and health and property and casualty insurance undertaking is required to submit an actuarial opinion on an annual basis to the supervisory officials of each state in which it is licensed. The opinion must be from a qualified actuary and cover all provisions (“reserves”). The inclusion of a reduction in provisions for salvage and subrogation or discounting must also be noted. The language of the opinion must include specific wording regarding the sufficiency of the provisions. For specific life products, an asset adequacy test must also be conducted, and an actuarial memorandum documenting the test filed with the domiciliary supervisory official; the focus of such a test is whether assets are sufficient to fund policy obligations as they become due. In some states, the provisions method for certain life products is required by statute. The American Academy of Actuaries is the main accrediting organisation for actuaries in the United States.

9.4 Australia

41. In Australia life insurance is prudentially regulated under the Life Insurance Act 1995 (LIA) and general (non-life) insurance is regulated under the Insurance Act 1973 (IA) and these acts are administered by the Australian Prudential Regulation Authority (APRA). An important role is played by the system of trustees, providing protection for policyholders.

9.4.1 Accounting and reporting standards

42. For life insurance it is worth noting that assets are valued at market value and that the financial condition report is a centrepiece of information, both to the Board of the company and APRA. This report is prepared by the appointed actuary under a professional standard issued by the Institute of Actuaries. For the valuation of policy liability, defined to be a best

estimate plus a planned profit margin, there is a statutory actuarial standard issued by the Life Insurance Standards Board.

43. Accounting standards for non-life insurance are issued by AASB, the Australian Accounting Standards Board. The same standards are used for financial reporting, supervision and fiscal purposes. Assets are valued at market value and technical provisions for outstanding claims are to be discounted.

9.4.2 Definition of capital requirement: Solvency and capital adequacy

44. For life insurance, a distinction is drawn between solvency and capital adequacy standards. Both standards refer to a requirement of a statutory fund to be met under a range of adverse circumstances, but differ in perspective. The solvency standard should ensure that the company on a short-term basis would be able to meet its guaranteed obligations to policyholders and its obligations to other creditors. The capital adequacy standard should ensure that the company would be able to meet its obligations to policyholders and other creditors as well as reasonable expectations of policyholders in the context of a viable ongoing operation. This includes the ability to meet solvency standards over the next three years. The solvency requirement is disclosed publicly, whereas the capital adequacy requirement is only disclosed to APRA.

45. Some details of the calculation of the solvency requirement are:

- Solvency liabilities (guaranteed liabilities valued more conservatively than best estimate), subject to a minimum of total surrender values for each related product group.
- Expense reserve (provision for the overrun of acquisition expenses that can occur upon closing a statutory fund to new business).
- Resilience reserve, for asset–liability mismatch.
- Inadmissible assets reserve (asset concentration, associated entities).

46. The capital adequacy standard is less prescriptive and there is more reliance on the appointed actuary for the valuations. In addition to the items mentioned for the solvency requirement, there is a new business reserve for new business planned over the next three years.

47. General (non-life) insurers are required to hold a statutory minimum solvency margin. The solvency test is applied to liabilities denominated in Australian dollars and to overall liabilities. The minimum solvency margin should be the greatest of

- \$2 million,
- 20 per cent of premium income and,
- 15 per cent of the (net discounted) provisions for outstanding claims.

9.4.3 Risk limitations and credit given to reinsurance cover

48. Reinsurance arrangements must be approved by APRA. Guidelines concerning reinsurance arrangements require that the net tangible assets for general insurers in Australia should be sufficient for the following:

- a limitation of risk retention to 5 and preferably less than 3 percent of the net tangible assets in Australia, or
- in addition to the minimum statutory solvency margin, net tangible assets in Australia in excess of the maximum retention per event in Australia.

Similar requirements hold for reinsurers, but with the higher risk retention limit of 7.5 per cent.

49. For supervision purposes, full credit is given for reinsurance recoverables. A direct insurer may place all its reinsurance with an authorised reinsurer, and – at most – 5 per cent with an unauthorised reinsurer.

9.4.4 Control levels

50. The solvency system is a single tier system, but in practice market benchmarks seem to be about twice the minimum and APRA will show a close interest in a company with less than 150 per cent of the minimum.

9.4.5 Policyholder protection plans

51. Australian legislation currently does not provide for a levy to be made on the industry to make good losses that arise from insurance contracts. The debate on this issue has fallen in favour of a preference to avoid moral risk. For retirement savings arrangements there is a facility where an industry levy could be raised to make good losses to certain fund members but the losses are restricted to those arising from fraud or theft. A decision to make such a charge rests with the government minister responsible for the financial sector and has never been used.

52. Similar legislation was enacted at a federal level for a specific situation which arose in life insurance but was not used and has been repealed. Some state governments do have some arrangements to support classes of insurance in their jurisdiction – third party liability for motor insurance and workers compensation business.

