Technical Paper

Review of capital standards for general insurers and life insurers

Insurance concentration risk capital charge for general insurers

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www.apra.gov.au

Australian Prudential Regulation Authority

Preamble

APRA is reviewing its capital requirements for general insurers and life insurers.

This technical paper is part of a series of papers that outline APRA's proposals to update the capital standards for both general insurers and life insurers. The first of this series of papers was a discussion paper issued on 13 May 2010, which set out APRA's proposed changes to capital standards at a conceptual level.

This technical paper describes APRA's proposals for determining the insurance concentration risk capital charge for general insurers. APRA has released two other technical papers, one in respect of the asset risk capital charge for both general insurers and life insurers, and the other in respect of the capital base and insurance risk capital charge for life insurers.

APRA has invited insurers to participate in a quantitative impact study (QIS) with insurer responses due on 29 October 2010.

APRA is inviting comment on the proposals discussed in this technical paper. Written submissions should be emailed to InsuranceCapital@apra.gov.au by 15 November 2010 and addressed to:

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Important

Submissions will be treated as public unless clearly marked as confidential and the confidential information contained in the submission is identified.

Submissions may be the subject of a request for access made under the Freedom of Information Act 1982 (FOIA). APRA will determine such requests, if any, in accordance with the provisions of the FOIA.

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Glossary

APRA	Australian Prudential Regulation Authority
Appointed Actuary	The actuary appointed under the *Insurance Act 1973*
FCR	The financial condition report (FCR) is a report, required under GPS 310, by the Appointed Actuary to the Board.
General insurer	A general insurer authorised under the *Insurance Act 1973*
GPS 110	*Prudential Standard GPS 110 Capital Adequacy*
GPS 112	*Prudential Standard GPS 112 Capital Adequacy: Measurement of Capital*
GPS 116	*Prudential Standard GPS 116 Capital Adequacy: Concentration Risk Capital Charge*
GPS 230	*Prudential Standard GPS 230 Reinsurance Management*
GPS 310	*Prudential Standard GPS 310 Audit and Actuarial Reporting and Valuation*
PML	The probable maximum loss (PML) is the largest gross loss to which an insurer will be exposed due to a concentration of risk exposures (such that the probability of a gross loss exceeding that amount is within a specified probability) without any allowance for potential reinsurance assets.
MER	The maximum event retention (MER) is the largest loss to which an insurer will be exposed due to a concentration of risk exposures (such that the probability of a loss exceeding that amount is within a specified probability) after netting out any potential reinsurance assets.
Return period	The expected average period within which a particular loss event will re-occur, for example a return period of 1 in 250 years.
Level 1	Supervision that applies to individual operating companies authorised to undertake activities within a single APRA-regulated industry (ADIs, general insurers, life insurers and RSE licensees)
Level 2	Consolidated group supervision that applies to all single APRA-regulated industry groups headed by an ADI, general insurer or authorised non-operating holding company
QIS	Quantitative Impact Study
Natural disaster	For the purposes of this technical paper, a natural disaster includes natural events, such as earthquakes and cyclones, as well as man-made disasters, such as bushfires, that affect property risks.
Prescribed capital amount	The capital required under the proposed APRA prudential standards, before any supervisory adjustment is applied
Prudential capital requirement	The total capital required under the proposed APRA prudential standards, including any supervisory adjustment applied to the prescribed capital amount
ReMS	Reinsurance management strategy as detailed in GPS 230
Supervisory adjustment	An adjustment that APRA would make if the prescribed capital amount did not adequately account for all of an insurer's risks. The adjustment may increase the PCR or strengthen the composition of the insurer's capital base.

Chapter 1 – Introduction

APRA issued a discussion paper on 13 May 2010 outlining its proposals for changes to the prudential standards that determine the regulatory capital requirements of general insurers and life insurers.

The reasons for change were described in detail in the discussion paper. In brief, in undertaking this review, APRA is seeking to:

- improve the risk sensitivity and appropriateness of the capital standards in general and life insurance; and
- where appropriate, improve the alignment of the capital standards across industries.

The proposed framework for required capital was outlined in the discussion paper. The discussion paper describes the prescribed capital amount, which includes capital charges for asset risk, asset concentration risk, insurance risk, insurance concentration risk and operational risk. The discussion paper also defines the prudential capital requirement, which comprises the prescribed capital amount plus any supervisory adjustment applied by APRA.

The discussion paper foreshadowed APRA's intention to review certain aspects of the insurance concentration risk capital charge for general insurers. This technical paper outlines APRA's proposed changes to this charge for Level 1 general insurers, including lenders mortgage insurers.

APRA's discussion paper, along with this technical paper, focuses on the capital standards for individual (Level 1) insurers. Further details on APRA's proposals for Level 2 groups will be set out in the response paper that accompanies the draft standards and will be subject to consultation at that stage.

APRA intends to evaluate its capital proposals by assessing the results of a quantitative impact study (QIS) in which all insurers have been invited to participate. The QIS was issued on 1 September 2010. APRA has requested that insurers complete the QIS by 29 October 2010.

This technical paper was not issued at the time of the QIS release. APRA is therefore releasing an addendum to the QIS with a request for further information to assist in determining the capital impact of proposals contained in this paper. Insurer responses on this paper and the QIS addendum will be due by 15 November 2010.

APRA expects its proposals for the new capital standards to be finalised during 2011 and implemented in 2012.

All details of methodology and parameters in this technical paper should be considered as being indicative only and are subject to change until such time as the final prudential capital standards are issued. APRA will review the proposals put forward in the discussion paper and technical papers in light of the submissions received and the QIS responses. Accordingly, the ultimate impact of the changes to the capital standards will not be able to be assessed until the proposals are finalised. It is important that insurers complete the QIS, including the QIS addendum released in conjunction with this technical paper, to ensure that APRA has as complete information as possible to assess the impact of its proposals for individual insurers and the industry as a whole.

Chapter 2 – Existing concentration risk capital charge

A general insurer is exposed to the possibility of very large losses arising from its insurance portfolios as a result of natural disasters or other accumulations of losses arising from a common dependent source. Such events may occur only rarely and yet their financial impact on an insurer can be very significant, possibly resulting in its failure.

