Technical Paper

Review of capital standards for general insurers and life insurers

Asset risk capital charge

12 July 2010

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Australian Prudential Regulation Authority

Preamble

APRA is reviewing its capital standards 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 in detail APRA's proposals for determining the asset risk capital charge for both general insurers and life insurers.

APRA is releasing two other technical papers, one in respect of the capital base and insurance risk capital charge for life insurers, and the other in respect of the insurance concentration risk capital charge for general insurers.

APRA will invite insurers to participate in a quantitative impact study (QIS). Details of the QIS will be issued shortly.

APRA is inviting comment on the proposals discussed in this technical paper. Written submissions should be emailed to InsuranceCapital@apra.gov.au by 29 October 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.

Contents

Glossary

APRA	Australian Prudential Regulation Authority
Appointed actuary	The actuary appointed under either the *Insurance Act 1973* or the *Life Insurance Act 1995*.
Capital base	The capital APRA determines is suitable for the purpose of meeting the Prudential Capital Requirement. See the discussion paper for details. For life insurers also refer to the technical paper: Capital base and insurance risk capital charge for life insurers.
CPI	The Consumer Price Index published by the Australian Bureau of Statistics.
General fund	The management fund for a friendly society or the shareholders' fund for other life companies.
General insurer	A general insurer authorised under the *Insurance Act 1973*.
GPS 114	*Prudential Standard GPS 114 Capital Adequacy: Investment Risk Capital Charge*
GPS 310	*Prudential Standard GPS 310 Audit and Actuarial Reporting and Valuation*
LIASB	Life Insurance Actuarial Standards Board
Life insurer	A life company registered under the *Life Insurance Act 1995* (includes friendly societies).
LPS 1.04	*Prudential Standard LPS 1.04 Valuation of Policy Liabilities* – an ex-LIASB standard (AS 1.04) remade by APRA with effect from 1 January 2008.
LPS 2.04	*Prudential Standard LPS 2.04 Solvency Standard* – an ex-LIASB standard (AS 2.04) remade by APRA with effect from 1 January 2008.
LPS 3.04	*Prudential Standard LPS 3.04 Capital Adequacy Standard* – an ex-LIASB standard (AS 3.04) remade by APRA with effect from 1 January 2008.
LPS 6.03	*Prudential Standard LPS 6.03 Management Capital Standard* – an ex-LIASB standard (AS 6.03) remade by APRA with effect from 1 January 2008.
LPS 7.02	*Prudential Standard LPS 7.02 General Standard* – an ex-LIASB standard (AS 7.02) remade by APRA with effect from 1 January 2008.
Prescribed capital amount	The capital required under the proposed APRA prudential standards, before any supervisory adjustment is applied.
Prudential capital requirement	The capital required under the proposed APRA prudential standards, after any supervisory adjustment has been applied.
QIS	Quantitative Impact Study

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 insurance and life insurance companies.[1]

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

(a) improve the risk sensitivity and appropriateness of the capital standards in general and life insurance; and

(b) where appropriate, improve the alignment of the capital standards across industries.

The proposed framework for required capital was described in the discussion paper. It includes capital charges for asset risk, asset concentration risk, insurance risk, insurance concentration risk and operational risk.

The discussion paper outlined the differences between the proposed asset risk capital charge and the existing capital requirements for asset risks. The asset risk capital charge would replace the investment risk charge for general insurers (currently specified in GPS 114) and the resilience reserve for life insurers (currently specified in LPS 2.04, LPS 3.04 and LPS 6.03).

The discussion paper described APRA's reasons for replacing the existing capital requirements for asset risks. One reason is to align the capital requirements for the life insurance and general insurance industries. The existing capital requirements differ significantly between the two industries. The proposed asset risk capital charge also addresses a number of shortcomings in the existing requirements for both industries. In particular, some potentially significant risks are not adequately addressed and the recognition of correlations between different asset risks can be improved.

This technical paper provides further details of APRA's proposals for the calculation of the asset risk capital charge. APRA is inviting comment on the proposals detailed in this paper, including:

- the structure of the asset risk capital charge;
- the proposed parameters; and
- the treatment of particular types of assets and liabilities.

APRA intends to evaluate its capital proposals by assessing the results of a quantitative impact study (QIS) in which all insurers will be invited to participate. The QIS is expected to be issued in July and insurers will be given three months to complete it. 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 indicative only and subject to change until the final prudential capital standards are issued.

Examples of the calculation of the asset risk capital charge and summaries of the existing capital requirements for asset risks are included in the appendices to this paper.

1 Including friendly societies.

Chapter 2 – Asset risk capital charge

This chapter provides an overview of the asset risk capital charge. Detailed specifications for the components of the asset risk capital charge and the aggregation method are included in Chapters 3 to 5.

The asset risk capital charge aims to protect insurers against asset risks – that is, risks arising from movements in the values of investments (including market and credit risks) and from reinsurance assets and other recoverables. It should encourage insurers to adopt an investment policy that has regard to the term and nature of their liabilities. Both on and off-balance sheet exposures would need to be considered.

The asset risk capital charge would be calculated by considering the impact on insurers of a range of stresses, either directly to asset values or to economic factors which in turn affect the value of both assets and liabilities. The likelihood of different stresses occurring simultaneously would be considered when the charges for the individual stresses are aggregated.

APRA proposes that each type of asset risk would be evaluated separately in eight risk modules. The modules are listed below. Detailed specifications for the risk modules are included in Chapter 3 of this paper.

Each risk module would specify stresses that APRA estimates to give a 99.5 per cent probability of sufficiency over a 12-month period. The capital charge for each stress would be the fall (if any) in the capital base in response to the specified stress. The stresses would be applied to all admissible assets and all of the liabilities that determine the capital base.[2]

The capital charges for the modules would be aggregated using a correlation matrix specified by APRA. The aggregation process is described in Chapter 4 of this paper. The aggregation method recognises that the probability of all eight stresses occurring simultaneously is very remote.

Risk module	Directions	Stresses are applied to:
Real interest rates[3] (RIR)	up, down	Real yields
Expected inflation (INF)	up, down	CPI inflation expectations
Currency (CUR)	up, down	Exchange rates
Volatility (VOL)	up, down	Volatility assumptions[4]
Equity (EQY)	up	Dividend yields
Property (PROP)	up	Rental yields
Credit spreads (CSP)	up	Credit spreads
Default risk (DEF)	down	Value of asset[5]

2 For general insurers: because the stresses are applied to the capital base, and not the balance sheet, the real interest rates and expected inflation stresses would be applied to APRA net premiums liabilities rather than AIFRS premiums liabilities.

3 The difference between nominal interest rates and expected CPI inflation.

4 Volatility is a parameter used in the valuation of options and some other types of derivatives.

5 The assets that are stressed in the default risk module are described in Chapter 3. They include reinsurance assets.

For the first four modules, the impact of stresses would need to be considered for both upwards and downwards movements in the stressed variables. The capital charge for each stress would have a minimum of zero. In practice, in most cases it is expected that insurers would be readily able to identify which one of the movements (up or down) would cause an increase in the capital base. This scenario would therefore not need to be calculated.

The eight major asset risks considered are not exhaustive. However, APRA considers them to be the major risks likely to be encountered by insurers in the normal course of business.

2.1 Derivation of factors

The factors used in each of the asset risk modules and the correlations between modules have been determined by APRA after considering relevant historical experience, both in Australia and internationally, and economic theory. A substantial degree of judgement was required.

The stresses applied to interest rates and asset values are generally larger than those specified in the existing life insurance capital adequacy standard LPS 3.04. The stresses in LPS 3.04 were broadly intended to produce a resilience reserve that had a 99 per cent probability of sufficiency over a 12-month period whereas for the asset risk capital charge the probability of sufficiency is intended to be 99.5 per cent over a 12-month period.

The stresses are generally much larger than the factors specified for the general insurance investment risk capital charge in GPS 114. The factors in GPS 114 made implicit allowance for diversification between the different asset classes and between asset and insurance risks, whereas in the proposed framework the allowances for diversification are explicit (via the aggregation method). Diversification between asset classes would be recognised in the aggregation method used for the asset risk capital charge (see Chapter 4). Diversification between asset and insurance risks would be recognised in the calculation of an aggregation benefit, as outlined in the discussion paper.

In addition to these changes to the capital framework, the stresses have been reassessed having regard to recent Australian and international experience.

Chapter 3 – Asset risk modules

3.1 Real interest rates module

This module measures the impact on the capital base of changes to real interest rates. All assets and liabilities whose value depends on real interest rates would be affected. The affected assets would, for example, include all fixed interest assets. Floating rate assets would not be affected. All liabilities valued using a discount rate would be affected.

