BERMUDA MONETARY AUTHORITY

CONSULTATION PAPER

REFINEMENTS TO THE
BERMUDA SOLVENCY CAPITAL REQUIREMENTS

June 2013

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1. PURPOSE AND EXECUTIVE SUMMARY

1. The mission of the Bermuda Monetary Authority (the Authority) includes ensuring appropriate protection for policyholders and a transparent regulatory regime that provides certainty to market participants. Moreover, by maintaining a supervisory framework that keeps pace with international best practice, Bermuda's reputation and position as a leading international financial centre is enhanced.

2. The Bermuda Solvency Capital Requirement (BSCR) was initially introduced for Property and Casualty (P&C) legal entities in Classes 3B and 4, and has been rolled out to include all commercial classes in later years. Proposals were subsequently put forward to include Long-Term (LT) insurers and also Groups subject to the Insurance (Group Supervision) Rules 2011.

Long-Term insurers

3. In consultation with industry, the Authority has identified elements of the BSCR for Long-Term insurers that warrant refinement to more effectively reflect the underlying risks. Accordingly, this Consultation Paper sets out the Authority's proposals to revise the Long-Term insurance BSCR. Refinements are proposed for several broad areas covering:

- investment risks;
- credit risks;
- longevity risks;
- variable annuity risks; and
- miscellaneous and consequential items.

4. As agreed when the LT BSCR was originally introduced, the BSCR requirement will be phased in over three years, starting at 50% for year-end 2013, 75% for year-end 2014 and 100% thereafter.

P&C insurers

5. Some of the changes affect modules which are currently common to the BSCR for P&C companies. As it was felt that the changes proposed would largely be neutral to beneficial for companies, and the additional data requirements were not felt to be unduly onerous, the Authority has therefore proposed that corresponding changes be made to the BSCR for these companies.

6. For P&C companies, the changes proposed to credit risk also have some consequential impact on credit risk aspects with the catastrophe risk module, and so it is proposed that some small changes be made here also.

7. All of the changes for P&C companies are proposed to take immediate effect from year-end 2013, as they are expected to result in reduced BSCR requirements in most cases. However, as the Authority undertook last year not to change the BSCR in 2013, any company that experiences difficulties with this requirement should discuss the matter with their usual supervisory contact.

Groups

8. For Groups, it is proposed that all of the above changes be largely reflected in the Groups BSCR. As previously agreed with the industry, taking into account the relatively early stage of development of consolidated group capital requirements globally, it is proposed that the changes be phased in over several years, starting at 50% for year-end 2013, and rising by 10% each year until it reaches 100% for year-end 2018.

Consultation proposals

9. The refinements to the BSCR proposed herein are part of the Authority's ongoing process of regular review of its regulatory regimes. These proposals have resulted from an earlier limited scale consultation with LT and P&C entities in April and May, following which various refinements were made. Draft legislation to implement these proposals is being published for consultation simultaneously, and can be obtained from the BMA website at the following link: http://www.bma.bm/document-centre/consultation-papers/SitePages/Insurance.aspx. Further changes may be considered and implemented in future years.

10. Where a company has already agreed adjustments to their existing BSCR model with the Authority in respect of one of the modules affected by these proposals, these adjustments will be carried over into their new requirements.

11. The Authority is committed to consulting with stakeholders as it develops its framework. Comments on all matters covered in this Consultation Paper and the draft legislation are welcome. Responses should be sent to the Authority via e-mail at riskanalytics@bma.bm, no later than close of business on 6th September 2013.

2. INTRODUCTION

12. The Authority's mission includes ensuring appropriate protection for policyholders and maintaining and enhancing Bermuda's reputation as a leading international financial centre. To achieve these goals, the Authority must ensure that its regulatory and supervisory frameworks are both transparent and aligned with international regulatory best practice.

13. The proposed refinements address several broad areas:

a. investment risks;
b. credit risks;
c. longevity risks;
d. variable annuity risks; and
e. miscellaneous and consequential items.

14. The proposed adjustments to the capital requirements for investment risks incorporate additional asset classes and provide for a more refined breakdown by level of risk. The refinements are intended to more accurately reflect the underlying risk of the investments. Where a company invests in more highly rated securities, its investment capital requirements will reduce. Investments in less highly rated assets will attract higher capital requirements reflecting the greater level of risk.

15. The proposed adjustments to the capital requirements for credit risks are intended to more accurately reflect the underlying credit risk to the insurer. In addition, for P&C business, there are some consequential changes proposed for the credit risk component of the catastrophe risk module.

16. The proposed adjustments to the capital requirements for longevity risk include age specific factors to more appropriately reflect the longevity risks of the lives insured and a negative correlation with mortality risk is proposed for incorporation in the diversification formula.

