BERMUDA MONETARY AUTHORITY

CONSULTATION PAPER

BERMUDA SOLVENCY CAPITAL REQUIREMENT UPDATE PROPOSAL

MARCH 2018

TABLE OF CONTENTS

I. Background

1. The Bermuda Monetary Authority (Authority) is considering restructuring certain aspects of the Bermuda Solvency Capital Requirement (BSCR) standard formula. The BSCR standard formula has served its purposes well overall but, as with any other regulatory model it can and should be updated and improved whenever and wherever appropriate.

2. The Authority embarked upon an Economic Balance Sheet (EBS) framework development in 2010 and has issued a number of policy papers, conducted field testing and hosted a series of market meetings to develop a framework suitable for the Bermuda commercial insurance market. For the 2015 financial year, the Authority required commercial insurers to include in their regular statutory filing a trial run submission of their EBS filing with BSCR capital charge amendments for cash and cash equivalents, credit risk, currency risk, concentration risk, and geographic diversification. These changes were ultimately adopted by the Authority and came into force for year-end filings for the financial year beginning on or after 1st January 2016 (i.e. for year-end 2016 for most insurers).

3. The changes performed to the valuation framework and to the BSCR standard formula were instrumental for Bermuda to achieve full equivalence with the European Solvency Regime, the so called Solvency II, a feature currently achieved by only two jurisdictions in the world and that cemented Bermuda's position as a world leading financial centre and reinforced its overall business attractiveness. However, notwithstanding these significant achievements, the Authority continues to monitor and evaluate the level of robustness, sophistication and comparability of Bermuda's capital requirements and continues to proactively ensure that capital requirements are in line with best practices in terms of solvency regimes.

4. Changes made to the valuation framework present an opportunity for an overhaul of the modelling approach for certain aspects of the BSCR standard formula. On 30th November 2016, the Authority issued a consultation paper on a series of potential adjustments to the BSCR standard formula. Responses to industry comments were provided in our "Response to Industry Comments – Bermuda Solvency Capital Requirement Update Proposal, November 2016" posted 15th March 2017.

5. On 15th March 2017 the Authority issued a revised version of the consultation paper taking into account market feedback and conducted a field testing exercise of the proposals therein contained. A summary of the main findings of the trial-run exercise was provided in our "Findings of the Trial Run Exercise – Bermuda Solvency Capital Requirement Update Proposal, March 2017" posted also on 30th November 2017.

6. On 30th November 2017, the Authority issued a new consultation paper that further updated the referred March 2017 Consultation Paper and introduced additional adjustments with the ultimate goal of further increasing the risk sensitivity of the BSCR standard formula and better reflecting how insurers manage risks. The Authority also carried out a round of field testing on the proposed adjustments to the BSCR standard formula in the beginning of 2018 using financial figures as of 31/12/2016.

7. This consultation paper updates the referred November 2017 Consultation Paper taking into account consultation feedback and the results of the trial-run exercise using financial data as of 31/12/2016. The Authority will conduct a final round of field testing on the proposed changes in the spring of 2018 using financial figures as of 31/12/2017. Alongside the Consultation Paper, the Authority will publish the associated BSCR models and draft rules.

8. A stakeholder letter on the feedback from the consultation process and the two rounds of trial-run will be published on 31th July 2018 alongside the final version of the new rules. The new rules will enter into force in 1stJanuary 2019 notwithstanding grade-in provisions. They will apply (as applicable) to all Classes of insurers in the so called "commercial regime", i.e. Class 3A, Class 3B, Class 4, Class C, Class D, Class E and Groups. Further information on the timeline for these changes is provided below.

Milestone	Deadline
Republish consultation paper, draft rules and associated BSCR models taking into account consultation feedback and the results of the trial-run exercise using financial data as of 31/12/2016	31st March 2018
Trial-run of proposals using financial data as of 31/12/2017	31st May 2018 (both Legal Entities and Groups)
Stakeholder letter on feedback from the consultation process and the two rounds of trial-run	31th July 2018
New rules published	31th July 2018
New rules enter into force	1st January 2019

9. The areas considered in this paper are equity risk, premium risk, credit risk, dependencies within premium and reserve risks, the overall risk aggregation process, operational risk, other BSCR adjustments, treatment of run-off insurers, currency risk, interest rate and liquidity risk, risk mitigation, use of management actions, the use of look through, treatment of derivatives, and grade-in arrangements as well as other provisions.