Risk-free interest rates can be considered as comprising a real interest rate and an expected CPI inflation rate.[6] The risk-free interest rates would need to be split into these two components in order to do the calculations required for the real interest rates and expected inflation modules.

The real interest rates used in this risk module, would be the difference between the risk-free rates and the expected CPI inflation rates. The expected CPI inflation rates would be the rates used in the liability valuation.

For assets and liabilities denominated in foreign currencies, the real interest rates and expected inflation rates would need to be derived for each currency to which the insurer is exposed.

The rationale for considering real interest rates and expected inflation separately is to allow for asset and liability mismatches in terms of both the timing of cash flows and whether or not those cash flows are affected by inflation. Some asset and liability cash flows are affected by inflation and others are not. If stresses were applied to nominal yields (real interest rates plus expected inflation rates), the capital charge would only reflect mismatches in the timing of cash flows.

Real interest rates and expected inflation rates both have term structures, with rates varying by duration. The proposed stress factors are greater for shorter durations than long durations – this is consistent with both historical data and economic theory.

The stresses are expressed as factors multiplied by the base assumptions. This ensures that the stressed rates cannot become negative. It also means the stresses to the values of assets and liabilities become larger when the base assumptions are higher.

For the real interest rates and expected inflation modules, the upward stresses to rates are greater than the downward stresses. APRA believes it is important to recognise that an upward movement is more likely than a downward movement of the same magnitude.

The existing life insurance capital standards LPS 2.04 and LPS 3.04 also have asymmetric stresses to interest rates, with the upward stresses greater than the downward stresses. The proposed downward stresses are notably greater than those specified in LPS 2.04 and LPS 3.04. This is partly a reflection of actual experience in recent years, which showed that large downward movements in interest rates and inflation expectations are possible over short periods.

For the real interest rate module, APRA would specify an increase and a decrease to apply to the prevailing real yield curves. All other asset and liability valuation parameters (including expected inflation and credit spreads) would be unchanged for the purpose of calculating the capital required for the stresses in this module.

6 In the event that APRA were to allow a liquidity premium adjustment for some types of life insurance annuities (see Chapter 8 of the discussion paper), this adjustment would be regarded as separate from the real interest rate and the expected CPI inflation rate.

Proposed stresses

The stresses to real interest rates are found by multiplying the real zero coupon spot yield curve by the factors specified in the table below. The factors depend on the duration of each of the expected asset and liability cash flows. The duration should be rounded up to the next highest year when finding the appropriate factor from the table below. Both upward and downward movements in the real yield curve must be considered.

For the real interest rates module, inflation expectations are assumed to be constant, so the same basis point adjustment applies for both real and nominal interest rates.

	Maturity (years)				
	1	2, 3	4, 5	6, 7	8+
+	0.8	0.7	0.65	0.6	0.55
-	-0.7	-0.6	-0.55	-0.5	-0.45

Example

If the base real interest rate is 3.0 per cent for all maturities, the proposed variations are +2.4 per cent and -2.1 per cent for a maturity of one year, and +1.65 per cent and -1.35 per cent for maturities of eight years or more. These adjustments would apply to both real and nominal yields.

Assume the interest bearing assets are $100 with a duration of one year and the liabilities are $200 with a duration of 10 years. Other assets are not interest-bearing. Because this portfolio is quite simple, with liabilities greater than assets in both value and duration, a fall in interest rates would cause a fall in the capital base, and a rise in interest rates would increase the capital base. The capital charge for the scenario of a rise in interest rates is zero and does not need to be calculated.

- The increase in the value of assets in the falling interest rates scenario is approximately $100 x 2.1 per cent x 1 = $2.10.
- The increase in the value of liabilities is approximately $200 x 1.35 per cent x 10 = $27.
- The estimated fall in the capital base is $27 – $2.10 = $24.90. This is the capital charge for the falling real interest rates scenario.

3.2 Expected inflation module

This module measures the impact on the capital base of changes to expected CPI inflation rates. Both assets and liabilities may be affected.

For the expected inflation module, APRA would specify an increase and a decrease to apply to the expected CPI inflation rates. Real interest rates, credit spreads and all other valuation parameters would remain unchanged. Nominal discount rates (real interest rate plus expected inflation) would vary in line with the change in expected inflation.

The values of assets and liabilities with inflation-linked cash flows would not be affected by the stresses applied to expected CPI inflation rates as changes to the inflation rate of future cash flows are exactly offset by changes to the discount rate.

The inflation stress would only affect the value of assets and liabilities whose cash flows were not affected by inflation. The value of these assets and liabilities would be affected by changes to the nominal discount rate.

General insurance liabilities would normally be considered by APRA to be inflation-linked liabilities and therefore not affected by changes to expected CPI inflation. Most general insurers would, however, be affected in this module by changes to the value of their fixed-interest assets. General insurers may already allow for inflation risk in their insurance liability risk margins. Inflation risk could be double-counted if it was also considered in the asset risk capital charge. As part of the QIS, general insurers will be asked to provide results both with and without allowance for inflation risk in the asset risk capital charge. See Chapter 6 for further discussion of this issue.

Proposed stresses

The stresses to expected CPI inflation are determined by multiplying the expected CPI inflation rates by factors from the table below. These factors depend on the duration of the cash flows. Both upward and downward movements in expected inflation must be considered.

Under the adjustment to expected CPI inflation, real interest rates are assumed to be constant, implying the same basis point adjustment for both expected inflation and nominal interest rates. As noted above, only the value of non-inflation linked asset and liability cash flows would be affected by this stress.

	Maturity (years)				
	1	2, 3	4, 5	6, 7	8+
+	0.95	0.75	0.65	0.6	0.55
-	-0.85	-0.65	-0.55	-0.5	-0.45

Example

If the base inflation rate is 2.5 per cent for all maturities, the proposed variations are +2.38 per cent or -2.13 per cent for a maturity of one year and +1.38 per cent or -1.13 per cent for maturities of eight years or more.

3.3 Currency module

This module measures the impact on the capital base of changes in foreign currency exchange rates. These changes may affect the values of both assets and liabilities when measured in Australian dollars.

For the currency module, APRA would specify a rise or fall in the Australian dollar exchange rates relative to foreign currencies.

Proposed stress

The proposed currency stress is an increase or decrease of 25 per cent in the value of the Australian dollar against foreign currencies.

The stress would apply to all assets and liabilities not denominated in Australian dollars. For clarity, this includes shares listed on foreign exchanges and properties located overseas, even though they are not denominated in any particular currency. All foreign currencies are assumed to move in the same direction against the Australian dollar. Gains in the capital base arising from movements in one foreign currency cannot be used as an offset to losses from movements in other foreign currencies.[7]

The impact of the currency movements on reinsurance assets that are denominated in a different currency to the insurance liabilities would need to be considered by the insurer.

Life insurance statutory funds that have all liabilities denominated in foreign currency would use the currency of the liabilities as the reference point instead of the Australian dollar.

7 As a consequence, insurers with asset and liability exposures in multiple foreign currencies may have non-zero capital charges for both directions of stress in the currency module. Both stresses will need to be considered in the aggregation process (Chapter 4).

Currency	Assets (in AUD)	Liabilities (in AUD)	Cap base (in AUD)	Capital required	
				AUD rises	AUD falls
AUD	140	100	40	0	0
NZD	80	100	-20	0	5
GBP	40	0	40	10	0
Total	**260**	**200**	**60**	**10**	**5**

Example

Assume an insurer has both assets and liabilities denominated in Australian and New Zealand dollars, and assets only in British pounds.

In the scenario of a rise by the AUD against all foreign currencies, the rise of the AUD against the NZD would increase the capital base (and so it is set to zero), but the rise in the AUD against the GBP would reduce the capital base. In the other scenario of a falling AUD it is the fall against the NZD which creates the need for capital.

The capital charges for the currency module in this example are $10 for the upward stress and $5 for the downward stress. It would be necessary to consider both stresses when the results from the modules are aggregated as the correlations between the currency module and other modules vary depending on which scenario is used (see Chapter 4).

3.4 Volatility module

This module measures the impact on the capital base of changes in the volatility parameters used for valuing financial options and some other derivative assets. These stresses would also affect the values of any financial options and guarantees that are included in life insurance liabilities. Forward-looking volatility is a key valuation parameter for financial options and some other types of derivatives and can change significantly over fairly short periods.

In general, standard option valuation models depend on the following factors:

- the strike price of the option;
- the time to expiration, together with any restrictions on when exercise may occur;
- the current market price of the underlying security;
- the cost of holding a position in the underlying security, including interest and dividends; and
- an estimate of the future volatility of the underlying security's price over the life of the option.