17. The proposals for variable annuity risks provide an approach for insurers to use their internal capital model to determine their required capital. In addition, the standard factor based methodology has been refined and can be used for situations where the use of an internal capital model is not practical.

3. INVESTMENT RISKS

Background

18. The Authority recognises that the current BSCR factors for investments do not properly reflect differences in the risk profiles of insurers. In some cases, it was necessary to refine the factors to reflect more ratings categories, while in other cases we have reflected differences in various sub-classes of assets. In developing the proposed changes, we were careful to consider materiality both in terms of individual companies as well as for the industry as a whole. We were also cognizant of the need to avoid onerous data collection on the part of companies.

Investment Risk Classifications

19. The Authority proposes to refine the asset rating classifications to be used for determining investment risk capital requirements. This would be implemented through a set of BSCR ratings classes with a class zero defined to represent certain sovereign debt (as defined below).

BSCR Ratings Class	Standard & Poor's	Moody's	AM Best	Fitch
0				
1	AAA	Aaa	A++	AAA
2	AA+ to AA-	Aa1 to Aa3	A+	AA+ to AA-
3	A+ to A-	A1 to A3	A	A+ to A-
4	BBB+ to BBB-	Baa1 to Baa3	A-	BBB+ to BBB-
5	BB+ to BB-	Ba1 to Ba3	B++ to B	BB+ to BB-
6	B+ to B-	B1 to B3	B- to C+	B+ to B-
7	CCC+ to CCC-	Caa1 to Caa3	C,C-	CCC+ to CCC-
8	Below CCC-	Below Caa3	Below C-	Below CCC-

Sovereign Debt

20. Sovereign debt issued by a country (in its own currency) that is rated AA- or better would be assigned to BSCR ratings class 0, and would attract a zero charge.

21. Similar treatment would be afforded to debt issued by government owned or related entities, provided the obligations were explicitly guaranteed by the (sovereign) government meeting the above requirements.

22. All other sovereign bonds would be treated similarly to corporate bonds of the same rating.

Corporate Bonds

23. The following proposed capital requirement factors would be applied to the Form 1/1A/4[1] value of assets:

BSCR Ratings Class	Proposed Factors
0	**0.0%**
1	**0.4%**
2	**0.8%**
3	**1.5%**
4	**3.0%**
5	**8.0%**
6	**15.0%**
7	**26.3%**
8	**35.0%**

Residential Mortgage Backed Securities

24. Since Residential Mortgage-backed Securities (RMBS) are less transparent than corporate bonds and appear to have been rated less rigorously prior to the financial crisis, the proposed capital requirements are somewhat stronger.

25. The following proposed capital factors would be applied to the Form 1/1A/4 value of assets:

BSCR Ratings Class	Proposed RMBS Factors
1	**0.6%**
2	**1.2%**
3	**2.0%**
4	**4.0%**
5	**11.0%**
6	**25.0%**
7	**35.0%**
8	**35.0%**

26. The ratings agencies do not always adequately reflect the risk associated with RMBSs that are being held at less than par value. For this reason, the National Association of Insurance

[1] This refers to the Statutory Balance Sheet: Form 1 for Groups, Form 1A for P&C entities and Form 4 for Long-term entities.

Commissioners (NAIC) has modeled these bonds and provides US insurers with a rating reclassification. We propose to allow companies the option to use these reclassifications when summarising their portfolio. A general provision will be included in the legislation for the Authority to have the ability to recognise alternative approaches in relation to mortgage backed securities. The Authority will provide the market with written guidance as it relates to recognised approaches. The recognition will be reviewed as techniques develop or material developments occur that make such recognition inappropriate. The Authority will provide initial recognition to the NAIC approach. Where an instrument has a rating from a rating agency that would put it in BSCR ratings classes 1-2, and it has also been classified as NAIC ratings class 1 (equivalent to BSCR ratings class 3), then the better BSCR ratings class may be selected. We will require companies to provide a separate summary of the Form 1/1A/4 value by BSCR rating class, both before and after the adjustment.

The NAIC reclassifications of Mortgage-backed securities will be assigned to the BSCR Ratings Classes according to the following table:

BSCR Ratings Class	NAIC (for Mortgage-backed Securities only)
0	
1	
2	
3	1
4	2
5	3
6	4
7	5
8	6

27. Some RMBS bonds are not directly modeled by the NAIC, including bonds held by insurers that do not have a United States presence. The NAIC provides a documented four-step process as part of its SSAP No. 43R for reclassifying such bonds based on their rating and their Form 1/1A/4 value relative to par. We are proposing to allow companies to optionally follow this process in classifying bonds that have not been formally reclassified by the NAIC.