10. The main changes from the November 2017 version of the Consultation Paper are:

    a. The revision of the downward interest rate risk shocks and treatment of the long-term forward rate (LFTR) for the alternative approach for interest rate and liquidity risk and the testing of a modified duration based approach also for interest rate and liquidity risk for Long-Term insurers.
    b. Reduced equity risk charges for private equity holdings that meet certain criteria.
    c. Small changes to the criteria under which the use of look through is allowed.
    d. Change in the grade-in formulas to allow for the full impact of the tax mitigating effects to be incorporated in the capital calculation as soon as the BSCR changes come in force.

11. A high level description of the approach is outlined in this paper. The calibration of the approaches has been performed using a mix of benchmarking with other major risk based supervisory regimes (Solvency II, the Swiss Solvency Test and the draft Insurance Capital Standard of the International Association of Insurance Supervisors), empirical data and expert judgment. The charges are calibrated to the underlying nature of risks underwritten in Bermuda.

12. Any questions relating to these proposals should be directed to riskanalytics@bma.bm in the first instance.

II. Equity Risk

13. Current equity charges are set by type of financial instrument and range from 5% to 55%, with a significant component of the equity holdings (common stocks) being charged at 14%. With recent global developments, we have come to the conclusion that some of the equity risk charges are not adequate when compared to international standards. On the other hand, the current approach applies factor charges to exposure measures and adds them up, which is equivalent to assuming perfect positive correlation between equity holdings – a conservative assumption. We also believe there is value in changing the "bucketing approach" in order to make it more consistent with other leading risk based solvency regimes.

14. The new proposed approach can be summarised as follows: an instantaneous shock is applied to the balance sheet exposure, both relevant assets[1] and liabilities[2], triggering the revaluation of the balance sheet exposure[3] under the shock. The relevant shocks are detailed below:

Equity Holding	Type	Charge
Strategic holdings	1 or 2	20%
Duration based (For Long-Term Insurers and Type 1 exposures only)	1	20%
Infrastructure (Non-affiliate holdings, non-duration based)	3	25%
Equities listed on developed markets and selected mutual funds	1	35%
Equity P/S 1	1	0.6%
Equity P/S 2	1	1.2%
Equity P/S 3	1	2%
Equity P/S 4	1	4%
Equity P/S 5	1	11%
Equity P/S 6	1	25%
Equity P/S 7	1	35%
Equity P/S 8	1	35%
Equity Real Estate1	4	10%
Equity Real Estate2	4	20%
Letters of Credit	2	20%
Other	2	45%

[1] Including exposures to equity risk from investment holdings packaged as funds, segregated account company assets, deposit assets and other sundry assets as determined from the application of the look-through provisions.
[2] Including exposures to equity risk from insurance technical provisions (excluding variable annuity guarantees), segregated account company liabilities, deposit liabilities and other sundry liabilities as determined from the application of the look-through provisions.
[3] Note that the revaluation of an asset or liability under a shock may produce haircuts different than the value of the shock, namely for nonlinear exposures such as derivatives.

Correlation matrix	Type 1	Type 2	Type 3	Type 4
Type 1	1			
Type 2	0.75	1		
Type 3	0.75	0.75	1	
Type 4	0.5	0.5	0.5	1

Where,

- Strategic holdings: means qualifying equity investments of a strategic nature.[4] If these investments are listed in developed markets, namely on a Bermuda approved listed stock exchange or any exchange set out under Instructions[5] issued by the Authority, then they will be classified as Type 1. Otherwise, these investments will be classified as Type 2.
- Duration based: means equity securities listed on developed markets, namely on a Bermuda approved listed stock exchange or any exchange set out under Instructions[5] issued by the Authority, held by Long-Term insurers to cover retirement products where:
    - All assets and liabilities corresponding to the business are ring-fenced[6], without any possibility of transfer.
    - The average duration of the liabilities corresponding to the business held by the insurer exceeds an average of 12 years.
    - The equity investments backing the liability are type 1 equity exposures, that is equities listed on developed markets or preferred shares (PS 6 to PS 8).
- Infrastructure (non-strategic holdings, non-duration based): means equity investments in qualifying infrastructure investments (non-strategic holdings, non-duration based).[7]

---

[4]A qualifying strategic holding must fulfil all of the following criteria:

1. The investing company holds at least 20 % of voting rights or share capital in the investment.
2. The value of the equity investment is likely to be materially less volatile than the value of other equities as a result of both the nature of the investment and the influence exercised by the participating company;
3. The nature of the investment is strategic, taking into account:
    a) the existence of a clear decisive strategy to continue holding the participation for a long period;
    b) the consistency of such strategy with the main policies guiding or limiting the actions of the participating company; and where the company is part of a group, the consistency of such strategy with the main policies guiding or limiting the actions of the group;
    c) the ability of the company to continue holding the participation;
    d) the existence of a durable link.