The strike price and expiry date are fixed when an option contract is struck. The other factors can vary and affect the value of an option from the time it is struck until its expiry. The current market price of the underlying security and the cost of holding a position in the underlying security are stressed in other asset risk modules. Volatility is important in determining the value of options due to the asymmetric nature of option payoffs (in many potential outcomes an option will have zero value when it expires).

More advanced option valuation models can require additional factors, such as an estimate of how volatility changes over time and for various underlying price levels, or the dynamics of stochastic interest rates. APRA is not proposing to apply stresses to these additional factors.

Proposed stresses

For the volatility module, APRA would specify a rise or fall in forward-looking volatilities for interest rates, equities and currency.

The proposed stresses to volatility parameters are shown in the following table. They are expressed as a fixed proportion of current volatility levels. The volatility parameters for interest rates, equities and currency are to be increased or decreased simultaneously.

	Factor (bps)		
	Interest rates	Equities	Currency
+	+60	+150	+80
-	-30	-60	-40

For example, in the upward stress scenario an equity volatility of 18 per cent would change to (1 + 1.5) x 18 per cent = 45 per cent.

3.5 Equity module

This module applies to listed equity assets. It also applies to hedge funds and unlisted (private) equity assets where a 'look through' approach has not been used (see Chapter 5), and to any assets that are not considered in any of the other modules – e.g. precious metals or works of art. Life insurance liabilities would be affected if the benefits under the policies are contractually linked to the performance of the assets held.

For listed equities, APRA would specify an addition to the prevailing dividend yield on the ASX 200 Index. Insurers would be required to convert this increase in dividend yield into an equivalent fall in equity prices. The same proportionate fall in prices would be applied to both Australian and foreign listed equities. This method of applying a stress to the dividend yield would result in a higher capital charge being applied when the prevailing dividend yield is low and a lower capital charge being applied when the prevailing dividend yield is high. It reduces the pro-cyclical nature of the asset risk capital charge by increasing the charge following a rise in equity markets and reducing it following a market fall.

A separate stress factor would be applied to hedge funds, unlisted equities and any other assets not considered in other modules. APRA considers these assets to have higher risk and less liquidity than listed equities. In extreme circumstances, the realisable value of these types of assets may fall further than listed equities.

Proposed stresses

Listed equities

A 2.5 per cent addition to the ASX 200 dividend yield.[8]

Other assets

A 45 per cent fall in value. The other assets category includes private unlisted equity, hedge funds and any other assets not included in other modules.

Example

If the current dividend yield is 4 per cent, the proposed stressed yield for listed equities would be 6.5 per cent, which is equivalent to a fall of 38.5 per cent in value (= 1 – 4 per cent/6.5 per cent).

If the current dividend yield is 7 per cent (a level reached in early 2009 when Australian shares reached the low point of the recent market downturn), the stressed yield would be 9.5 per cent. This is equivalent to a fall of 26.3 per cent in value.

In both situations, the fall in value of other assets such as unlisted equity would be 45 per cent.

8 Life insurers must also consider the scenario of a 2.5 per cent reduction to the ASX 200 dividend yield, if this would result in a fall in capital base..

3.6 Property module

This module applies to property assets and infrastructure assets. Life insurance liabilities would be affected if the benefits under the policies are contractually linked to the performance of the assets held.

APRA considers infrastructure assets to be similar in nature to direct property assets and therefore proposes to include them in this module.

Proposed stress

The proposed property stress is a 2.75 per cent addition to rental yields. This is equivalent to increasing capitalisation rates by 2.75 per cent.

Basing the asset stress on rental yields rather than prices reduces the pro-cyclical nature of the asset risk capital charge. This is similar to the equity module, where the stress is based on dividend yields.

The rental yields are to be based on the most recent leases in force and are determined net of expenses. The rental yields and changes in value can be calculated separately for each property asset, or they can be calculated for the property portfolio as a whole.

Owner-occupied property would need to be revalued at fair value (if not already at fair value on the balance sheet) and an estimate of the imputed rental yield would be required. For vacant land, the insurer would need to consider an appropriate treatment.

Example

If the current rental yield (capitalisation rate) is 6 per cent then the proposed stressed yield would be 8.75 per cent. This results in a fall of 31.4 per cent in the property value.

3.7 Credit spreads module

This module applies to interest-bearing assets, including cash deposits and floating-rate assets. Credit derivatives and zero-coupon instruments such as bank bills would also be included. Life insurance liabilities would only be affected if the benefits under the policies were contractually linked to the performance of interest-bearing assets.

A credit spread is the difference in yield between an asset that is subject to credit risk and a similar risk-free asset. Credit spreads can vary significantly over time, both for individual securities and for securities markets as a whole. The credit spreads module stresses the value of interest-bearing assets by increasing the prevailing yields on these assets. In addition to the risk of an increase in credit spreads for the particular counterparty grade, the proposed stresses also allow for the risk of default or migration of the asset to a lower credit rating over the following 12 months.

Proposed stresses

The annualised yields on interest-bearing assets are increased according to the following table:

Counterparty grade	Bonds[9] (%)	Securitised assets (%)
1 (government)	0	0
1 (other)	0.6	2
2	0.9	2.5
3	1.5	3.5
4	2.5	5.0
5	4.5	7.5
6	8.5	12.5
7	16	22

9 and other non-securitised assets.

The counterparty grades listed in the table above are detailed in Appendix A. For example, Grade 1 includes assets with a AAA long-term rating. For general insurers grades 6 and 7 are new – assets with these counterparty grades were included in grade 5 in GPS 114.

Separate factors would apply for structured or securitised assets and for other interest-bearing assets (e.g. corporate bonds and mortgages). The higher factors for the former reflect their complexity and the difficulties associated with rating and assessing their inherent risk. These issues were highlighted during the global financial crisis.

In order to capture their default risk, cash deposits and floating-rate assets would be assumed to have a minimum term of 12 months, even if they are in practice immediately redeemable by the insurer. For example, the capital charge for an at-call bank deposit with counterparty grade 1 would be 0.6 per cent of the amount deposited. If not redeemable within 12 months, the actual duration of these assets would be used.

The government bonds which would qualify for the zero factors are Commonwealth Government bonds and foreign government bonds which are AAA rated. Other types of government bonds (including most State government bonds) would have non-zero factors, depending on their counterparty grade and determined from the above table. State government debt is subject to the risk of widening credit spreads and the downgrading of its credit rating.

Assets that have been guaranteed for their remaining term may have the counterparty grade of the guarantor.

Example

For a corporate bond or mortgage with a duration of 10 years and a counterparty grade of 4, the fall in value in the credit spreads module is approximately 10 x 2.5 per cent = 25 per cent.

3.8 Default risk module

This module applies to reinsurance assets, over-the-counter (OTC) derivatives[10], unpaid premiums and any other credit exposures that are not considered in the credit spreads module. Life insurance liabilities would be affected if the benefits under the policies are contractually linked to the performance of these assets.

Proposed stresses

Default risk is assessed by applying factors from the table below to the value of each asset. Separate factors would apply to unpaid premiums and other exposures, as outlined below.

Counterparty grade	General insurance recoveries (%)	Other[11] (%)
1	2	1
2	2	1
3	4	2
4	6	3
5	8	4
6	12	6
7	20	10

The proposed factors allow for the typical concentration of exposures to these assets (e.g. insurers are normally only exposed to a small number of reinsurers). As an offset, the factors also recognise that some recoveries would be expected to be made on defaulting reinsurance assets.

10 It is only the counterparty default risk that is included here. The risk of changes to the value of the derivative because of changes to its underlying security(ies) is covered in the relevant other module, eg the currency module for a foreign exchange forward.

11 Includes life reinsurance assets, over the counter derivatives and any other credit exposures not considered elsewhere in the default module or the credit spreads module.

For life insurers, the values of reinsurance assets used in this module would be at 99.5 per cent sufficiency (with regard to insurance risks) rather than at best estimate. The value of the reinsurance assets would be determined by calculating the adjusted liabilities and insurance risk charge gross of reinsurance, and deducting the corresponding net of reinsurance values. For general insurers, reinsurance assets and other recoveries would be at the level of sufficiency required for the insurance liabilities in GPS 310 (i.e. 75 per cent sufficiency in most cases).

The counterparty default risk on OTC derivatives would need to be assessed at 99.5 per cent sufficiency, after allowing for other stresses in the asset risk capital calculations. For example, a put option on a share price index would be stressed in the real interest rates, expected inflation, volatility and equity modules.

The lower factors proposed for life reinsurance assets and OTC derivatives are in recognition of the higher degree of stress applied in the calculation of these assets, for the purpose of determining the default risk charge.