9.4.6 The role of the actuary

53. The role of the actuary is considerable in life insurance, as is clear from what has been said. Directors must receive advice from the appointed actuary regarding:

- Likely consequences of any proposed distribution of profit.
- Distribution of shareholder capital.
- Terms and conditions, surrender values and unit pricing of any proposed policies.
- Reinsurance.

54. There is currently no statutory requirement for actuarial involvement in the operation of a general insurance company, but the Insurance Act gives APRA the power to demand an actuarial assessment of the adequacy of the outstanding claims provision.

55. The Institute of Actuaries of Australia (IAA) is active in issuing professional standards, e.g. regarding the financial condition report and advice on outstanding claims in general insurance.

9.4.7 Developments

56. Practice is developing as regards the fair value or best estimate of liabilities in general insurance. More refined solvency standards for general insurers and dynamic financial analysis are in focus of the actuarial debate.

9.5 Canada

57. While insurance companies in Canada can be provincially incorporated, the majority of companies and all branches of foreign insurers are federally incorporated. Federal, provincial and territorial governments are involved in the supervision. The Office of the Superintendent of Financial Institutions (OSFI) is the federal regulatory body. Solvency regulation is done by the regulatory body in the jurisdiction of incorporation (i.e., for federally incorporated companies this is OSFI); consumer protection is exclusively a provincial responsibility.

58. The current solvency tests for life insurance and property and casualty insurance are significantly different, in part reflecting the different risks and time frames of the businesses. The life test is based on a going concern assumption, whereas the property and casualty test is based on a liquidation concept. The life solvency test is in some ways similar to those described for the USA in that both take a risk-based approach. Because OSFI also regulates banks, there has been an attempt to harmonise insurance (both life and property and casualty) and bank capital rules, where feasible. For example, the definition of capital is by-and-large the same, as is the treatment of off-balance-sheet exposures.

9.5.1 Accounting and reporting standards

59. Canadian insurance companies follow generally accepted accounting principles (GAAP) as prescribed by the Canadian Institute of Chartered Accountants, except where otherwise specified by the Superintendent. These same principles apply for statutory reporting, although the Superintendent has the power to override GAAP.

9.5.2 Definition of capital requirement

60. For life insurance, the capital framework is known as the Minimum Continuing Capital and Surplus Requirements (MCCSR). Capital required is determined by applying factors for four risk components to specific assets and liabilities on and off the consolidated balance sheet, and adding the result. One risk component is related to the risk of incorrect assumptions about mortality, morbidity and lapse rates. The other components are related to asset default risk, changes in interest rate environment and interest margin pricing risk.

61. Canadian property and casualty insurers are subject to a non-consolidated solvency test referred to as the Minimum Asset Test (MAT). Capital requirements are calculated by analysing a company's assets, adjusted for solvency purposes, and subtracting liabilities plus a

margin based on a company's underwriting experience from this amount. OSFI, in conjunction with the provincial regulators, is currently reviewing the MAT test with a view to moving towards a harmonised (federal–provincial) risk–based approach.

62. Foreign property and casualty insurers are subject to the federal Test of Adequacy of Deposits in Canada (DAT). Under DAT, foreign insurers must maintain a margin of assets over liabilities.

9.5.3 Definition of capital and surplus

63. For life insurance, capital available is divided into two tiers – tier 1 is core capital (e.g. retained earnings, common shares, etc.) and tier 2 is supplementary capital (e.g. term preferred shares, subordinated debt, etc.). The definition includes certain deductions, limits and restrictions, but generally follows the BIS capital rules for banks.

64. The solvency test for property and casualty insurance companies uses the GAAP definition of capital (i.e. retained earnings and share capital).

9.5.4 Risk limitations and credit given to reinsurance cover

65. Credit for reinsurance is given where the reinsurers are registered in Canada, or generally where assets have been vested in a trust account under the Superintendent's control to cover policyholder liabilities in Canada ceded to unregistered insurers. For life insurers there are some additional circumstances where credit is given for policyholder liabilities outside of Canada that have been ceded (e.g. credit is given for reinsurance with a company subject to solvency regulation by an OECD country).

9.5.5 Control levels

66. OSFI limits the net amount of risk to be retained by a property and casualty company. An individual risk should not exceed two percent of the insurer's statutory capital. The amount of credit given to the reinsurance cover can be limited, both in general and based on the amount of security held. Provincial reinsurers can be registered to allow the ceding company the maximum benefit of reducing its technical provisions. If the reinsurer is not registered, the ceding company can still reduce its liabilities to the extent funds are vested in a trust account under the Superintendent's control for the ceding company; the assuming company issues a letter of credit to the ceding company; or funds are withheld by the ceding company. For life insurers, the minimum capital requirements are monitored on an individual company basis and can be adjusted by the Superintendent. Currently, the minimum requirement (expressed as capital available divided by capital required) is 120 per cent of MCCR, although supervisory action may be taken for companies falling below 150 per cent.

67. Under the MAT test, property and casualty companies must hold assets that equal 110 per cent of liabilities plus a margin.

