

ICP 17 Capital Adequacy

The supervisor establishes capital adequacy requirements for solvency purposes so that insurers can absorb significant unexpected losses and to provide for different degrees of supervisory measures.

Introductory Guidance

17.0.1 This ICP does not directly apply to non-insurance legal entities (regulated or unregulated) within an insurance group, but it does apply to insurance legal entities and insurance groups with regard to the risks posed to them by non-insurance legal entities.

Capital adequacy in the context of a total balance sheet approach

17.1 The supervisor requires that a total balance sheet approach is used in the assessment of solvency to recognise risks and the interdependence between assets, liabilities, regulatory capital requirements and regulatory capital resources.

17.1.1 The overall financial position of an insurer should be based on consistent measurement of assets and liabilities and explicit identification and consistent measurement of risks and their potential impact on all components of the balance sheet.

17.1.2 The assessment of the financial position of an insurer for supervision purposes should address the adequacy of the insurer's technical provisions, regulatory capital requirements and regulatory capital resources. These aspects of solvency assessment (namely technical provisions and capital) are intrinsically inter-related and should not be considered in isolation by a supervisor.

17.1.3 Capital resources may be regarded very broadly as the amount of the assets in excess of the amount of the liabilities. Assets and liabilities in this context may include contingent assets and contingent liabilities. Liabilities in this context include technical provisions and other liabilities (some of these other liabilities may be recognised as regulatory capital resources – see Standard 17.11 and related guidance).

17.1.4 Liabilities and regulatory capital requirements should be covered by adequate assets appropriate in nature considering the liabilities and regulatory capital requirements they cover. To address the quality of assets, the supervisor may consider applying restrictions or adjustments (such as quantitative limits, asset eligibility criteria or prudential filters) where the risks inherent in certain asset classes are not adequately covered by the regulatory capital requirements.

Additional guidance for insurance groups and insurance legal entities that are members of groups

- 17.1.5 The capital adequacy assessment of an insurance legal entity which is a member of an insurance group needs to consider the value of any holdings the insurance legal entity has in affiliates and its associated risks. Consideration should be given, either at the level of the insurance legal entity or the insurance group, to the risks attached to this value.
- 17.1.6 Where an insurance legal entity is the parent of the group, the supervisor may adopt either a group-wide capital adequacy assessment or a legal entity assessment of the parent, by including the value of its holdings in affiliates in the capital adequacy assessment. Both approaches may be similar in outcome although the detail of the approach may be different. For example, a group-wide assessment may consolidate the business of the parent along with its subsidiaries and assess the capital adequacy for the combined business while a legal entity assessment of the parent may consider its own business and its investments in its subsidiaries.
- 17.1.7 While there are various approaches to group-wide supervision. A capital adequacy assessment of an insurance group typically falls into two broad sets of approaches:
- group level focus; and
 - legal entity focus.
- Hybrid or intermediate approaches which combine elements of a group and a legal entity focus may also be used.
- 17.1.8 The choice of approach depends on a variety of factors, such as the legal environment which may specify the level at which the group-wide capital requirements are set, the structure of the group and the structure of the supervisory arrangements between the involved supervisors.
- 17.1.9 To illustrate the various approaches to group-wide capital adequacy assessment, a two dimensional continuum may be considered; on one axis the organisational perspective – the extent to which a group is considered as a set of interdependent entities or a single integrated entity; on the other axis the supervisory perspective – the relative weight of the roles of insurance legal entity supervision and group-wide supervision. The continuum may be split into four quadrants as shown in Figure 17.1.

Figure 17.1

SUPERVISORY PERSPECTIVE

	Legal Entity Focus	Group Level Focus
Large relative weight of group-wide supervision with respect to local supervision	<p>Capital adequacy is assessed for all relevant legal entities based on the local capital framework but taking into account group impact; requirements will be binding (meaning that if there are shortfalls in capital adequacy, there would be a need for the legal entities to take actions including obtaining capital injection from the group)</p> <p>- Local supervisors apply their respective local capital frameworks on the legal entity, which are binding</p>	<p>Capital adequacy is assessed under the assumption that the group behaves as a single integrated entity.</p> <p>- A group-level capital assessment of capital adequacy will be made, based on a common framework eg a group-wide capital framework; requirements will be binding</p> <p>- Local supervisors apply their respective local capital frameworks on the legal entity, which are binding</p>
Small relative weight of group-wide supervision with respect to local supervision	<p>- Capital adequacy is assessed for all relevant legal entities based on the local capital framework but taking into account of group impact; but requirements will not be binding</p> <p>- Local supervisors apply their respective local capital frameworks on the legal entity, which are binding</p>	<p>A group-level capital assessment of capital adequacy will be made, based on a common framework eg a group-wide capital framework; but requirements will not be binding</p> <p>- Local supervisors apply their respective local capital frameworks on the legal entity, which are binding</p>

ORGANISATIONAL PERSPECTIVE

Additional guidance for insurance groups and insurance legal entities that are members of groups - group level focus

17.1.10 Under a group-wide capital adequacy assessment which takes a group level focus, the insurance group is considered primarily as a single integrated entity and a separate assessment is made for the group as a whole on a consistent basis. This assessment includes adjustments to reflect constraints on the fungibility of capital resources and transferability of assets among group members. Hence under this approach, a total balance sheet approach to solvency assessment is followed that is based (implicitly or explicitly) on the balance sheet of the insurance group as a whole. However, adjustments may be necessary

to appropriately reflect relevant risks from non-insurance members of the insurance group.

- 17.1.11 Methods will vary in the way in which group regulatory capital requirements are calculated. The group's consolidated accounts may be used as a basis or an aggregation method may be used. In the consolidated approach, intra-group holdings are already adjusted but further adjustments may be needed to reflect the fact that the group may not behave or be allowed to behave as one single entity. Consolidated accounts may be those used for accounting purposes or they may differ in terms of the entities included in the consolidation. An aggregation method may sum surpluses or deficits (ie the difference between regulatory capital resources and regulatory capital requirements) for each insurance legal entity in the group with relevant adjustments for intra-group holdings in order to measure an overall surplus or deficit at group level, taking also into consideration entities other than insurance legal entities. Alternatively, the aggregation approach may sum the insurance legal entity regulatory capital requirements and insurance legal entity regulatory capital resources separately in order to measure group-wide regulatory capital requirements and group-wide regulatory capital resources. Where an aggregation approach is used for a cross-border insurance group, consideration should be given to consistency of valuation and capital adequacy requirements and their treatment of IGTs.

Additional guidance for insurance groups and insurance legal entities that are members of groups - legal entity focus

- 17.1.12 Under a legal entity focused group-wide capital adequacy assessment, the insurance group is considered primarily as a set of interdependent legal entities. The focus is on the capital adequacy of the parent and each of the insurance legal entities in the insurance group, taking into account risks arising from all entities within the group, including those involving non-insurance legal entities. The regulatory capital requirements and regulatory capital resources of the insurance legal entities in the group form a set of connected results but further adjustments are needed for non-insurance legal entities in determining the overall group-wide regulatory capital requirements and group-wide regulatory capital resources. This is consistent with a total balance sheet approach, as the assessment considers the balance sheets of the individual group entities simultaneously rather than amalgamating them to a single balance sheet for the group as a whole.
- 17.1.13 For insurance legal entities that are members of a group and for insurance sub-groups that are part of a wider insurance or other sector group, the potential impact arising from group risk should be taken into account in the capital adequacy assessment.

Establishing regulatory capital requirements

- 17.2 The supervisor establishes regulatory capital requirements at a sufficient level so that, in adversity, an insurer's obligations to policyholders will continue to be met as they fall due, and requires that insurers maintain regulatory capital resources to meet regulatory capital requirements.**

Purpose and role of regulatory capital requirements and resources

- 17.2.1 An insurer's Board and Senior Management have the responsibility to ensure that the insurer has adequate and appropriate capital resources to support the risks to which it is exposed. Regulatory capital resources serve to reduce the likelihood of failure due to significantly adverse losses incurred and/or valuation changes over a defined period and to reduce the magnitude of losses to policyholders in the event that the insurer fails.
- 17.2.2 In the context of its own risk and solvency assessment (ORSA), the insurer is generally expected to consider its financial position from a going concern perspective (ie, assuming that it will carry on its business as a going concern and continue to take on new business); but it may also need to consider a solvent run-off and/or a liquidation or resolution perspective. The determination of regulatory capital requirements reflects aspects of a going concern, a solvent run-off and/or liquidation or resolution perspective. Therefore, in establishing regulatory capital requirements, the supervisor may consider the financial position of insurers under different scenarios of operation.
- 17.2.3 From a macroeconomic perspective, requiring insurers to maintain adequate and appropriate regulatory capital resources enhances the safety and soundness of the insurance sector and the financial system as a whole, while not increasing the cost of insurance to a level that is beyond its economic value to policyholders or unduly inhibiting insurers' ability to compete in the marketplace. There is a balance to be struck between the level of risk that policyholder obligations will not be paid and the cost to policyholders of increased premiums to cover the costs of servicing additional capital.
- 17.2.4 The level of regulatory capital resources that insurers need to maintain for regulatory purposes is determined by the regulatory capital requirements specified by the supervisor.
- 17.2.5 Regulatory capital resources protect the interests of policyholders by meeting the following two objectives:
- reducing the probability of insolvency by absorbing losses on a going concern basis or in solvent run-off; and/or
 - reducing the loss to policyholders in the event of liquidation or resolution.
- 17.2.6 The extent to which capital elements achieve the above objectives will vary depending on their characteristics or quality. For example, ordinary share capital may be viewed as achieving both objectives, whereas subordinated debt may be viewed largely as only protecting policyholders in insolvency. Capital resources that achieve both objectives are sometimes termed "core regulatory capital resources" or similar (see Guidance 17.11.38) and capital resources that only reduce the loss to policyholders in liquidation or resolution are generally termed "winding-up capital" or "gone concern capital". It would be expected that going concern capital should form the substantial part of capital resources.

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- 17.2.7 For an insurer, the management and allocation of capital resources is a fundamental part of its business planning and strategies. In this context, capital resources typically serve a broader range of objectives than those described in Guidance under 17.2.5. For example, an insurer may use regulatory capital resources over and above the regulatory capital requirements to support future growth or to achieve a targeted credit rating.
- 17.2.8 An insurer's capital management (in relation to regulatory requirements and own capital needs) should be supported and underpinned by establishing and maintaining a sound enterprise risk management framework, including appropriate risk and capital management policies, practices and procedures which are applied consistently across its organisation and are embedded in its processes. Maintaining sufficient regulatory capital resources alone is not sufficient protection for policyholders in the absence of disciplined and effective risk management (see ICP 16 Enterprise Risk Management for Solvency Purposes).

Additional guidance for insurance groups and insurance legal entities that are members of groups

- 17.2.9 The supervisor should require insurance groups to maintain regulatory capital resources to meet regulatory capital requirements. These requirements should take into account the non-insurance activities of the insurance group. For supervisors that undertake group-wide capital adequacy assessments with a group level focus this means maintaining insurance group-wide regulatory capital resources to meet insurance group-wide regulatory capital requirements for the group as a whole. For supervisors that undertake group-wide capital adequacy assessments with a legal entity focus this means maintaining regulatory capital resources in each insurance legal entity based on a set of connected regulatory capital requirements for the group's insurance legal entities (see Guidance under 17.1.13) which fully account for the relationships and interactions between these legal entities and other entities in the insurance group.
- 17.2.10 A group-wide capital adequacy assessment does not replace assessment of the capital adequacy of the individual insurance legal entities in an insurance group. Instead, its purpose is to determine that group risks are captured and the capital adequacy of individual insurance legal entities is not overstated (considering possible aspects such as multiple gearing and leverage of regulatory capital resources or as a result of risks emanating from the wider group), and that the overall impact of IGTs is appropriately assessed.
- 17.2.11 Group-wide capital adequacy assessment considers whether the amount and quality of regulatory capital resources relative to regulatory capital requirements are adequate and appropriate in the context of the balance of risks and opportunities that group membership brings to the group as a whole and to insurance legal entities that are members of the group. The assessment should satisfy requirements relating to the structure of group-wide regulatory capital requirements and group-wide regulatory

capital resources and should supplement the capital adequacy assessments of individual insurance legal entities in the group. It should indicate whether there are sufficient regulatory capital resources in the group so that, in adversity, obligations to policyholders will continue to be met as they fall due. If the assessment concludes that group-wide regulatory capital resources are inadequate or inappropriate, then corrective action may be triggered either at a group or an insurance legal entity level.

- 17.2.12 The quantitative assessment of group-wide capital adequacy is one of a number of tools available to supervisors for group-wide supervision. If the overall financial position of a group weakens it may create stress for its members either directly through financial contagion and/or organisational effects or indirectly through reputational effects. Group-wide capital adequacy assessment should be used together with other supervisory tools, including, the capital adequacy assessment of insurance legal entities in the group. A distinction should be drawn between regulated entities (insurance and other sectors) and non-regulated entities. It is necessary to understand the financial positions of both types of entities and their implications for the capital adequacy of the insurance group but this does not imply setting regulatory capital requirements for non-regulated entities. In addition, involved supervisors should take into consideration the complexity of intra-group relationships (between both regulated and non-regulated entities), contingent assets and liabilities and the overall quality of risk management in assessing whether the overall level of safety required by the supervisor is being achieved.
- 17.2.13 For insurance legal entities that are members of a group and for insurance sub-groups that are part of a wider insurance or other sector group, regulatory capital requirements and regulatory capital resources should take into account all material group risks.

Structure of regulatory capital requirements - solvency control levels

- 17.3 The supervisor sets solvency control levels based on regulatory capital requirements which trigger different degrees of supervisory measures in a timely manner. There is coherence between the solvency control levels and the associated actions at the disposal of the insurer and/or the supervisor.**

Establishing solvency control levels

- 17.3.1 The supervisor should establish control levels that trigger measures by the supervisor when an insurer's regulatory capital resources fall below these control levels. A control level may be supported by a specific or a more general framework providing the supervisor latitude of action. A supervisor's goal in establishing control levels is to safeguard policyholders from loss due to an insurer's inability to meet its obligations when due.
- 17.3.2 The solvency control levels provide triggers for action by the insurer and/or the supervisor. Hence, they should be set at a level that allows measures at a sufficiently early stage of an insurer's difficulties so that there can be a realistic prospect for the situation to be rectified in a timely

manner. At the same time, the reasonableness of the control levels should be examined in relation to the nature of the corrective measures. The risk tolerance of the supervisor influences both the level at which the solvency control levels are set and the measures that are triggered.