[5] The Authority envisages to consider regulated markets in countries which are members of the Organisation for Economic Cooperation and Development (OECD) or the European Economic Area (EEA) or in Hong-Kong or in Singapore or in other developed markets as published in the Authority's Instructions.

[6] "Ring-fenced" shall be defined as assets and liabilities that:

1. are managed and organised separately from other Long-Term business of the Long Term insurer,
2. are recorded as a separate (internal) financial reporting segment within the Long-Term insurer's general account, and
3. have sufficient general account capital allocated to satisfy BSCR requirements on a stand-alone basis.

[7]Qualifying infrastructure investments are defined as "investment in an infrastructure project entity that meets all of the following criteria":

1. The infrastructure project entity can meet its financial obligations under sustained stresses that are relevant for the risk of the project.

2. The cash flows that the infrastructure project entity generates for equity investors are predictable.
    a) For the purposes of this paragraph, the cash flows generated for debt providers and equity investors shall not be considered predictable unless all except an immaterial part of the revenues satisfies the following conditions:
        (i) One of the following criteria is met:
            1. the revenues are availability-based. That is, the revenues consist primarily of fixed periodic payments, usually from a public sector authority, and are based on the availability of project facilities for use as specified in the contract;
            2. the revenues are subject to rate-of-return regulation;
            3. the revenues are subject to take-or-pay contract;
            4. the level of output or the usage and the price shall independently meet one of the following criteria:
                a. it is regulated,
                b. it is contractually fixed,
                c. it is sufficiently predictable as a result of low demand risk.
        (ii) Where the revenues of the infrastructure project entity are not funded by payments from a large number of users, the party which agrees to purchase the goods or services provided by the infrastructure project entity shall be one of the following:
            1. central banks or governments, multilateral development banks or international organisations as established in Instructions issued by the Authority;
            2. a regional government or local authority as established in Instructions issued by the Authority;
            3. an entity with a BSCR Credit Rating of at least 4;
            4. an entity that is replaceable without a significant change in the level and timing of revenues.
3. The terms and conditions relating to matters such as the infrastructure project assets and infrastructure project entity, are governed by a contract [which specifies the laws of the country under which it is governed] that provides equity investors with a high degree of protection including the following:
    a) Where the revenues of the infrastructure project entity are not funded by payments from a large number of users, the contractual framework shall include provisions that effectively protect equity investors against losses resulting from the termination of the project by the party which agrees to purchase the goods or services provided by the infrastructure project entity.
    b) The infrastructure project entity has sufficient reserve funds or other financial arrangements to cover the contingency funding and working capital requirements of the project.
4. The infrastructure assets and infrastructure project entity are located in Bermuda or in an OECD member country.
5. Where the infrastructure project entity is in the construction phase the following criteria shall be fulfilled by the equity investor, or where there is more than one equity investor, the following criteria shall be fulfilled by all of the equity investors as a whole:
    a) The equity investors have a history of successfully overseeing infrastructure projects and the relevant expertise to oversee such projects.
    b) The equity investors have a low risk of insolvency, or there is a low risk of material losses for the infrastructure project entity as a result of their insolvency.
    c) The equity investors are incentivised to protect the interests of investors.
6. The infrastructure project entity has established safeguards to ensure completion of the project according to the agreed specification, budget or completion date.
7. Where operating risks are material, they are properly managed.
8. The infrastructure project entity uses tested technology and design.
9. The capital structure of the infrastructure project entity allows it to service its debt.
10. The refinancing risk for the infrastructure project entity is low.
11. The infrastructure project entity uses derivatives only for risk-mitigation purposes.

"Infrastructure project entity" means an entity which is not permitted to perform any other function other than owning, financing, developing or operating infrastructure assets, and which is used as the primary source to facilitate payments to debt providers and equity investors out of the income generated by such assets.

"Infrastructure assets" means physical structures or facilities, systems and networks that provide or support essential public services.

- Equities listed on developed markets and selected mutual funds: means equity securities listed on a Bermuda approved listed stock exchange or investments in certain mutual funds both set out under Instructions issued by the Authority[8]. Certain qualifying unlisted equity investments may be included under this category instead of under the category "Other" as set out under Instructions issued by the Authority[9].

---

[8] The Authority envisages to consider regulated markets in countries which are members of the Organisation for Economic Cooperation and Development (OECD) or the European Economic Area (EEA) or in Hong-Kong or in Singapore or in other developed markets as published in the Authority's Instructions. The Authority envisages to consider selected mutual funds defined as units or shares of alternative investment funds authorised as European Long-Term Investment Funds in accordance with Regulation (EU) 2015/760, of 29th April 2015, or units or shares of collective investment undertakings which are qualifying social entrepreneurship funds in accordance with article 3(b) of Regulation (EU) 346/2013, of 17th April 2013 or units or shares of collective investment undertakings which are qualifying venture capital funds as referred to in Article 3(b) of Regulation 345/2013 of 17th April 2013, and units or shares of closed-ended and unleveraged alternative investment funds where those alternative investment funds are established in the European Union or, if they are not established in the European Union, they are marketed in the European Union according to Articles 35 or 40 of Directive 2011/61/EU of 8th June 2011, as well as other similarly purposed investment funds as published in Authority's Instructions.