68. In prescribing a higher capital requirement for a company, the Superintendent will take into account such factors as operating experience, diversification of the asset or insurance portfolio and retention limits.

9.5.6 Insurance guaranty

69. Policyholder protection plans are in place for both life insurance and property and casualty insurance to cover policies in Canada.

9.5.7 The role of the actuary

70. Every insurance company has to submit annually the opinion of a qualified actuary on the adequacy of the technical provisions (reserves) and related actuarial items. The actuary must be a member of the Canadian Institute of Actuaries.

71. The actuary is also required to submit annually a report on the financial position and future financial condition of the company, a Dynamic Capital Adequacy Testing (DCAT) Report. The purpose of the DCAT is to identify plausible threats to the financial condition of the company, identify actions that could lessen the likelihood of threats, and identify actions that could mitigate a threat if it materialised.

9.5.8 Developments

72. Currently OSFI is developing a capital regime for insurance holding companies. In addition, it recently completed a review of the MCCSR guideline that highlighted a number of issues needing to be addressed. A discussion paper outlining the results of the review has just been released and is available on the OSFI web site. Federal and provincial regulators are developing a harmonised risk-based Minimum Capital Test (MCT) for domestic property and casualty insurers that is consistent with the approach in other financial sectors in Canada. Once completed, work will begin on developing a similar test for foreign property and casualty insurers.

9.6 Japan

73. In Japan, both life and non-life insurance industries are regulated by the Financial Supervisory Agency (FSA) under the Insurance Business Law. To measure the soundness of an insurance company, the solvency margin ratio (i.e. the ratio of solvency margin to capital requirement) is used as an index. A measure called “Prompt Corrective Action” shall be taken as a solvency margin ratio does not reach the statutory required standard.

9.6.1 Accounting and reporting standards

74. The accounting method of insurance is basically following the Commercial Law and other principles of business accounting. Since insurance business bears long-term liabilities to pay insurance to policyholders, insurance companies are strongly required to reserve sufficient resources for covering losses in order to protect policyholders. Therefore, the specific regulations, such as price fluctuation reserve, loss reserve, and underwriting reserve (premium reserve, unearned premium and reserve for future risk for life insurance; ordinary underwriting reserve, catastrophe reserve, refund reserve, reserve for policyholders’ dividends for non-life insurance) are provided.

9.6.2 Definition of capital requirement

75. The capital requirement is described as the amount of quantified risk that is beyond the normal estimates with respect to the occurrence of an insured accident. The risks are quantified in a similar way as Risk Based Capital (RBC). They are (1) insurance risk, (2) assumed interest rate risk, (3) asset management risk and (4) operational risk. Asset management risk consists of 5 types of risks: price fluctuation risk, credit risk, affiliate company risk, off-balance transaction risk, and others (e.g. reinsurance risk).

9.6.3 Definition of capital and surplus: The solvency margin

76. The solvency margin is composed of the following items:

- (1) the aggregate amount of the capital column of the balance sheet (excluding the amount to be expended as the disposition of profit or surplus, and the asset to be carried over),
- (2) price fluctuation reserve,
- (3) future risk reserve or catastrophe reserve,
- (4) bad debts provision,
- (5) 90 per cent of hidden profit of shares quoted at an exchange (latent loss deducts 100 per cent),
- (6) 85 per cent of hidden profit of the land (latent loss deducts 100 per cent) and
- (7) others (subordinated debenture, etc.).

9.6.4 Risk limitations and credit given to reinsurance cover

77. Regarding reinsurance, there is no standard to limit the amount of risk.

9.6.5 Control levels

78. A measure, Prompt Collective Action, shall move executive orders as the ratio of solvency margin does not reach the standard. If the ratio is less than 200 per cent but over 100 per cent, then the insurance company shall be ordered to submit and execute the management improvement plan for achieving prudence. If the ratio is less than 100 per cent but over 0 per cent, then the insurance company shall be ordered to take the following measures:

- (1) formation of a solvency increase plan and its execution,
- (2) restraint or prohibition on paying dividend, or on paying bonuses to members of a board of directors,
- (3) restraint or prohibition on paying dividend to policyholders,
- (4) changing of the assumed interest rate of the new contract,
- (5) restraint on high-risked investment,
- (6) curtailment of the operational expense,
- (7) curtailment of business operation,
- (8) disposal of shares and subsidiaries,
- (9) others.

If the ratio goes under 0 per cent, then the insurance company shall be ordered to suspend whole or a part of its business activities for a limited time.

9.6.6 Policyholder protection organisation

79. In order to enhance policyholders' protection, "Policyholders' Protection Corporations" are established, for both life insurance and non-life insurance respectively. All insurance companies are required to join in the Corporation. In addition to providing a reliever insurance company with financial aid, the Corporations shall accept transfer of insurance contracts entered into by an insolvent insurance company, when a reliever insurance company is not expected to come into existence.