Mortgage Loans

28. We propose different treatment for four groups of loans:

- 0.3% for insured/guaranteed mortgages in good standing;
- 5% for other commercial and farm mortgages in good standing;
- 1.5% for other residential mortgages in good standing;

- 35% for all other mortgages (e.g. restructured, 90 day overdue or in process of foreclosure).

<u>Mutual Funds</u>

29. We propose to use a look-through to the underlying assets for purposes of determining the capital requirements:

a. money market funds would be treated as cash equivalents;
b. for bond funds, companies would categorise them based on the bond ratings according to the fund manager (which may be an average intended rating for the fund rather than detailed individual ratings if these are not available);
c. equity funds would be treated in the same manner as direct equity investments.

30. We would also require disclosure of the name, type and amount of each mutual fund used. This would allow the Authority to follow up with individual companies where appropriate (in order to identify unusual fund types – e.g. hedge funds)

<u>Preferred Stock</u>

31. The following proposed capital requirement factors would be applied to the Form 1/1A/4 value of assets:

BSCR Ratings Class	**Proposed Preferred Stock Factors**
1	**0.6%**
2	**1.2%**
3	**2.0%**
4	**4.0%**
5	**11.0%**
6	**25.0%**
7	**35.0%**
8	**35.0%**

Commercial Mortgage-Backed Securities / Asset-Backed Securities

32. The following proposed capital requirement factors would be applied to the Form 1/1A/4 value of assets:

BSCR Ratings Class	Proposed ABS/CMBS Factors
1	**0.5%**
2	**1.0%**
3	**1.8%**
4	**3.5%**
5	**10.0%**
6	**20.0%**
7	**30.0%**
8	**35.0%**

33. As with the RMBSs, the NAIC have an analogous process for better reflecting the risk for those bonds being held at less than par value. Likewise, we propose to allow the same treatment here as described for RMBSs.

Investments in Affiliates

34. At present there is a difference in treatment of investments in affiliates between Groups and legal entities. For legal entities, the charge is a fixed 5% regardless of the nature of the investment in the affiliate, and is included within the credit risk module. Currently for Groups, investments in affiliates are included as part of the equity investment risk module, attracting charges between 5% and 55% depending on the type of investment, whilst advances to affiliates are included in the credit risk module and attract at 5% charge.

35. The Authority proposes to apply the same structure to the legal entity BSCR models as is currently the case for the Group model, i.e. to include investments in affiliates as part of equity investment risk module and leave advances to affiliates as part of the credit risk module. However we do not propose to make any material change to the overall level of the charges for this component at this time. This means that the charges applied within the current Group BSCR for investments in affiliates will remain unchanged, but that for the legal entity BSCR models, the charge for these line items will remain at 5%. The Authority would then propose to further review these charges in due course.

4. CREDIT RISKS

36. Reinsurance balances receivable will now be treated the same as reinsurance recoverables and the inputs reorganised accordingly. In addition, counterparties will be reported separately based on their credit rating instead of by affiliate/pool/other. However, a capital factor of 0% will continue to apply to domestic affiliates regardless of credit rating. As is currently the case, the Authority may adjust the factor in the event we have solvency concerns in relation to the domestic affiliate.

37. We are proposing to introduce more granularity into the charges for reinsurance exposures, to take into account the ratings of these exposures.

38. P&C companies and Groups are already required to identify their reinsurance exposures together with their ratings as part of their Statutory Financial Return (SFR) and their capital and solvency return. Whilst not at present extending the scope of the SFR for Long-Term companies, we are proposing to extend Schedule V of the capital and solvency return to require identification of at least the top 10 reinsurance exposures and various related details, with the remainder consolidated by BSCR rating class group, and/or as a single balancing group. Companies can choose to disclose ratings for more than their largest 10 exposures, but it must represent their largest exposures. This information can then be used as the basis for determining the credit charge for reinsurance exposures, with charges varying by BSCR rating class. Any exposures outside of the top 10 not individually identified can be grouped by BSCR ratings class. Optionally companies would be allowed to group all remaining exposures in a default category as a balancing amount, which would be treated with a default rating of BSCR ratings class 8.

39. Where a reinsurer is not rated, but is regulated in a regime which applies the IAIS ICPs (and which in particular utilises both an MCR (minimum capital requirement) and a PCR (prescribed capital requirement), and the reinsurer fully meets its (PCR) solvency requirements, it can be treated as rating class 4 (i.e. equivalent to BBB). For example, if the reinsurer is US regulated, and meets the 200% RBC requirements (so it is not subject to regulatory intervention solely on capital grounds), then it can be treated as BSCR rating class 4. For this purpose the regulatory solvency position used should be the most recently submitted assessment, and should be no older than 18 months.