[9] These are unlisted equity investments that have risk characteristics similar to listed Type 1 equities, and may be classified as Type 1 equities under the category "Equities listed on developed markets and selected mutual funds" with the associated lower capital charge. "Qualifying unlisted equity investments" are defined as i) direct investments in the equity of unlisted companies; or ii) equity investments in unlisted portfolio companies resulting from the look-through of private equity funds or private equity funds of funds; where the investments fulfill all of the following conditions:

1. Criteria on (underlying) equity investments
    a. Investments are in the common equity of companies that are unlisted.
    b. The companies are established in, derive a majority of their revenues from, and have the majority of the staff that they employ located in, eligible countries. Eligible country here is defined as Bermuda or a country such that, if the company was listed in the stock exchange of the country, the listed equity of the company would qualify as Type 1 equity under the rules of this section (see footnote 5).
    c. The companies have been larger than a small-sized enterprise in the last three years.
        i. For the purposes of this paragraph, a "small-sized enterprise" is defined as an enterprise which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed USD 10 million.
2. Criteria on vehicle (only for fund-type investments)
    a. The fund is closed-end.
    b. The fund does not use leverage, with the following exceptions which are allowed:
        i. borrowing arrangements entered into if these are temporary in nature and are fully covered by contractual capital commitments from investors in the fund;
        ii. derivative instruments used for currency hedging purposes that do not add any incremental exposure, leverage or other risks.
    c. The fund meets the following requirements:
        i. The fund invests in unlisted companies, listed companies that are to become unlisted as a result of the investment made by the fund or listed companies as the temporary consequence of exiting the investment.
        ii. The investment strategy includes the intention to remain invested in the underlying companies for a number of years.
        iii. The manager of the fund has the power to appoint a director to the Boards of the underlying companies and takes an active role in the governance of the company with the aim to bring about a significant development or transformation.
    d. The insurer has all the information necessary to assess the performance of the fund manager (e.g. profit & loss, cash flows and profits of the portfolio companies at a meaningful level of aggregation) and continues to get the information on a timely basis.
    e. The insurer invests through several independent fund managers to avoid undue concentration.
3. Criteria on own risk management
    a. Fund-type investments: the following requirements should be met:
        i. The insurer computes the portfolio beta whenever BSCR is calculated.

ii. The insurer follows a due diligence process prior to investing in the fund, including but not limited to:
    1. qualitative and quantitative analysis of the companies in which the manager has invested with its prior funds;
    2. obtaining information on how the fund is managed and the processes followed before investing.
iii. The insurer assesses the fitness of the fund manager on an on-going basis.
iv. The insurer benchmarks the performance of the fund against comparable funds.
v. There are regular and reliable reporting lines between the fund manager and the insurer.
vi. The insurer is able to challenge the investment decisions made by the fund manager (this implies that the fund manager provides sufficient information on the underlying assets).
vii. The insurer verifies that the manager of the fund regularly interacts with the management teams of the companies the fund invests in.

b. Direct investments: the following requirements should be met:
    i. The insurer computes the beta whenever BSCR is calculated.

4. Similarity criterion
    a. The approach can only be applied for portfolios where any equity investment does not represent more than 10 % of the portfolio value.
    b. The approach cannot be applied to financial companies.
    c. The beta of the unlisted equity portfolio is determined via the following steps:
        i. The hypothetical beta for each individual unlisted equity investment is calculated using the function set out below.
        ii. The portfolio beta is calculated as the average of the individual betas weighted by the book values of the equity investments.
    d. The beta for direct unlisted equity investments is calculated in the same way as the beta for individual portfolio companies above.
    e. The similarity criterion is met if the beta of the portfolio or direct investment does not exceed a cut-off value of 0.80.
    f. The beta for an individual unlisted equity investment is calculated with the following formula: beta = 0.9478 – 0.0034*AvgGrossMargin + 0.0139*TotalDebt/AvgCFO – 0.0015*AvgROE; where AvgGrossMargin = Average Gross Margin, TotalDebt = Total Debt, AvgCFO = Average Cash Flow from Operations, AvgRoe = Average Return on Common Equity.
    g. In the above formula, “Avg” means average of the annual figures over the last five financial years. If this information is not available, the value at the end of the last financial year has to be used.