80. The Corporation shall compensate up to 90 per cent of the underwriting reserves accumulated at the time of insolvency. In the case that an insurance company becomes insolvent until the end of March 2000, then the policyholders will be given more cordial protection. In addition, the Bank of Japan may lend fund to the Corporations, and the Government may guarantee obligation of the Corporation related to the borrowing.

9.6.7 The role of the actuary

81. All insurance companies are required to appoint an actuary by a board of directors. The actuary shall confirm the calculation of the underwriting reserve, the dividend to policyholders, etc., and submit a written opinion concerning the result of the confirmation to the board of directors and to the supervisory authority. The actuary must be a member of the Japanese Actuary Association.

82. The actuary not only confirms the calculation, but is expected to play an important role in securing the soundness of the insurance companies.

9.6.8 Developments

83. There is no plan to change the system at this moment, as the solvency system has just been introduced.

10. Solvency assessment – Some basic principles

1. Solvency assessment is a broader concept than solvency margin or minimum statutory capital and it adds complementary aspects to the issue of solvency. The following is an attempt at a definition.

2. Solvency assessment is a procedure or a process aiming at measuring or otherwise describing current status and possible changes in the solvency of an insurer, and attempting to relate it to some standard or benchmark. This assessment can be a basis for further action or decision by the company itself and by supervisors. The result of the solvency assessment can be part of the financial disclosure to other interested parties: customers (policyholders), creditors, lenders, investors and rating agencies.

3. As a point of departure, the following main components must be taken into consideration when making the solvency assessment:

- The fulfilment of the required minimum solvency margin.
- The extent of statutory reporting.
- The risk management.
- The processes of supervisory review.

Moreover, it should be stressed that subjects like market discipline and transparency as well as internal control procedures may have a substantial impact on how the solvency assessment is carried out, even if these subjects are not an integral part of the solvency assessment as such.

4. Information regarding the required minimum solvency margin, the available solvency margin as well as other statutory reporting will jointly give a static picture of the components of solvency in form of figures. This information reflects the solvency requirements as implemented by the regulations and gives also an indication about the quality of an insurance company's available solvency margin (solvency capital). This information does not, however, give the full picture of the risks the company already is exposed to or will be exposed to in the future.

5. The goal of supervisors in assessing insurance companies' solvency position and strategy is to ensure that the companies' available solvency margin is consistent with their overall risk profile and to enable early intervention if this margin does not sufficiently buffer the risks. In this connection the supervisor should not only check whether the (statutory) minimum solvency requirement is fulfilled or not, but also assess the available solvency margin against more informal (and possibly multi-levelled) industry standards for the solvency margin. Especially, these latter standards may reflect the various degrees of intervention being at the supervisor's disposal.

6. Risk management is one of the essential components of the solvency assessment system. Risk management systems should cover not only current activities but also future business, i.e. risk management in connection with the business plan. Moreover, it is important to stress that a risk management plan should be implemented not only for the asset side (investment risks) but also for the liability side (technical risks). In this context, the supervisors should also see to that internal control procedures are in place.

7. While the required minimum solvency margin and the statutory reporting – when jointly evaluated or analysed – will give only a static picture of the present situation for an insurance company, the risk management and supervisory review provide an understanding of the underlying risks and the effects of the business plan on the future solvency situation of the insurance company. For the company this information is necessary to ensure that its business plan is in line with the financial strength of the company. For the supervisor, this information is needed to ensure that the business plan of the company does not endanger the interest of the policyholders and that the overall risk profile of the company is backed by necessary capital. It should, however, be stressed that in general the companies will be in a position to make more detailed analyses than the supervisors due to their access to more detailed information.

8. In order for market participants to assess an insurance company's solvency situation, they need to have information about the company's available solvency margin, its minimum solvency margin as well as its risk profile. Especially, this aspect is relevant for the rating agencies having in-depth solvency assessments as one of their main tasks. In this respect, there may often be a common interest between the rating agencies and the supervisors with respect to the request for sufficiently detailed information regarding the solvency position of insurance companies. Moreover, the market discipline component may serve as a preventive measure for the company's management, due to the fact that publicly released information about solvency and risk exposure gives the market participants a better understanding of the company and puts them in a better position to compare companies.

9. As indicated by the description given so far, solvency assessment is a fairly complex process. There are many factors that influence the solvency position of a company and these factors are not independent of each other. As discussed earlier in this paper, at least the following factors are important when assessing an insurance company's solvency:

- A description and analysis of the technical risks the company is exposed to and the requirements for technical provisions that these risks generate. This analysis should include an assessment of the actual technical provisions while taking into account any stipulated minimum requirements or industry standards.
- A description and analysis of the investment risks the company is exposed to and the minimum required solvency margin that these risks generate. This analysis should include an assessment of the available solvency margin while taking into account the (minimum) required solvency margin.
- An analysis or evaluation of the impact any buffers in the technical provisions may have on the stipulation of the required minimum solvency margin, i.e. the mutual dependencies between the required technical provisions and the required minimum solvency margin.
- An analysis or evaluation of the impact of applied accounting and valuation methods on the solvency position of the company, including an assessment or estimate of any safety or prudent margins embodied in the technical provisions or the investments corresponding to the technical provisions.