The purpose of the insurance concentration risk capital charge is to address an insurer's exposure to such concentrations of insurance risk to the extent that they are not adequately covered by the value of insurance liabilities and other capital charges.

For property portfolios, the source of extreme loss is most likely a natural disaster in a particular region. For non-property portfolios, the source will vary depending on the classes of business that form the portfolio being considered.

The insurance concentration risk capital charge is described in general terms in *Prudential Standard GPS 110 Capital Adequacy* (GPS 110), with further details provided in *Prudential Standard GPS 116 Capital Adequacy: Concentration Risk Capital Charge* (GPS 116). The existing charge is equal to the maximum event retention (MER) plus the cost of one reinstatement of cover used to reduce an insurer's exposure to concentration of risks. This ensures that sufficient funds exist to reinstate reinsurance cover immediately following the occurrence of an event.

As part of determining the MER, the insurer must first determine its probable maximum loss (PML). This is currently defined as the 'largest gross loss to which an insurer will be exposed ... due to a concentration of risk exposures, without any allowance for potential reinsurance assets'.[1]

The largest gross loss is defined by way of a return period. The return period is the 'expected average period within which a particular catastrophic event will re-occur'. The existing standard requires a minimum return period of 1 in 250 years.[2]

The MER is then derived as the PML net of any potential reinsurance assets. For most property insurers, the MER is typically a function of an insurer's catastrophe excess-of-loss reinsurance cover retentions.

The approach described above applies for both property and non-property portfolios. When considering non-property portfolios, insurers must recognise the potential for losses caused by a series of dependent claims arising from one originating cause.

1 Paragraph 8 ,GPS 116.
2 Paragraph 9, GPS 116.

Chapter 3 – Review of existing approach

The existing concentration risk capital charge was designed to ensure that an insurer could remain solvent and continue to cover risks already underwritten, even after the occurrence of a single extreme event. The intention was that, immediately following the occurrence of such an extreme event, the insurer would firstly be in a position to continue writing new business, as it still had reinsurance protection, and secondly be in a position to raise additional capital if needed to support future business, as past losses would be provided for through capital and/or reinsurance cover.

The existing concentration risk capital charge generally achieves this objective. However, as currently implemented, it differs from other components of the capital framework, which are aimed at requiring an insurer to hold sufficient capital to ensure at least a 99.5 per cent probability of survival over the next year.

When considering the existing concentration risk capital charge in light of APRA's overarching objective for the capital standards of a 99.5 per cent level of sufficiency, it has three key deficiencies:

- it may lead to insufficient levels of vertical reinsurance cover (i.e. reinsurance designed to cover the insurer for the risk of large single events) being purchased for geographically diversified property insurers exposed to large losses in more than one location;
- it only considers the capital impact from a single large event and not the impact of the accumulation of losses from multiple events at or below the insurer's net retention, or the cost of purchasing multiple reinstatements of reinsurance cover when several such events occur in a given year; and
- it considers a probable maximum loss with a return period of 1 in 250 years (i.e. broadly, a probability of sufficiency of 99.6 per cent), which differs from the remainder of the capital framework which is targeted to achieve an overall probability of sufficiency of 99.5 per cent in a given year.

Further commentary on each of these issues is provided below.

3.1 Exposures to large losses in more than one geographic location

The existing prudential standards define the probable maximum loss for an insurer as the highest 1 in 250 year loss event resulting from the occurrence of a single site aggregate exposure.[3] That is, it focuses on one very extreme loss in one location due to a single peril. The single site requirement is most clearly articulated in GPS 110, where it states that:

> 'at a minimum, the concentration risk capital charge relates to the risk associated with an accumulation of exposures to a single catastrophic event at a single site '.[4]

This definition aligns closely with the manner in which property catastrophe reinsurance cover has traditionally been purchased, and leads to a consistent definition of the probable maximum loss for two insurers similarly exposed in the same geographic location.

However, for insurers exposed to potential losses in multiple regions, this definition does not consider the additional possibility of an event in other regions also reaching, or possibly exceeding, the probable maximum loss. For these insurers, reinsurance purchased only to the 1 in 250 year single site level may result in a greater than 0.4 per cent chance of suffering a loss above the maximum level of cover on their catastrophe reinsurance in a given year.

3 Paragraph 13 of GPS 116 also states that 'APRA may require an insurer with a complex portfolio of insurance risks to estimate its MER using a whole of portfolio approach'.

4 Paragraph 32, GPS110.

For such insurers, the probable maximum loss would be more adequately described by use of a 'whole of portfolio' approach. The whole of portfolio approach takes into account the probability of one of several possible events occurring in the one year to determine the size of loss that represents a 0.4 per cent probability for that portfolio. That is, the set of possible natural disasters is widened to include all possible events in all possible regions (rather than just the largest one). The whole of portfolio approach should not be confused with allowing for the possibility of two or more natural disasters occurring in the same year (which is, in the majority of reinsurance contracts, addressed by reinsurance reinstatement covers being in place).

For example, a diversified insurer might be exposed to an event of size $1 billion in Sydney with a 0.4 per cent probability of occurrence in a year, plus an event of size $1 billion in Melbourne with a 0.4 per cent probability of occurrence in a year. The overall probability of a $1 billion event occurring for this insurer is therefore closer to 0.8 per cent. The insurer therefore needs to purchase reinsurance cover to a level greater than $1 billion, if it is to limit the risk of suffering losses in excess of its reinsurance cover to only 0.4 per cent.

3.2 Impact on capital from occurrence of multiple events

For property insurers, the quantum of the concentration risk capital charge is typically driven by an insurer's risk appetite in setting its net retention (as reflected in the MER). Most catastrophe reinsurance cover retentions are quite low relative to the insurer's PML.

While the probability of occurrence of an event with a size equal to the limit of the insurer's catastrophe reinsurance cover might be intended to be 0.4 per cent, the probability of occurrence of an event of a size equal to the insurer's chosen reinsurance retention is likely to be significantly greater than 0.4 per cent.

As a result, a property insurer's capital position can be adversely affected over a period by the occurrence of a succession of smaller sized events, as well as by the occurrence of a single very large event. The insurer must pay the cost of claims up to the retention for each and every event, and may also need to purchase multiple reinstatements of reinsurance cover if existing reinsurance cover is exhausted.