- 17.3.3 When establishing solvency control levels it is recognised what level is deemed acceptable may differ from jurisdiction to jurisdiction and by types of business written and will reflect, amongst other things, the extent to which the pre-conditions for effective supervision exist within the jurisdiction and the risk tolerance of the particular supervisor. A certain level of insolvencies may be unavoidable and establishing an acceptable threshold for insolvencies may facilitate a competitive marketplace for insurers and avoid inappropriate barriers to market entry.
- 17.3.4 The criteria used by the supervisor to establish solvency control levels should be transparent. This is particularly important where legal action may be taken in response to an insurer violating a control level. In this case, control levels should generally be simple and readily explainable to a court when seeking enforcement of supervisory measures.
- 17.3.5 The supervisor may need to consider different solvency control levels for different scenarios of an insurer's operation - such as an insurer in a (solvent) run-off or an insurer operating as a going concern (see Guidance under 17.4.3-17.4.5).
- 17.3.6 In addition, the supervisor should consider the allowance for insurer management discretion and future action in response to changing circumstances or particular events. In allowing for insurer management discretion, the supervisor should only recognise actions that are practical and realistic for the circumstances under consideration. The supervisor should carefully consider the appropriateness of allowing for such management discretion in the particular case of the Minimum Capital Requirement (MCR) as defined in Standard 17.4.
- 17.3.7 Other considerations in establishing solvency control levels include:
- the way the quality of capital resources is addressed by the supervisor;
 - the coverage of risks in the determination of technical provisions and regulatory capital requirements and the extent of the sensitivity or stress analysis underpinning those requirements;
 - the relationship between the different solvency control levels;
 - the powers of the supervisor to set and adjust solvency control levels within the regulatory framework;
 - the accounting and actuarial frameworks applied in the jurisdiction (in terms of the valuation basis and assumptions that may be used and their impact on the values of assets and liabilities that underpin the determination of regulatory capital requirements);

- the comprehensiveness and transparency of disclosure frameworks in the jurisdiction and the ability for markets to exercise sufficient scrutiny and impose market discipline;
- policyholder priority and status under the legal framework relative to other creditors in the jurisdiction;
- overall level of capitalisation in the insurance sector in the jurisdiction;
- overall quality of risk management and governance frameworks in the insurance sector in the jurisdiction;
- the development of capital markets in the jurisdiction and their impact on the ability of insurers to raise capital; and
- the balance to be struck between protecting policyholders and the impact on the effective operation of the insurance sector and considerations around unduly onerous levels and costs of regulatory capital requirements.

Additional guidance for insurance groups and insurance legal entities that are members of groups

- 17.3.8 While the general considerations on the establishment of solvency control levels apply in a group-wide context as well as a legal entity context, the supervisory measures triggered at group level are likely to differ from those at legal entity level. As a group is not a legal entity, the scope for direct supervisory measures in relation to the group as a whole is more limited and measures may need to be taken through coordinated actions at legal entity level.
- 17.3.9 Nevertheless, group-wide solvency control levels are a useful tool for identifying a weakening of the financial position of a group as a whole or of particular parts of a group, which may, for example, increase contagion risk or impact reputation which may not otherwise be readily identified or assessed when considering individual group entities. The resulting timely identification and mitigation of a weakening of the financial position of a group may thus address a threat to the stability of the group or its insurance legal entities.
- 17.3.10 Group-wide solvency control levels may trigger a process of coordination and cooperation between different supervisors of group entities which would facilitate mitigation and resolution of the impact of group-wide stresses on insurance legal entities within a group.

Structure of regulatory capital requirements - triggers for supervisory measures in the context of legal entity capital adequacy assessment

- 17.4 The supervisor establishes at least two solvency control levels for insurance legal entities and, as appropriate, for insurance groups:**
- **The Prescribed Capital Requirement (PCR) is the solvency control level at which assets will exceed technical provisions and other liabilities with a specified degree of safety over a**

defined time horizon. If breached, the supervisor intervenes on capital adequacy grounds.

- **the Minimum Capital Requirement (MCR) is the lowest solvency control level below which no insurer is expected to be able to operate effectively. If breached, the supervisor intervenes with its strongest measures.**

- 17.4.1 A range of different measures should be taken by a supervisor depending on the event or concern that triggers such measures. Some of these triggers are linked to the level of an insurer's regulatory capital resources relative to the level at which regulatory capital requirements are set.
- 17.4.2 The higher regulatory capital requirement is the PCR. The PCR is set at the level at which if breached, the supervisor requires action to increase the regulatory capital resources held or reduce the risks undertaken by the insurer. This does not preclude the supervisor from requiring action for other reasons, such as weaknesses in the risk management or governance of the insurer. Nor does it preclude the supervisor from taking preventive measures when the insurer's regulatory capital resources are above the PCR but the supervisor expects them to fall below the PCR in the near term.
- 17.4.3 The PCR would generally be determined on a going concern basis. Therefore, in establishing the PCR to provide for an acceptable level of solvency, the potential growth in an insurer's portfolio may be considered.
- 17.4.4 The main aim of the MCR is to provide the minimum safety net for the protection of the interests of policyholders. The measures required for a breach of MCR could include stopping the activities of the insurance legal entity (eg withdrawal of its licence), requiring it to cease writing new business or run-off the portfolio, transfer its portfolio to another insurer, arrange additional reinsurance, or other specified actions. This position is different from the accounting concept of insolvency - the MCR may be set at a level in excess of the level at which the assets of the insurer are still expected to be sufficient to meet the insurer's obligations to existing policyholders as they fall due. Not breaching MCR does not preclude the supervisor requiring measures for other reasons.
- 17.4.5 Usually, the MCR would be constructed taking into consideration the possibility of ceasing to write new business. However, it is relevant to also consider the going concern scenario in the context of establishing the level of the MCR, as an insurer may continue to take on new risks up until the point at which a breach of MCR triggers the strongest supervisory measures. The supervisor should consider the appropriate relationship between the PCR and MCR, establishing a sufficient buffer between these two levels (including consideration of the basis on which the MCR is generated) within an appropriate continuum of solvency control levels, taking into account the different situations of business operation and other relevant considerations.

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- 17.4.6 Regulatory capital resources should also be capable of protecting policyholders if the insurer were to cease writing new business. Generally, the determination of regulatory capital resources on a going concern basis would not be expected to be less than if it is assumed that the insurer were to cease writing new business. However, this may not be true in all cases, since some capital elements may lose some or all of their value in the event of a solvent run-off, resolution or liquidation (eg because of a forced sale or because they reflect the anticipated value of writing future business). Similarly, some liabilities may actually be higher than if the portfolio is in run-off (eg claims handling expenses or fixed expenses to be covered only by the existing business, hence overall cost to be incurred could be higher).
- 17.4.7 In establishing a minimum bound on the MCR the supervisor may, for example, apply a market-wide nominal floor (such as an absolute monetary minimum amount of regulatory capital resources required to be held by an insurer in a jurisdiction) to the regulatory capital requirements, based on the need for an insurer to operate with a certain minimal critical mass and consideration of what may be required to meet minimum standards of governance and risk management. Such a nominal floor may vary between lines of business or type of insurance legal entity and is particularly relevant in the context of a new insurance legal entity or line of business.
- 17.4.8 Regulatory capital requirements may include additional solvency control levels between the PCR and MCR. These control levels may be set at levels that correspond to a range of different supervisory measures that may be taken by the supervisor itself or actions which the supervisor would require of the insurer according to the severity or level of concern regarding capital adequacy of the insurer. These additional control levels may be formally established by the supervisor with explicit measures linked to particular control levels. Alternatively, these additional control levels may be structured less formally, with a range of possible measures available to the supervisor depending on the particular circumstances. In either case the possible triggers and range of measures should be disclosed by the supervisor.
- 17.4.9 Possible measures include:
- measures that are intended to enable the supervisor to better assess and/or control the situation, either formally or informally, such as increased supervision activity or reporting, or requiring auditors or actuaries to undertake an independent review or extend the scope of their examinations;
 - measures to address regulatory capital requirements levels such as requesting capital and business plans for restoration of regulatory capital resources to required levels, limitations on redemption or repurchase of equity or other instruments and/or dividend payments;
 - measures intended to protect policyholders pending strengthening of the insurer's capital position, such as

restrictions on licences, premium volumes, investments, types of business, acquisitions, and/or reinsurance arrangements;

- measures that strengthen or replace the insurer's management and/or risk management system and overall corporate governance framework;
- measures that reduce or mitigate risks (and hence regulatory capital requirements) such as requesting reinsurance, hedging and other mechanisms; and/or
- refusing, or imposing conditions on, applications submitted for regulatory approval such as acquisitions or growth in business.

17.4.10 In establishing different solvency control levels, the possible measures at each level should be considered, as well as the probability that at each control level an insurance legal entity is able to increase its regulatory capital resources or access appropriate risk mitigation tools from the market.

17.4.11 It should be emphasised that an insurer meeting the regulatory capital requirements should not be taken to imply that further financial injections may not be necessary under any circumstances in future.

Structure of regulatory capital requirements - triggers for supervisory measures in the context of group-wide capital adequacy assessment

17.5 In the context of assessing group-wide capital adequacy, the supervisor establishes solvency control levels that are appropriate in the context of the approach to group-wide capital adequacy that is applied.

17.5.1 The design of group-wide solvency control levels depends on a number of factors. These include the supervisory perspective (ie the relative weight placed on group-wide supervision and insurance legal entity supervision) and the organisational perspective (ie the extent to which a group is considered as a set of interdependent entities or a single integrated entity) (see Figure 17.1). The solvency control levels are likely to vary according to a particular group and the supervisors involved. The supervisor should also define the relationship between the group-wide solvency control levels and the solvency control levels at insurance legal entity level for members of the group. The establishment of group-wide solvency control levels should be such as to enhance the overall supervision of the insurance legal entities in the group.

17.5.2 Having group-wide solvency control levels does not necessarily mean establishing a single regulatory capital requirements at group level. For example, under a legal entity approach consideration of the set of regulatory capital requirements for individual entities (and interrelationships between them) may enable appropriate decisions to be taken about supervisory measures on a group-wide basis. However, this requires the approach to be sufficiently well developed for group risks to be taken into account on a complete and consistent basis in the capital adequacy assessment of insurance legal entities in a group. To achieve consistency for insurance legal entity assessments, it may be necessary

to adjust the regulatory capital requirements used for insurance legal entities so they are suitable for group-wide assessment.

- 17.5.3 One approach may be to establish a single group-wide PCR or a consistent set of PCRs for insurance legal entities that are members of the group which, if any of these PCRs were breached, would trigger supervisory measures at group level. The determination of the PCR should also take into consideration the risks arising from non-insurance members of the group, including non-regulated members. This method may assist in achieving consistency of approach towards similar organisations with a branch structure and different group structures. Where a single group-wide PCR is determined, it may differ from the sum of insurance legal entity PCRs because of group factors including group diversification effects, group risk concentrations and IGTs. Similarly, where group-wide capital adequacy assessment involves the determination of a set of PCRs for the insurance legal entities in an insurance group, these may differ from the insurance legal entity PCRs if group factors are reflected differently in the group-wide capital assessment process. Differences in the level of safety established by different jurisdictions in which the group operates should be considered when establishing group-wide PCR(s).
- 17.5.4 The establishment of a single group-wide MCR may also be considered and may, for example, trigger supervisory measures to restructure the control and/or assets and liabilities of the group. A possible advantage of this approach is that it may encourage a group solution where an individual insurance legal entity is in financial difficulty and regulatory capital resources are sufficiently fungible. Alternatively, the protection provided by the supervisory power to intervene at an individual insurance legal entity level in breach of its MCR may be regarded as sufficient.
- 17.5.5 The solvency control levels adopted in the context of group-wide capital adequacy assessment should be designed so that together with the solvency control levels at insurance legal entity level they represent a consistent ladder of supervisory measures. For example, a group-wide PCR should trigger supervisory measures before a group-wide MCR because the latter invokes the supervisor's strongest actions. Also, if a single group-wide PCR is used it may be appropriate for it to have a floor equal to the sum of the MCRs of the individual insurance legal entities in the insurance group. Alternatively, the supervisor of an individual legal entity should notify the group-wide supervisor and any other relevant supervisory authority when that insurance legal entity has breached its local regulatory requirements (such as the MCR or its equivalent).
- 17.5.6 Supervisory measures triggered by group-wide solvency control levels should take the form of coordinated action by relevant involved supervisors. For example, this may involve increasing regulatory capital resources at holding company level or strategically reducing the risk profile or increasing regulatory capital resources in insurance legal entities within the group. Such supervisory measures may be exercised via the insurance legal entities within a group and via authorised holding companies. Supervisory measures in response to breaches of group-wide solvency control levels should not alter the existing division of

responsibility and authority amongst the involved supervisors of each individual insurance legal entity.

Structure of regulatory capital requirements - approaches to determining regulatory capital requirements

17.6 In determining regulatory capital requirements, the supervisor establishes standardised approaches and may allow, subject to approval, the use of more tailored approaches including (partial or full) internal models.

- 17.6.1 The supervisor may develop separate approaches for the determination of different regulatory capital requirements, in particular for the determination of the MCR and the PCR. For example, the PCR and MCR may be determined by two separate approaches, or the same approach may be used but with two different levels of safety specified. In the latter case, for example, the MCR may be defined as a simple proportion of the PCR, or the MCR may be determined on different specified target criteria to those specified for the PCR.
- 17.6.2 Regulatory capital requirements may be determined using a range of approaches, such as standard formulae or other approaches more tailored to the individual insurer (such as partial or full internal models), which are subject to approval by the relevant supervisors. A more tailored approach that is not an internal model may include, for example, approved variations in factors contained in a standard formula or prescribed scenario analysis which are appropriate for a particular insurer or group of insurers.
- 17.6.3 Regardless of the approach used, the principles and concepts that underpin the objectives for regulatory capital requirements described in this ICP apply and should be applied consistently by the supervisor to the various approaches. The approach adopted for determining regulatory capital requirements should take account of the nature and materiality of the risks insurers face generally and, to the extent practicable, should also reflect the nature, scale and complexity of the risks of the particular insurer.
- 17.6.4 Standardised approaches should be designed to deliver regulatory capital requirements which reasonably reflect the overall risk to which insurers are exposed, while not being unduly complex. Standardised approaches may differ in level of complexity depending on the risks covered and the extent to which they are mitigated, or may differ in application based on classes of business (eg life and non-life). Standardised approaches should be appropriate to the nature, scale and complexity of the risks that insurers face and should include approaches that are feasible in practice for insurers of all types including small and medium sized insurers, taking into account the technical capacity that insurers need to manage their businesses effectively.
- 17.6.5 A standardised approach may not be able to fully and appropriately reflect the risk profile of each individual insurer. Therefore, where appropriate, a supervisor may allow the use of more tailored approaches subject to approval. In particular, where an insurer has an internal model (or partial internal model) that appropriately reflects its risks and is

embedded into its risk management and reporting, the supervisor may allow the use of such a model to determine more tailored regulatory capital requirements. The use of the internal model for this purpose would be subject to prior approval by the supervisor based on a transparent set of criteria and would need to be evaluated at regular intervals. In particular, the supervisor would need to be satisfied that the insurer's internal model is, and remains, appropriately calibrated relative to the target criteria established by the supervisor (see Guidance under 17.12).