40. For ceding companies, collateral and existing reinsurance payables (Form 1/1A/4 lines 28, 29, 33 and 34(c)) will now be directly offset against the specific exposure with collateral reduced by 2% to approximate the market risk associated with the collateral assets themselves. If an exposure is over-collateralised, the minimum exposure will be set to zero. Where exposures protected by collateral arrangements are being included in a grouped category above, the amount of collateral recognised should be limited to the relevant exposure (net of payables), so that any excess collateral does not get credited against exposures which it does not protect.

41. Letters of credit supporting an exposure will be recognised by replacing the rating of the reinsurer with the better of the rating of the reinsurer or the letter of credit issuer. Where a letter of credit does not cover all of a reinsurance exposure, then the exposure should be split as appropriate.

42. The factors to be applied for each rating class and applied to the amount of exposure less any offset take into account both probability of default and loss given default and are shown below. Note that:

a. domestic affiliates will be treated as BSCR Ratings Class 0, however the Authority may adjust the factor in the event it has solvency concerns in relation to the domestic affiliate;
b. unrated companies would be treated as BSCR Ratings Class 8 (apart from those dealt with under paragraph 39 above); and
c. any counterparties that are not explicitly identified would be treated as class 8.

BSCR Ratings Class	**Proposed Credit Risk Factors**
0	**0.0%**
1	**0.7%**
2	**1.5%**
3	**3.5%**
4	**7.0%**
5	**12.0%**
6	**20.0%**
7	**27.0%**
8	**35.0%**

43. For funds held by ceding companies, the credit risk calculated by the reinsurer will be based on the nature of the arrangement.

- Where specific assets have been allocated for the benefit of the reinsurer, such that the reinsurer bears market risk on those assets, we propose to look through to the underlying assets, and effectively add them in to the existing fixed interest risk and equity risk modules as relevant.
- Where there are no specific identified assets, the reinsurer is effectively in a similar position to a typical cedant with reinsurer exposure, and the amounts will thus be treated similarly to reinsurance recoveries above.

44. A diversification adjustment will be applied to the total credit risk charge for reinsurance exposures to reflect the extent of diversification over the holdings. This will be driven by the relationship of the size of the largest reinsurance exposure to the total of all reinsurance exposures. The diversification adjustment will be determined as:

(1-(largest exposure / total exposures)) * 40%

5. CREDIT RISK ELEMENT OF CATASTROPHE RISK

45. Credit risk is also part of the catastrophe risk charge. Currently the calculation does not take into account the current ratings of the reinsurers from which cover has been obtained, and also does not take into account any collateral arrangements that might have been made.

46. The Authority has proposed a change to allow for specific collateral to be offset similarly to the allowance for recoverables in paragraph 40 above. The Authority has also recognised that where risks have been ceded to fully funded Special Purpose Insurers (SPI) or other cat bond type arrangements, the resulting impact is broadly similar to holding collateral directly, and so a similar treatment is proposed. It is important to note that the amounts available to be offset in the calculations should not necessarily be the face value or maximum amounts of the arrangements, but must be related to the recoverable implied by the difference between the gross and net probable maximum loss that forms the base of the cat risk charge. Amounts recognised from SPIs will be shown separately for those on an ‘indemnity’ basis and ‘others’.

47. At this stage the Authority is not proposing to explicitly take into account the current rating of the reinsurers that form part of the cat reinsurance programme, but will be looking to do so in the future. In the meantime, and in recognition of the general reduction in credit risk charges for better rated counterparties included in the proposals in paragraph 42 above, the Authority has proposed to reduce the current 12.2% charge to 10%.

6. LONGEVITY RISKS

Background

48. The Authority carefully considered various approaches to developing capital requirements for longevity risk. Research papers[2] from a number of studies have produced results that support a range of methods. The Authority modeled a number of mortality improvement scenarios and annuity risk exposures in its development process. The proposed capital factors are based upon analysis work completed by CEIOPS in developing Solvency II standards. For younger ages, the capital factors were developed from mortality rates that were improved by approximately 20%. At older ages, the improvement to the mortality rates was gradually reduced.

Immediate Payout Annuities

49. Immediate payout annuities currently pay a regular periodic benefit stream for the lifetime of the annuitant(s), and do not include variable annuities which are covered elsewhere in the BSCR. The following proposed capital requirement factors would be applied to the full amount of reserves:

Attained Age of Annuitant	Proposed Factors
0-55	2%
56-65	3%
66-70	4%
71-80	5%
81+	6%

50. The above table is to be used by attained age for both male and female lives. For joint and survivor annuities cases, the younger age should be used.