The existing concentration risk capital charge only ensures sufficient capital for one catastrophe reinsurance cover retention plus the reinsurance premium payable for one reinstatement of cover. It does not address the risk of occurrence of a number of events within a reasonably short period such as one year.

Some allowance for retained event losses will be factored into the insurer's premiums and also premiums liability estimates. These estimates, however, would generally only allow for average (or expected) retained losses and not losses at the 99.5 per cent probability of sufficiency level. Furthermore, the allowance would not typically address the cost of the additional reinstatements of reinsurance cover that may be required. Hence, the allowance for such events in premiums and premiums liabilities is likely to be insufficient in the context of capital standards where the target level of sufficiency is 99.5 per cent over a one-year period.

To limit the impact of retained losses within retention levels from multiple events in a given year, some insurers have purchased forms of stop-loss aggregate reinsurance cover in addition to its per event excess-of-loss cover. The existing concentration risk capital charge does not explicitly recognise the benefits to the insurer of such aggregate reinsurance cover.

3.3 Specified return period for probable maximum loss

As noted above, the existing capital standards define the probable maximum loss as being the largest expected loss for an insurer based on the occurrence of an event with a return period of 1 in 250 years (i.e. representing a loss event with a probability of occurrence of 0.4 per cent over a one-year period).

This return period differs from the remainder of the capital framework, which is intended to target an overall probability of sufficiency of 99.5 per cent over a one-year period. The other components of the prescribed capital amount are also generally intended to target a probability of sufficiency of 99.5 per cent over a one-year period, with separate allowance for diversification between the component risk charges. To be more consistent with the overall capital framework, the return period for the determination of the concentration risk capital charge could be revised to reflect an event expected to occur 1 in 200 years (i.e. with a probability of 0.5 per cent over a one-year period).

3.4 Options considered

APRA's overall objective in establishing its capital framework is to ensure that an insurer has enough capital to withstand the events of the next year with a 99.5 per cent probability of sufficiency.

With this objective in mind, APRA considered two options to address the issues identified with the current concentration risk capital charge as outlined above:

(i) directly reflect such considerations in the determination of the prescribed capital amount; or

(ii) consider these issues through the supervisory review process and, in particular, by setting out additional requirements to be addressed in each insurer's ReMS and capital management plans that are submitted to APRA for review.

Addressing the issues outlined above in the prescribed capital amount would provide a consistent basis for all insurers for determining the concentration risk capital charge. Any revised formula would need to address the dual objectives of encouraging the purchase of adequate vertical reinsurance cover, while also ensuring that adequate capital was available to support unexpected levels of retained losses and reinstatements of reinsurance cover where required. It would need to be able to adequately reflect the wide range of insurance risks covered and reinsurance protections in place, without introducing unnecessary complexity to the calculation.

Addressing the issues outlined above through the supervisory review process would enable a more tailored, flexible and risk-based response. It would also allow more flexibility in any supervisory adjustment imposed if an insurer's reinsurance program was considered inadequate to support APRA's overall capital objectives. Addressing such risks through the supervisory review process would, however, lead to less transparent outcomes. Further, ensuring consistent approaches and outcomes across all insurers would be potentially more difficult.

After consideration of the relative merits of each approach, APRA is proposing to modify the determination of the concentration risk capital charge component of the prescribed capital amount. APRA's proposals for changes to the concentration risk capital charge are outlined in Chapters 4 and 5 of this paper.

In addition to the proposed modifications to the concentration risk capital charge, APRA will continue to consider the adequacy of an insurer's reinsurance arrangements through its supervisory review process. APRA expects insurers to be considering each of the risks identified above, along with the quality of reinsurance protection purchased, when designing their reinsurance program and developing and implementing their capital management plans. APRA expects insurers to have sufficient reinsurance to limit the probability of ruin in the next year to less than 0.5 per cent, whether due to the chance occurrence of multiple small to medium-sized events or the occurrence of an extremely large event.

If insurers cannot demonstrate that they have sufficient capital and/or reinsurance cover to provide for event losses at a 99.5 per cent probability of sufficiency, APRA may apply a supervisory adjustment.

Chapter 4 – The insurance concentration risk capital charge

Chapters 4 and 5 of this paper describe the proposed changes to the determination of the insurance concentration risk capital charge to address the issues outlined in Chapter 3.[5] This chapter outlines the proposed approach for insurers for which the insurance concentration risk capital charge primarily relates to property exposures. The proposed approach for determining the insurance concentration risk capital charge in relation to non-property exposures is outlined in Chapter 5. The principles outlined in Chapter 4 are also intended to apply in respect of non-property exposures, with some modification as outlined in Chapter 5.

The key features of the proposed insurance concentration risk capital charge are:

- alignment with the target 99.5 per cent probability of sufficiency that applies for the overall capital framework (a change from the 99.6 per cent level that underlies the existing concentration risk capital charge);
- separate consideration of the limit of vertical cover required (vertical requirement) and the amount of capital and/or reinsurance required for exposures to multiple events (horizontal requirement);
- a requirement that the 1 in 200 year return period loss for the purpose of the vertical requirement be assessed on a whole of portfolio basis;
- consideration for the purpose of the horizontal requirement of the capital impact of scenarios of multiple losses within a one-year period, each intended to be at the 99.5 per cent probability of sufficiency level; and
- allowance for diversification, both within the vertical and horizontal components of the insurance concentration risk capital charge, and with other elements of the capital framework as appropriate.

4.1 Proposed insurance concentration risk capital charge formula

APRA is proposing an approach that combines both a vertical requirement and a horizontal requirement for determining the insurance concentration risk capital charge.

For the vertical requirement (VR), APRA proposes to maintain the concepts of the probable maximum loss (PML) and the maximum event retention (MER). For the purpose of determining VR, however, the PML would be defined as the gross loss arising from the occurrence of a single event with size equal to the 1 in 200 year whole of portfolio loss without any allowance for potential reinsurance assets. The MER would continue to be defined as the PML after netting out any potential reinsurance assets.

The horizontal requirement (HR) considers the expected net loss from the occurrence of several smaller-size events in a given year on a whole of portfolio basis.