- 17.6.6 The supervisor should also be clear on whether an internal model may be used for the determination of the MCR. In this regard, the supervisor should take into account the main objective of the MCR as the minimum safety net for the protection of policyholders and the ability of the MCR to be defined in a sufficiently objective and appropriate manner to be enforceable.

Addressing risks

- 17.7 The supervisor addresses all relevant and material risks in insurers in valuation and/or regulatory capital requirements. If the risks are addressed in both valuation and regulatory capital requirements, the supervisor clarifies the extent to which the risks are addressed in each. The supervisor establishes how the risks and their aggregation are reflected in regulatory capital requirements.**

Types of risks to be addressed

- 17.7.1 Addressing all relevant and material categories of risk includes at least underwriting risk, credit risk, market risk and operational risk. This should include any significant risk concentrations (eg to economic risk factors, market sectors or individual counterparties), taking into account both direct and indirect exposures and the potential for exposures in related areas to become more correlated under stressed circumstances.

Dependencies and interrelations between risks

- 17.7.2 The assessment of the overall risk that an insurer is exposed to should address the dependencies and interrelationships between risk categories (eg between underwriting risk and market risk) as well as within a risk category (eg between equity risk and interest rate risk). This should include an assessment of potential reinforcing effects between different risk types as well as potential second order effects (ie indirect effects to an insurer's exposure caused by an adverse event or a change in economic or financial market conditions). It should also consider that dependencies between different risks may vary as general market conditions change and may significantly increase during periods of stress or when extreme events occur. "Wrong way risk" (the risk that occurs when exposure to counterparties, such as financial guarantors, is adversely correlated to the credit quality of those counterparty) should also be considered as a potential source of significant loss (eg in connection with derivative transactions). Where the determination of overall regulatory capital requirements takes into account diversification effects between different risk types, the insurer should be able to explain

the allowance for these effects and ensure that it considers how dependencies may increase under stressed circumstances.

Allowance for risk mitigation

- 17.7.3 Any allowance for reinsurance in determining regulatory capital requirements should consider the possibility of breakdown in the effectiveness of the risk transfer and the security of the reinsurance counterparty and any measures used to reduce the reinsurance counterparty exposure. Similar considerations would also apply for other risk mitigants (eg derivatives).

Treatment of risks which are difficult to quantify

- 17.7.4 Some risks, such as strategic risk, reputational risk and operational risk, are less readily quantifiable than other risks. Operational risk, for example, is diverse in its composition and depends on the quality of systems and controls in place. The measurement of operational risk, in particular, may suffer from a lack of sufficiently uniform and robust data and well developed valuation methods. Jurisdictions may choose to base regulatory capital requirements for these less readily quantifiable risks on some simple proxies for risk exposure and/or stress testing and/or scenario analysis. Requiring the insurer to control particular risks via exposure limits and/or qualitative requirements (such as additional systems and controls) may be more appropriate than requiring the insurer to hold additional regulatory capital resources.
- 17.7.5 However, it is envisaged that the ability to quantify some risks (such as operational risk) will improve over time as more data become available or improved valuation methods and modelling approaches are developed. Further, although it may be difficult to quantify some risks, it is important that an insurer nevertheless addresses all material risks in its ORSA.

Setting target criteria for regulatory capital requirements

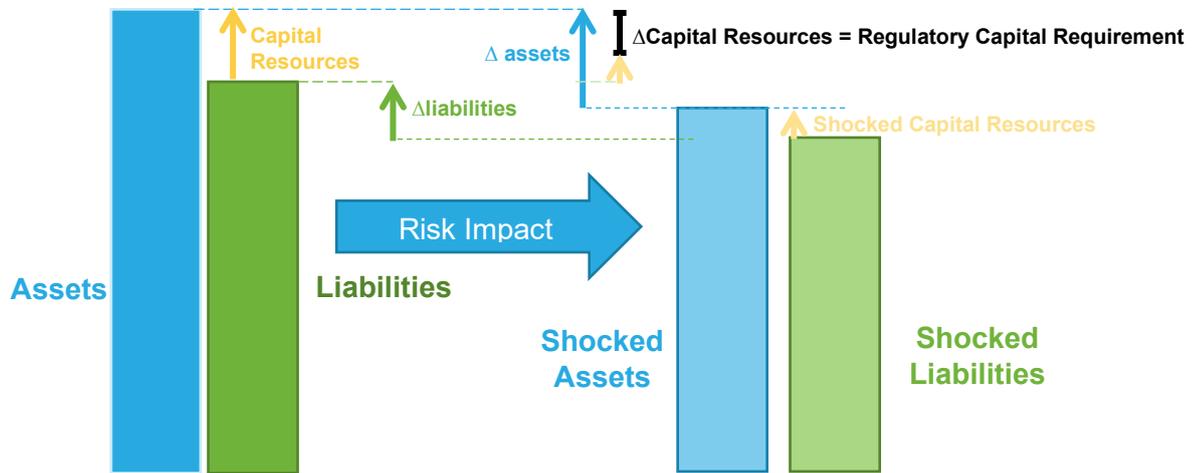
17.8 The supervisor sets target criteria for the calculation of regulatory capital requirements, which underlie the calibration of a standardised approach. Where the supervisor allows the use of more tailored approaches, the target criteria underlying the calibrations are not less prudent than those of the standardised approach.

- 17.8.1 The level at which regulatory capital requirements are set reflects the risk tolerance of the supervisor. It is important that individual jurisdictions set appropriate target criteria (such as risk measures, confidence levels or time horizons) for their regulatory capital requirements. Further, a jurisdiction should outline clear principles for the key concepts it uses to determine regulatory capital requirements, considering the factors that the supervisor should take into account in determining the relevant parameters as outlined in this ICP.
- 17.8.2 Where the supervisor allows the use of other more tailored approaches to determine regulatory capital requirements, the target criteria established should not be less prudent than those of the standardised approach. In particular, where the supervisor allows the use of internal

models for the determination of regulatory capital requirements, target criteria should be applied in approving the use of an internal model by an insurer for that purpose. This should achieve broad consistency among all insurers and a similar level of protection for all policyholders within the jurisdiction.

- 17.8.3 With regard to the choice of the risk measure and confidence level to which regulatory capital requirements are calibrated, some supervisors set a confidence level for regulatory purposes which is comparable with a minimum investment grade level. Some examples include a 99.5% Value at Risk (VaR) calibrated confidence level over a one year timeframe, 99% Tail Value at Risk (TVaR) over one year and 95% TVaR over the term of the policy obligations.
- 17.8.4 With regard to the choice of an appropriate time horizon, the determination and calibration of the regulatory capital requirements should be based on a more precise analysis, distinguishing between:
- the period over which a shock is applied to a risk factor – the shock period; and
 - the period over which the shock that is applied to a risk factor will impact the insurer– the effect horizon.
- 17.8.5 For example, a one-off shift in the interest rate term structure during a shock period of one year has consequences for the discounting of the cash flows over the full term of the policy obligations (the effect horizon). A judicious opinion (eg on an appropriate level of compensation) in one year (the shock period) may have permanent consequences for the value of claims and hence change the projected cash flows to be considered over the full term of the policy obligations (the effect horizon).
- 17.8.6 The impact on cash flows of each stress that is assumed to occur during the shock period should be calculated over the effect horizon for the relevant cash flows. In many cases this is the full term of the insurance obligations. In some cases, realistic allowance for reducing discretionary benefits to policyholders or other offsetting management actions may be considered where they could and would be made and would be effective in reducing policy obligations or in reducing risks in the circumstances of the stress. At the end of the shock period, regulatory capital resources have to be sufficient so that the assets cover the liabilities (including technical provisions) redetermined at the end of the shock period. The redetermination of the technical provisions would allow for the impact of the shock on the technical provisions over the full time horizon of the policy obligations.
- 17.8.7 Figure 17.2 illustrates key aspects relevant to the determination of regulatory capital requirements:

Figure 17.2: Illustration of determination of regulatory capital requirements



- 17.8.8 For the determination of technical provisions, an insurer is expected to consider the likely (or expected) variation of future experience from what is assumed in determining the current estimate, over the full period of the policy obligations. As indicated above, regulatory capital requirements should be calibrated such that assets exceed the liabilities during a defined shock period with an appropriately high degree of safety. The regulatory capital requirements should be set such that the insurer's regulatory capital resources can withstand a range of predefined shocks or stress scenarios that are assumed to occur during that shock period (and which lead to significant unexpected losses over and above the expected losses that are captured in the technical provisions).

Calibration and measurement error

- 17.8.9 The risk of measurement error inherent in any approach used to determine regulatory capital requirements should be considered. This is especially important where there is a lack of sufficient statistical data or market information to assess the tail of the underlying risk distribution. To mitigate model error, quantitative risk calculations should be blended with qualitative assessments, and, where practicable, multiple risk measurement tools should be used. To help assess the economic appropriateness of risk-based regulatory capital requirements, information should be sought on the nature, degree and sources of the uncertainty surrounding the determination of regulatory capital requirements in relation to the established target criteria.
- 17.8.10 The degree of measurement error inherent, particularly in a standardised approach, depends on the degree of sophistication and granularity of the methodology used. A more sophisticated standardised approach has the potential to be aligned more closely to the true distribution of risks across

insurers. However, increasing the sophistication of a standardised approach is likely to imply higher compliance costs for insurers and more intensive use of supervisory resources (for example, in validating the calculations). The calibration of a standardised approach therefore needs to balance the trade-off between risk-sensitivity and compliance costs.

Procyclicality

- 17.8.11 When applying risk-based regulatory capital requirements, there is a risk that an economic downturn will trigger supervisory measures that exacerbate the economic crises, thus leading to an adverse “procyclical” effect. For example, a severe downturn in share markets may result in a depletion of the regulatory capital resources of a major proportion of insurers. This in turn may force insurers to sell assets with high regulatory capital requirements and to invest in less risky assets in order to decrease the regulatory capital requirements. A simultaneous massive selling of such assets by insurers could, however, lead to a further drop in prices and to a worsening of the economic crisis.
- 17.8.12 However, the system of solvency control levels enables the supervisor to introduce a more principles-based choice of supervisory measures in cases where there may be a breach of the PCR, and this can assist in avoiding exacerbation of procyclicality effects. Supervisory measures are able to be more targeted and flexible in the context of an overall economic downturn so as to avoid measures that may have adverse macroeconomic effects.
- 17.8.13 The supervisors should consider whether further explicit procyclicality-dampening measures are needed. They may include allowing a longer period for corrective measures or allowance for the calibration of the regulatory capital requirements to reflect procyclicality dampening measures. Overall, when such dampening measures are applied, an appropriate balance needs to be achieved to preserve the risk sensitivity of the regulatory capital requirements.
- 17.8.14 In considering the impacts of procyclicality, the influence of external factors (for example, the influence of credit rating agencies) should be given due regard. The impacts of procyclicality also heighten the need for supervisory cooperation and communication.

Additional guidance for insurance groups and insurance legal entities that are members of groups

- 17.8.15 Approaches to determining group-wide regulatory capital requirements depend on the overall approach taken to group-wide capital adequacy assessment. Where a group level approach is used, either the group’s consolidated accounts may be taken as a basis for calculating group-wide regulatory capital requirements or the requirements of each insurance legal entity may be aggregated or a mixture of these methods may be used. For example, if a different treatment is required for a particular entity (such as an entity located in a different jurisdiction) it may be disaggregated from the consolidated accounts and then included in an appropriate way using a deduction and aggregation approach.

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- 17.8.16 Where consolidated accounts are used, the requirements of the jurisdiction in which the ultimate parent of the group is located would normally be applied. Consideration should also be given to the scope of the consolidated accounts used for financial reporting purposes as compared to the consolidated balance sheet used as a basis for group-wide capital adequacy assessment (eg for the identification and appropriate treatment of non-insurance group entities).
- 17.8.17 Where an aggregation method is used to calculate group-wide regulatory capital requirements or where a legal entity focus for group-wide capital adequacy assessment is adopted, consideration should be given as to whether local regulatory capital requirements can be used for insurance legal entities within the group which are located in other jurisdictions or whether regulatory capital requirements should be recalculated according to the requirements of the jurisdiction in which the ultimate parent of the group is located.

Group risks

- 17.8.18 There are a number of group factors that should be taken into account in determining group-wide regulatory capital requirements including diversification of risk across group entities, IGTs, risks arising from non-insurance group entities, treatment of group entities located in different jurisdictions and treatment of partially-owned or controlled entities and minority interests. Particular concerns may arise from a continuous sequence of internal financing within the group, or closed loops in the financing scheme of the group.
- 17.8.19 Group risks posed by each group entity to insurance members of the group and to the group as a whole are a key factor in an overall assessment of group-wide capital adequacy. Such risks are typically difficult to measure and mitigate and include notably contagion risk (financial, reputational, legal), concentration risk, complexity risk and operational/organisational risks. As groups can differ significantly it may not be possible to address these risks adequately using a standardised approach for regulatory capital requirements. It may therefore be necessary to address group risks through the use of more tailored approaches to regulatory capital requirements. Alternatively, supervisors may vary the standardised regulatory capital requirements so that group risks are adequately provided for in the insurance legal entity and/or group-wide capital adequacy assessment (see Standard 17.9).
- 17.8.20 Group risks should be addressed from both an insurance legal entity perspective and group-wide perspective. Consideration should be given to the potential for duplication or gaps between insurance legal entity and group-wide approaches.

Diversification of risks between group entities

- 17.8.21 In the context of a group-wide solvency assessment, there should also be consideration of dependencies and interrelations of risks across different members in the group. However, this does not mean that where diversification effects exist these should be recognised automatically in an assessment of group-wide capital adequacy. It may, for example, be

appropriate to limit the extent to which group diversification effects are taken into account for the following reasons:

- diversification may be difficult to measure at any time, particularly in times of stress. Appropriate aggregation of risks is critical to the proper evaluation of such benefits for solvency purposes;
- there may be constraints on the transfer of diversification benefits across group entities and jurisdictions because of a lack of fungibility of regulatory capital resources or transferability of assets; or
- diversification may be offset by concentration/aggregation effects (if this is not separately addressed in the assessment of group-wide regulatory capital resources).