Unpaid premiums and unclosed business

For unpaid premiums, the factors are four per cent for premiums due less than 6 months previously and eight per cent for other premiums.

For unpaid life insurance premiums, the above factors only apply if the unpaid premiums cannot be recovered by reducing the termination value of the policy. The charge for unpaid life insurance premiums does not apply in the case of premiums due from a registered life company under a contract of reinsurance.

For unclosed general insurance business, a four per cent factor applies. Unclosed business is business for which there is insufficient information available to report an exact amount of premium. Premiums for unclosed business must be estimated. Unclosed business includes business which has been accepted by the insurer/reinsurer prior to the balance date but where there is insufficient information to fully identify the business.

Recoveries from non-APRA authorised reinsurers

For general insurers, the factors (from the table above) used for recoveries from non APRA-authorised reinsurers would be stepped down a grade (e.g. for a grade 4 non-authorised reinsurer the factor used would be that applying for a grade 5 authorised reinsurer). This is consistent with the treatment of these recoveries in GPS 114. The treatment of certain reinsurance recoverables due from non APRA-authorised reinsurers as specified in paragraphs 5 to 7 in Attachment A of GPS 114 would continue to apply as part of the proposed default module.

Unsecured loans with 100 per cent default factors

The following types of unsecured loans would have a 100 per cent default factor applied to them:

- loans to directors of the insurer;
- loans to directors of related bodies corporate (or a director's spouse);
- loans to a parent or related company that are not on commercial terms; and
- loans to employees exceeding $1,000.

Loans with a 100 per cent default factor would not be subject to stresses in the other modules, in order to avoid double-counting of risk.

These requirements are the same as those in GPS 114, except that GPS 114 also applies a 100 per cent factor to secured loans to directors and parent or related companies.

These requirements differ from those in LPS 2.04 in several ways. All unsecured loans to directors, employees, advisers and related parties are treated as inadmissible assets under LPS 2.04. APRA proposes that all loans to advisers, all loans to parent or related companies that are on commercial terms, and all loans to employees not exceeding $1,000 will receive the same treatment as credit exposures where the counterparty is unrelated to the insurer. Note that unsecured loans which are not publicly rated would have a counterparty grade of 6. These loans may incur a significant charge in the credit spreads module, depending on the term of the loan.

LPS 3.04 does not require any special treatment of unsecured loans to directors, employees, advisers and related parties.

Assets excused from being treated as inadmissible

The technical paper dealing with the capital base and insurance risk capital charge for life insurers allows assets that would otherwise be inadmissible to be treated as admissible if certain conditions are met. These conditions include policy benefits being dependent on the performance of the assets.

Any assets that fall into this category will have a 100 per cent default factor applied. The liabilities may reduce in response to the application of this charge. For example, investment-linked liabilities will be able to absorb all of the default charge, providing the liabilities have no performance guarantees.

These assets are treated this way so that movements in the liabilities can appropriately offset the 100 per cent charge applied to the assets.

Chapter 4 – Aggregation of capital charges

APRA proposes to combine the capital charges for the asset risk modules in a way that recognises the diversification benefits of exposure to different types of risk. The aggregation of the capital charges would be undertaken by applying a correlation matrix.

The aggregated asset risk capital charge would be calculated as:

$$A_{default} + \sqrt{\sum_{x,y} Max\,(0, Corr_{x,y}.A_x.A_y.sign(x).sign(y))}$$

where A_x = the capital charge for asset risk module x

$\sum_{x,y}$ = the sum over all combinations of asset risk modules, excluding the default module

$Corr_{x,y}$ = the correlation between asset risk modules x and y

$sign(x)$ = 1 if the stress direction for module x is the same as specified in the correlation matrix, otherwise -1

In situations of stress, risks can become more highly correlated. Therefore, the correlations between the different asset risks would be set at conservative levels by APRA and would allow for the relative likelihood of scenarios occurring at the same time.

The above formula effectively sets the correlation between two stresses to be zero if the sign of one of the stresses is opposite to that assumed in the correlation matrix. For example, a fall in the Australian dollar against all foreign currencies is assumed to be positively correlated with falls in equity and property markets, and increases in credit spreads. However, a rise in the Australian dollar is assumed to be uncorrelated with these other stresses. Lower correlations result in higher diversification benefits. Negative correlations have not been allowed, in order to limit the degree to which diversification benefits can be recognised.

For life insurers, the aggregation calculation would be done separately for each of the statutory funds and the general fund. There would be no recognition of diversification benefits between funds.

The proposed correlation matrix:

	RIR	INF	CUR	VOL	EQY	PROP	CSP
Direction	down	down	down	up			
RIR	1	0.2	0	0	0.2	0.2	0.2
INF	0.2	1	0	0.2	0.4	0.4	0.2
CUR	0	0	1	0.4	0.6	0.2	0.4
VOL	0	0.2	0.4	1	0.8	0.2	0.6
EQY	0.2	0.4	0.6	0.8	1	0.4	0.8
PROP	0.2	0.4	0.2	0.2	0.4	1	0.2
CSP	0.2	0.2	0.4	0.6	0.8	0.2	1

For each entry in the table, the size of the correlation coefficient reflects APRA's assessment of how likely it is that extreme movements of the two relevant modules, both in the directions indicated (or both opposite to the directions indicated), would occur at the same time. It is proposed that there be no allowance for any diversification benefit between default and the other asset risks.

Four of the modules allow for stresses to apply in two directions. The aggregation needs to be performed twice for each of these modules if both stresses produce a non-zero capital charge, and the largest of the aggregates chosen.[12] For the RIR, INF, CUR and VOL modules, this situation could occur if the assets or liabilities include financial derivatives or options.

For the currency module, it may also occur if there are both assets and liabilities in multiple foreign currencies. Where a module does produce non-zero capital charges for stresses in both directions, it is possible the smaller capital charge could produce the larger aggregate capital charge because the values of sign(x) and sign(y) in the aggregation formula vary depending on the direction of the stress.

Example 1

The capital charges for each module are shown in the following table, together with the 'sign' to be used in the aggregation formula:

	RIR	INF	CUR	VOL	EQY	PROP	CSP	DEF
up	60	0	0	10				
down	0	30	50	0	20	20	50	10
sign	-1	1	1	1				

Without allowance for diversification, the total asset risk capital charge would be $250.

The asset risk capital charge allowing for diversification is $149.

Example 2

This example is the same as example 1 except that the currency stress is in the opposite direction (the Australian dollar appreciates against foreign currencies).

	RIR	INF	CUR	VOL	EQY	PROP	CSP	DEF
up	60	0	50	10				
down	0	30	0	0	20	20	50	10
sign	-1	1	-1	1				

Without allowance for diversification, the total asset risk capital charge would be $250, as in the previous example.

The asset risk capital charge allowing for diversification is $134. The diversification adjustment is larger than in Example 1 because the sign of the currency stress is negative instead of positive. In other words, the scenario of a rising Australian dollar (in combination with the other stresses) is considered less likely than the scenario of a falling Australian dollar. Therefore, the asset risk capital charge for the rising Australian dollar scenario is lower.

12 The maximum number of aggregations to perform is sixteen if all four bidirectional modules have a non-zero capital charge for stresses in both directions. However this is very unlikely.

Chapter 5 – Methodologies

This chapter provides further description of the methodologies that must be used.

5.1 Complex assets

Insurers would be required to consider their effective exposure to the various asset classes, regardless of their physical asset holdings. The treatment of the main asset classes, such as fixed-interest securities, direct property holdings and listed equities, is relatively straightforward. For more complex assets, the insurer would need to consider how the asset values would change in each of the asset risk scenarios. The following paragraphs describe the treatment of various complex or less commonly held assets. This chapter is not exhaustive as it cannot describe every possible type of asset. Insurers would be expected to exercise judgement in the treatment of assets that are not specifically mentioned.

Unlisted and controlled investment entities

The calculation must take account of the underlying exposure of the insurer to assets by considering a 'look-through' approach in respect of each unlisted or controlled investment entity, except in situations where the simpler alternative described below is used.

For this purpose, an investment entity is an entity whose assets are solely investments, where the sole purpose of the entity is investment activities and where the investor investing in that entity has security directly linked to those assets. For example, cash management trusts would fall into this category of investments.

If the look-through approach is used for geared investments, the debt must be treated as if it were a liability of the insurer, with appropriate allowance made for the sensitivity of the underlying assets and liabilities to market movements in each of the asset risk modules.

As a simpler alternative to the look-through approach, unlisted or controlled investment entities can be treated as belonging to the category of hedge funds, private equity and other non-standard assets in the equity module. However, this treatment would only be allowed if the resulting asset risk capital charge is not materially less than if the look-through approach was used.