The value of unlisted equity investments to which the lower capital charge is applied shall not exceed 5 % of the market value of all investments.

- Equity P/S 1 to 8: means preferred shares with rating 1 to 8, as in the current BSCR model.
- Equity Real Estate1: means company-occupied real estate exposures less encumbrances, as in the current BSCR model.
- Equity Real Estate2: means investment real estate exposures less encumbrances, as in the current BSCR model.
- Other: means equity investments not covered in any of the other categories above, namely equities not listed in stock exchanges of developed markets, equities which are not listed (with the exception of qualifying unlisted equity investments as defined above), hedge funds, commodities, and other alternative investments.

15. On the previous versions of the Consultation Paper sundry assets were previously subject to a 45% equity risk shock. The treatment of sundry assets and liabilities is now proposed to be refined to reflect the varied nature of these assets as follows:
    a. Derivative instruments: capital charges applicable to the underlying risk as determined from the application of the look-through provisions and per Section XIV. Treatment of Derivatives of this Consultation Paper.
    b. Segregated Accounts Companies: capital charges applicable to the underlying risk as determined from the application of the look-through provisions and for both assets and liabilities.
    c. Deposit assets and liabilities: capital charges applicable to the underlying risk as determined from the application of the look-through provisions and for both assets and liabilities.
    d. Balances receivable on the sale of investments: Credit risk charge as per section IV. Credit Risk of this Consultation Paper.
    e. Intangible assets and Pension Benefit Surplus: old 20 % charge will be retained.
    f. Deferred tax assets: No capital charge.
    g. Other: capital charges applicable to the underlying risk as determined from the application of the look-through provisions and for both assets and liabilities.

16. For the calculation of the equity risk capital charge, hedging and risk transfer mechanisms may be taken into account as long as they comply with the requirements set in section XI. Risk Mitigation of this Consultation Paper. Where insurers hold short positions in equities (including put options), these may be allowed to reduce the equity risk capital charge only if the short positions meet the requirements set forth in section XI. Risk Mitigation of this Consultation Paper. Any other short equity exposures (other than those embedded in the technical provisions, segregated account companies and deposit liabilities) will not be allowed to reduce the equity risk capital charge. Should the revaluation of the balance sheet exposure result in a negative capital charge for certain shocks then a null equity risk charge will be assigned.

17. For the calculation of the equity risk capital charge, management actions may be taken into account as long as they comply with the requirements set in section XII. Management Actions of this Consultation Paper.

18. In order to prevent double-counting capital charges for Variable Annuity guarantees, the following additional provisions shall apply:
    a. Where companies are using an internal model for Variable Annuity risk, assets and liabilities associated with Variable Annuity (VA) guarantees may be excluded from the equity risk shock, if the following conditions are fulfilled:
        i. The company is able to identify and track assets associated with Variable Annuity guarantees.
        ii. Equity risk associated with both the VA guarantee liabilities and the associated assets is explicitly modeled in the internal model.
    b. Where equity risk is modelled for VA guarantees, but not for the associated assets; or the associated assets cannot be separately identified; only the VA guarantee liabilities may be excluded from the equity shock, but any assets may not.
    c. Where companies are using the BSCR Standard Formula to calculate Variable Annuity guarantee risk, only the VA guarantee liabilities may be excluded from the equity shock, but any assets may not.

Question 1: *Do you see any practical issues that the proposals may introduce?*

Question 2: *What practical issues are there in deriving the inputs needed?*

III. Premium Risk

19. Currently, the exposure measure for Property & Casualty (P&C) premium risk which deals with future (non-CAT) losses that will occur in the course of the next year is (Net) Premium Written. It has the advantage of being an objective, readily available and audited item, but it is not a prospective measure (although it can serve as a reasonable proxy for a stable book of business), does not take into account Bound But Not Incepted business (BBNI) and under-estimates the risk of multi-year (re)insurance contracts (the charge will be the same regardless of the number of the years left to run in the contract).

20. In the previous March 2017 version of the Consultation Paper, we recommended a new approach to deal with the premium risk base exposure measure (the actual capital factors per line of business remained unchanged), including provisions on how to charge BBNI and multi-year contracts. The base exposure measure was changed to the maximum between the "estimate of the net premiums to be earned during the next 12 months accounting period" and the net premium written at year end for single year contracts and additional considerations were made for multi-year contracts.

21. This version of the Consultation Paper maintains a similar base exposure measure but fine-tunes the multi-year exposure and improves on the calibration of the capital factors for the multi-year exposure.

- **Exposure measure = Base exposure + Multi-year exposure**

  Where,

  - Base exposure = Maximum (Estimate of the net premiums to be earned by the insurer during the next 12 months accounting period; net premium written at year end).
    Note that by definition this exposure measure will cover BBNI exposures.