17.8.22 Regardless of approach to assessing group-wide capital adequacy, an assessment of group diversification benefits is necessary. Under a legal entity approach, recognition of diversification benefits may require consideration of the diversification between the business of an insurance legal entity and other entities within the group of which it is a part and of IGTs. Under a consolidated accounts approach, some diversification benefits are recognised automatically at the level of the consolidated group. In this case, supervisors need to consider whether it is prudent to recognise such benefits or whether an adjustment should be made in respect of potential restrictions on the transferability or sustainability under stress of increases in regulatory capital resources created by group diversification benefits.

Intra-group transactions

17.8.23 IGTs may result in complex and/or opaque intra-group relationships which may give rise to increased risks at insurance legal entity and group level, such as when the balance sheet is not fully consolidated. In a group-wide context, credit for risk mitigation should only be recognised in group-wide regulatory capital requirements to the extent that risk is transferred outside the group. For example, the transfer of risk to a captive reinsurer or to an intra-group insurance special purpose entity should not result in a reduction of overall group-wide regulatory capital requirements.

Non-insurance group entities

17.8.24 In addition to insurance legal entities, an insurance group may include a range of different types of non-insurance legal entities, either subject to no financial regulation (non-regulated entities) or regulated under other financial sector regulation. The impact of all such entities should be taken into account in the overall assessment of group-wide solvency, but the extent to which they can be captured in a group-wide capital adequacy measure as such will vary according to the type of non-insurance legal entity, the degree of control/influence on that entity and the approach to group-wide supervision.

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- 17.8.25 Risks from non-regulated entities are typically difficult to measure and mitigate. Supervisors may not have direct access to information on such entities, but it is important that supervisors are able to assess the risks they pose in order to apply appropriate mitigation measures. Measures taken to address risks from non-regulated entities do not imply active supervision of such entities.
- 17.8.26 There are different approaches to addressing risks stemming from non-regulated entities such as capital measures, non-capital measures or a combination thereof.
- 17.8.27 One approach may be to increase regulatory capital requirements for regulated entities in order that the group holds sufficient regulatory capital resources. If the activities of the non-regulated entities have similar risk characteristics to insurance activities (eg certain credit enhancement mechanisms as compared to traditional bond insurance) it may be possible to calculate an equivalent capital charge. Another approach may be to deduct the value of holdings in non-regulated entities from the regulatory capital resources of the insurance legal entities in the group, but this on its own may not be sufficient to cover the risks involved.
- 17.8.28 Non-capital measures may include, for example, limits on exposures and requirements on risk management and governance applied to insurance legal entities with respect to non-regulated entities within the group.

Partial ownership and minority interests

- 17.8.29 An assessment of group-wide capital adequacy should include an appropriate treatment of partially-owned or controlled group entities and minority interests. Such treatment should take into account the nature of the relationships of these entities within the group and the risks and opportunities they bring to the group. The financial reporting may provide a starting point. Consideration should be given to the availability of any minority interest's share in the net equity in excess of regulatory capital requirements of a partially-owned entity.

Variation of regulatory capital requirements

17.9 The supervisor allows variations to the regulatory capital requirements only in limited circumstances. Any variations take into account the nature, scale and complexity of the risks and the target criteria.

- 17.9.1 A standardised approach may not be able to fully and appropriately reflect the risk profile of each insurer. In cases where a standardised approach established for determining regulatory capital requirements does not materially capture the risk profile of the insurer, the supervisor should have the flexibility to increase the regulatory capital requirements of the insurer. For example, an insurer using the standardised approach may warrant a higher PCR or other regulatory capital requirements at insurance legal entity or group level, if it is undertaking higher risk activities, (eg offering new products where credible experience is not available to establish technical provisions) or if it is exposed to significant risks that are not specifically covered by the standard approach.

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- 17.9.2 Similarly, in some circumstances when an approved more tailored approach is used for regulatory capital purposes, it may be appropriate for the supervisor to have some flexibility to increase the regulatory capital requirements calculated using that approach. In particular, where an internal model or partial internal model is used for regulatory capital purposes, the supervisor may increase the regulatory capital requirements where it considers the internal model does not adequately capture certain risks, until the identified weaknesses have been addressed. For example, this may arise even though the model has been approved where there has been a change in the business of the insurer and there has been insufficient time to fully reflect this change in the model and for a new model to be approved by the supervisor.
- 17.9.3 In addition, supervisory requirements may be designed to allow the supervisor to decrease the regulatory capital requirements for an insurer where the standardised approach materially overestimates the regulatory capital requirements according to the target criteria. However, such an approach may require a more intensive use of supervisory resources due to requests from insurers for consideration of a decrease in their regulatory capital requirement. Therefore, not all jurisdictions may wish to allow such an option. Further, this reinforces the need for such variations in regulatory capital requirements to be allowed only in very limited circumstances.
- 17.9.4 Any variations made by the supervisor to the regulatory capital requirements calculated by the insurer should be made in a transparent manner and be appropriate to the nature, scale and complexity of risks as well as the target criteria. For example the supervisor may develop criteria to be applied in determining such variations and appropriate discussions between the supervisor and the insurer may occur. Variations in regulatory capital requirements from those calculated using standardised approaches made following supervisory review or approved more tailored approaches should be expected to be made only in very limited circumstances.
- 17.9.5 In undertaking its ORSA, the insurer considers the extent to which the regulatory capital requirements (in particular, any standardised formula) adequately reflect its particular risk profile. In this regard, the ORSA undertaken by an insurer can be a useful source of information for the supervisor in reviewing the adequacy of the regulatory capital requirements of the insurer and in assessing the need for variation in those requirements.

Identification of regulatory capital resources

- 17.10 The supervisor establishes the approach to identify regulatory capital resources and their value. Such an approach is consistent with a total balance sheet approach for solvency assessment and addresses the quality and suitability of capital resources.**
- 17.10.1 The following outlines a number of approaches a supervisor could use for the determination of regulatory capital resources in line with this requirement. The determination of regulatory capital resources would

generally require the following steps as described in Guidance under 17.11:

- the amount of capital resources potentially eligible to meet regulatory capital requirements is identified;
- an assessment of the quality and suitability of those capital resources is then carried out; and
- on the basis of this assessment, the regulatory capital resources are determined.

17.10.2 In addition, the insurer is required to carry out its own assessment of its capital resources to meet regulatory capital requirements and any additional capital needs (see ICP 16 Enterprise Risk Management for Solvency Purposes).

Regulatory capital resources under a total balance sheet approach

17.10.3 A total balance sheet approach requires that the determination of regulatory capital requirements and resources is based on consistent assumptions for the recognition and valuation of assets and liabilities for solvency purposes.

17.10.4 The objective of regulatory capital requirements is to ensure that, in adversity, an insurer's obligations to policyholders will continue to be met as they fall due. This objective is achieved if technical provisions and other liabilities remain covered by assets over a defined period, to a specified level of safety.

17.10.5 To achieve consistency with this economic approach to setting capital requirements in the context of a total balance sheet approach, capital resources should broadly be regarded as the difference between assets and liabilities on the basis of their recognition and valuation for solvency purposes.

17.10.6 When regarding capital resources as the difference between assets and liabilities, the following issues should be considered:

- the extent to which certain liabilities other than technical provisions may be treated as regulatory capital resources;
- whether contingent assets may be included;
- the treatment of assets which may not be fully realisable in a going concern, solvent run-off, or in liquidation/resolution; and
- reconciliation of such a "top down" approach to determining capital resources with a "bottom up" approach which sums up individual capital elements to derive the overall amount of capital resources.

Treatment of liabilities

17.10.7 Certain liabilities other than technical provisions may be treated as regulatory capital resources

17.10.8 Subordinated debt instruments (whether perpetual or not) may be treated as regulatory capital resources if they satisfy the criteria established by

the supervisor. Adequate recognition should be given to contractual features of the debt such as embedded options which may change its loss absorbency. For example, perpetual subordinated debt, although usually classified as a liability under the relevant accounting standards, could be recognised as regulatory capital resources because of its availability to act as a buffer to reduce the loss to policyholders and senior creditors through subordination.

17.10.9 Other liabilities without loss absorbency features would not be considered as part of the capital resources.

Treatment of contingent assets

17.10.10 It may be appropriate to include contingent capital elements that are not recognised under relevant accounting standards, where the likelihood of payment if needed is sufficiently high according to criteria specified by the supervisor. Such contingent capital elements may include, for example, letters of credit, members' calls by a mutual insurer or the unpaid element of partly paid capital elements. Their recognition as regulatory capital may be subject to prior approval by the supervisor.

Treatment of assets which may not be fully realisable on a going concern, solvent run-off or liquidation/resolution basis

17.10.11 The supervisor should consider that, for certain assets in the balance sheet, the realisable value under a liquidation or resolution scenario may be significantly lower than the economic value which is attributable under going concern conditions. Similarly, even under normal business conditions, some assets may not be realisable at full economic value, or at any value, at the time they are needed. This may render such assets unsuitable for inclusion at their full economic value for solvency purposes. In particular, the supervisor should consider the value of contingent assets for solvency purposes, taking into account the criteria set out in Standard 17.11.

17.10.12 Examples of such assets include:

- intangible assets: their realisable value may be uncertain even during normal business conditions and may have no significant marketable value in a solvent run-off or liquidation (goodwill is a common example);
- deferred tax assets: such credits may only be realisable if there are future taxable profits, which is improbable in the event of liquidation;
- implicit accounting assets: under some accounting models, certain items regarding future income are included, implicitly or explicitly, as asset values. In the event of solvent run-off or liquidation, such future income may be reduced;
- investments in other insurers or financial institutions: such investments may have uncertain realisable value if there were contagion risk between entities; also there is the risk of double gearing where such investments lead to a recognition of the same amount of capital resources in several financial entities.

These investments include, for example, the equity of, or loans or bonds issued by, related parties;

- company-related assets: certain assets carried in the accounting statements of the insurer could lose some of their value in the event of solvent run-off or liquidation, for example physical assets used by the insurer in conducting its business which may reduce in value in a forced sale; and
- encumbered assets: certain assets may not be fully accessible to the insurer (for example, pledged assets or surplus in a corporate pension arrangement).

17.10.13 The treatment of such assets for capital adequacy purposes may need to reflect an adjustment. Generally, such an adjustment may be carried out as one of the following:

- directly, by not admitting a portion of or the full economic value of the asset for solvency purposes;
- indirectly, through an addition to regulatory capital requirements; or
- through a combination of both approaches.

17.10.14 When an asset value is adjusted, in order to avoid double penalty, only the reduced value of the asset should be used in the determination of regulatory capital requirements for the risk of holding that asset.

Reconciliation of approaches

17.10.15 The approach to determining capital resources as the amount of assets over liabilities (with the potential adjustments as discussed above) may be described as a top-down approach (ie starting with the high level capital resources as reported in the balance sheet and adjusting it in the context of the relevant solvency control level). An alternative, bottom-up approach sums up the amounts of particular capital elements which are specified as being acceptable. The bottom-up approach should be reconcilable to the top-down approach on the basis that the allowable capital elements under the bottom-up approach should ordinarily include all items which contribute to the excess of assets over liabilities in the balance sheet, with the addition or exclusion of items.

Other considerations

17.10.16 A number of factors may be considered by the supervisor in identifying what may be recognised as regulatory capital resources, including:

- the way in which the quality of capital resources is addressed by the supervisor, including whether or not quantitative requirements are applied to the composition of regulatory capital resources and/or whether or not a tiering or continuum-based approach is used (see Guidance 17.11.36);
- the coverage of risks in the determination of technical provisions and regulatory capital requirements;

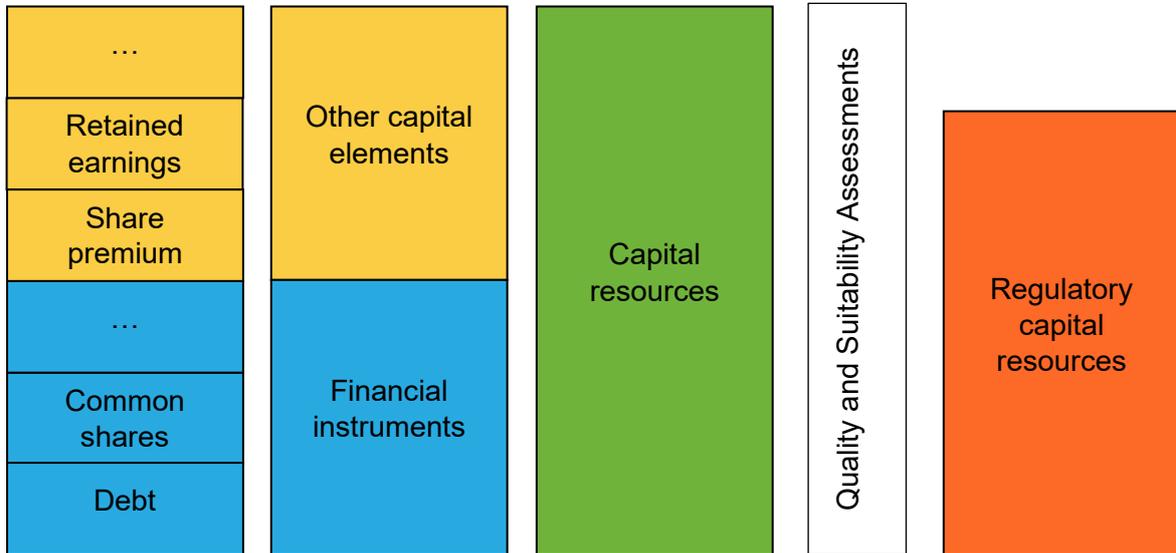
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- the assumptions in the valuation of assets and liabilities (including technical provisions) and the determination of regulatory capital requirements (eg going concern basis, solvent run-off, or liquidation or resolution basis, before tax or after tax);
 - policyholder priority and status under the legal framework relative to other creditors in the jurisdiction;
 - overall quality of risk management and governance frameworks in the insurance sector in the jurisdiction;
 - the comprehensiveness and transparency of disclosure frameworks in the jurisdiction and the ability for markets to exercise sufficient scrutiny and impose market discipline;
 - the development stage of the capital market in the jurisdiction and its impact on the ability of insurers to raise capital;
 - the balance to be struck between protecting policyholders and the impact on the effective operation of the insurance sector and considerations around unduly onerous levels and costs of regulatory capital requirements;
 - the relationship between risks faced by insurers and those faced by other financial services entities, including banks.