Assets under a fixed or floating charge

The assets of a general insurer that are under a fixed or floating charge have a 100 per cent factor applied under GPS 114. For the proposed asset risk capital charge there would be no specific factor applied to charged assets. Instead, the effective asset and liability exposures of the insurer would be considered. The asset and the charge would be considered separately, with the charge being regarded as a liability of the insurer. For example, the change in value of a property subject to a fixed-rate mortgage would be considered in the property module, and the change in value of the mortgage would be considered in the real interest rates and expected inflation modules.

Off-balance sheet transactions

The principle of considering the effective exposure of the insurer to asset risks must be applied to any off-balance sheet exposures of the insurer. Examples of these exposures include the provision of guarantees to third parties, such as a guarantee to defined benefit superannuation funds, and collateral assets held by the insurer. Any increase in the cost of providing these guarantees must be recognised in each of the asset risk modules.

Collateral held against an asset may be considered in place of the asset if this would reduce the asset risk capital charge. If the fair value of the collateral is less than the value of the asset, the collateral would only partly replace the asset. For general reinsurance recoverables from non-APRA authorised reinsurers, the conditions for recognising collateral, detailed in GPS 114, would continue to apply.

Listed unit trusts

The look-through approach can be applied to listed unit trusts or alternatively they can be treated as listed equity.

Hybrids

Hybrid assets such as convertible notes must be split into their interest-bearing and equity/option exposures. The changes in value of the two exposures would be considered in each of the asset risk modules.

Derivatives

Changes in the value of derivatives (or hedging instruments) must be considered in each of the asset risk modules. For example, the value of an OTC share option may be affected in all modules except property and credit spreads.

Other assets

Bank notes and coins would not be regarded as at risk in any module (except for foreign notes and coins in the currency module).

Investment income receivables would be regarded as being part of the asset that generated the income.

Catastrophe bonds and other insurance-linked securities must be treated as structured or securitised assets. They will be included in the credit spreads module and other modules such as real interest rates and expected inflation if the value of these assets is affected by these risks.

Subordinated debt that is held as an asset would be treated in the same way as other interest-bearing assets.

Disaggregation of assets

Some assets may combine the characteristics of two or more asset sectors. An example is a property, where the sub-asset representing the value of an existing long-term lease with a high quality tenant may have the characteristics of a fixed-interest investment. The other sub-asset would represent the residual value of the property.

These assets may be disaggregated subject to certain requirements being met to APRA's satisfaction. These include:

- the stress applied to the value of the residual sub-asset is determined so that the total of the stresses applied to the separate sub-assets, after allowing for diversification benefits between the sub-assets, is not less than the stress that would apply to the whole asset before disaggregation. For this purpose, real interest rates and expected inflation would both be assumed to increase;
- the disaggregated sub-assets are appropriately credit risk rated; and
- the totality of the cash flows under the overall asset is fully represented by the disaggregated sub-asset cash flows.

Disaggregation has the effect of allowing the changes in the value of the liabilities in the real interest rates and expected inflation modules to be partly offset by movements in the value of the interest-sensitive sub-assets. In the example of a disaggregated property asset, the sub-asset representing the value of existing leases would have its value stressed in the real interest rates, expected inflation and credit spreads modules, whilst the residual asset would have its value stressed in the property module.

5.2 Asset concentrations

In order to avoid double counting of capital charges, assets in excess of the asset concentration limits would be assumed to be unchanged in value in each of the asset risk modules.

5.3 Fair value adjustments

The stresses in each asset risk module are to be applied to the fair value of the assets.

For life insurers, any adjustments required to bring assets to fair value are made through the inadmissible assets.

For general insurers' assets that are not reported at fair value in the statutory balance sheet, the difference between fair value and reported value is to be used as an offset to the asset stresses. In other words, the asset values after applying the asset risk stresses should be at fair value.

For example, if the reported value of an asset was 90, the fair value was 100, and the stress applied was a reduction in value of 20 per cent, the reduction in fair value would be 20 and the reduction in capital base would be 10.

5.4 Tax

All of the proposed asset stresses are before allowance for any tax offsets.

Deferred tax assets are to be regarded as inadmissible assets. Tax benefits arising in the asset risk scenarios can be recognised but only to the extent that tax legislation allows them to be absorbed by the existing deferred tax liabilities or (life insurance only) offset against liabilities to policy owners.

An insurer that is part of a tax consolidation group may not recognise tax benefits whose value is contingent on them being used by other entities within the tax consolidation group.

A life insurer may assume that tax benefits in one fund can be offset against deferred tax liabilities in another statutory fund or the general fund, subject to the offset only being used once in the calculation of the asset risk capital charges for both funds.

5.5 Materiality

The existing life insurance standards include allowance for materiality. Guidance is given that variations in excess assets (above the solvency and capital adequacy requirements) of 10 per cent or more may be presumed material and variations of five per cent or less may be presumed immaterial.

The general insurance standard GPS 310 covering audit and actuarial reporting and valuation also includes allowance for materiality. An appointed actuary must take into account materiality when preparing an Insurance Liability Valuation Report (ILVR). Where information, if misstated or omitted, would cause the results or opinions of the appointed actuary to be misleading to users of the ILVR, that information would be considered material. Whether something is material or not would always be a matter for judgement by an appointed actuary.

APRA proposes to include materiality provisions in its revised capital standards.

Examples of approximate methods

The materiality provisions would allow approximate methods to be used to calculate the asset risk capital charge.

These methods may include, for example:

- using the modified durations of assets and liabilities to calculate the capital required for changes to real interest rates, expected inflation and credit spreads;
- assuming cash management trusts have zero duration for the real interest rates and expected inflation modules; and
- not doing full projections of participating life insurance liabilities for modules where the value of the existing guaranteed benefits is unchanged – instead, an approximate split of future profits between policy owners and shareholders might be used.

5.6 Hypothecation (life insurance)

For life insurers, hypothecation of particular assets to specific liabilities would be allowed. Hypothecation affects the movement in the capital base when stresses are applied if the value of any of the liabilities is dependent on the value of particular assets (e.g. for participating and investment-linked business), or if tax depends on the way the assets are hypothecated. If hypothecation is used it should reflect the way the business is managed in practice.

For statutory funds whose policy liabilities are investment-linked and without investment guarantees, there would be no asset risk capital charge in respect of the assets backing the liabilities to policy owners (as defined for determining the capital base). There would be an asset risk capital charge in respect of the other assets and liabilities of the fund.

5.7 Relationships between funds (life insurance)

The asset risk capital charge would be calculated separately for each of an insurer's statutory funds and the general fund. However for each asset risk module where both upward and downward stresses have to be considered, the capital charge could be reduced where the same stress would result in an increase in the capital base in one fund and a reduction in another. This would be similar to the existing allowance under paragraph 11.2 of LPS 2.04 and LPS 3.04. The reduction could be taken in either fund (but not both). The total asset risk capital charge of the company, when reductions across all funds are taken together, could not be less than that which would result if the asset risk capital charge was calculated at the company level.

5.8 Allowance for management discretions (life insurance)

For life insurers, it could be assumed that management would exercise discretions in response to adverse experience, as in the existing standards LPS 2.04 and LPS 3.04. These discretions include reducing surrender values, reducing bonuses and other discretionary additions to policy owner benefits, and moving to a matched asset/liability position.

It must be assumed that policy owners' retained profits for participating business and the investment fluctuations reserve for non-participating business would be distributed in full to policy owners in all adverse scenarios. There would also need to be consideration of whether additional distributions may be required to satisfy policy owners' reasonable expectations.

The valuation of the liabilities both before and after the application of the investment stresses must include the value of any embedded options. This may require the use of a stochastic market-consistent valuation method. It would need to be considered whether the policy guarantees and/or policy owners' reasonable expectations allow movement to a matched asset/liability position immediately after an extreme event occurs. If this is not allowed or reasonable (for example if only a gradual or partial change in asset mix may be expected) then an embedded option remains. This may increase the value of the liabilities.

This is a clarification of the requirements in the existing standards, not a new requirement. Changes to asset mix are one of the discretions described in Section 5.2 of LPS 3.04. The exercise of discretions can only be assumed to the extent they are appropriate, justifiable and equitable under the adverse conditions being assumed.

5.9 Discretionary life insurance business

This section applies to life insurance business with discretionary participation features (as defined in LPS 7.02). This includes all participating business and some types of non-participating business.