The insurance concentration risk capital charge (ICRC) is proposed to be determined as:

$$ICRC = \sqrt{VR^2 + HR^2}$$

Where:

VR = the vertical requirement, equal to the MER plus the cost of one full reinstatement of cover used to reduce an insurer's exposure to concentration of risks;

5 GPS 116 currently uses the term 'concentration risk capital charge'. APRA proposes to rename this as the 'insurance concentration risk capital charge' to distinguish it from the 'asset concentration risk capital charge'.

HR = the horizontal requirement, equal to the greater of multiple event scenarios H(3) and H(4), less a deduction for a portion of natural disaster claim costs already allowed for in the determination of the prescribed capital amount. That is

$$HR = Max\{H(3), H(4)\} - C$$

H(3) = the net retained losses plus the cost of reinsurance reinstatements arising from the occurrence of three losses in a year, each loss of a size equal to the 1 in 10 year event, on a whole of portfolio basis;

H(4) = the net retained losses plus the cost of reinsurance reinstatements arising from the occurrence of four losses in a year, each loss of a size equal to the 1 in 6 year event, on a whole of portfolio basis; and

C = the annual allowance made by the insurer in insurance premiums for the expected cost of claims arising from accumulations of exposures to natural disasters, plus an allowance to reflect the premiums liability risk margin that would be applied in respect of these claims. No deduction would be allowed for the insurance risk capital charge component of such accumulations of exposure.

Vertical requirement

The vertical requirement encourages the purchase of adequate levels of vertical reinsurance cover. The requirement is similar to the existing MER requirement, except that it is calculated based on a 1 in 200 year whole of portfolio loss, rather than based on the largest 1 in 250 year single site loss. As with the existing concentration risk capital charge, VR would need to be re-assessed following the occurrence of an event. This will ensure that sufficient cover remains at all times during the year for a 1 in 200 year event, plus the cost of one full reinstatement of reinsurance cover.

However, in re-assessing the vertical requirement following the occurrence of an event, insurers must not take any aggregate stop-loss reinsurance cover into account. This aims to ensure that the insurance concentration risk capital charge focuses on events that may occur over the next full year. It also limits the potential for large changes in the capital requirement arising from the impact of catastrophe losses on the aggregate reinsurance program or from the aggregate program being reset to the original (or similar) level of retention at the end of the treaty year. Such an approach will ensure relative stability of the capital charge throughout the year. Aggregate cover may be allowed for in determining the horizontal requirement, as outlined below.

Horizontal requirement

APRA is proposing that the horizontal requirement be set at the start of the applicable catastrophe reinsurance treaty year and held constant throughout the year. Each scenario considered in HR represents a combination of events of given frequency and size intended to represent a 1 in 200 loss scenario over one year. In selecting the scenarios, recognition was given for the fact that weather-related events at low return periods are likely to be correlated (hence complete independence was not assumed). The proposed approach for calculating the horizontal requirement is to take the greater of net losses plus the cost of reinstatement(s) derived from scenarios H(3) and H(4).

APRA recognises that a portion of losses expected under scenarios H(3) and H(4) may already be allowed for in the premiums liability estimates and hence need not be provided for again in determining HR. Therefore, APRA proposes that the horizontal requirement be reduced by an allowance for these losses. As HR is determined at the start of the year, APRA proposes that in determining HR insurers should deduct the annual allowance made by the insurer in insurance premiums for the expected cost of claims arising from accumulations of exposures to natural disasters, plus allowance to reflect the premiums liability risk margin that would be applied in respect of these claims (defined as 'C' above). For most insurers with an even distribution of business over a year, 'C' is likely to be roughly double the allowance in the premiums liability provision for natural disaster risk (as the premiums liability typically only covers half of the risks expected in the course of a full year).

When determining scenarios H(3) and H(4), the cost of any reinsurance reinstatements needed to address the reinsurance requirements of the scenario would be included. APRA is proposing that the cost of reinstating reinsurance cover be set equal to one full year's reinsurance premium each time a scenario loss exhausts a reinsurance layer, unless the insurer has pre-arranged reinstatements (in which case it would be the outstanding cost of any pre-arranged reinstatements required for the scenario being considered that are not already accounted for).

Where an insurer has aggregate stop-loss reinsurance cover for exposures to natural disasters, it may take this into account when determining the impact of the multiple event scenarios.

Aggregation

In aggregating the vertical requirement and horizontal requirement, allowance has been made for diversification through application of the square root of sum-of-squares formula. This reflects the reasonable likelihood that the loss in excess of the vertical limit of reinsurance will not occur in conjunction with the accumulation of net losses arising from exposures to multiple events.

APRA also proposes that allowance be made for diversification between the insurance concentration risk capital charge and the asset risk capital charge. This would be achieved by calculating the sum of the insurance risk capital charge and the insurance concentration risk capital charge, with this total capital charge relating to insurance risk then being diversified with the asset risk capital charge in determining the aggregation benefit (as per the formula indicated in APRA's 13 May 2010 discussion paper). This is a change from the approach outlined in the discussion paper where it was indicated that only the insurance risk capital charge would be included in the aggregation benefit. The approach proposed in this technical paper is consistent with the approach proposed for life insurers and reflects that the events considered in determining the insurance concentration risk capital charge will not necessarily occur in the same period as the shocks that are considered in the asset risk capital charge.

4.2 All classes and risks need to be considered

APRA's intention is that insurers consider all classes of business when determining the insurance concentration risk capital charge. In estimating the probable maximum loss for exposures to natural disasters, the insurer would include:

- the impact of the natural disaster on all lines of business affected, including, for example, property, motor and workers compensation;
- an allowance for non-modelled risks, including demand surge and portfolio growth; and
- the impact of large single policy exposures.

The modelling of single large losses for natural disasters is likely to be done with the assistance of commercial catastrophe modellers. If this modelling does not include the impact of natural disasters on other classes of business (such as motor or workers compensation), an estimate for these losses would need to be added without allowance for diversification.

Where certain perils (such as bushfire, flood) are material but not included in the modelling of the single large loss, an allowance for losses in respect of these perils would need to be estimated. If it is not practical to calculate a loss exceedance curve for such perils, then the insurer would estimate a 1 in 200 loss separately for such perils and determine the whole of portfolio probable maximum loss by aggregating the 1 in 200 loss for each peril using the square root of sum-of-squares approach (see Appendix A for more detail). A similar approach would also be taken in estimating the 1 in 6 and 1 in 10 loss scenarios.