Additional guidance for insurance groups and insurance legal entities that are members of groups

17.10.17 The practical application of these considerations may differ according to whether a legal entity focus or a group level focus is taken to group-wide supervision. Whichever approach is taken, key group-wide factors to be addressed in the determination of group-wide regulatory capital resources include multiple gearing, intra-group creation of regulatory capital resources and reciprocal financing, leverage of the quality of regulatory capital resources and fungibility of regulatory capital resources and free transferability of assets across group entities. There may be particular concerns where such factors involve less transparent transactions (eg because they involve both regulated and non-regulated entities or where there is a continuous sequence of internal financing within the group, or closed loops in the financing of the group).

17.10.18 Figure 17.3 provides an overview of the process to establish regulatory capital resources.

Figure 17.3



Capital resources consist of capital elements, which can either be financial instruments (eg common shares) or other capital elements (eg retained earnings). These capital resources are assessed with respect to their quality and suitability. This assessment allows for determination of regulatory capital resources eligible to cover regulatory capital requirements.

Criteria for the assessment of the quality and suitability of capital resources

17.11 The supervisor establishes criteria for assessing the quality and suitability of capital resources, having regard to their ability to absorb losses in all of the following: going concern, solvent run-off, and liquidation/resolution bases.

17.11.1 In view of the two objectives of regulatory capital resources, the following questions should be considered when establishing criteria to determine the quality and suitability of capital resources for regulatory purposes:

- To what extent can capital resources be used to absorb losses on a going concern basis or solvent run-off?
- To what extent can capital resources be used to reduce the loss to policyholders in the event of liquidation or resolution?

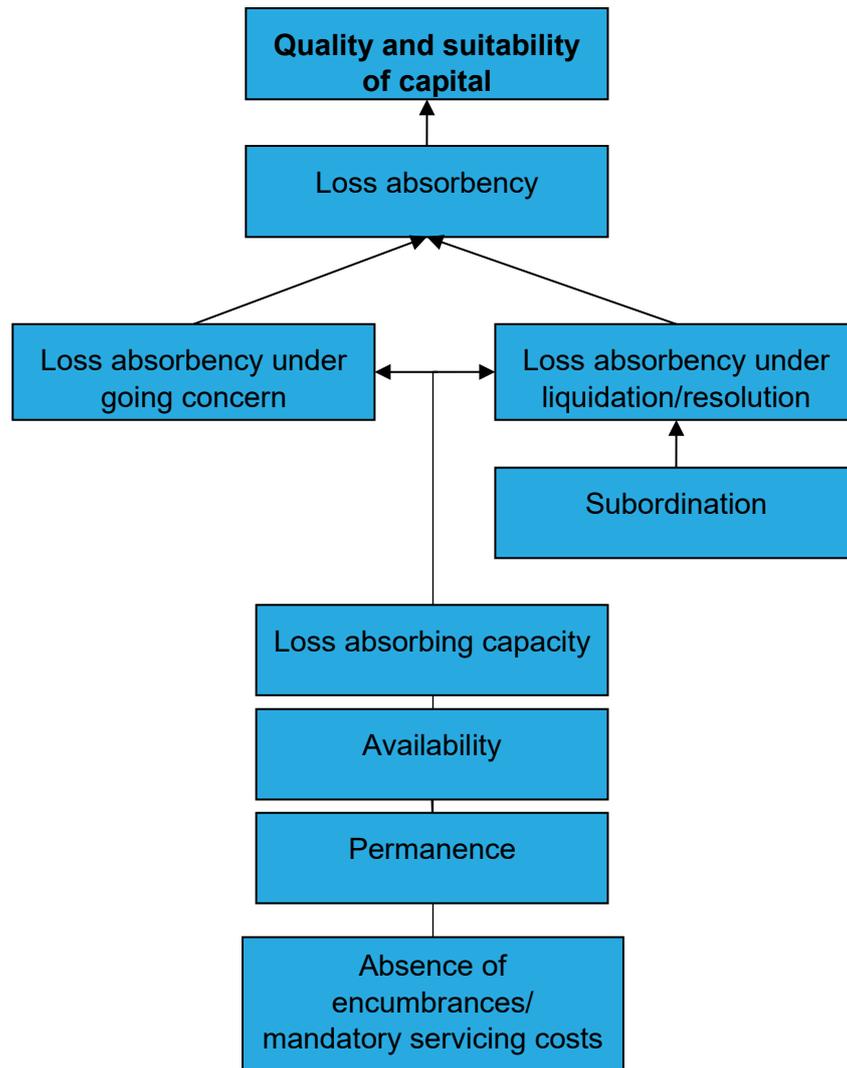
17.11.2 Some capital elements are available to absorb losses on a going concern basis, solvent run-off and liquidation. For example, common shareholders' funds (ordinary shares and retained earnings) allow the insurer to absorb losses on an ongoing basis, are permanently available and rank as the most subordinated capital elements in a liquidation.

Further, this capital element best allows insurers to conserve resources when they are under stress because it provides an insurer with full discretion as to the amount and timing of distributions. Consequently, common shareholders' funds are a core element of regulatory capital resources.

- 17.11.3 As the extent of loss absorbency of other capital elements can vary considerably, the supervisor should take a holistic approach to evaluating the extent of loss absorbency overall and should establish criteria to evaluate capital elements in this regard, taking into account empirical evidence, where available, that particular capital elements have or have not absorbed losses in practice.
- 17.11.4 To complement the structure of regulatory capital requirements, the supervisor may choose to vary the criteria for regulatory capital resources to cover the different solvency control levels established by the supervisor. Where such an approach is chosen, the criteria relating to regulatory capital resources to cover an individual control level should take into consideration the supervisory measure that may arise if the level is breached, and the objective of policyholder protection.
- 17.11.5 For example, considering that the main aim of the MCR is to provide the minimum safety net for the protection of the interests of policyholders, the supervisor may decide to establish more stringent quality criteria for regulatory capital resources to cover the MCR (regarding such resources as a last line of defence for the insurer both during normal times and in liquidation/resolution) than for regulatory capital resources to cover the PCR.
- 17.11.6 Alternatively, a common set of criteria for regulatory capital resources could be applied at all solvency control levels, with regulatory capital requirements reflecting the different nature of the various solvency control levels.
- 17.11.7 In assessing the quality and suitability of capital resources, the supervisor should determine their ability to absorb losses by reviewing the following characteristics:
- loss absorbing capacity (on a going concern basis, solvent run-off and/or in liquidation);
 - subordination;
 - availability to absorb losses;
 - permanence; and
 - absence of mandatory servicing costs or encumbrances.

17.11.8 Figure 17.4 illustrates the relationship between these characteristics.

Figure 17.4



17.11.9 The characteristics of capital resources described above may be used to establish criteria for an assessment of the quality and suitability of capital elements for regulatory purposes. It is recognised that views about the specific characteristics that are acceptable may differ by jurisdiction and will reflect, amongst other things, the extent to which the pre-conditions for effective supervision exist within the jurisdiction and the risk tolerance of the supervisor.

Loss absorbing capacity

17.11.10 Loss absorbing capacity refers to the extent to which, and in which circumstances, the capital element absorbs losses. In order to protect policyholders, the value of the capital element should be able to be depleted to absorb losses.

17.11.11 Some contractual features may be considered when assessing loss absorbing capacity. For example, certain financial instruments contain a Principal Loss Absorbency Mechanism (PLAM), which is a mechanism providing for either a write-down of the liability (principal and dividend/coupon) or a conversion of the instrument into a financial instrument treated as regulatory capital resources in contractually predefined going concern conditions. Such mechanisms provide a means for such instruments to absorb losses on a going concern basis.

Subordination

- 17.11.12 The determination of suitable capital elements for solvency purposes is critically dependent upon the legal environment of the relevant jurisdiction. Policyholders are given a high legal priority within the liquidation claims hierarchy; however, they do not necessarily have the highest priority (see ICP 12 Exit from the Market and Resolution). The supervisor should evaluate each potential capital element in the context that its value and suitability, and hence an insurer's solvency position may change significantly in a liquidation or resolution scenario. In most jurisdictions the payment priority in a liquidation is clearly stated in law.
- 17.11.13 In order to qualify as a regulatory capital resource, a financial instrument should be subordinated to the rights of policyholders and to other non-subordinated creditors. This implies that the holder of a financial instrument is not entitled to repayment, dividends or interest once liquidation or resolution proceedings have been started until all insurance obligations have been satisfied. Subordinated instruments will often have to meet other conditions in order to qualify as regulatory capital resources, as discussed below, and which may include supervisory approval.
- 17.11.14 In addition, there should be no encumbrances that undermine the subordination or render it ineffective. One example of this would be applying rights of offset where creditors are able to set off amounts they owe the insurer against the subordinated financial instrument. Rights of offset will vary according to the jurisdiction's legal framework. Further, the instrument should not be guaranteed by either the insurer or another related entity unless it is clear that the guarantee is available subject to policyholder priority. In some jurisdictions, subordination to other creditors may also need to be taken into account.
- 17.11.15 The supervisor should evaluate each potential capital element in the context that its value and suitability, and hence an insurer's solvency position may change significantly in a liquidation or resolution scenario. In most jurisdictions the payment priority in a liquidation is clearly stated in law.
- 17.11.16 In context of insurance groups, the form of subordination can be either contractual or structural. Structural subordination of debt refers to a situation where a holding company issues a financial instrument directly to third party investors and then down-streams the proceeds into insurance legal entities.

Availability

- 17.11.17 In order for regulatory capital resources to be available to absorb unexpected losses, it is important that capital elements are fully paid.
- 17.11.18 However, in some circumstances, a capital element may be paid for in kind (ie issued for non-cash). The supervisor should define the extent to which payment other than cash is acceptable for a capital element to be treated as fully paid without prior approval by the supervisor, and the circumstances where payment for non-cash consideration may be considered as suitable subject to approval by the supervisor. There may be issues, for example, about the valuation of the non-cash components or the interests of parties other than the insurer.
- 17.11.19 It may also be appropriate to treat certain contingent capital elements as capital resources when the probability of payment is expected to be sufficiently high (for example, the unpaid part of partly paid capital, contributions from members of a mutual insurer or letters of credit, see Guidance 17.10.11).
- 17.11.20 Where the supervisor allows contingent capital elements to be included in the determination of capital resources, such inclusion would be expected to be subject to meeting specific supervisory requirements or prior supervisory approval. When assessing the appropriateness of inclusion of a contingent capital element, the following should be considered:
- the ability and willingness of the counterparty concerned to pay the relevant amount;
 - the recoverability of the funds, taking into account any conditions which would prevent the item from being successfully paid in or called up; and
 - any information on the outcome of past calls which have been made in comparable circumstances by other insurers, which may be used as an indication of future availability.

Fungibility and transferability

- 17.11.21 The availability of capital elements may also be impaired when capital is not fully fungible. While the fungibility of regulatory capital resources and transferability of assets is primarily an issue in the context of group-wide solvency assessment, it may also be relevant for the supervision of an insurance legal entity.
- 17.11.22 In general, a lack of fungibility could occur when part of the assets or surplus of the insurer is segregated from the rest of its operations in a ring-fenced fund. In such cases, assets in the fund may only be able to be used to meet obligations to policyholders with respect to which the fund has been established. In these circumstances, the insurer's regulatory capital resources relating to the ring-fenced fund can only be used to cover losses stemming from risks associated with the fund (until transferred out of that fund) and cannot be transferred to meet the insurer's other obligations.
- 17.11.23 In the context of a group-wide solvency assessment, excess capital resources in an insurance legal entity above the level needed to cover

its own regulatory capital requirements may not always be available to cover losses or regulatory capital requirements in other entities in the group. Free transfer of assets and regulatory capital resources may be restricted by either operational or legal limitations. Some examples of such legal restrictions are exchange controls, surpluses in with-profits funds of life insurers which are earmarked for the benefit of policyholders and rights that holders of certain instruments may have over the assets of the legal entity. In normal conditions, regulatory capital resources at the top of a group can be down-streamed to cover losses in group entities lower down the chain. However, in times of stress such parental support may not always be forthcoming or permitted.

- 17.11.24 The group-wide capital adequacy assessment should identify and appropriately address restrictions on the fungibility of regulatory capital resources and transferability of assets within the group in both normal and stress conditions. The identification of, and provision for, restricted availability of funds may be facilitated by a legal entity approach which identifies the location of regulatory capital resources and takes into account legally enforceable mechanism that allow intra-group transfer of risk and capital. Conversely a group level approach using consolidated accounts (which generally assumes that regulatory capital resources and assets are readily fungible/transferable around the group) should be adjusted to provide for the restricted availability of funds.

Permanence

- 17.11.25 To provide suitable protection for policyholders for solvency purposes, a capital element should be available to protect against losses for a sufficiently long period to ensure that it is available to the insurer when needed. Supervisors may want to determine a minimum period that capital elements should be outstanding to be recognised as regulatory capital resources.
- 17.11.26 When assessing the extent of permanence of a capital element, the following should be considered:
- the duration of the insurer's obligations to policyholders, which should be assessed on an economic basis rather than strict contractual basis, if that leads to longer durations;
 - contractual features of the capital instrument which have an effect on the period for which the capital is available (eg lock-in clauses, step-up options or call options);
 - any supervisory powers to restrict the redemption of capital resources; and
 - the time it may take to replace the capital element on suitable terms as it approaches maturity.
- 17.11.27 Similarly, if a capital element has no fixed maturity date, the notice required for repayment should be assessed against the same criteria.
- 17.11.28 It is important to take into account incentives to redeem a capital element prior to its maturity date; such incentives may exist in a capital element, and they may effectively reduce the period for which the capital

is available. For example, a financial instrument which features a coupon rate which increases from its initial level at a specified date after issue, may give rise to an expectation that the instrument will be paid back at that future specified date.

Absence from mandatory servicing requirements or encumbrances

- 17.11.29 The extent to which capital elements require servicing in the form of interest payments, shareholder dividend payments and principal repayments should be considered, as it affects the insurer's ability to absorb losses on a going concern basis.
- 17.11.30 Capital elements that have a fixed maturity date may have fixed servicing costs that cannot be waived or deferred before maturity. The presence of such features also affects the insurer's ability to absorb losses on a going concern basis and may accelerate insolvency if the payment of a servicing cost results in the insurer breaching its regulatory capital requirements.
- 17.11.31 A further consideration is the extent to which payments to capital providers or redemption of capital elements should be restricted or subject to supervisory approval. For example, the supervisor may have the ability to restrict the payment of dividends or interest and any redemption of regulatory capital resources where considered appropriate to preserve the solvency position of the insurer. Insurers may also issue capital elements for which payments and redemptions are fully discretionary or subject to supervisory approval according to the contractual terms.
- 17.11.32 Some capital elements are structured so as to restrict the payment of dividends or interest and any redemption of regulatory capital resources where an insurer is breaching or near to breaching its regulatory capital requirements and/or is incurring loss. The payment of dividends or interest may also be subordinated to policyholder interests in case of liquidation or resolution. Such features contribute to the ability of the capital elements to absorb losses on a liquidation or resolution basis provided that any claims to unpaid dividends or interest are similarly subordinated.
- 17.11.33 It should also be considered whether the capital elements contain encumbrances which may restrict their ability to absorb losses, such as guarantees of payment to the capital provider or other third parties, hypothecation or any other restrictions or charges which may prevent the insurer from using the capital resource when needed. Where the capital element includes guarantees of payment to the capital provider or other third parties, the priority of that guarantee in relation to policyholders' rights should be assessed. Encumbrances may also undermine other characteristics such as permanence or availability of capital resources.