In calculating the capital charge for each of the asset risk modules, and in determining the insurance risk capital charge, allowance can be made for the exercise of management discretions. These discretions have the effect of reducing the liabilities in the stressed scenarios. The discretions may include reductions to bonus rates and reductions to surrender values. When aggregating the capital charges for the asset and insurance risks, there would need to be allowance for the limits to the exercise of discretions (e.g. bonuses cannot be reduced below a certain level and surrender values cannot be reduced below the minimum termination values). It is possible that discretions could be double-counted if they are assumed to be exercised independently in several risk modules. In testing whether the limits to discretions would be breached, the combination of both insurance and asset risks needs to be considered.

An adjustment to the prescribed capital amount may be required if the statutory fund contains business with discretionary participation features. Because this adjustment needs to consider both asset and insurance risks it would not form part of the asset risk capital charge. The adjustment would be made after the asset risk capital charge, insurance risk capital charge and other capital charges are aggregated.

One possible approach to making an adjustment is as follows:

1. Calculate the prescribed capital amount for the statutory fund assuming that bonus rates, surrender values and other discretionary features are changed appropriately in each stressed scenario.
2. Calculate the prescribed capital amount as in 1. but assuming that no changes are made to bonus rates, surrender values and other discretionary features in each scenario. For modules which consider both upward and downward stresses (e.g. interest rates), the direction of the stress should be the same as in 1. even if this gives a zero result.
3. Calculate the value of discretions exercised as the difference between 2. and 1.
4. Calculate the value of available discretions. This is the increase in the fund's capital base if all available discretions were exercised without changing other assumptions (e.g. future bonus declarations are reduced to their minimum level and surrender values fall from current termination value to minimum termination value).
5. Add any excess of the value of discretions exercised from Step 3 over the value of available discretions from Step 4 to the prescribed capital amount calculated in Step 1.

Appendix C contains an example of how this adjustment can be calculated.

5.10 Variable annuities

The proposed standard asset risk capital charge will not adequately cater for the special features of variable annuities. This section outlines APRA's proposals for determining the required capital for this type of product.

Variable annuities are a type of life insurance product that does not have a simple asset and liability profile. It is likely that stochastic modelling would be required instead of the scenario-based calculations used for other types of products. The stochastic modelling would consider both asset and insurance risks simultaneously. It may not therefore be either necessary or appropriate to split the capital required for variable annuity funds into separate asset and insurance risk charges.

APRA expects the following issues to be addressed in determining the capital requirement for variable annuities:

- the effectiveness of hedging arrangements;
- the ability to access suitable hedge instruments in the future;
- whether a matched asset and liability profile within 12 months can be achieved for this type of product, particularly given the risks that exist for these type of products beyond 12 months e.g. ratchets and path dependencies;
- allowance for any discretions available; and
- allowance for management corrective action to achieve a matched asset and liability profile within 12 months.

APRA proposes that the capital requirement be determined via the following formula:

Capital = E * Capital (Best efforts)
+ (1-E) * Capital (Adjusted)

where:

Capital (Best efforts) = the capital requirement calculated assuming the dynamic hedging is included in the model

Capital (Adjusted) = the capital requirement assuming there is no dynamic hedging but allowance can be made for hedge positions that exist at the valuation date

E = an effectiveness factor that reflects the level of sophistication of the dynamic hedging in the model.

In determining E, the following points are relevant:

- because most models would include at least some approximations or idealistic assumptions, E cannot be greater than 0.70;
- if certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, E must be in the lower end of the range of 0.0 to 0.7;
- a company that does not have 12 months of experience to date must set E to a value no greater than 0.30. [Note that the same considerations that apply after 12 months for the range 0.0 to 0.7 mentioned above are to be applied for the range of 0.0 to 0.3 for such companies]; and
- the ultimate effect of the current hedging strategy (including currently held hedge positions) needs to recognise all:
  - risks;
  - associated costs;
  - imperfections in the hedges; and
  - hedging mismatch tolerances associated with the hedging strategy.

The risks include, but are not limited to:

- basis;
- gap;
- price;
- parameter estimation; and
- variation in assumptions (mortality, persistency, withdrawal, annuitisation, etc.).

Costs include, but are not limited to:

- transaction, margin (opportunity costs associated with margin requirements); and
- administration.

In addition, the reduction to the capital requirement attributable to the hedging strategy may need to be limited in view of the uncertainty associated with the company's ability to implement the hedging strategy in a timely and effective manner.

The standard asset concentration risk and operational risk capital charges would apply to variable annuity funds.

Chapter 6 – Inflation risk for general insurers

GPS 310 specifies that general insurance liabilities must include a risk margin. The risk margin is the component of the value of the insurance liabilities that relates to the inherent uncertainty that liability outcomes will differ from the central estimate. However, the risk margin does not relate to the risk associated with the underlying assets, such as asset-liability mismatch risk.

One of the risks that affects general insurance liabilities is inflation risk. This risk includes risks arising from price inflation in the broad economy (as measured by the CPI) and risks arising from superimposed inflation, where claims are expected to inflate at a faster rate than CPI.

CPI inflation (but not superimposed inflation) can be considered an asset-liability mismatch risk for the following reasons:

- expected CPI inflation is a key driver of interest rates – inflation expectations have a significant degree of correlation with medium to long-term bond yields; and
- it is possible to match the CPI component of inflation risk in the liability cash flows by purchasing inflation-ndexed bonds – e.g. Treasury Indexed Bonds issued by the Commonwealth government and Capital Indexed Bonds issued by the NSW State government .

APRA is aware that many general insurers include an allowance for CPI inflation in their insurance liability risk margins. In these situations, inflation risk would be double-counted if it was also allowed for in the calculation of the asset risk capital charge.

The two methods of allowing for inflation risk (in risk margins or in the asset risk capital charge) give approximately the same result if the assets backing the central estimate of the liabilities are assumed to be non-indexed government bonds of the same duration as the liabilities. This can be demonstrated as follows:

1. For insurance liability risk margins, the impact of inflation on the liabilities is considered by increasing the inflation rate whilst keeping the discount rate constant.
2. For the expected inflation module, stresses are applied to both the inflation rate for the liability cash flows and the expected inflation component of the discount rate. If the liability cash flows are inflationary, their present value is unaffected as both the inflation and discount rates change by the same amount. The value of the assets will, however, reduce if the discount rate increases.

Increasing the inflation rate for the liabilities (in 1) gives approximately the same change in net assets as an equivalent increase to the discount rate for the assets (in 2).

The advantages of allowing for CPI inflation risk in the asset risk capital charge would include:

- standardisation of the allowance for CPI inflation risk. The stresses to CPI inflation would be common for all insurers and would be specified by APRA;
- recognition that asset/liability matching can be enhanced by investing in indexed bonds;
- consideration of the inflation risk to all assets, not just those backing the central estimate of the liabilities; and
- recognition that if the assets held are non-indexed bonds, the optimal duration of the assets is likely to be shorter than the duration of the liabilities. This effect arises because, by shortening the duration of the assets, an insurer replaces some of the inflation risk with an exposure to real interest rate risk (due to the duration mismatch). These two risks are assumed to be only partly dependent (see the correlation factors in Chapter 4) and this creates a diversification benefit.

The disadvantages of removing any allowances for CPI inflation risk from the insurance liability risk margins would include changing existing well-established practices for liability valuations. APRA is not intending to change current practice.

For the QIS, APRA is proposing two alternatives. One approach is that the results for the inflation module of the asset risk capital charge be set to zero if CPI inflation risks have already been considered in determining the insurance liability risk margins.

The alternative approach is to allow for the impact of inflation risk in the asset risk capital charge. General insurers will be asked to provide results and commentary on both bases – with and without allowance for inflation risk. If APRA does decide to include inflation risk in the asset risk capital charge, the double-counting issue could be addressed by appropriate reductions to the insurance risk capital charge factors, whilst leaving the insurance liability risk margins unchanged. Larger reductions would apply to the factors for long-tail business, where inflation risk is more significant. Reducing the insurance risk capital charge factors instead of the risk margins would enable the insurance liabilities to remain unchanged, whilst giving a similar outcome in terms of the total of required capital and liabilities.

Appendix A – Counterparty grades

Counterparty grades for assets that have been publicly rated are shown in the tables below. Short-term ratings are typically used for assets with original term to maturity of not more than 13 months.

General reinsurance recoveries from non APRA-authorised reinsurers are to be rated down one grade (e.g. a non APRA-authorised reinsurer with Fitch rating of A would be grade 4 in this table).

For the counterparty grades of other assets refer to Attachment 1 of LPS 7.02. In particular:

- Secured or mortgaged assets have counterparty grades of 2 to 5, depending on the type of security, the loan to value ratio and whether or not a minimum level of lenders mortgage insurance has been obtained.
- Assets that are not publicly rated and are not secured have a counterparty grade of 6.