Diversified insurers are exposed to both the risk of natural disaster losses in respect of property exposures and to other accumulations of large losses from a common dependent source in respect of non-property exposures. Such insurers would need to assess whether their exposure to non-property related accumulations of exposure is material in the context of the determination of VR. In practice, APRA expects that very few insurers exposed to natural disasters in respect of property exposures would need to estimate the net of reinsurance 1 in 200 loss for other accumulations of risks, as the expected losses from the natural disaster scenario is likely to dominate the insurer's portfolio and hence the determination of VR. However, for insurers with low catastrophe reinsurance cover retentions, the impact on net exposures from other sources of loss may be significant.

APRA is proposing that, where an insurer's calculated vertical requirement for non-property risks exceeds 70 per cent of the calculated vertical requirement for exposure to natural disasters (or vice versa), then the insurer's overall vertical requirement would be determined as the square root of the sum-of-squares of the two component charges. Otherwise the vertical requirement would be the larger of the two components.

Chapter 5 – Considerations for non-property risks

The previous chapter outlined APRA's proposals for modifications to the insurance concentration risk capital charge formula for general insurers, with a focus primarily on the approach in respect of property exposures. The proposed approach for determining the insurance concentration risk capital charge in relation to non-property exposures is outlined in this chapter. Specific requirements in relation to the determination of the insurance concentration risk capital charge for lenders mortgage insurers (LMIs) are set out in section 5.4.

The method for determining the insurance concentration risk capital charge for insurers with material exposures to non-property risks has been the subject of much discussion between APRA, insurers, auditors and actuaries. This chapter clarifies aspects of APRA's expectations for the calculation of the insurance concentration risk capital charge for insurers with material exposures to non-property risks.

5.1 Proposed insurance concentration risk capital charge

As noted in Chapter 4, the same principles for determining the insurance concentration risk capital charge are broadly intended to apply in respect of both property and non-property exposures. Some modifications for non-property exposures are felt to be appropriate, however, as outlined below.

Vertical requirement

APRA proposes that the principles for the determination of the vertical requirement outlined in Chapter 4 be adopted when considering accumulations of non-property exposures. The proposed approach for determining the VR for non-property exposures is therefore very similar to the existing MER requirement, except that it would be calculated on a 1 in 200 year loss basis rather than the existing 1 in 250 year loss basis. APRA expects that insurers would, when calculating the VR, consider the effect of multiple claims arising from a single dependent source.

Horizontal requirement

The horizontal requirement considers the expected net loss from the occurrence of several smaller-size events in a given year. As a practical measure, APRA proposes that the horizontal requirement for accumulations of non-property exposures be set as zero for all insurers. This is because:

- for many non-property insurers, an 'event' is determined by reference to a single large claim. In these cases, multiple such events in a year would be regarded as attritional claims and allowance included in premiums liabilities; further, even though these claims could potentially be large, they would usually be limited in their impact on the insurer due to the reinsurance cover in place;
- when an 'event' is defined as a series of multiple claims arising from a dependent source the likelihood of multiple such events within a one-year period would be negligible (much less than 0.5 per cent);
- similarly for some 'events' that occur over an extended period of time, for example the economic downturn which is relevant for LMIs and trade credit portfolios, it is not reasonable to assume that more than one such event will occur in a given year; and
- in other cases, the smaller-size events that occur over a one-year period, would not be expected to be as material relative to VR as is the case for property exposures.

APRA will require the Appointed Actuary to review and comment in the Financial Condition Report (FCR) on the exposure of insurers to multiple non-property events in a year and whether or not they would materially alter the determination of the insurance concentration risk capital charge should the formula outlined in Chapter 4 be applied. If there would be a material impact on the insurance concentration risk capital charge, APRA may apply a supervisory adjustment.

Aggregation

For insurers that are predominantly exposed to accumulations of non-property, rather than property, the insurance concentration risk capital charge will be equal to the vertical requirement only. As outlined in Chapter 4, APRA also proposes that allowance be made for diversification between the insurance concentration risk capital charge and the asset risk capital charge. This would be achieved by calculating the sum of the insurance risk capital charge and the insurance concentration risk capital charge, with this total capital charge relating to insurance risk then being diversified with the asset risk capital charge in determining the aggregation benefit.

5.2 Identification of the probable maximum loss for non-property exposures

For property exposures, possible maximum event scenarios generally relate to natural peril events affecting an aggregation of risks and the insurer would undertake some form of loss modelling to assess its exposure to such losses.

For non-property exposures, the probable maximum loss is more difficult to define. In determining the probable maximum loss for such exposures, APRA expects insurers to consider:

- the nature of the insurance products provided;
- the losses that may lead to an aggregation of multiple per-risk or per-policy losses arising from one dependent cause (whether that cause may occur either once at a point in time or arise over an extended period);
- the potential for multiple classes of insurance and/or portfolios to be impacted from this one dependent cause; and
- whether the upper limit of reinsurance cover purchased is sufficiently high to cover the probable maximum loss.

Historically, some insurers have explicitly considered a range of possible maximum event scenarios when determining their MER and the commensurate insurance concentration risk capital charge. Other insurers, however, have derived their insurance concentration risk capital charge with reference solely to the per-claim excess-of-loss reinsurance retention or aggregate stop-loss reinsurance retention, with little evidence of consideration of what the probable maximum loss might be for an MER type event.

It is APRA's view that consideration of the reasonable scenarios that might give rise to maximum loss events is an important factor in the overall risk identification and management process of an insurer, and that the adequacy of existing reinsurance arrangements should be substantiated with scenario analysis and stress testing. This is in addition to any stochastic modelling which may have been performed for the insurer.

APRA's expectations in this regard will be clarified in the prudential standards. The prudential standards require the Appointed Actuary to review and comment on the insurer's approach to the determination of the insurance concentration risk capital charge and this requirement will continue. APRA also proposes to clarify that the Appointed Actuary should review and comment in the FCR on whether or not the reinsurance cover purchased by the insurer is sufficient to cover the probable maximum loss.