51. Immediate payout annuities may contain a fixed benefit (or certain) period. Immediate annuities with only a fixed benefit period remaining will not require a longevity risk capital requirement. All annuities with a mortality contingent benefit (both with and without an initial fixed benefit period) will be subject to the above capital requirements. In determining the proposed factors, credit was given to recognise lower risk when fixed benefit periods exist.

[2] These included (1) CEIOPS Advice for Level 2 Implementing Measures on Solvency II: Standard formula SCR – Article 109 C Life Underwriting Risk;
(2) Mortality Driven Risks: Calculating Capital Requirements for Solvency II, RMS Life Risks, June 2012
(3) A Value at Risk Framework for Longevity Trend Risk, Institute of Actuaries, Nov 19, 2012
(4) Longevity Risk and Solutions for it, Canadian Institute of Actuaries Webcast, Nov 27, 2012

<u>Deferred Payout Annuities</u>

52. Deferred payout annuities have committed to pay a regular periodic benefit stream for the lifetime of the annuitant(s) that will commence at some time in the future and do not include variable annuities which are covered elsewhere in the BSCR. The following proposed capital requirement factors would be applied to the full amount of reserves:

Age at which Annuity Benefits Commence	Proposed Factors
0-55	**2%**
56-60	**3%**
61-65	**4%**
66-70	**5%**
71-75	**6%**
76+	**7%**

53. The above table is to be used for both male and female lives. For joint and survivor annuities cases, the commencement age for the younger life should be used.

54. Deferred payout annuities may contain a fixed benefit period. Deferred annuities with only a fixed benefit period remaining (i.e. annuities certain) will not require a longevity risk capital requirement. All deferred annuities with a mortality contingent benefit (both with and without an initial fixed benefit period) will be subject to the above capital requirements. In determining the proposed factors, credit was given to recognise lower risk when fixed benefit periods exist.

<u>Deferred Accumulation Annuities</u>

55. Deferred accumulation annuities provide an investment benefit to policyholders. At some future date, the policyholder may withdraw the funds or convert the accumulated amount into a payout annuity benefit, which may or may not be on guaranteed terms. They do not include variable annuities which are covered elsewhere in the BSCR. The Authority recognises that deferred accumulation annuities may contain guaranteed annuitisation rates as a contractual right. In the current low interest rate environment, such benefits may present a realisable value to the policyholder, including the possibility of some longevity risk. At the present time we do not propose to include a longevity risk charge for deferred accumulation annuities. However to better understand the risk, the Authority seeks to gather data on the potential exposure. Disclosure of the following information is proposed:

a. Total reserves for deferred accumulation annuities
b. Total reserves for deferred accumulation annuities with contractual guaranteed annuitisation rates

c. Total reserves for deferred accumulation annuities annuitised in the past year at contractual guaranteed rates (prior to annuitisation)
d. Total reserves for deferred accumulation annuities annuitised in the past year at contractual guaranteed rates (post annuitisation).

Negative Correlation With Mortality Risk

56. The Authority proposes to incorporate a 25% negative correlation between the longevity capital requirement and the mortality capital requirement in the diversification formula.

Possible Exceptions to the Above Approaches for Longevity Risk

57. The above approaches to determining capital requirements for longevity risk are appropriate for direct written annuity business and traditional reinsurance arrangements. Where alternative approaches to reinsuring longevity risks are used, the capital determination methods outlined herein may not adequately reflect the underlying risks. In these circumstances, internal capital modeling or bespoke solutions will probably be required. Companies conducting such business will need to consult with the Authority to determine an appropriate capital requirement.

58. In determining the above longevity capital requirement factors, the Authority noted higher sensitivity to the underlying assumptions at the older ages. Where the volume of longevity risk business is heavily concentrated at ages above 80, companies will need to consult with the Authority to determine an appropriate capital requirement.

7. VARIABLE ANNUITY RISKS

Background

59. We propose to use two approaches to determining the capital requirements for variable annuity guarantee risks:

- **a.** internal model with disclosures and stress tests;
- **b.** refinements to the current factor-based approach.

Companies would be able to choose to report under ***either*** approach. However, having made the choice, they would be unable to switch without first obtaining permission from the Authority.

Internal Model With Stress Tests

60. Key elements of this approach include:

- **a.** capital requirements would be based on the company's own internal model results;
- **b.** certain aspects of the model would be prescribed;
- **c.** model results for certain sensitivities would be disclosed;
  - **i.** economic sensitivities would be prescribed;
  - **ii.** behavioural and actuarial sensitivities (lapse, mortality, etc.) would be at the judgment of the approved actuary;
- **d.** enhanced disclosure of the in-force demographics; and
- **e.** structured actuarial memorandum to include prescribed descriptions intended to capture details of the various guarantees, model (including data, governance, assumptions, etc.), hedging, etc.