Determination of regulatory capital resources

- 17.11.34 The regulatory capital resources can be determined based on the assessment of the quality and suitability of capital resources.

- 17.11.35 Capital elements that are fully loss absorbent under all circumstances, (ie going concern, solvent run-off and liquidation/resolution perspective) would generally be allowed to cover any of the different levels of regulatory capital requirements. However, the supervisor may choose to restrict the extent to which the lower solvency control levels that trigger stronger supervisory measures may be covered by lower quality regulatory capital resources, and/or it may choose to establish minimum levels for the extent to which these lower solvency control levels should be covered by higher quality regulatory capital resources. In particular, this applies to amounts of regulatory capital resources to cover the MCR.
- 17.11.36 To determine the amount of an insurer's regulatory capital resources, supervisors may choose a variety of approaches:
- categorising capital resources into different quality tiers and apply certain limits/restrictions with respect to these tiers (tiering approaches);
 - ranking capital elements on the basis of the identified quality characteristics (continuum-based approaches);
 - applying restrictions or charges on individual capital elements where necessary; or
 - a combination of various approaches.

Determination of regulatory capital resources - tiering approach

- 17.11.37 Under a tiering approach, the composition of regulatory capital resources is based on the categorisation of capital elements according to the quality criteria set by the supervisor.
- 17.11.38 Capital elements may be categorised into two or more distinct tiers of quality when considering criteria for, and limits on, those capital elements for solvency purposes. For example, one broad categorisation may be as follows;
- Highest quality regulatory capital resources that are permanent and fully available to cover losses of the insurer at all times on a going concern, solvent run off and liquidation or resolution basis;
 - Medium quality regulatory capital resources that lack some of the characteristics of highest quality regulatory capital resources, but which provide a degree of loss absorbency on a going concern basis and are subordinated to the rights (and reasonable expectations) of policyholders; and
 - Lowest quality regulatory capital resources that provide loss absorbency in liquidation or resolution only.

Capital elements categorised as being of highest quality are often referred to as core regulatory capital resources and lower quality as supplementary regulatory capital resources, or similar.

- 17.11.39 Under a tiering approach, the supervisor sets minimum and/or maximum levels for the extent to which regulatory capital requirements

are met with various tiers of regulatory capital resources. Where established, the level may be expressed as a percentage of regulatory capital requirements (for example, a minimum level of 50% of regulatory capital requirements met using highest quality regulatory capital resources, and/or a maximum limit for lowest quality regulatory capital resources may be 25% of regulatory capital requirements). There may also be limits set on the extent to which regulatory capital requirements may be met by certain specific types of capital elements (for example, perpetual subordinated loans and perpetual cumulative preference share may be limited to meet 50% of the regulatory capital requirement.) Alternative approaches may also be used, for example, where the levels are expressed as a percentage of regulatory capital resources.

- 17.11.40 What constitutes an adequate minimum or maximum level may depend on the nature of the insurance business, and on how the requirement interacts with the various solvency control levels. A separation into tiers as set out above assumes that all capital elements can clearly be identified as belonging to one of the specified tiers and that elements falling into an individual tier are all of the same quality. In reality, such distinctions between capital elements may not be clear cut and different capital elements will exhibit the above quality characteristics in varying degrees.
- 17.11.41 There are two potential ways to address this fact. One is to set minimum quality thresholds on the characteristics the capital element must have to be included in the relevant tier - as long as these thresholds are met for a given element then it can be included in the relevant tier of regulatory capital resources without limit. The other approach is to set minimum quality thresholds for limited inclusion in the relevant tier, but to set additional higher quality thresholds for elements to be permitted to be included in that tier without limit. This approach effectively sub-divides the tiers. It permits greater recognition within a given tier for capital elements which are more likely to fulfil the quality targets specified for that tier.
- 17.11.42 Where a tiering approach is applied, this should ideally distinguish between regulatory capital resources for a going concern, for solvent run-off, and for liquidation/resolution.

Determination of regulatory capital resources– continuum-based approach

- 17.11.43 Under a continuum-based approach, capital elements are not categorised, but rather ranked, relative to other capital elements on the basis of identified quality characteristics set by the supervisor. The supervisor also defines the minimum acceptable level of quality of regulatory capital resources and perhaps for different solvency control levels. In this way the capital elements are classified from highest to lowest quality on a continuum basis; only capital elements sitting above this defined minimum level on the continuum would be accepted as regulatory capital resources. Due consideration should be given to the quality of capital elements so as to ensure that there is an appropriate balance of regulatory capital resources for a going concern, for solvent run-off, and for liquidation/resolution.

Determination of regulatory capital resources - other approaches

17.11.44 The supervisor may also apply approaches that are based on an assessment of the quality of individual capital elements and their specific features. For example, the terms of a hybrid capital element may not provide enough certainty that coupon payments will be deferred in times of stress. In such a case, the supervisor may limit (possibly taking into account further quality criteria) the ability of that instrument to cover the regulatory capital requirements.

Determination of regulatory capital resources - choice and combination of approaches

17.11.45 The supervisor should consider the organisation and sophistication of the insurance sector and choose the best approach for determining regulatory capital resources appropriate to its jurisdiction's circumstances. Whatever approach is used, it should be consistently applied so that regulatory capital resources are of sufficient quality on a going concern, solvent run-off and a liquidation/resolution basis.

17.11.46 It is also important that the approach to the determination of regulatory capital resources is consistent with the framework and principles underlying the determination of regulatory capital requirements. This includes not only the implemented range of solvency control levels but is also relevant to the target criteria underlying the regulatory capital requirements. In particular, the target criteria for regulatory capital requirements, and hence the approach to determining regulatory capital resources, should be consistent with the way in which the supervisor addresses the two broad objectives of regulatory capital resources.

17.11.47 As an illustration, in setting regulatory capital requirements a supervisor can consider the maximum probability over a specified time period with which the supervisor is willing to let unexpected losses cause the insolvency of an insurer. In such a case, insurers would need to maintain sufficient regulatory capital resources to absorb losses before insolvency occurs (before liquidation or resolution are initiated). Hence the determination of regulatory capital resources would need to lay sufficient emphasis on the first objective of loss absorbency under going concern, and could rely less on the second objective of loss absorbency solely under liquidation or resolution.

Multiple gearing and intra-group creation of regulatory capital resources

17.11.48 Double gearing may occur if an insurer invests in a capital element that counts as regulatory capital resources of its subsidiary, its parent or another group entity. Multiple gearing may occur if a series of such transactions exist.

17.11.49 Intra-group creation of regulatory capital resources may arise from reciprocal financing between members of a group. Reciprocal financing may occur if an insurance legal entity holds shares in or makes loans to another legal entity (either an insurance legal entity or otherwise) which, directly or indirectly, holds a capital element that counts as regulatory capital resources of the first insurance legal entity.

17.11.50 For group-wide capital adequacy assessment with a group level focus, a consolidated accounts approach would normally eliminate IGTs and consequently multiple gearing and other intra-group creation of regulatory capital resources whereas, without appropriate adjustment, a legal entity focus may not. Whatever approach is used, multiple gearing and other intra-group creation of regulatory capital resources should be identified and treated in a manner deemed appropriate by the supervisor to prevent the duplicative use of regulatory capital resources.

General provisions on the use of an internal model to determine regulatory capital requirements

17.12 Where the use of internal models to determine regulatory capital requirements is allowed, the supervisor:

- **establishes appropriate modelling criteria to be used for the determination of regulatory capital requirements, which require broad consistency among all insurers within the jurisdiction; and**
- **identifies the different solvency control levels for which the use of internal models is allowed.**

17.12.1 Internal models can be considered for the dual purposes of:

- determining an insurer's own economic capital needs (the economic capital that results from an economic assessment of the insurer's risks given the insurer's risk tolerance and business plans); and
- determining an insurer's regulatory capital requirements.

In either case, the quality of the insurer's risk management and governance is vital for the effective use of internal models. While an insurer would seek supervisory approval for the use of an internal model in determining its regulatory capital requirements, the insurer would not need supervisory approval, initial or ongoing, for the use of its internal model in determining its own economic capital needs or management.

17.12.2 An internal model used for regulatory capital requirements purposes should be aligned with the one established for determining economic capital. The methodologies and assumptions used for the two purposes should be consistent; any differences can be explained by their respective underlying objectives. Where the supervisor allows a range of standardised and more tailored approaches, including internal models, for regulatory capital requirements purposes, an insurer should have a choice as to which approach it adopts, subject to satisfying conditions established by the supervisor on the use of internal models for regulatory capital requirements purposes.

17.12.3 Where there is a choice of approach allowed by a supervisor, it is inappropriate for an insurer to cherry-pick between approaches.

17.12.4 In particular, where the assumptions underlying a standardised approach for calculating regulatory capital requirements are inappropriate for the risk profile of an insurer, the supervisor may increase the insurer's regulatory capital requirements or require the insurer to reduce the risks

it bears. However, in such circumstances the supervisor could also consider encouraging the insurer to develop a full or partial internal model which may enable its risk profile to be better reflected in its regulatory capital requirements.

- 17.12.5 Effective use of internal models by an insurer for regulatory capital purposes should lead to a better alignment of risk and capital management by providing incentives for insurers to adopt better risk management procedures which can:
- produce regulatory capital requirements that are more risk sensitive and better reflect the supervisor's target criteria; and
 - assist the integration of the internal model fully into the insurer's strategic, operational and governance processes, systems and controls.

Criteria for the use of an internal model to determine an insurer's regulatory capital requirements

- 17.12.6 The target modelling criteria should require broad consistency between all insurers within the jurisdiction, based on the same broad level of safety requirements applied to the overall design and calibration of the standardised approach to determining regulatory capital requirements. Discussions with the insurance industry in a jurisdiction may also assist in achieving consistency.
- 17.12.7 In particular, when considering whether an internal model may be used in determining the MCR, the supervisor should take into account the MCR's main objective of providing the minimum safety net for the protection of policyholders and the ability of the MCR to be defined in a sufficiently objective and appropriate manner to be enforceable. If internal models are allowed for determining the MCR, particular care should be taken so that the strongest supervisory measures that may be necessary if the MCR is breached can be enforced, for example if the internal model is challenged in a court of law.
- 17.12.8 The supervisor should establish the appropriate modelling criteria for calibration of internal models used to calculate regulatory capital requirements. Some supervisors that allow the use of internal models to determine regulatory capital requirements have set a confidence level for regulatory purposes, which is comparable with a minimum investment grade level. Different criteria may apply for PCR and MCR.
- 17.12.9 If an internal model is used for regulatory capital requirements purposes, the insurer should ensure that its regulatory capital requirements determined by the model are calculated in a way that is consistent with the objectives, principles and criteria for achieving the targeted safety level established by the supervisor. For example, the insurer may be able to apply the confidence level specified in the supervisors' modelling criteria directly to the probability distribution forecasts used in its internal model. Alternatively, depending on the insurer's own modelling criteria for its economic capital, an insurer may have to recalibrate its internal model to the modelling criteria required by the supervisor in order to use it for regulatory capital requirements purposes. This allows internal

models to have a degree of comparability to enable supervisors to make a meaningful assessment of an insurer's capital adequacy, without sacrificing the flexibility needed to make it a useful internal capital model in the operation of the insurer's business. (see Guidance 17.15.1 - 17.15.2.)

- 17.12.10 Due to the insurer-specific nature of each internal model, internal models can be very different from each other. In allowing the use of an internal model for regulatory capital requirements purposes, the supervisor should preserve broad consistency of regulatory capital requirements between insurers with broadly similar risks.

Partial internal models

- 17.12.11 A partial internal model typically involves the use of internal modelling to substitute parts of a standardised approach for the determination of regulatory capital requirements. For example, an insurer could decide to categorise its insurance contracts along business lines for modelling purposes. If the regulatory capital requirements for some of these categories are determined by modelling techniques, while the regulatory capital requirements for other categories are determined using a standardised approach, then this would constitute the insurer using a partial internal model to calculate regulatory capital requirements.
- 17.12.12 Partial internal models are often used to smooth an insurer's transition to full use of an internal model or to deal with instances such as the merger of two insurers, one of which uses an internal model, and the other uses a standardised approach. Given the potential complexity of a full internal model, use of a partial internal model could be a satisfactory approach provided its scope is properly defined (and approved by the supervisor). Provided the reduced scope of the internal model is justified, the use of a partial internal model could be allowed as a permanent solution. There may be a tendency for an insurer to cherry-pick when using internal models, particularly where partial modelling is allowed. The supervisor should place the onus on the insurer to justify why it has chosen to only use internal models for certain risks or business lines. Where this is not sufficiently justified, the supervisor should take appropriate measures.
- 17.12.13 An insurer should assess how a partial internal model achieves consistency with the modelling criteria specified by the supervisor for regulatory purposes. As part of the approval process for regulatory capital requirements use, an insurer should be required to justify the limited scope of the model and why it considers that using partial internal modelling for determining regulatory capital requirements is more consistent with the risk profile of the business than the standardised approach or why it sufficiently matches regulatory capital requirements. The insurer should clearly document the reasons behind its decision to use partial internal models. For example, if this is to ease transition towards full internal models, the insurer should outline a transitional plan, considering the implications for risk and capital management of the transition. Such plans and use of partial internal models should be reviewed by the supervisor, who may decide to impose certain

restrictions on the partial model's use for calculating regulatory capital requirements (for example, introducing a capital requirements add-on during the transitional period).