5.3 Adjustments to the determination of the insurance concentration risk capital charge

Adjustments to the determination of the insurance concentration risk capital charge for non-property insurers, and in particular the calculation of the probable maximum loss, will be appropriate in some circumstances to allow for:

- losses that are already included in the premiums liability provision in respect of the event or loss scenario being considered; and
- stop-loss reinsurance protection.

Adjustment for premiums liability provisions

For some limited classes of business, there may be times when the maximum loss event that is relevant to the determination of the insurance concentration risk capital charge will include working/attritional losses that were envisaged when setting the premiums liability provision. The severity and potential impact of the maximum loss event, however, would be greater than the losses envisaged in the premiums liability scenarios. Examples of such cases include insurers that write trade credit or consumer credit insurance, where the maximum loss scenario considered relates to an economic downturn. When this event occurs, some provision will be included in premiums liability provisions for losses related to the downturn scenario as those losses emerge.

In such circumstances, some double-counting of risk may occur if losses contributing to the probable maximum loss are considered in determining the insurance concentration risk capital charge in addition to the premiums liability provision. APRA considers it appropriate for an insurer to adjust its probable maximum loss in such circumstances to ensure that there is no double counting of risk. In these cases, an insurer can reduce its probable maximum loss by the portion of the premiums liability provision (including risk margin) that already captures this risk when determining the insurance concentration risk capital charge.

This situation clearly does not apply for all classes of business. For example, in medical indemnity and other liability classes, it is not likely to be reasonable to assume that the claims making up the premiums liability provision overlap significantly with the claims represented in the maximum event scenario.

Also, for some insurers, the potential double-counting of risk would not necessarily always apply and could depend on particular circumstances. For example, during times of economic prosperity there would be expected to be little or no overlap between the premiums liability provision and the maximum event scenario for insurers that write trade credit or consumer credit insurance.

Adjustment for stop-loss insurance

There also may be times where a non-property insurer has in place aggregate stop-loss reinsurance arrangements that will have an impact on the maximum loss scenario. In particular, a portion of paid and outstanding claims and premiums liabilities may contribute to an insurer's retained losses as defined in the reinsurance agreement. APRA considers it appropriate for an insurer to reduce its insurance concentration risk capital charge by the quantum of such provisions that contribute to the retention on the stop-loss reinsurance.

APRA approval has also been sought for the stop-loss retention to be discounted for the time value of money when determining the insurance concentration risk capital charge. APRA considers this to be an acceptable adjustment if the insurer's stop-loss reinsurance retention is fixed and is not indexed for inflation. The period of discount assumed should be no greater than the average period of discount assumed in determining the premiums liability provision, and the rate of discount used should be the risk-free discount rate.

Adjustment for insurance risk capital charges

A number of non-property insurers have sought APRA approval for the insurance risk capital charges associated with the outstanding claims and premiums liability to be netted off against the retention on aggregate stop-loss reinsurance arrangements. The insurance risk capital charges and the insurance concentration risk capital charges are designed to address very different risk areas. The insurance risk capital charge is intended to address general uncertainty in reserving for working/attritional losses whereas the insurance concentration risk capital charge is intended to address exposure to accumulations of losses from risk concentrations. The aggregate of all of the capital components when added together are intended to achieve an overall survival probability of the insurer of 99.5 per cent over a one-year period and it is not appropriate to consider offsets between individual components of the framework. APRA's view, therefore, is that it will not allow an insurer to deduct the insurance risk capital charges for outstanding claims or premiums liabilities when determining its insurance concentration risk capital charge.

Order of adjustments

The adjustments for potential double-counting of premiums liability provisions and for stop-loss reinsurance outlined above will reduce the insurance concentration risk capital charge for an insurer. The order in which these adjustments are applied may also affect the resulting insurance concentration risk capital charge. An insurer should apply these adjustments in the appropriate order by reference to the maximum event scenario and the structure and specifics of the stop-loss reinsurance arrangements. An insurer will need to ensure that it has not deducted its premiums liability provision twice from the insurance concentration risk capital charge. APRA expects an insurer to provide justification for its approach to the determination of the insurance concentration risk capital charge, and to outline the calculation process and quantum of any adjustments made, in its reinsurance management strategy. APRA also expects the Appointed Actuary to review and comment on these aspects of the insurer's approach to determining the insurance concentration risk capital charge in the FCR.

5.4 Lenders mortgage insurers

The calculation of the MER for LMIs is currently based on specific requirements detailed in Attachment A of GPS 116. In particular, the maximum event scenario for LMIs takes the form of a specified three-year economic downturn (the prescribed stress scenario). This differs from the maximum event scenario that applies for other non-property insurers and is intended to better reflect the nature of LMI business and the scenarios likely to lead to an accumulation of losses.

Currently, an LMI calculates its insurance concentration risk capital charge by calculating the probable maximum loss by using factors prescribed in Attachment A of GPS 116. The probable maximum loss can then be reduced by applying the LMI's reinsurance program(s) to the calculated probable maximum loss, subject to a limit that reinsurance recoveries cannot be greater than 60 per cent of PML. The principles that underpin this approach are broadly consistent with those outlined in this paper.

APRA does not intend to substantially change the current approach to the determination of the insurance concentration risk capital charge for LMIs. In May this year, APRA made technical changes to the specific requirements in response to a review undertaken in 2009. APRA also postponed two proposals and the related re-calibration in order for them to be considered as part of this broader review of the capital standards for general insurers and life insurers.

The postponed proposals were:

- inclusion of expected claims in the probable maximum loss and the deduction of net premiums liabilities in the insurance concentration risk capital charge; and
- removal of the claims handling expense component of the insurance concentration risk capital charge.

APRA proposes to implement the principles of both of these proposals.

In determining the insurance concentration risk capital charge for an LMI, APRA considers it appropriate for the LMI to continue to firstly deduct from the probable maximum loss any expected reinsurance recoveries. The limit on the reduction in PML due to reinsurance, of 60 per cent of PML, will remain.

A further deduction would then be made for a portion of the premiums liability provision (including risk margins) that relates to losses envisaged by the prescribed stress scenario i.e. economic downturn losses. This is consistent with the approach proposed in section 5.3 regarding adjustments for premiums liability provisions.

APRA's view is that it is not appropriate for the total adjustment to the PML to result in an insurance concentration risk capital charge that is close to (or possibly less than) zero. APRA therefore proposes to limit the total deduction for both reinsurance recoveries and premiums liabilities to 90 per cent of PML, so that the insurance concentration risk capital charge would be no less than 10 per cent of the PML.