Internal Model

61. The company would use its own stochastic internal capital model to determine the total asset requirement for its variable annuity guarantee business. This is not dependent on the different reserving bases currently in place in Bermuda and ensures that the total asset requirement (sum of capital plus reserves) is set at an appropriate level for all companies.

62. We would not specify the methodology used in the model and instead would require companies to use their own assumptions with full disclosure to the Authority. This approach is being adopted in recognition that each business is different and the assumptions will be dependent on such factors as the type of business, how and when it was sold, who it was sold to, the particular product provisions, as well as the external environment and prior actions.

63. Economic assumptions should not be risk-neutral but real-world.

64. It is commonly recognised that there is uncertainty around the choice of best-estimate assumption and that, aside from volatility due to random fluctuation, the underlying assumption itself may misestimate the risk. Requirements for prudent assumptions will already be familiar to parent companies subject to US/Canadian regulatory reporting. Different companies will have different levels of confidence in various actuarial assumptions depending on the level of experience and credible data at their disposal. Therefore, rather than prescribe margins, we are proposing that individual companies should determine (and disclose) the degree of prudence added to reflect the uncertainty around each assumption.

65. The preferred approach for determining the capital requirement is a one-year model with a 99TVaR threshold. However, it is recognised that much of the Bermuda business originates from companies that use other modeling approaches. Therefore we propose to also accept runoff models based on a 95TVaR threshold. Where a company believes that an alternative threshold is appropriate for their business, we will be willing to consider any evidence provided. We will also be collecting summary model data that will enable us to consider a possible future refinement to the runoff model threshold.

66. Where a company uses hedging or other risk mitigation, this should be reflected in the model used to set the capital requirement. For informational purposes, results should also be reported without future hedging. Depending on the Authority's assessment of the hedging process in place and other factors, it is possible that the capital requirement for a particular company may be adjusted to reflect less than 100% credit for hedging. However any adjustment would be assessed after the first submission, or after a major change in hedging strategy, and would not normally be expected to vary from year to year.

Sensitivities / Stress Tests

67. In order to be able to understand which risks underlying the business are the most material, it is proposed that certain standard stress tests be performed in order to illustrate the impact on required capital.

68. The proposed approach would have the company stress its allocated VA balance sheet and capture the change in surplus as a result of the stress. This should be done both with and without hedging.

69. For the economic assumptions, the following stress tests would be prescribed:

- **a.** equity - immediate downwards shock of 20% to separate account funds;
- **b.** absolute immediate increase of 10% in the volatility of equity funds;
- **c.** interest rates - immediate parallel shift up / down (subject to a floor) by 100 basis points;

d. in all of the above cases, the underlying behaviour of the economic assumption would not change, nor any other parameters such as the Long-Term interest rate target.

70. For the actuarial assumptions for mortality and policyholder behaviour, the stress tests would be a 10% variance in the base assumption, with the variance being either positive or negative depending upon which gives the more adverse result.

Disclosures

71. Companies will be required to provide summaries of their in-force data. For each of 13 different types of guarantees, companies would summarise policy counts, account values, guarantee amounts / amount at risk. This data would be further broken out by policy year, the level of fund volatility (0-10%, 10-20%, 20%+), and how far in or out of the money:

Less than -15%,
-15% to -5%,
-5% to +5%,
+5% to +15%,
Greater than 15%.

Actuarial Memorandum

72. The purpose of the actuarial memorandum is to collect information that cannot be easily collected or reviewed in the confines of a spreadsheet. It would be signed by the Approved Actuary.

73. This includes such information as descriptions of how actuarial assumptions were developed, what kind of governance is in place for a hedging programme, etc.

74. However, in order to be able to standardise our reviews and be able to easily compare submissions from different companies at a high level, it is proposed that the actuarial memorandum be highly structured.

75. The items to be included in the actuarial memorandum are listed in Appendix 1.

76. We propose to provide guidance on the type of information and the level of detail to be provided for each item in due course. However, we will not prescribe the items at a detailed level, but will instead rely on the judgment of the Approved Actuary who it is presumed will have familiarity with similar actuarial memoranda that are typically provided for other purposes. In recognition of the significance of this requirement, it will be acceptable for companies to use “best efforts” in the first year.

77. As with other requirements, the Authority may require further follow-up information based on our review of the information provided in the actuarial memorandum.

Refinements to Factor-Based Approach

Background

78. A number of specific shortcomings with the current BSCR model were identified during the 2012 trial run and in discussions with industry. Therefore, we want to take the opportunity to make refinements where it is practical and material to do so.