10. The technical provisions are an estimate of an insurance company's technical liabilities or contractual obligations. The sufficiency of the technical provisions depends to a large extent on how the company has judged the technical risks and also to a certain degree on how they have judged the investment risks. At the same time we know that the value of assets corresponding to the technical provisions are dependent on the accounting and valuation methods used in that specific jurisdiction. Lastly solvency requirements are dependent on all the other factors.

11. In chapter 5–7 of this paper many aspects of the factors mentioned in paragraph 9 are discussed. Due to the fact that these interdependencies exist, it is too simple to have an assessment procedure that separately deals with the components mentioned in paragraph 3. It seems to be necessary to build up models that include all the interdependencies. Based on these models, scenarios could be tested to identify plausible threats to the financial condition of the company, identify actions that could lessen the likelihood of threats, and identify actions that could mitigate a threat if it materialises. In this respect, it seems necessary in the

assessment of a company's solvency position to have access to high-qualified expertise, e.g. an actuary or other persons with relevant skills.

11. In summary

1. The Solvency Sub-Committee is to set, in the long term, the standard on solvency requirements, supplementary risk control requirements, and solvency assessment. This paper has discussed various aspects to be taken into consideration when establishing a system for solvency requirements and solvency assessments in some detail.

2. As is stated in the "Insurance Supervisory Principles" of the IAIS, sound solvency regimes and effective solvency assessment methods are a critical part of proper insurance regulation.

3. At present the methods used to safeguard the solvency of an insurance undertaking are different in a number of jurisdictions (see chapter 9). When setting up a particular solvency system, certain factors within the context of the individual jurisdiction must be taken into account. The nature of accounting standards and accounting values for assets and liabilities is important. A general standard does not necessarily need to state how these factors should be taken into account or how to implement the system in detail. We conclude that general standards should not prescribe specific methods regarding implementation.

4. From the present point of view, all existing systems which aim at safeguarding solvency can be improved to a greater or lesser extent. Within the insurance sector the following four pillars of solvency are worthy of assessment.

(1) Risk Management

5. The paper emphasises that an assessment of risk is fundamental to a solvency regime and solvency assessment. In particular, the paper sets out a possible structure of risks (see chapter 5).

6. This would include both current risks as well as the management of future business plans and the associated risks expected from new business.

7. The paper identifies the role of an insurance company in analysing, controlling and limiting risks as well as the role of supervisors to establish rules and make assessments of risk. An insurance company's own internal risk assessment and management procedure is one of the essential elements of a solvency regime.

8. A section on a company's reinsurance arrangements is included as reinsurance is an important vehicle available to companies for the management and mitigation of risk. Equally, a poorly constructed reinsurance programme can lead to the inadvertent retention of risk.

(2) Minimum Solvency Requirements

9. A set of minimum requirements that utilises sound methods for the assessment of the risks of an insurer and includes a required minimum margin or control level is considered to be an important safeguard.

10. The control level should be sufficient to ensure that, if a company's failure is inevitable, it can be managed with a minimum of loss to policyholders.

(3) Solvency Assessment and Supervisory Review

11. The capacity for company management to assess the company's solvency position and also for the supervisor to make assessments is important.

(4) Disclosure of Information

12. The important role of disclosure of information to allow third parties to form a view on a company is noted. Analysis in the paper suggests that different regimes also have different degrees of disclosure.

13. Attempts should be made to establish these four pillars in every country. The precise methods used to establish these pillars will depend on the environment in each jurisdiction, including the accounting standards and the role of professionals.

Annex 1

A glossary of solvency and solvency–related terms

In the following glossary, the main terms are printed in bold type and italics, while the synonyms are printed in italics. If the definition contains a term which is also defined in this paper, this term is printed in bold type and italics.

A. Terms relating to solvency

available solvency (margin)

actual solvency margin

statutory solvency margin

available surplus capital

eligible capital

regulatory capital

free capital

total adjusted capital

policyholder surplus

statutory surplus

Surplus of assets over liabilities, both evaluated in accordance with domestic regulation (either in accordance with rules of public accounting or with special supervisory rules) and taking into account domestic requirements as regards ***eligible capital elements***, i.e. the amount of capital appropriate to cover the ***required solvency margin*** in accordance with domestic law or supervisory regulations.