    If the insurer has met the following conditions,
    (a) the Board of Directors has decided that its earned premiums for each segment during the following 12 months will not exceed the net premium written at year end;
    (b) the insurer has established effective control mechanisms to ensure that the limits on earned premiums referred to in point (a) will be met;
    (c) the insurer has informed the Authority about the decision referred to in point (a) and the reasons for it.

    Then the insurer may apply for a BSCR modification to calculate the base exposure as solely the estimate of the net premiums to be earned by the insurer during the next 12 month accounting period.

- **Multi-year exposure[10] = FP (existing) + FP (future)**

  Where,

  - FP (existing): The expected present value of premiums to be earned by the insurer after the next 12 month accounting period for existing contracts.

  - FP (future): The expected present value of net premiums to be earned by the insurer after the next 12 month accounting period for contracts where the initial recognition date falls in the following 12 months.

22. The previous March 2017 version of the Consultation Paper had inconsistencies on the treatment of multi-year contracts related to existing business and multi-year contracts to be recognized in the following 12 months (future business). These inconsistencies have now been corrected. Having said that, the main area of focus in the current version of the Consultation Paper is the capital factors for multi-year exposure. These have now been better calibrated so that they are more reflective of the underlying risks (re)insurers are exposed to at different future periods and, instead of a single capital factor applying across all future exposures the charges now vary by period. This means that the revised approach distinguishes between business earned during the first year and business earned in subsequent years and applies different capital charges between the two exposure segments.

23. The main risk driver in the subsequent future years (i.e. after time 1) is the volatility arising from revising, at the end of the first period, the view of the expected loss ratio on the segment of the contracts to be earned after the first period. This change in view would be due to new information emerging between the time the contract was last priced or reserved and the year end. This new information may come from a number of sources including adverse claims development of prior years, new market or model information, or adverse losses during the first future year. The volatility resulting from this new information is lower when compared to the volatility the first period capital factor captures and as a result the charge on business earned in subsequent future periods should be lower.

[10] In order to determine what contracts fall under multi-year exposure, insurers should take into account paragraph 122 of the Authority's Guidance Notes for Commercial Insurers and Insurance Groups' Statutory Reporting Regime, of 30th November 2016: "the cash flow projections used in the calculation of the best estimate should take account of all future cash in- and out-flows required to settle the insurance obligations attributable to the lifetime of the policy. This is defined to continue up to the point at which:
a) the insurer is no longer required to provide coverage;
b) the insurer has the right or the practical ability to reassess the risk of the particular policyholder and, as a result, can set a price that fully reflects that risk;
c) the insurer has the right or the practical ability to reassess the risk of the portfolio that contains the contract and, as a result, can set a price that fully reflects the risk of that portfolio."
For example, multi-year contracts with "getaway clauses", such as annual renewal of cancellation provisions may be treated as one-year contracts and thus excluded from multi-year exposure.
For avoidance of doubt, single year policies where the initial recognition date falls in the following 12 months (i.e. future single policies) do not fall under multi-year exposure.

24. An additional distinction to be made is between multi-year exposure for FP (existing) and multi-year exposure for FP (future). This is because the average time over which new information arise for the former is twelve months but less than twelve months for the latter. As a result the capital charge on business earned past time 1 should be lower for contracts written during the first period compared to contracts already written before time zero.

25. Performing the calculation described above will produce three different capital numbers which would be added together to form total premium risk for each line of business. The three capital numbers can be defined as:-
    a. Capital Factor 1: Capital charge for the base exposure (i.e. for year 1) and which will correspond to current BSCR premium risk factor.
    b. Capital Factor 2: Capital charge for FP (existing) (i.e. for years 2 and onwards relating to contracts bound by time 0).
    c. Capital Factor 3: Capital charge for FP (Future) (i.e. for years 2 and onwards relating to contracts binding in the first year)

26. Below is a formulaic representation.

- **Premium Risk = [Base Exposure] x [Capital Factor 1]**
  + [FP (existing)] x [Capital Factor 2]
  + [FP (future)] x [Capital Factor 3]