Additional guidance for group-wide internal models

- 17.12.14 A group-wide internal model is a risk measurement system a group uses to analyse and quantify risks to the group as a whole as well as risks to the various parts of the group. Group-wide internal models may include partial models which capture a subset of the risks to the group. Group-wide internal models also may include combinations of models in respect of different parts of the group. An insurer's internal model may be part of a broader group-wide internal model rather than a standalone one.
- 17.12.15 Where the supervisor allows the use of group-wide internal models to determine regulatory capital requirements, the supervisor should determine modelling criteria for such models, based upon the level of safety required by the supervisor applicable to an insurance group adopting an internal model for that purpose.
- 17.12.16 The modelling criteria for internal models for regulatory capital requirements purposes and the process for internal model approval that a supervisor establishes should require broad consistency between group-wide regulatory capital requirements and regulatory capital requirements of individual insurance legal entities.
- 17.12.17 Group-wide internal models can vary greatly depending on their nature. In allowing the use of group-wide internal models for regulatory capital requirements purposes, the supervisor should preserve broad consistency between insurance groups and insurance legal entities with broadly similar risks (eg insurance legal entities and insurance groups operating through a branch structure in a jurisdiction). The supervisor should design modelling criteria and the process for model approval so as to maintain broad consistency between the regulatory capital requirements determined using internal models and standardised approaches.
- 17.12.18 Modelling criteria used may differ between jurisdictions. For insurance groups operating in multiple jurisdictions, the degree of consistency in regulatory capital requirements across group members may vary.
- 17.12.19 The supervisor should set out for which group-wide regulatory capital requirements, corresponding to the solvency control level or levels which apply to an insurance group, the use of group-wide internal models is allowed.
- 17.12.20 In particular, when the supervisor considers allowing the use of internal models for the purpose of determining group-wide regulatory capital requirements at the MCR level, the issues relating to possible legal challenges may differ from those encountered in respect of individual insurance legal entities. For example, involved supervisors may need to work together to establish and coordinate grounds for legal action in respect of the different insurance legal entities within a group.

Initial validation and supervisory approval of internal models

17.13 Where the use of internal models to determine regulatory capital requirements is allowed, the supervisor requires the insurer to obtain prior supervisory approval for the insurer's use of an internal model for the purpose of calculating regulatory capital requirements by:

- **demonstrating that the model is appropriate for regulatory capital requirements purposes;**
- **validating an internal model to be used for regulatory capital requirements purposes by subjecting it to, and demonstrating the results of, at least, a statistical quality test, calibration test and use test; and**
- **meeting documentation requirements.**

Approval of the use of an internal model for determination of regulatory capital requirements

17.13.1 Where insurers are allowed to use internal models for calculating regulatory capital requirements, such models should be subject to prior supervisory approval. The onus should be placed on the insurer to validate a model that is to be used for regulatory capital requirements purposes and provide evidence that the model is appropriate for those purposes. This should include showing that:

- starting balances used in internal models to derive the regulatory capital requirements reconcile to the solvency balance sheet used in determining regulatory capital resources; and
- the model is consistent with the valuation approach.

17.13.2 The supervisor may prescribe requirements to allow it to assess different models fairly and facilitate comparison between insurers within its jurisdiction. However, overly prescriptive rules on internal model construction may be counter-productive in creating models which are risk-sensitive and useful for insurers. Therefore, although a certain level of comparability can be achieved by the calibration requirements, full and effective comparison across a jurisdiction to establish a best practice may be best achieved by dialogue between the supervisor and insurers.

17.13.3 The supervisor should require that in granting approval for the use of an internal model to calculate regulatory capital requirements, it has sufficient confidence that the results being produced by the model provide adequate and appropriate measures of risk and regulatory capital requirements. Although the supervisor may encourage or require insurers to develop internal models that better reflect their risks than the standardised approach, this should not lead to models being approved until there is confidence that they are calibrated correctly. The supervisor may therefore consider it necessary to evaluate an internal model over a sufficiently long specified period of time prior to approval.

17.13.4 In approving the use of an internal model to calculate regulatory capital requirements, the supervisor should consider the primary role of the model as part of the insurer's risk management process. Any

requirements imposed by the supervisor for the approval of a model for use in determining regulatory capital requirements should not prevent the model from being sufficiently flexible to be a useful strategic decision making tool which reflects the insurer's unique risk profile. Consistent standards and practices for the approval of an insurer's internal model should be applied by the supervisor, regardless of whether the model is developed in-house by the insurer or by an external party.

- 17.13.5 It is essential that supervisors are able to understand fully the insurers' internal models and be able to appraise their quality. To this end, the supervisor should have access to experienced personnel with appropriate technical ability, as well as sufficient resources. It is likely to take time for supervisors to acquire the necessary experience to appraise an insurer's internal model. Without the experience and resources, the supervisor may be unable to reliably approve the use of an insurer's internal model for regulatory purposes. The supervisor may consider using external specialists that have the appropriate experience, such as actuarial consultants, accounting firms and rating agencies, to assist it in reviewing an insurer's internal model. In such instances, the supervisor retains the final responsibility for review and approval of the use of the internal model for regulatory purposes.
- 17.13.6 It may be appropriate for a supervisor to consider transitional measures when permitting insurers to use internal models for regulatory capital requirements purposes for the first time. Such measures will permit the necessary time for both insurers and the supervisor to become familiar with the internal models and their uses. For example, during a transition period, the supervisor could include the use of a partial internal model, to allow the insurer to transition gradually to use a full internal model or the supervisor could require parallel reporting of regulatory capital requirements determined by both the internal model and standardised approach. The supervisor may also consider applying a temporary minimum level of the regulatory capital requirements during the transition period.
- 17.13.7 The supervisor may need to impose additional regulatory capital requirements (capital requirements add-ons) or take other supervisory measures to address any identified weaknesses in an internal model, either prior to approving the use of the model, as a condition on the use of the model or in the context of a review of the ongoing validity of an internal model for regulatory capital requirements purposes. It may be necessary to introduce additional supervisory powers, to allow such supervisory measures, when internal models are allowed for regulatory capital requirements purposes by a supervisor.
- 17.13.8 Where an insurance legal entity which is a subsidiary of an insurance group seeks approval for the use of an internal model which itself is part of a broader group-wide internal model, the supervisor of this subsidiary should conduct the approval process in close cooperation with the group-wide supervisor. In particular, the supervisor of the subsidiary should check the status of the group-wide internal model and seek information from the group-wide supervisor about its approval process.

Validation of an internal model used for determination of regulatory capital requirements

- 17.13.9 The statistical quality test and the use test are intended to be more insurer-specific measures which should allow the supervisor to gain an understanding of how a particular insurer has constructed its internal model and embedded it within its business. The calibration test is used by the supervisor to assess the results from the internal model in comparison to the insurer's regulatory capital requirements using standardised approaches and to those of other insurers.
- 17.13.10 In addition, the insurer should review its own internal model and validate it so as to satisfy itself of the appropriateness of the model for use as part of its risk and capital management processes. In addition to an internal review, the insurer may consider a regular independent, external review of its internal model.
- 17.13.11 The responsibility for model validation by the insurer should reside with a different department or personnel from those who developed or use the internal model to facilitate independence.

Additional guidance for group-wide internal models

- 17.13.12 The required prior supervisory approval should specify whether the use of an internal model is for insurance legal entity and/or group level.
- 17.13.13 If an insurance group wishes to use its group-wide internal model for regulatory capital requirements purposes in more than one jurisdiction in which it operates, the group may be subject to requirements that differ in a number of ways, such as:
- modelling criteria (risk measure, time horizon, level of safety);
 - valuation bases for regulatory capital requirements purposes;
 - the risks that have to be modelled;
 - treatment of IGTs;
 - approach to group-wide capital adequacy (eg group level or legal entity focus); and
 - recognition of diversification across the group.

A group-wide internal model therefore needs to be sufficiently flexible to meet the differing requirements of each jurisdiction in which it is to be used for regulatory capital requirements purposes.

- 17.13.14 In the case of an insurance group that operates in more than one jurisdiction but only applies to use its group-wide internal model for regulatory capital requirements purposes in one jurisdiction the group does not need group-wide internal model approval of other jurisdictions provided that it is using other approaches to meet the local regulatory capital requirements of those other jurisdictions. However, the supervisor considering approval of the group-wide internal model may wish to consult the other involved supervisors about the relevant insurance markets, the group's operations in those markets and the standard of modelling.

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- 17.13.15 In the case of an insurance group that wishes to use its group-wide internal model in more than one jurisdiction to calculate insurance legal entity regulatory capital requirements, the supervisor of each of those jurisdictions should consider approval of the specific application of the group-wide internal model in its jurisdiction. If the legal framework permits, the consideration may include a joint decision process by the involved supervisors of those jurisdictions, including that the group-wide-supervisor may take the decision if no joint decision is reached.
- 17.13.16 When considering approval of the use of a group-wide internal model for group-wide regulatory capital requirements purposes, each supervisor should consider:
- its group-wide regulatory capital requirements;
 - whether and the extent to which its jurisdiction allows the use of internal models for regulatory capital requirements purposes (eg determining the PCR and/or MCR);
 - how its jurisdiction interacts with the other jurisdictions potentially involved when supervisory measures are being considered; and
 - the arrangements for collaboration between involved supervisors of the legal entities within the insurance group.
- 17.13.17 Additionally, a supervisor may delegate the approval process to the group-wide supervisor or another involved supervisor or agree to be bound by its decision while retaining supervisory responsibility. If more than one jurisdiction is concerned, making such authority legally binding may require a treaty between these jurisdictions. To be effective, each arrangement requires a high level of collaboration between the involved supervisors. To require the model to appropriately address all material risks, the supervisor making the decision needs sufficient knowledge of the local circumstances in which the group operates.
- 17.13.18 The involved supervisors of an insurance group that conducts insurance business in more than one jurisdiction may consider their joint and common interests for the joint approval of the use of a group-wide internal model for regulatory capital requirements purposes. Doing so may improve the efficiency and effectiveness of the approval process if the involved supervisors agree on common requirements for the process.
- 17.13.19 Alternatively, the involved supervisors may independently approve the use of a group-wide internal model. Therefore, an insurance group seeking approval for a group-wide internal model may receive permission from one supervisor to use the model in that jurisdiction, while not receiving approval in another jurisdiction.
- 17.13.20 Similarly, where an insurance legal entity operates in other jurisdictions through a branch structure, the host supervisors in those branch jurisdictions will have an interest in the solvency of the insurance legal entity. If host supervisors in these jurisdictions are not satisfied with the regulatory capital requirements of the home supervisor (for example because they are determined to use internal models) the host

supervisors may impose limitations on the branch operations. The home supervisor, however, does not need to have the approval of the host supervisors in order to approve the use of the insurance legal entity's internal model for its own purposes.

17.13.21 Involved supervisors should require that the approval process for the use of a group-wide internal model for regulatory capital requirements purposes is sufficiently flexible to achieve an approach appropriate at each organisational level in an insurance group. Risks which may have a large impact at insurance legal entity level may have much smaller significance at insurance group level. Conversely, risks that may have a small impact at insurance legal entity level may aggregate to have a larger impact on risk at the group level. The nature and complexity of risks may also vary at different levels in the insurance group.

17.13.22 While the risk coverage by an internal model may look reasonable from a group-wide perspective, it may not be reasonable from the point of view of each member of the insurance group. For example, in a group that has many non-life insurers and one small life insurer it may be appropriate from an overall perspective to place less emphasis on the modelling of the life insurance risks. However, this may not be appropriate from the life insurer's or its supervisor's perspective. In such circumstances, it may be necessary for the group to upgrade its model to include an adequate life insurance risk component or to set up a self-contained internal model for the life insurer in order to gain approval.

Additional guidance for group-wide internal models

17.13.23 Group members should be sufficiently engaged in the use of an internal model used to determine group-wide regulatory capital requirements, as well as the model's application to their businesses (through their input to the model, local Board involvement, capital allocation, performance measurement etc), even if the model is not used to determine the regulatory capital requirements of individual group members.

Quality test for internal models

17.14 Where the use of internal models to determine regulatory capital requirements is allowed, the supervisor requires the insurer to conduct statistical quality tests that ensure:

- **the adopted risk modelling techniques are appropriate to the nature, scale and complexity of its risks;**
- **assessment of the base quantitative methodology of the internal model to demonstrate the appropriateness of this methodology, including the choice of model inputs and parameters and to justify the assumptions underlying the model; and**
- **the determination of the regulatory capital requirement using an internal model addresses the overall risk position of the insurer and that the underlying data used in the model are accurate and complete.**

17.14.1 Given the importance of an embedded internal model to an insurer's risk management policy and operations, an internal model would generally

be constructed to deliver a probability distribution of the required risk capital rather than a point estimation. A range of approaches could constitute an effective internal model for risk and capital management purposes, and the supervisor should encourage the use of a range of different approaches appropriate to the nature, scale and complexity of different insurers and different risk exposures. There are several different risk quantification techniques which could be used by an insurer to construct its internal model. In broad terms, these could range from basic deterministic scenarios to complex stochastic models. Deterministic scenarios would typically involve the use of stress testing and scenario analysis reflecting an event, or a change in conditions, with a set probability to model the effect of certain events (such as a drop in equity prices) on the insurer's capital resources position, in which the underlying assumptions would be fixed. In contrast, stochastic modelling often involves simulating very large numbers of scenarios in order to reflect the likely distributions of the capital requirements by, and the different risk exposures of, the insurer.

- 17.14.2 There are numerous methodologies which an insurer could use as part of its stress testing and scenario analysis. For example, an insurer may decide to model the effect of various economic scenarios (such as a fall in equity prices or a change in interest rates) on its assets and liabilities. Alternatively, an insurer could consider the effect of various scenarios on a specific portfolio of business in a solvent run-off situation. The insurer should use scenarios which it regards as most appropriate for its business. Where the internal model is used for regulatory capital requirements purposes, the onus is on the insurer to demonstrate to the supervisor that the chosen methodology is appropriate to capture the relevant risks for its business. This includes testing of the model to demonstrate that it can replicate its results on request and that its response to variation in input data is adequate such as that corresponding to changes in base or stress scenarios. Overall regulatory capital requirements derived from an internal model can be highly sensitive to assumptions on the effect of diversification across risks. Therefore, supervisors and insurers should give particular consideration to aggregation issues. Conducting stress testing and scenario analysis may be a suitable tool to validate statistical assumptions.
- 17.14.3 Where an internal model is established to assess risks on a risk-by-risk basis, in order to conduct an overall risk assessment the insurer should aggregate the results for each of these risks both within and across business lines. Several methods exist to aggregate the separate results allowing for diversification effects. An insurer would generally be expected to decide how best to aggregate and account for the risks to the whole of its business. The determination of overall regulatory capital requirements by the internal model should consider dependencies within, as well as across, risk categories. Where the internal model allows for diversification effects, the insurer should be able to justify its allowance for diversification effects and demonstrate that it has considered how dependencies may change under stressed circumstances.