Let

A be the total amount of assets on the balance sheet,

Ad the amount (included in A) to be deducted for prudential reasons (e.g. intangible items, percentage of market value),

TP the total amount of ***technical provisions*** on the balance sheet evaluated in accordance with domestic regulation (either public accounting or supervisory rules),

TPd the amount included in TP representing an ***eligible capital element*** to cover the ***required solvency margin*** (e.g. the free ***profit reserve***),

OL the total amount of other liabilities (provisions) not directly linked to obligations under insurance contracts,

OLd the amount included in OL representing an ***eligible capital element*** (to cover the ***required solvency margin*** (e.g. ***subordinated loans***),

F the total amount of free capital (i.e. balance sheet items not belonging to TP or OL),

Fd the amount included in F to be deducted (e.g. share capital not paid up), and

I the implicit (off-balance sheet) elements eligible to cover the **required solvency margin** (e.g. **hidden reserves**, future profits estimated in accordance with domestic law).

Then the available solvency, AS, is equal to

$$AS = [A - Ad] - [(TP - TPd) + (OL - OLd)] - Fd + I. \quad (\text{the "solvency formula"})$$

As

$$F = A - TP - OL$$

by definition, the formula could be simplified to

$$AS = F - Ad + TPd + OLd - Fd + I.$$

This may be interpreted as free capital on the balance sheet, adjusted for any off-balance sheet item, or as appropriate under supervisory rules.

break-up basis

A method of considering the financial situation assuming that no new business is written and that the company is liquidated (i.e. the investment portfolio has to be sold at that time).

eligible capital element

regulatory capital element

admissible capital item

On or off-balance sheet element which, in accordance with domestic regulations, is suitable to cover the **required solvency margin** (i.e. eligible for inclusion in the **available solvency** or regulatory capital, i.e. allowable for solvency purposes). As a general rule, these elements are either assets free of all foreseeable liabilities, or, if they represent liabilities, the latter should be subordinated to any other liabilities, i.e. in the event of a winding-up or bankruptcy, they are to be paid only after the claims of all other creditors have been satisfied. The eligible capital elements correspond to items in TPd, OLd or I in the solvency formula.

going-concern basis

A method of considering the financial situation assuming that the company will continue to operate and that future business will be written.

profit reserve

provision for bonuses and rebates

Amounts, i.e. bonuses and rebates, that are intended for policyholders or contract beneficiaries if such amounts have not been credited to policyholders or contract beneficiaries or included in a fund for future appropriations.

(regulatory) control level

trigger amount

trigger point

intervention level

impairment level

regulatory action level

A threshold value that requires intervention of the supervisor or imposes certain restrictions on the insurer if its **available solvency margin** falls short of this amount. A system of **solvency requirements** may have more than one control level for different types of regulatory action (e.g. RBC approach of USA, EU solvency requirements).

required solvency margin

required minimum margin

statutory minimum solvency margin

minimum capital requirement

required surplus

regulatory capital requirement

The minimum amount of **solvency margin** as defined above, stipulated by domestic law.

If we denote the **required solvency margin** by RS and refer to the solvency formula, this would mean that AS = RS. The **required solvency margin** should have a level that ensures with a high probability the undertaking's ability to meet its obligations over a certain period of time or sets the expected policyholder deficit to an acceptable low level. However, the views as to which level is acceptable may differ from jurisdiction to jurisdiction.

run-off basis

A method of considering the financial situation assuming that no new business will be written but that the company will continue to operate with underwritten insurance contracts until the end of the term set by the policy conditions (e.g. the renewal date, the end of a fixed term, death of the insured person) including the settling of claims eventually arising during this period.

solvency*)

solvability

capital adequacy)*

financial health

Ability of an insurer to meet its obligations (liabilities) under all contracts at any time. Due to the very nature of insurance business, it is impossible to guarantee solvency with certainty. In order to come to a practicable definition, it is necessary to make clear under which circumstances the appropriateness of the assets to cover claims is to be considered, e.g. is only written business (**run-off basis**, **break-up basis**) to be considered, or is future new business (**going-concern basis**) also to be considered. In addition, questions regarding the volume and the nature of an insurance company's business, which time horizon is to be adopted, and what is an acceptable degree of probability of becoming insolvent should be considered.

*) In the Australian life insurance context these terms are not used like synonyms: **solvency** is used assessing financial health on a **run-off basis** while **capital adequacy** is used assessing financial health on a **going-concern basis**.

solvency margin

surplus capital

Surplus of assets over liabilities. (Because these terms are frequently used in an imprecise manner, the glossary refers to **available solvency (margin)** or *available surplus capital* and **required solvency margin** or *required surplus*.)

solvency requirements*)

statutory solvency rules

regulatory capital requirements

required solvency

required capital adequacy

surplus requirements

risk based capital requirements

The whole set of statutory requirements or rules as regards the **required solvency margin** (RS) and **eligible capital elements** to cover the margin, and includes the performance of the **solvency test** to prove compliance with these requirements.

*) In the Australian life insurance context, the term **solvency requirement** refers to the amount of assets needed to meet the solvency test. Similarly, the term **capital adequacy requirement** refers to the amount of assets needed to meet the capital adequacy test.

solvency test

capital test

The test showing compliance with domestic **solvency requirements** at a certain point in time (e.g. as of the balance sheet date), either by following a static approach, i.e. by comparing **available solvency margin** with **required solvency margin** (i.e. the test must show AS = RS), or by following a dynamic approach, i.e. an actuarial test based on certain assumptions as to the risk parameters of the existing and potential future portfolio (e.g. mortality, investment yield, distribution of losses, expenses).