27. The recommended charges for each Line of Business are displayed below.

BSCR LoB	CapitalFactor1 - BSCR Premium Risk	CapitalFactor2	CapitalFactor3	CapitaFactor 2 to CapitalFactor 1	CapitalFactor 3 to CapitalFactor 2
Property Catastrophe	0.0%	11.5%	5.8%		50.0%
Property	49.7%	12.4%	6.2%	25.0%	50.0%
Property Non-Proportional	51.6%	12.9%	6.5%	25.0%	50.0%
Personal Accident	34.1%	8.5%	4.3%	25.0%	50.0%
Personal Accident Non-Proportional	41.2%	12.4%	6.2%	30.0%	50.0%
Aviation	48.2%	14.5%	7.2%	30.0%	50.0%
Aviation Non-Proportional	48.2%	14.5%	7.2%	30.0%	50.0%
Credit / Surety	39.8%	11.9%	6.0%	30.0%	50.0%
Credit / Surety Non-Proportional	45.4%	13.6%	6.8%	30.0%	50.0%
Energy Offshore / Marine	42.1%	12.6%	6.3%	30.0%	50.0%
Energy Offshore / Marine Non-Proportional	47.0%	14.1%	7.1%	30.0%	50.0%
US Casualty	50.3%	25.1%	12.6%	50.0%	50.0%
US Casualty Non-Proportional	55.6%	27.8%	13.9%	50.0%	50.0%
US Professional	51.2%	25.6%	12.8%	50.0%	50.0%
US Professional Non-Proportional	53.8%	26.9%	13.5%	50.0%	50.0%
US Specialty	51.4%	25.7%	12.9%	50.0%	50.0%
US Specialty Non-Proportional	52.7%	26.3%	13.2%	50.0%	50.0%
International Motor	42.2%	12.7%	6.3%	30.0%	50.0%
International Motor Non-Proportional	48.2%	24.1%	12.1%	50.0%	50.0%
International Casualty Non-Motor	50.0%	25.0%	12.5%	50.0%	50.0%
International Casualty Non-Motor Non-Proportional	53.6%	26.8%	13.4%	50.0%	50.0%
Retro Property	50.8%	12.7%	6.4%	25.0%	50.0%
Structured / Finite Reinsurance	27.2%	6.8%	3.4%	25.0%	50.0%
Health	15.0%	3.8%	1.9%	25.0%	50.0%

28. **Capital Factor 2** is calculated as a proportion of **Capital Factor 1**, with the exception of the Property Catastrophe line of business, and the ratio between the two may be 50%, 30% or 25% depending on the tail of the business (long/medium/short). The premise of the factor calibration process is that an insurer's pricing and expectations are largely driven by their own historic experience. As a consequence, any underperformance against plan or deterioration in prior years would lead the insurer to revise their future loss ratio expectation upwards resulting in a loss for that business segment. The factors were calibrated using assumptions consistent with the current premium risk capital charges and market information.

29. A non-zero **Capital Factor 2** is introduced for Property Catastrophe as the risk of mispricing future catastrophe business is currently not captured in the one-year PMLs submitted in the BSCR. The calibration theme is the same as for the other Lines of Business but instead of historic loss experience AALs from the BSCR submissions are used.

30. **Capital Factor 3** is set equal to half the size of **Capital Factor 2** in order to allow for the fact that (re)insurers have less than one year's worth of new information to revise their estimated future loss ratio on the contract.

Question 3: *Do you see any practical issues that the proposals may introduce?*

Question 4: *What practical issues are there in deriving the inputs needed and in particular in estimating the multi-year exposures?*

IV. Credit Risk

31. The Authority is considering changes to four areas: future premium receivables, receivables on securities sold, reinsurance recoverables, and derivatives.

32. Future premium receivables (accounts and premiums receivable deferred - not yet due) under the EBS are moved to the liability side of the balance sheet and thus would no longer be captured by the BSCR credit risk charge. The Authority proposes to reinstate this exposure for the purposes of calculating the credit risk capital charge for this item using the previously applied 5% capital factor.

33. Receivables on securities sold are included as part of Sundry Assets on Line 13 of the statutory balance sheet (Form 1SFS) and, as such, attract a charge of 20% in the equity investment risk (other equity investments) module of the BSCR. These receivable balances are usually only outstanding for a few weeks, at most, and thus the risk is normally very low. The Authority proposes going forward to treat this item in a similar manner to another receivables item – accrued investment income that attracts a charge of 2.5% within the credit risk module.

34. Currently, the main exposure measure for reinsurance credit risk associated with future claims (premium risk and CAT) is reinsurance balances receivable (adjusted for reinsurance balances payable and collateral). This results in new insurers that have not had claims yet and that are reinsuring large portions of business not to have a credit risk charge. Additionally this exposure measure is not prospective and reflective of reinsurance exposures in stressed circumstances.

35. We propose that the capital charge be the higher of the current approach and a new approach. In the new approach the capital charge will be determined by changing the current exposure measure to an exposure measure determined by the premium risk charge based on gross premiums and deducting the existing calculation based on net premiums. The new exposure measure will then be allocated per rating assuming an allocation (proportionally) similar to the one determined under the current approach (e.g. if 30% of the reinsurance balances receivable have a rating of “A” we will assume that 30% of the new exposure measure will also have a rating of “A”). In the case of new insurers without any reinsurance balances yet but with outward reinsurance contracts a “BBB” rating will be assumed in the calculation.