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- 17.14.4 Internal models need high quality data to produce sufficiently reliable results. The data used for an internal model should be current and sufficiently credible, accurate, complete and appropriate. Hence, a statistical quality test should examine the appropriateness of the underlying data used in the construction of the internal model. A statistical quality test should include an examination of the aggregation of data, the modelling assumptions and the statistical measures used to construct the internal model. This may include an annual (or more frequent) review of the various items that are being measured (claims, lapses, etc.) updated for the additional data available together with a scrutiny of data from previous periods to determine whether this data continues to be relevant. Older data may no longer be relevant possibly due to changes in risks covered, secular trends or policy conditions and guarantees attaching. Similarly, new data may not be of substantive use when modelling items that require a long-term view of experience (such as testing the predictions of cash flows for catastrophic events).
- 17.14.5 An insurer may not always have sufficient reliable data in-house. In instances where an insurer lacks fully credible data it may rely on industry or other sufficiently credible data sources to supplement its own data. For example, a new company may lack its own historical data and so could use market data sources in constructing its internal model. Some supervisors publish jurisdictional data which may be of some use.
- 17.14.6 Another possible source of data may be reinsurers whose data pool is typically larger and covers a wider spectrum of the market. However, it is important to consider that such data may not be entirely appropriate for all insurers. Reinsurers often only receive data in aggregated form and sometimes are only informed of larger claims or from smaller insurers whose market may not be applicable for all or many insurers. Therefore, any data not specific to the insurer would need to be carefully considered before deciding whether they are appropriate for use as the basis for an insurer's statistical quality test. Even where deemed appropriate, it may still be necessary to adjust the data to allow for differences in features between the data source and the insurer.
- 17.14.7 In assessing suitability of data and of other inputs (eg assumptions) to an internal model, expert judgment should be applied and supported by proper justification, documentation and validation.
- 17.14.8 As part of the statistical quality test, the insurer should be able to demonstrate that the base quantitative methodology used to construct its internal model is sound and sufficiently reliable to support the model's use. The methodology should also be consistent with the methods used to calculate technical provisions.
- 17.14.9 The statistical quality test should also include a review of the internal model to determine whether the assets and products as represented in the model truly reflect the insurer's actual assets and products. This should include an analysis of whether all reasonably foreseeable and relevant material risks have been incorporated, including any financial guarantees and embedded options. Insurers should also consider whether the algorithms used are able to take into account management

actions and the reasonable expectations of policyholders. Testing should include future projections within the model and to the extent practicable back-testing (the process of comparing the predictions from the model with actual experience).

Calibration test for internal models

17.15 Where the use of internal models to determine regulatory capital requirements is allowed, the supervisor requires the insurer to conduct a calibration test to demonstrate that the regulatory capital requirements determined by the internal model satisfies the specified modelling criteria.

17.15.1 As part of the calibration test, where an internal model is used for determining regulatory capital requirements, the insurer should assess the extent to which the internal model results are consistent with the modelling criteria defined for regulatory capital purposes, and hence, confirm the validity of using its internal model for that purpose.

17.15.2 The calibration test should be used by the insurer to demonstrate that the internal model is calibrated appropriately to allow a fair, unbiased estimate of the regulatory capital requirements for the particular level of confidence specified by the supervisor. Where an insurer's existing internal model uses different modelling criteria than those specified by the supervisor for regulatory capital requirements purposes, the insurer may need to recalibrate its model to the supervisor's modelling criteria to achieve this.

Use test and governance for internal models

17.16 Where the use of internal models to determine regulatory capital requirements is allowed, the supervisor requires the insurer to:

- **have adequate governance and internal controls in place with respect to the internal model.**
- **ensure its Board and Senior Management**
 - **have overall control of and responsibility for the construction and use of the internal model for risk management purposes;**
 - **have sufficient understanding of the model's construction at appropriate levels within the insurer's organisational structure; and**
 - **understand the consequences of the internal model's outputs and limitations for risk and capital management decisions.**
- **conduct a use test to demonstrate that the internal model, its methodologies and results, are fully embedded into the insurer's risk strategy and operational processes;**

17.16.1 In considering the use of an internal model for regulatory capital requirements purposes by an insurer, the supervisor should not merely focus on its use for that narrow purpose but should also consider the

wider use of the internal model by the insurer for its own risk and capital management.

- 17.16.2 The use test is the process by which the internal model is assessed in terms of its application within the insurer's risk management and governance processes. In order for the insurer's internal model to be most effective it should be genuinely relevant for use within its business for risk and capital management purposes.
- 17.16.3 Where an insurer decides to adopt a higher confidence level than the level required for regulatory capital requirements purposes for its own purposes (for example, in order to maintain a certain investment grade rating) then calibration testing should also be conducted by the insurer to allow it to determine the level of capital resources needed at this higher level. The insurer should then assess whether holding this amount of capital resources is consistent with its overall business strategy.
- 17.16.4 The insurer should have the flexibility to develop its internal model as an important tool in strategic decision making. An insurer should therefore have the flexibility to use the most appropriate risk measure and modelling techniques in its internal models. The insurer should be able to demonstrate why it has chosen a particular risk measure, and it should include in its internal model an appropriate recalibration or reconciliation, if necessary, between the modelling criteria used in the model for its own risk and capital management purposes and those set by the supervisor for regulatory capital requirements purposes. Differences between the economic capital and the regulatory capital requirements should be explicit and capable of being explained by the insurer's Senior Management to its Board and the supervisor.
- 17.16.5 The use test is a key method by which the insurer can demonstrate that its internal model is embedded within its risk and capital management and governance framework. As part of the use test, an insurer should examine how its internal model is used for operational management purposes, how the results are used to influence the risk management strategy and business plan of the insurer, and how the Senior Management is involved in applying the internal model in running the business. An insurer should demonstrate to the supervisor that an internal model used for regulatory capital requirements purposes remains useful and is applied consistently over time and that it has the full support of and ownership by the Board and Senior Management.
- 17.16.6 The insurer's Senior Management should take responsibility for the design and implementation of the internal model, in order to ensure full embedding of the model within the insurers' risk and capital management processes and operational procedures. The methodology used in building the model should be compatible with the overall risk management system agreed to by the Board and implemented by Senior Management. Although the Board and Senior Management may not be able to de-construct the internal model in detail, it is important that the Board has overall oversight of the model's operation on an ongoing basis and the level of understanding necessary to achieve this. The Board and Senior Management should also ensure that processes are in place to

update the internal model to take into account changes in the insurer's risk strategy or other business changes.

- 17.16.7 Various units within the insurer may be involved in the construction and operation of the internal model, such as risk management, capital management, finance and actuarial departments, depending on the size of the insurer. The experience and technical ability of staff involved in the construction and operation of the internal model should be an important consideration for the insurer. For a model to pass the use test it is expected that an insurer has a framework for the model's application across business units. This framework should define lines of responsibility for the production and use of information derived from the model. It should also define the purpose and type of management information available from the model, the decisions to be taken using that information, and the responsibilities for taking those decisions. The use test should also ensure the adequacy of systems and controls in place for the maintenance, data feeds and results of the model.
- 17.16.8 The governance processes and communication in respect of an internal model are as important as its construction. An internal model should be subject to an appropriate review and challenge so that it is relevant and reliable when used by the insurer. The key elements and results from the internal model should be understood by the key personnel within the insurer, including the Board, and not only by those who have constructed it. This understanding should ensure that the internal model remains a useful decision-making tool. If the internal model is not widely understood, it will not achieve its purpose and add value to the business. The use test is key in ensuring the relevance of the internal model to the insurer's business.

Documentation for internal models

17.17 Where the use of internal models to determine regulatory capital requirements is allowed, the supervisor requires the insurer to provide documentation that:

- **explains the design, construction and governance of the internal model, including an outline of the rationale and assumptions underlying its methodology; and**
- **is sufficient to demonstrate compliance with the regulatory validation requirements for internal models, including the statistical quality test, calibration test and use test.**

17.17.1 The insurer should document the design and construction of the internal model sufficient for a knowledgeable professional in the field to be able to understand its design and construction. This documentation should include justifications for and details of the underlying methodology, assumptions and quantitative and financial bases, as well as information on the modelling criteria used to assess the level of the regulatory capital requirements.

17.17.2 The insurer should document, on an ongoing basis, the development of and decisions on the model and any major changes, as well as instances where the model is shown to not perform effectively. Where there is

reliance on an external party, the reliance should be documented along with an explanation of the appropriateness of the use of the external party.

- 17.17.3 The insurer should document the results of the statistical quality test, calibration test and use test conducted to enable the supervisor to assess the appropriateness of its internal model for regulatory capital requirements purposes.

Additional guidance for group-wide internal models

- 17.17.4 In view of the potential complexity of a group-wide internal model, the flexibility required and the potential need for multiple supervisory approvals, it is essential that the group fully documents all aspects of the group-wide internal model clearly and unambiguously. This enables involved supervisors to identify what is approved and what is not approved. The insurance group should provide thorough documentation of the scope of an internal model, clarifying what falls within and outside of the model boundaries and what parts of the group are covered by internal models. Involved supervisors should know the boundaries of the internal model.

- 17.17.5 The documentation of the group-wide internal model should include at least:

- A full description of the risk profile of the insurance group and how the group models those risks, including the underlying assumptions and methods;
- the parts, entities and geographical locations of the insurance group and which of these are included in or excluded from the scope of the model submitted for approval;
- specification of which risks are modelled;
- IGTs such as (subordinated) loans and hybrid instruments, together with their different level of triggers, guarantees, reinsurance, capital elements and risk transfer instruments, contingent assets and liabilities, off-balance sheet items and special purpose entities;
- the effect of these IGTs, either on individual insurance legal entities or on the insurance group considered as one single economic entity or on both, depending on supervisory requirements and how these effects are modelled;
- justifications for specific decisions taken in terms of assumptions, scope, and simplifications;
- the flexibility of the model architecture to cope with assumptions ceasing to be valid;
- more generally the insurance group's processes for validating, maintaining and updating the model, including the use of stress testing and scenario analysis and the results of those tests and analyses;

- when required (such as when there is no fully consolidated balance sheet), how the model allows for and models fungibility of regulatory capital resources, transferability of assets and liquidity issues, the assumptions made especially regarding the treatment of IGTs and the free flow of assets and of liabilities across different jurisdictions, and how the group uses the model for an analysis or a qualitative assessment of liquidity issues; and
- the allocation of capital resources to insurance legal entities implied by the group-wide internal model and how this would change in times of stress for insurance groups established in more than one jurisdiction. The allocation of group-wide regulatory capital resources required by involved supervisors may differ from the allocation of capital resources by an insurance group for its own capital management purposes (eg by region or business line).

17.17.6 If elements are omitted from the group-wide internal model, the involved supervisors should require an explanation within the required documentation (for example if and why the internal model is not used for some insurance legal entities, lines of business or risks).

17.17.7 The involved supervisors should require the insurance group to provide documentation describing whether and how the modelling is consistent over different jurisdictions or insurance legal entities regarding, for example, modelling criteria, risks, lines of business, IGTs or capital and risk transfer instruments with suitable explanations for any differences in approach.

17.17.8 Diversification/concentration of risks means that some risks or positions are offset or increased by other risks or positions. The involved supervisors should require, within the framework of the required internal model documentation, a description of how the insurance group:

- incorporates diversification/concentration effects at the relevant different levels within the group-wide internal model;
- measures such effects in normal and in adverse conditions;
- confirms those measurements for reasonableness, and
- allocates limits to diversification effects across the group according to supervisory and legal requirements (eg ring fenced funds).

Credit for diversification effects should only be allowed where appropriate, taking into account risk correlations in adverse financial conditions.

Ongoing validation and continued supervisory approval of the internal model

17.18 Where the use of internal models to determine regulatory capital requirements is allowed, the supervisor requires the insurer to:

- **monitor the performance of its internal model and regularly review and validate the ongoing appropriateness of the model's specifications;**
- **demonstrate that the model remains fit for regulatory capital requirements purposes in changing circumstances against the criteria of the statistical quality test, calibration test and use test;**
- **notify the supervisor of material changes made to the internal model for review and continued approval of the use of the model for regulatory capital requirements purposes;**
- **properly document and validate internal model changes; and**
- **report information for supervisory review and ongoing approval of the internal model on a regular basis, as determined by the supervisor.**

Model Changes

- 17.18.1 Over time an insurer's business may alter considerably, as a result of internal factors or events (such as a change in insurer strategy) and external factors or events (such as a change in interest rates), so that the internal model may no longer fully capture the risks to which the insurer is exposed unless adapted. The supervisor should reassess an insurer's internal model and its results on a regular basis against the criteria of the statistical quality test, calibration test and use test so that it remains valid for use, both as a strategic decision-making tool in the context of the insurer's own risk and capital management, and as a means of calculating regulatory capital requirements where appropriate. In general, only material changes to the model (such as changing the underlying model structure or the risk measure used) or to the risks faced by the insurer should require the model to be reassessed by the supervisor. A model change policy could be agreed between the supervisor and the insurer regarding the degree and timing of changes made to the internal model. This would enable the insurer to enact minor changes to its internal model without seeking prior supervisory approval (provided the changes are in accordance with the agreed policy), thereby allowing the model to be updated in a quicker and more flexible way.
- 17.18.2 The insurer should properly document changes to the internal model to enable the supervisor to assess, for continued approval, the ongoing validity of the model for use in determining regulatory capital requirements. Following any material changes to an internal model, the supervisor should give the insurer a reasonable amount of time to embed the updated model in its risk strategies and operational processes. The insurer should demonstrate that the data used in the internal model remain appropriate, complete and accurate for this purpose.
- 17.18.3 The supervisor should require the insurer to provide documentation of material changes in its operations and the reasons why continued use of the internal model would remain appropriate following the change. If such reasons cannot be given or are not sufficient the supervisor should

require the insurer to propose appropriate model changes as a result of the material change for re-assessment of approval by the supervisor.

Supervisory reporting

- 17.18.4 Regular reporting should include the results of analysis conducted against the criteria of the statistical quality test, calibration test and use test as well as regular validation. While involved supervisors should determine the exact nature and scope of the information they require, supervisory reporting should be appropriate to the nature, scale and complexity of an insurer's business.
- 17.18.5 The level of information on internal models necessary to allow meaningful assessment by supervisors would be expected to include appropriate information regarding the insurer's risk and capital management strategy – for example, how the model is embedded into the insurer's governance procedures, overall business strategy, operational procedures and risk processes. An insurer should report details of the risks assessed by the model, including how these are identified and measured, as well as information on the results of the internal model analysis, the economic capital derived from these results and how the results of the internal model compare to those derived from the standardised approach. Supervisors may require the estimation of the regulatory capital requirements using a standardised approach as needed.