Long-term ratings

Grade	Standard & Poor's	Moody's	AM Best	Fitch
1	AAA	Aaa	aaa	AAA
2	AA+ AA AA-	Aa1 Aa2 Aa3	aa+ aa aa-	AA+ AA AA-
3	A+ A A-	A1 A2 A3	a+ a a-	A+ A A-
4	BBB+ BBB BBB-	Baa1 Baa2 Baa3	bbb+ bbb bbb-	BBB+ BBB BBB-
5	BB+ BB BB-	Ba1 Ba2 Ba3	bb+ bb bb-	BB+ BB BB-
6	B+ B B-	B1 B2 B3	b+ b b-	B+ B B-
7	CCC or below	Caa or below	Below b	CCC or below

Short-term ratings

Grade	Standard & Poor's	Moody's	AM Best	Fitch
1	A1+		AMB-1+	F1+
2	A1	P1	AMB-1	F1
3	A2	P2	AMB-2	F2
4	A3	P3	AMB-3	F3
5				
6	B	NP Vulnerable	AMB-4	B
7	C	NP Currently Vulnerable		C

Appendix B – Example 1

This example of the calculation of the asset risk capital charge is for either a general insurance company, or a life insurance statutory fund that has no policy benefits contractually linked to the value of assets.

Assumptions

Assets	$m	
Government bonds	1000	Commonwealth government, duration 5 years
Corporate bonds	500	Rated AA, duration 5 years
Bank deposits at call	200	Rated F1+ (Fitch short-term rating)
Listed equities	100	Current ASX200 dividend yield 3.5%
Properties	200	Current rental yield 6%
Total assets	**2000**	
Liabilities		
Insurance liabilities	1500	Duration 6 years. All liability cash flows subject to inflation risk.
Other liabilities	100	Payable immediately
Total liabilities	**1600**	
Capital base	400	All assets are admissible.

All assets and liabilities are denominated in Australian currency, except for 100 of the insurance liabilities which are denominated in New Zealand dollars. The asset concentration risk charge is assumed to be zero.

Current yields (%)	Maturity (years)	
	5	6
Real interest rates	2.5	3
Expected CPI inflation	3	3
Nominal interest rates	5.5	6

Real interest rates

The stresses in this module affect the bond assets and the insurance liabilities.

The adverse scenario is a fall in interest rates.

The fall in interest rates is 1.375 per cent for maturity 5 and 1.5 per cent for maturity 6.

The increase in asset values is approximately 1500 x 1.375 per cent x 5 = 103.1 (using a simple interest method of calculation).

The increase in insurance liabilities is approximately 1500 x 1.5 per cent x 6 = 135.

The asset risk capital charge for this module is 135 – 103.1 = 31.9.

Expected inflation

The stresses in this module affect the bond assets. The insurance liabilities are not affected as the effect of changing the rate of inflation of the liability cash flows is offset by the change in the discount rate.

As only assets are affected, the adverse scenario is an increase in expected inflation.

The increase in expected inflation is 1.95 per cent for maturity 5.

The asset risk capital charge for this module is 1500 x 1.95 per cent x 5 = 146.3 (using a simple interest method of calculation).

Currency

The only currency exposure is to insurance liabilities (denominated in NZD), so a decrease in the Australian dollar relative to foreign currencies is the adverse scenario.

The asset risk capital charge for this module is 25 per cent x 100 = 25.

Volatility

This module produces a zero value as there are no derivatives, options or guarantees.

Equities

The equities are listed, so the dividend yield method must be used. The current dividend yield is 3.5 per cent. The stressed dividend yield is 3.5 per cent + 2.5 per cent = 6 per cent. This is equivalent to a fall in value of 41.7 per cent.

The asset risk capital charge for this module is 41.7 per cent x 100 = 41.7.

Property

The current rental yield is 6 per cent. The stressed dividend yield is 6 per cent + 2.75 per cent = 8.75 per cent. This is equivalent to a fall in value of 31.4 per cent.

The asset risk capital charge for this module is 31.4 per cent x 200 = 62.9.

Credit Spreads

The stress to credit spreads for the bank deposits is 0.6 per cent (counterparty grade 1) and is applied for the minimum period of 12 months.

The stress to credit spreads for AA rated corporate bonds (counterparty grade 2) is an increase of 0.9 per cent applied to the portfolio assuming an average duration of 5 years.

The asset risk capital charge for this module is:

200 x 0.6 per cent + 500 x 0.9 per cent x 5 = 23.7 (using a simple interest method).

Default

There are no assets affected by the default risk module.

Aggregation

The results of the calculations for the individual modules are:

Capital charges from modules

	RIR	INF	CUR	VOL	EQY	PROP	CSP	DEF
up	0	146.3	0	0				
down	31.9	0	25	0	41.7	62.9	23.7	0
sign	1	-1	1	1				

Results from cross multiplying capital charges

	RIR	INF	CUR	VOL	EQY	PROP	CSP
RIR	1018	0	0	0	266	401	151
INF	0	21404	0	0	0	0	0
CUR	0	0	625	0	626	315	237
VOL	0	0	0	0	0	0	0
EQY	266	0	626	0	1739	1049	791
PROP	401	0	315	0	1049	3956	298
CSP	151	0	237	0	791	298	562

The total asset risk capital charge without allowance for diversification between modules would be 331.5.

The results of cross multiplying the capital charges for the asset risk modules (excluding default) with the correlation factors and the 'sign' functions, and then taking the greater of zero are shown in the table above.

The asset risk capital charge is found by adding the numbers in this table (= 37,572), taking the square root (= 193.8), and then adding the default charge (which is zero in this example).

Result

The asset risk capital charge with allowance for diversification is 193.8.

This compares with a charge of 73 which would apply under GPS 114. This comprises 5 for government bonds, 2 for bank deposits, 10 for corporate bonds, 16 for equities and 40 for property.

Aggregation of asset and insurance risks

In this example the asset risk capital charge is significantly higher than under GPS 114. The impact of the higher asset risk capital charge on the total capital requirement would be offset to a considerable extent by the aggregation benefit (see Chapter 8 of the discussion paper). The aggregation benefit would depend on the size of the asset and insurance risk charges and the correlation between asset and insurance risks. The table below shows the potential size of this aggregation benefit. In this example the insurance risk charge is assumed to be 200 and the correlation factor between asset and insurance risks is assumed to be 0.2. The proposed correlation factor will be advised by APRA when details of the Quantitative Impact Study are released.

	Proposed	Existing GPS 114
Asset risk capital charge	193.8	73
Insurance risk capital charge	200	200
Aggregation benefit	-88.7	0
Total[13]	**305.1**	**273**

13 Capital charges for operational risk, asset concentration risk and insurance concentration risk will also apply.

Appendix C – Example 2

This example is for a life insurance statutory fund that includes participating policy benefits.		
Assumptions		
Assets	**$m**	
Government bonds	1000	Commonwealth government, duration 10 years
Listed equities	500	Current ASX200 dividend yield 3.5%
Properties	500	Current rental yield 6%
Total assets	**2000**	
Adjusted liabilities		
Participating BEL	1200	Duration 10 years
Participating future bonuses	200	Duration 10 years
Other liabilities	200	Payable immediately
Total adjusted liabilities	**1600**	
Capital base	400	

The liabilities have been adjusted as specified in the insurance risk technical paper. Shareholder profit margins are not regarded as a liability. The best estimate liability (BEL) and future bonuses are calculated using risk-free investment returns and discount rate. The future bonuses include distribution of all future policy owner profits. Policy owner retained profits are zero. Profits for participating business are split 80:20 between policy owners and shareholders.

None of the liability cash flows are assumed to be subject to inflation risk (this is unlikely to be a correct assumption in practice as some expense loadings are likely to be subject to inflation risk).

For the participating business the insurer currently pays the Minimum Surrender Value which is so low that it can be ignored in these calculations (this is unlikely to be a correct assumption in practice).

The participating Value of Supporting Assets (VSA)[14] is 1450. This includes future shareholder profit margins of 50, which are included in the capital base. All of the equities and property assets are hypothecated to the participating business, together with 450 of government bonds.

All assets and liabilities are denominated in Australian currency. Tax is ignored in order to simplify the calculations.

	Current yields (%)
Real interest rate	3
Expected CPI inflation	3
Nominal interest rate	6

Real interest rates

The stresses in this module affect the bond assets and the participating liabilities.

With changes to bonus rates

Both rising and falling interest rate scenarios are considered.

The rise in interest rates is 1.65 per cent for maturity 10.

The fall in interest rates is 1.35 per cent for maturity 10.

The fixed interest assets hypothecated to the participating VSA are 450.

14 as defined in LPS 1.04.