B. Terms relating to liabilities, valuation and matching

assets/liabilities management

assets/liabilities matching

Since asset performance and returns are continuously influenced by changes in the capital markets, exchange rates, etc. and since such changes may jeopardise adequate funding of the technical liabilities, the insurer's managers must constantly monitor whether technical provisions are sufficiently covered by suitable assets at all times. Consideration should be given to setting up a **resilience reserve** to cover the risks associated with any mismatching.

claims provision

provision for outstanding claims/claims outstanding

claims reserve

total claim liability

Amount set aside on the balance sheet to meet the total estimated ultimate cost to an insurance undertaking of settling all claims arising from events which have occurred up to the end of the financial year, whether reported or not, less amounts already paid in respect of such claims. This term may also be defined as not including the **IBNR provision**.

equalisation provision*fluctuation provision**(claims) fluctuation reserve**stabilisation reserve*

Amount set aside on the balance sheet in compliance with legal or administrative requirements to equalise fluctuations in loss ratios in future years or to provide for special risks. It depends on the purpose of this amount if the term “reserve” or “provision” is used. Amounts set aside for specified types of business (e.g. hail, pollution liability or credit insurance) may be referred to as “provisions”, whereas amounts set aside to cover fluctuations of the entire portfolio may be referred to as “reserve”. This item may include catastrophe provisions.

equity capital*share capital**subscribed capital**paid-in capital*

Capital subscribed by shareholders or members of mutual societies.

hidden reserves

Potential surplus resulting from an evaluation based on the principle of lower-of-cost-or-market-value as long as the market values exceed the purchase prices of the assets. This item may correspond to the ***revaluation reserve*** if assets are valued on the basis of the current market price.

IBNR provision

Provision for claims incurred but not reported by the balance-sheet date.

life assurance provisions*mathematical provisions**policy liabilities**policy reserves*

Amount on the balance sheet which comprises the actuarially estimated value of an insurance undertaking's liabilities for future benefit payments including bonuses already declared and after deduction of the actuarial value of that component of future premiums attributable to meeting those liabilities.

provision for unearned premiums*unearned premium reserve*

Amount on the balance sheet representing that part of premiums written which is to be allocated to the following financial year or to subsequent financial years.

provision for unexpired risks*premium deficiency reserve*

Amount set aside on the balance sheet in addition to unearned premiums with respect to risks to be borne by the insurance undertaking after the end of the financial year, in order to provide for all claims and expenses in connection with insurance contracts in force in excess of the related unearned premiums and any premiums receivable on those contracts.

reserve

appropriated surplus

segregated surplus

contingency reserve

Amounts set aside to meet unforeseeable liabilities (i.e. an obligation that has not yet materialised) or statutory requirements, and stemming either from shareholders' capital or, in the case of mutuals, members' contributions and from accumulated surplus. Reserves are part of the own funds (in contrast to provisions that support liabilities to parties other than shareholders or other owners).

resilience reserve

mismatch reserve

additional reserve for cash flow testing

A reserve for adverse movements in the capital markets to the extent that these movements will not be matched by a corresponding movement in the liabilities.

revaluation reserve

asset fluctuation reserve

Amount set aside in the balance sheet representing the difference (or a portion thereof) between purchase price and current market price if assets (investments) are valued on the basis of the current market price (market value).

subordinated loans (liabilities)

subordinated debt

subordinated debenture

Loans (liabilities) that rank after the claims of all other creditors and to be paid, in the event of liquidation or bankruptcy, only after all other debts have been met. These items may be part of OLD in the solvency formula.

technical provision

technical liabilities

(technical) reserves

Amount set aside on the balance sheet to meet liabilities arising out of insurance contracts, including ***claims provision*** (whether reported or not), ***provision for unearned premiums***, ***provision for unexpired risks***, ***life assurance provision*** and other liabilities related to life insurance contracts (e.g. premium deposits, savings accumulated over the term of with-profit policies).