79. Given that companies with significant variable annuity guarantee business will likely prefer to use an internal model with stress tests approach described above, some degree of conservatism is desirable here. This has been reflected in our considerations. It is not practical to try to capture every nuance of variable annuity guarantees with a high degree of precision through a factor-based model.

80. Under the factor-based approach, hedging will not be explicitly recognised. However, we would be willing to consider adjustments in cases where a company can provide evidence of a robust risk mitigation programme.

Contracts with Multiple Guarantees

81. To avoid requiring separate input of different combinations of overlapping guarantees, we propose simply to prompt companies to input the percentage of Guaranteed Minimum Death Benefit (GMDB) policies that had a multiple guarantee. We would then reduce the GMDB charges by that percent. This has the advantage of being clean, explicit, and approximately correct. We would make it optional for companies to input this percentage with the default of 0% being somewhat conservative.

Minimum Floor Factors based on Account Value

82. Industry comments contend that the minimum capital charge based upon account value is counter-intuitive since a higher account value should result in a lower risk. We propose to replace the account value with the guaranteed value.

Volatility of Underlying Funds

83. The current BSCR factors distinguish between fund allocations with <10% and >10% volatility. We propose to split the upper band into 10-15% and >15%. Proposed Net Amount at Risk (NAR) factors and floor factors for business other than Guaranteed Minimum Accumulation Benefits (GMAB) are shown below:

	NAR Factors				Minimum Floor Factors		
Fund Volatility --->	**0 - 10%**	**10 - 15%**	**> 15%**		**0 - 10%**	**10 - 15%**	**> 15%**
Simple GMDB	4.0%	8.5%	13.0%		0.25%	0.50%	0.75%
Rollup GMDB	12.0%	16.5%	21.0%		0.75%	1.00%	1.25%
EEB	1.0%	9.0%	17.0%		0.00%	0.50%	1.00%
GMIB	100.0%	130.0%	160.0%		5.00%	6.50%	8.00%
GMWB	60.0%	75.0%	90.0%		3.25%	4.25%	5.00%

Net Amount at Risk for GMWB

84. The Authority has noted that the GMWB net amount at risk should reflect withdrawals already taken. It is proposed that we now instruct companies to approximate the net amount at risk by subtracting prior withdrawals from the guarantee amount.

GMAB Factors

85. GMABs are qualitatively different to other guarantees in that they are paid without fail on a certain date. This makes them sensitive to the remaining duration as well as the volatility of the underlying funds. The current GMAB factors appear to be too crude to adequately cover the full breadth of situations. In particular, for guarantees that are imminent, the 0-5 year duration band is too wide. In addition, the volatility threshold of less than or greater than 10% does not cover some of the more aggressive funds, particularly when there are no allocation limits imposed on the policyholder by the insurer. Therefore, we have recalibrated the model for this coverage. The proposed factors are shown below:

GMAB Factors

	NAR Factors				Minimum Floor Factors		
Fund Volatility --->	**0 - 10%**	**10 - 15%**	**> 15%**		**0 - 10%**	**10 - 15%**	**> 15%**
Time to Maturity							
> 9	30.0%	45.0%	60.0%		1.0%	1.4%	3.9%
8 - 9	35.0%	50.0%	70.0%		1.1%	1.7%	4.3%
7 - 8	40.0%	55.0%	80.0%		1.4%	2.1%	4.9%
6 - 7	45.0%	65.0%	90.0%		1.7%	2.8%	5.9%
5 - 6	50.0%	75.0%	100.0%		2.0%	3.5%	6.8%
4 - 5	55.0%	85.0%	115.0%		2.4%	4.3%	8.0%
3 - 4	60.0%	95.0%	135.0%		2.8%	5.0%	8.8%
2 - 3	70.0%	105.0%	160.0%		3.0%	5.0%	8.9%
1 - 2	80.0%	115.0%	200.0%		3.0%	5.0%	8.9%
0 - 1	90.0%	130.0%	250.0%		3.2%	5.0%	9.0%

Offsetting In-the-Money with Out-of-the-Money Contracts

86. The BSCR currently aggregates policies for purposes of determining how far in- or out-of-the-money they are. This aggregation masks differences in risk between different policies. Furthermore, the greater of the NAR factor amount and the floor factor amount in aggregate is used. This is appropriate at a policy-by-policy level but not at the aggregate level.

87. Since the NAR and floor factors are applied to the total account value / NAR and are therefore linear, it would be appropriate to aggregate the in-the-money and out-of-the-money policies separately. In effect this means that out-of-the-money contracts would now correctly be subject to the floor factors only.