In the rising interest rate scenario the fall in the value of the assets hypothecated to the VSA is approximately 450 x 1.65 per cent x 10 = 74.25. The value of the assets backing the VSA after the asset stress would be 1450 – 74.25 = 1375.75. The participating BEL after the asset stress would be approximately 1200 - (1200 x 1.65 per cent x 10) = 1002. The shareholder profit margins in the VSA would be (1375.75 – 1002) x 20 per cent = 74.7. This is an increase of (74.7 - 50) = 24.7. The other fixed interest assets of 550 would fall in value by 550 x 1.65 per cent x 10 = 90.7. The overall fall in the capital base would be 90.7 – 24.7 = 66.

In the falling interest rate scenario the increase in the value of the assets hypothecated to the VSA is approximately 450 x 1.35 per cent x 10 = 60.75. The value of the assets backing the VSA after the asset stress would be 1450 + 60.75 = 1510.75. The participating BEL after the asset stress would be 1200 + (1200 x 1.35 per cent x 10) = 1362. The shareholder profit margins in the VSA would be (1510.75 – 1362) x 20 per cent = 29.75. This is a reduction of (50 – 29.75) = 20.25. The other fixed interest assets of 550 would increase in value by 550 x 1.35 per cent x 10 = 74.25. The overall change in the capital base would be positive.

Without changing bonus rates

Only the rising interest rate scenario needs to be considered as this was the only adverse scenario when bonus rates were changed. If bonus rates were unchanged, rising interest rates would increase the capital base as the value of the participating BEL and future bonuses would fall by more than the value of assets.

Result

The result from this module is:

Bonus rates altered:	Nil (falling interest rates)
	66 (rising interest rates)
Bonus rates unaltered:	Nil (rising interest rates)

Expected inflation

The stresses in this module affect the bond assets and the participating liabilities. The stresses are the same as for the real interest rate module.

Result

The result from this module is:

Bonus rates altered:	Nil (falling interest rates)
	66 (rising interest rates)
Bonus rates unaltered:	Nil (rising interest rates)

Currency

This module produces a zero value as there are no foreign currency exposures.

Volatility

This module produces a zero value as there are no derivative-type assets. There is assumed to be no embedded option remaining in the participating liabilities after the asset stresses as the asset mix can be changed so that it matches the liabilities post-stresses.

Equities

The equities are listed, so the dividend yield method must be used. The current dividend yield is 3.5 per cent. The stressed dividend yield is 3.5 per cent + 2.5 per cent = 6 per cent. This is equivalent to a fall in value of 41.7 per cent.

The fall in value is 41.7 per cent x 500 = 208.5.

Result

The result from this module is:

Bonus rates altered:	208.5 x 20 per cent = 41.7
Bonus rates unaltered:	208.5

Property

The current rental yield is 6 per cent. The stressed dividend yield is 6 per cent + 2.75 per cent = 8.75 per cent. This is equivalent to a fall in value of 31.4 per cent.

The fall in value is 31.4 per cent x 500 = 157.

Result

The result from this module is:

Bonus rates altered: 157 x 20 per cent = 31.4

Bonus rates unaltered: 157

Credit spreads

This module produces a zero value as there are no credit exposures.

Default

The capital charge is zero.

Aggregation of asset risk capital charge

The results of the calculations for the individual modules with bonus rates altered in response to each stress:

	RIR	INF	CUR	VOL	EQY	PROP	CSP	DEF
up	66	66	0	0				
down	0	0	0	0	41.7	31.4	0	0
sign	-1	-1	1	1				

Result

The asset risk capital charge is 119.3.

If the insurance risk capital charge was 20 and the correlation factor was 0.2, the prescribed capital amount would be 124.8 (assuming the operational risk charge is zero).

Adjustment to prescribed capital amount

If bonus rates are unaltered the results of the asset risk modules are:

	RIR	INF	CUR	VOL	EQY	PROP	CSP	DEF
up	0	0	0	0				
down	0	0	0	0	208.5	157	0	0
sign	-1	-1	1	1				

The total asset risk capital charge required before exercise of discretions is 307.1.

If the insurance risk capital charge was 100 before exercise of discretions the prescribed capital amount before exercise of discretions would be 341.5.

The value of discretions exercised is 341.5 – 124.8 = 216.7.

The available discretions are 200, representing the value of future bonuses.

As the available discretions have been exceeded, the prescribed capital amount of 124.8 (before adjustment) must be increased by 16.7 to 141.5.

Appendix D – Existing life insurance standards

This appendix gives a brief summary of the allowances for asset risk in the existing life insurance solvency (LPS 2.04) and capital adequacy (LPS 3.04) standards.

Asset risk is allowed for in the existing standards by means of resilience reserves. The resilience reserves are an addition to the reserves for insurance risk, which form part of the solvency and capital adequacy liabilities. An implicit allowance is made for diversification between asset and insurance risks. This means the asset and insurance risk parameters are smaller than they would be if diversification was explicitly allowed for via an aggregation benefit.

The resilience reserve is determined as the additional amount that needs to be held before the happening of a prescribed set of changes in the economic environment, such that after the changes the admissible assets are able to meet the policy owner and other liabilities of the fund, determined using prescribed liability assumptions.

The prescribed set of changes to the economic environment includes adverse changes to interest rates, rental yields, dividend yields and exchange rates. The set of changes includes an increase in credit spreads and an allowance for default risk. The changes to the economic environment may affect the values of both assets and liabilities.

The adverse change to interest rates could be either an increase or a reduction in interest rates. Both scenarios must be considered.

The prescribed changes to interest rates, rental yields and dividend yields are reduced by the application of a diversification factor. The diversification factor for a fund is calculated using a formula which depends on the changes to the fund's proportionate holdings of interest bearing assets, indexed bonds, properties and equities.

For equities and properties the prescribed changes are applied to rental and dividend yields, instead of asset values, in order to lessen the pro-cyclical nature of the resilience reserve calculations. When asset values are high, yields are typically low and the fall in asset values would be higher than in more normal circumstances. The converse applies when asset values are low and yields are high.

The factors used in calculating the resilience reserves for statutory funds under the solvency and capital adequacy standards are as follows:

Solvency

Investment sector	Prescribed yield change %
Equities	+ or – 1.25
Property	+ or – 1.25
Interest bearing	+ 1.75 or – min (1.75, 0.2 x Mid Swap Rate)
Indexed bonds	+ or - 0.60
Currency	10% reduction in value of assets exposed to a denomination other than that of the liabilities.

Credit factors to apply to fixed interest and cash investments		
Counterparty grade	Credit risk default factor (%)	Credit risk yield movement (%)
1 (OECD Government)	0.00	0.00
1 (other)	0.00	0.20
2	0.00	0.30
3	0.00	0.40
4	0.75	0.60
5	2.00	0.80
6	6.25	0.90
7	9.75	0.90

Capital adequacy

Investment sector	Prescribed yield change %
Equities	+ or – (0.50 + (0.4 x yield))
Property	+ or - 2.50
Interest Bearing	+ (1.30 +(0.25 x mid swap rate)) or – (0.20 + (0.25 x mid swap rate))
Indexed Bonds	+ or - 1.00
Currency	15% reduction in value of assets exposed to a denomination other than that of the liabilities.

Credit factors to apply to fixed interest and cash investments		
Counterparty grade	Credit risk default factor (%)	Credit risk yield movement (%)
1 (OECD Government)	0.00	0.00
1 (other)	0.00	0.30
2	0.00	0.40
3	0.25	0.60
4	1.75	0.90
5	4.00	1.00
6	11.00	1.10
7	17.00	1.10

Appendix E – Existing general insurance standard

This appendix gives a brief summary of the allowances for asset risk in the existing general insurance Investment Risk Capital Charge (Prudential Standard GPS 114).

To calculate the capital charge for investment risk, each of an insurer's assets (and certain off-balance sheet exposures) is assigned to various categories. The Investment Risk Capital Charge is determined by multiplying the balance sheet value of each asset by the appropriate Investment Capital Factor for its category (subject to any concentration thresholds). The total capital charge for investment risk is the sum of the Investment Risk Capital Charges for each individual asset. Different treatment is accorded to certain reinsurance recoverables due from a non-APRA-authorised reinsurer.

The investment capital factors for major classes of assets are set out in the following table. For a full list of factors refer to GPS 114.

Asset	Investment capital factor (%)
Government bonds	0.5
Corporate bonds grade 1 or 2 with maturity less than 1 year	1
Corporate bonds grade 1 or 2 with maturity more than 1 year	2
Corporate bonds grade 3	4
Corporate bonds grade 4	6
Corporate bonds grade 5	8
Listed equities	16
Unlisted equities and direct property	20

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