APRA expects an LMI to justify in its ReMS its approach to the determination of the portion of premiums liabilities that relate to the economic downturn scenario and the quantum of the adjustment for premiums liabilities that is made in determining the insurance concentration risk capital charge. APRA also expects the Appointed Actuary to review and comment on these aspects of the LMI's approach to determining the insurance concentration risk capital charge in the FCR.

APRA proposes to remove the requirement for an LMI to explicitly hold five per cent of its probable maximum loss as capital for claims handling expenses. This brings this aspect of the determination of the insurance concentration risk capital charge for LMIs into line with the approach for other insurers with respect to claims handling expenses.

In the QIS released on 1 September 2010, APRA requested specific information from LMIs in relation to the insurance concentration risk capital charge. This will assist APRA to re-calibrate the factors in the prescribed stress scenario in order to implement the above proposals.

Chapter 6 – Other items

6.1 Tax considerations

It has been argued by some insurers that the maximum event retention (and hence the insurance concentration risk capital charge) should be tax-effected. This is on the basis that:

- the MER exists to cover the effect of a possible future occurrence of losses. If that event were to occur, there would be a gross of tax impact, which would then be reduced by the tax rate to provide a net of tax impact on the insurer's balance sheet. For example, if the MER occurrence caused $100 of losses to an insurer, the net of tax impact on its retained earnings would be $70 (assuming a tax rate of 30 per cent); and
- if the losses incurred from the large event were able to be fully absorbed by profits in the period, the insurer would immediately realise the tax impact of such losses. If the losses could not be fully absorbed by profits in the period, the insurer can raise a deferred tax asset that can be used to offset against future profits.

APRA does not recognise deferred tax assets as allowable capital for the purposes of measuring an insurer's capital base. This is because in times of stress such assets hold limited value, as their value can only be realised once the insurer again makes a profit. Deferred tax assets are not likely to have any value in a wind-up situation.

The APRA capital framework considers the ability of an insurer to survive an extreme loss, in addition to working / attritional losses. The stresses considered are events likely to occur with probability of less than 0.5 per cent in a given year. In such extreme situations, it would be inappropriate to assume that the insurer would be making enough profits in the year to fully offset such a loss, whether that loss arose from a large weather event, an extreme downturn in claims experience or a deteriorating investment market.

By definition, capital is only required at times when profits are not being made by the insurer. It therefore follows that, when considering an extreme loss or losses, it is appropriate to assume that such a loss would lead to creation of a deferred tax asset rather than being fully offset against profits in the current year.

APRA therefore proposes no change and that the MER and the insurance concentration risk capital charge continue to be determined on a gross of tax basis. This is consistent with the approach taken in determining other components of the prescribed capital amount, which are determined on a gross of tax basis (for example the insurance risk capital charges).

6.2 Reinsurance arrangements must meet governing law requirements

When determining the APRA capital base, deductions are currently made for reinsurance recoveries related to reinsurance contracts that do not meet the reinsurance documentation test, and for reinsurance assets receivable under reinsurance contracts that do not meet governing law requirements.[6]

The existing MER and insurance concentration risk capital charge requirements only make reference to the reinsurance documentation test (and not the governing law requirements) when determining the extent to which potential reinsurance assets expected from reinsurance contracts may be used to offset the PML.[7]

APRA proposes to clarify that all reinsurance contracts must meet both the reinsurance documentation test and the governing law requirements before potential reinsurance assets from those contracts can be considered as offsets to the PML.

6 Paragraph 25, GPS 112 and Paragraph 31, GPS 230.

7 Paragraph 14, GPS 116.

Appendix A – Principles of whole of portfolio approach

Principle 1: Single loss estimation – the whole of portfolio approach

The estimation of the 99.5 per cent one year loss from a single large catastrophic event over the whole portfolio of an insurer requires the use of the 'whole of portfolio' approach.

Under the whole of portfolio approach an amount $X is estimated so that the probability of the loss from a single event in the next year of size at least $X is 0.5 per cent. In principle, when estimating the size of loss, the insurer should allow for all perils in all locations. Such an approach will necessarily result in a size of loss no less than would be calculated if only considering a single peril in a single location.

Principle 2: Estimating the whole of portfolio approach – assumption of only a single loss in a year

When considering the capital for a single large event under the whole of portfolio approach, it may be assumed without any material impact that only one event may occur in a year. Hence the whole of portfolio approach is a single event estimation and should not be confused with the requirement to allow for multiple events.

The likelihood of two different extreme events (say a large earthquake in Sydney and a large windstorm in Brisbane) happening in the same year may be assumed to be sufficiently remote.

For example, if:

Expected number of events per year = $\frac{1}{250}$

Then:

1/252 < Prob(exactly 1 event in a year) < 1/251, and

1/251 < Prob(at least 1 event in a year) < Expected number of events per year = 1/250

Hence, the three definitions are not materially different and it is unnecessary (when considering the capital for a single large event under the whole of portfolio approach) to allow for the possibility of more than one event in a year.

Principle 3 : Estimating the whole of portfolio approach – aggregation of single peril loss exceedance curves

Where an insurer is able to estimate loss exceedance curves for two or more risks, then it is appropriate to estimate the whole of portfolio loss for those risks simply by adding the probabilities from the loss exceedance curves.

For example, if a portfolio contains only three risks, say Sydney earthquake, Melbourne earthquake and Brisbane windstorm, and the probability of losses from these risks exceeding $1 billion is 0.2 per cent, 0.2 per cent and 0.1 per cent respectively, then the 1 in 200 whole of portfolio loss will not be materially different from $1 billion.

In general, if a portfolio may be modelled as containing n independent risks, i = 1,2, 3, ..., n for which the probability of the largest single loss in a year exceeding $x is equal to $L_i(x)$, and if, for a particular value of x,

$$\sum_{i=1}^{n} L_i(x) = \frac{1}{k}$$

Then the probability that the largest single loss in the next year for the whole portfolio exceeds x is $L_T(x)$, where $L_T(x)$ satisfies the following relationship:

$$\frac{1}{k+1} \leq L_T(x) \leq \frac{1}{k}$$

This is true regardless of the number of risks being aggregated, and regardless of the shapes of their loss exceedance curves.