The IASC Insurance Project

1. The International Accounting Standards Committee (IASC) started in 1997 a project that addresses accounting for insurance contracts (or groups of contracts), rather than all aspects of accounting relevant for insurance undertakings. The rationale for only dealing with insurance contracts is that all other accounting issues for insurance undertakings already have been taken care of in other IAS-standards. An IASC Issues paper is expected to be released in the 4th quarter of 1999 with an exposure period of 6 months.
2. In the IASC project an insurance contract is defined as a contract under which one party (the insurer) accepts an insurance risk by agreeing with another party (the policyholder) to make a payment if a specified uncertain future event occurs. (This event should, however, be something more than only a change in a specified interest rate, security price, commodity price, foreign exchange rate, index of prices or rates, a credit rating or credit index, or a similar variable.)
3. According to the IASC project, the main objective should be to measure assets and liabilities that arise from insurance contracts (an asset-and-liability measurement approach), rather than to defer income and expenses so that they can be matched with each other (a deferral-and-matching approach).
4. The ideas that have been presented as a part of the Insurance Project so far indicate that the IASC will propose new principles for insurance accounting that in many respects will deviate radically from the norms being applied in many jurisdictions to day, cf. the list at the end of the present annex.
5. According to the IASC, the ultimate goals of the Insurance Project are as follows:
 - to launch an internationally accepted accounting standard that should be used for insurance undertakings that is in line with accounting standards for other financial undertakings,
 - to launch a single set of financial statements that could be used by all interested parties, and
 - to improve transparency and comparability.
6. It remains to be seen how the final version of the IASC-standard on insurance will be. Many of the (preliminary) proposals indicated by IASC so far will – if implemented – lead to substantial changes in the manner insurance undertakings in many jurisdictions have to set up their financial reports. It is also likely that the new standard will have a great impact on the solvency matters regarding insurance undertakings, including the stipulation of required minimum solvency margins.

7. An overview of some of the basic proposals on new principles for insurance accounting put forward in connection with the IASC Insurance Project is given below. In this context it should again be stressed that many of these proposals will be controversial in many jurisdictions.

IASC proposals regarding insurance accounting⁶

- (1) Insurance liabilities (both general insurance and life insurance) should be discounted.
- (2) The measurement of insurance liabilities should be based on current estimates of future cash flows from the current contract. Estimated future cash flows from renewals are:
 - (a) included if the current contract commits the insurer to pricing for those renewals, and
 - (b) excluded if the insurer retains full discretion to change pricing.
- (3) In the view of a majority of the IASC Steering Committee, catastrophe and equalisation reserves are not liabilities under IASC's framework. There may be a need for specific disclosures about low-frequency, high-severity risks – perhaps by segregating a separate component of equity.
- (4) The measurement of insurance liabilities should reflect risk to the extent that risk would be reflected in the price of an arm's length transaction between knowledgeable, willing parties. It follows that the sale of a long-term insurance contract may lead in some cases to the immediate recognition of income. The IASC Steering Committee recognises that some may have reservations about changing current practice in this way.
- (5) Overstatement of insurance liabilities should not be used to impose implicit solvency or capital adequacy requirements.
- (6) Acquisition costs would not be deferred as an asset because the measurement of the liability would already capture the economic benefits that those costs generate.
- (7) All changes in the carrying amount of insurance liabilities should be recognised as they arise. In deciding what components of these changes should be presented or disclosed separately, the IASC Steering Committee will monitor progress by the Joint Working Group on Financial Instruments.
- (8) The IASC Steering Committee is working on the assumption that the standard on "Financial Instruments: Recognition and Measurement" (IAS 39) will be replaced, before the end of the Insurance project, by a new International Accounting Standard that will require full fair value accounting for the substantial majority of financial assets and liabilities. The Steering Committee believes that
 - (a) if such a standard exists, portfolios of insurance contracts should also be measured at fair value,⁷ and
 - (b) in a fair value accounting model, the liability under a life insurance contract that has an explicit or implicit account balance may be less than the account balance.

⁶ Note that this list of proposals is extracted from the IASC Internet-site.

⁷ IASC defines fair value as "the amount for which an asset could be exchanged or a liability settled between knowledgeable, willing parties in an arm's length transaction".

- (9) Pending further discussion, the IASC Steering Committee is evenly divided on the effect of future investment margins. Some members believe that future investment margins should be reflected in determining the fair value of insurance liabilities. Other members believe that they should not.
- (10) For participating and with–profits policies:
- (a) where the insurer does not control allocation of the surplus, unallocated surplus should be classified as a liability, and
 - (b) where the insurer controls allocation of the surplus, unallocated surplus should be classified as equity (except to the extent that the insurer has a legal or constructive obligation to allocate part of the surplus to policyholders).
- Liability classification is the default to be used unless there is clear evidence that the insurer controls allocation of the surplus.
- (11) For investment–linked insurance contracts, premiums received may need to be split into a risk component (revenue) and an investment component (deposit).
- (12) The accounting for reinsurance by a reinsurer should be the same as the accounting for direct insurance by a direct insurer.
- (13) Amounts due from reinsurers should not be offset against related insurance liabilities.
- (14) Most of the disclosures required by IAS 32 (“Financial Instruments: Disclosure and Presentation”) and IAS 37 (“Provisions, Contingent Liabilities and Contingent Assets”) are likely to be relevant for insurance contracts. Some of the disclosures required by IAS 39 (“Financial Instruments: Recognition and Measurement”) may not be needed in a fair value context.
- (15) Other items that may require disclosure are regulatory solvency margins, key performance indicators (such as sum insured in life insurance, retention/lapse rates, level of new business), information about risk adjustments and information about value–at–risk and sensitivity.