8. MISCELLANEOUS ITEMS

Deferred Acquisition Costs / Value Of Business Acquired / Present Value Of Future Profits

88. When granted a Section 56 direction by the Authority, Long-Term companies can include Deferred Acquisition Costs (DAC), Value of Business Acquired (VOBA) and/or Present Value of Future Profits (PVFP) as sundry assets on their balance sheet. For capital determination purposes, we propose to treat these amounts as negative liabilities. As such, they will not attract an asset capital charge. In addition, the reserve amounts used in all capital calculation will be based on the reserves, net of DAC, VOBA and PVFP.

89. In order to attribute the DAC, VOBA and PVFP amounts to the correct itemised reserves, a supplemental schedule of inputs for reserves will be required.

90. As a consequence of the adjustments for DAC, VOBA and PVFP, it is possible that some reserve amounts may be negative. Capital requirements based on any such negative reserves will be floored at zero.

Other Miscellaneous Items

91. In certain cases, the Best estimate reserve (used to generate a capital credit for margins in the reserves) may also be negative. Credit for the difference between the negative best estimate reserve and the actual reserves will be available.

92. The current Class C BSCR incorrectly applies a minimum operation risk capital requirement of 2%. We propose to make corrections such that this will be 1%.

93. The weighted difference in duration for assets and liabilities in the interest rate risk calculation for Long-Term business can be weighted by assets instead of by liabilities. This is to be consistent with how this data is to be used. In addition, companies will now be required to disclose for information purposes the duration of assets and the durations of liabilities separately. There are no changes proposed to interest rate risk calculations for P&C business.

9. DEFERRED ITEMS

94. As part of its ongoing process of regular review, the Authority anticipates making refinements to the capital requirements from time to time. Such amendments will be used to better align the capital framework with the underlying risks. The Authority is aware of a number of areas in which further study may be warranted in the future. These include:

a) Mod-Co reinsurance arrangements; and
b) Taxation.

To assist us in ensuring that any future Mod-Co refinements are appropriate to the business, we propose to add a Mod-Co information schedule to the BSCR. This additional information will not be required as part of the Group BSCR.

10. APPENDICES

Appendix I – Requirements for Actuarial Memorandum

The following outlines the information that would be included in an actuarial memorandum. Since it is anticipated that much of this information will already exist in other documents, it would be acceptable to attach those documents and simply make reference to them in the actuarial memorandum.

Section	Information Submitted
Executive Summary	Required capital amount and high-level commentary on drivers of result Summary of key risks and associated risk mitigation techniques Summary of methods used and any changes since prior submission
Overview of Business	High-level summary of the business Summary of key product features and specifications
Key Risk Exposures	Qualitative description of key risk exposures including economic, mortality, surrender, annuitisation, withdrawal, expense and counterparty risks
Description of Methodology	Summarised approach used to calculate total assets and required capital Consider: – rate used to accumulate and discount cash flows; – measure of interim solvency, if any (e.g., how are periods of negative cash flows followed by positive cash flows allowed for) Benefits of aggregation Summary of reserve bases Changes in methodology since prior memorandum

Overview of Asset and Liability Models	Describe source of asset and liability data Approach to compressing in-force data, if relevant Allocation of assets to VA block Discussion of non-modeled business Timestep of model (e.g., monthly) Changes in models since prior memorandum
Description of Assumptions	Basis for economic scenarios including underlying model and parameters and information on the average return and volatility of the returns by fund For mortality and all policyholder behaviour assumptions: – basis for assumption, e.g., company-specific experience – basis for prudent estimate assumption – discuss future mortality improvement Approach to fund mapping Crediting strategy Expenses and commissions Tax Modeling of future premiums Other elective behaviour (e.g., revocation of benefits) Management action (other than hedging and reinsurance)
Reinsurance	Assumed and ceded, if relevant, including listing of counterparties Nature of arrangements, including caps, floors and recapture provisions Collateral requirements, if relevant Describe approach to modeling

Hedging	Business covered Hedge target Greeks managed / monitored Governance procedures Currently held derivatives and range of derivatives approved for trading Unhedged exposures Historical hedge effectiveness and sample attribution reports Changes in hedge policy since prior memorandum Description of how hedging is reflected in determination of required capital and stress-tests, including how any modeling limitations or simplifications are addressed
Results and Model Output	Capital results (e.g. Table 1) and commentary Results of stress tests (e.g. Table 2) with description and justification for tests selected and commentary on results Sensitivity results for key assumptions / risk exposures Factor-based results and commentary Summary output from model for a single tail scenario (e.g. that which most closely corresponds to the TVaR 95 result) showing cash flows by guaranteed rider type, accumulation and discounting of cash flows, and total assets required for the single scenario

Additional information can be submitted via appendices, as necessary.