In particular, if $x is chosen so that

$$\sum_{i=1}^{n} L_i(x) = \frac{1}{200}$$

Then

$$\frac{1}{201} \leq L_T(x) \leq \frac{1}{200}$$

Thus $x is not materially different from the 1 in 200 whole of portfolio single loss.

Principle 4: Estimating the whole of portfolio approach – aggregation of single peril PMLs

Where an insurer is not able to reasonably estimate loss exceedance curves for different risks, but can nonetheless estimate 1 in 200 losses for each risk, then it may aggregate these estimates using the 'square root of sum-of-squares' formula:

$$PML_T = \sqrt{\sum_{i=1}^{n} PML_i^2}$$

For natural hazards (particularly those with a heavy tailed loss distribution such as earthquake) this is likely to be an underestimate, and the following formula may be more appropriate:

$$PML_T = \left[\sum_{i=1}^{n} PML_i^k\right]^{\frac{1}{k}}$$

Where k is a suitably chosen factor reflecting the fat-tailedness of the risks, and

$1 < k < 2$

However, for simplicity, the square root of sum-of-squares formula would normally be acceptable.

The use of such formulae is consistent with the principles outlined above, and allows for the potential for greater losses from a particular peril at longer return periods (for example, the 1 in 300 year loss being more than the 1 in 200 year loss). Where this is not the case for a particular risk (for example the 1 in 200 year loss may equal the total sum insured), then the whole of portfolio approach implies taking the maximum of the PML for this risk and the whole of portfolio PML otherwise estimated.

Application of these principles means that the whole of portfolio PML may be reasonably estimated by: (i) taking the results of catastrophe modeling; (ii) combining the results of separate catastrophe modeling outputs (where separate modeling is performed for different risks and/or different regions), and (iii) incorporating separate estimates of material 'non-modelled' risks.

Appendix B – worked examples of insurance concentration risk capital charge for a large property insurer

This appendix provides some simple worked examples of the calculation of the insurance concentration risk capital charge for a large property insurer.

Calculations are provided for three scenarios. Each scenario assumes an insurer with the following characteristics.

	$m
1 in 200 year whole of portfolio loss	3000
1 in 10 year whole of portfolio loss	600
1 in 6 year whole of portfolio loss	300

Cost of reinsurance	$m
100m-200m layer	20
200m-300m layer	10
300m-400m layer	10
400m-500m layer	10
500m-600m layer	10

Scenario A

This scenario assumes, in addition to the general assumptions above, that:

- the per-event catastrophe reinsurance retention = $100m;
- there is one prepayment of full cover;
- the vertical limit exceeds $3000m;
- there is no aggregate reinsurance protection in place; and
- the annual allowance for the expected cost of events in insurance premiums, including risk margin (item C) = $200m.

The calculation

VR	100	equal to reinsurance retention given prepaid reinstatement of full cover
H(3)	360	• 1 in 10 year loss exceeds the retention, so net retained losses are 3 x retention = $300m • cover already in place for first two events (given prepaid reinstatement) but no cover in place for third event • cover for third event = cost of reinsurance for layer required ($100m to $600m layer) = $60m
H(4)	460	• 1 in 6 year loss exceeds the retention, so net retained losses are 4 x retention = $400m • cover already in place for first two events (given prepaid reinstatement) but no cover in place for third or fourth events • cover for third and fourth events = cost of reinsurance for layer required ($100m to $300m) = $30m per event, i.e. = $60m
C	200	as per scenario provided
HR	260	max (H3,H4)-C
ICRC	279	square of sum of squares of VR and HR

Scenario B

This scenario assumes, in addition to the general assumptions stated at the beginning of this appendix, that:

- the per-event catastrophe reinsurance retention = $400m;
- there is one prepayment of full cover;
- the vertical limit exceeds $3000m;
- there is aggregate reinsurance protection in place; and
- the annual allowance for the expected cost of events in insurance premiums, including risk margin (item C) = $600m.

The calculation

VR	400	equal to reinsurance retention given prepaid reinstatement of full cover
H(3)	1220	• 1 in 10 year loss exceeds the retention, so net retained losses are 3 x retention = $1200m • cover already in place for first two events (given prepaid reinstatement) but no cover in place for third event • cover for third event = cost of reinsurance for layer required ($400m to $600m layer) = $20m
H(4)	1200	• 1 in 6 year loss is less than the retention, so net retained losses are 4 x size of loss = $1200m • no cover needed for any event as all events are less than reinsurance retention
C	600	as per scenario provided
HR	620	max (H3,H4)-C
ICRC	738	square of sum of squares of VR and HR

Scenario C

This scenario assumes, in addition to the general assumptions stated at the beginning of this appendix, that:

- the per-event catastrophe reinsurance retention = $400m;
- there is one prepayment of full cover;
- the vertical limit exceeds $3000m;
- the annual allowance for the expected cost of events in insurance premiums, including risk margin (item C) = $600m; and
- there is aggregate reinsurance protection with aggregate deductible of $700m and cover of $400m.

The calculation

VR	400	equal to reinsurance retention given prepaid reinstatement of full cover
H(3)	820	• 1 in 10 year loss exceeds the retention, so net retained losses for first event is $400m • for the second event of $600m, we apply catastrophe reinsurance retention of $400m • with the aggregate reinsurance deductible at $700m, the retained loss for the second event is $300m • for the third event of $600m, we apply catastrophe reinsurance retention of $400m • with the aggregate reinsurance cover of $400m, the retained loss for the third event is $100m • cover already in place for first two events (given prepaid reinstatement) but no cover in place for third event • cover for third event = cost of reinsurance for layer required ($400m to $600m layer) = $20m
H(4)	800	• 1 in 6 year loss is less than the retention, so net retained losses for first and second event is $300m each or $600 in total (2 x $300m) • with the aggregate reinsurance deductible at $700m, the retained loss for the third event is $100m • with the aggregate reinsurance cover of $400m, the retained loss for the fourth event is $100m • no cover needed for any event as all events are less than reinsurance retention
C	600	as per scenario provided
HR	220	max (H3,H4)-C
ICRC	457	square of sum-of-squares of VR and HR

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