36. As part of the change in the treatment of derivatives, a credit risk charge is proposed for over-the-counter derivatives to capture their counterparty credit risk. Please refer to section XIV. Treatment of Derivatives of this Consultation Paper for more details.

Question 5: *Do you see any practical issues that the proposals may introduce?*

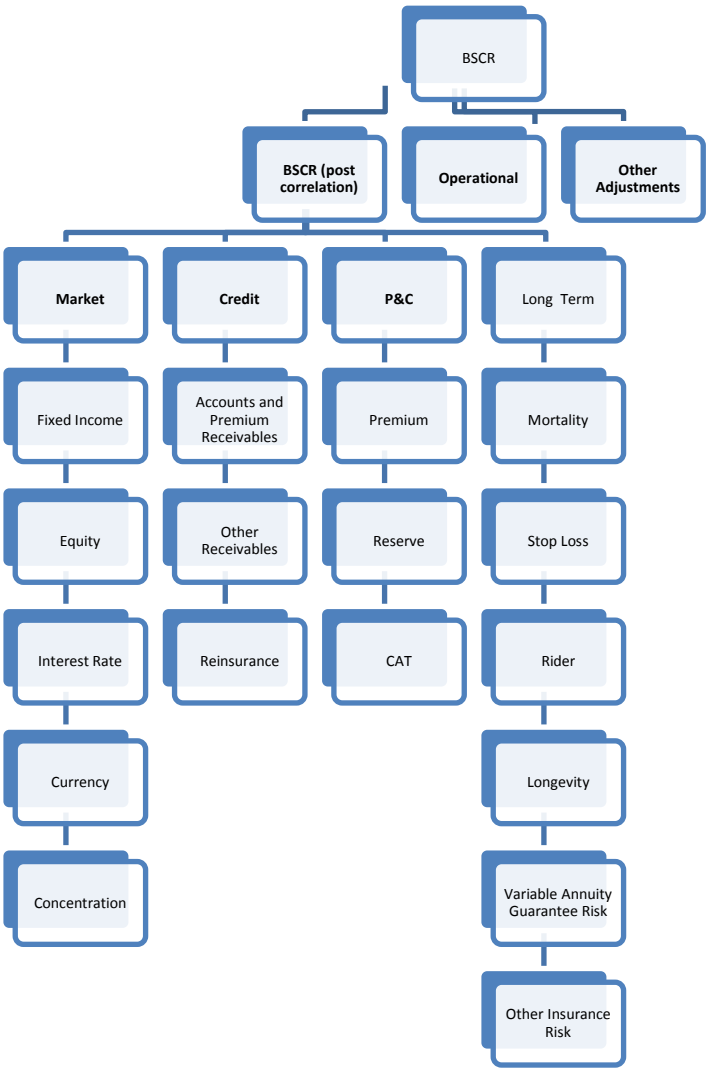
Question 6: *What practical issues are there in deriving the inputs needed?*

V. Dependencies

37. Variance-covariance aggregation approaches were common modeling practice when the BSCR standard formula was first developed, and assuming independence between risks was not uncommon practice either. Currently, other leading risk based solvency regimes aggregate risks mainly through the use of correlation matrices or copulas. Correlation matrices are easy to understand and implement and may account for tail dependency behaviour if a prudent calibration is chosen (i.e. if a tail correlation matrix is used). By definition linear correlation matrixes do not account for non-linear effects but the risks where these effects are more likely to be material are already being modeled in the BSCR standard formula through the use of internal models (for CAT risk and variable annuity business) or in the case of operational risk by assuming a worst case scenario (perfect positive correlation with other risks). Copulas although theoretically more robust are more difficult to parametrise, implement and understand.

38. Since our standard formula is applicable to all classes of business in the commercial regime (with a few sectoral differences) we believe that a prudent selection of tail correlations matrices strikes an adequate balance between tractability, robustness and risk sensitivity. It is our opinion that standard regulatory models should not be overly complicated, so to be easily implemented and supervised, and to avoid a sense of false precision which is particularly important in wholesale and bespoke markets.

39. In the existing BSCR, there is an aggregation of P&C premium and reserving risk amounts across lines of business, as well as an overall aggregation of risks across risk types. In the revised approach we are proposing to group underlying risk modules into market risk, credit risk, P&C insurance risk, Long-Term insurance risk and operational risk modules. The first four modules will be aggregated using a correlation matrix, with operational risk added to the result as at present to reach the final BSCR (and once the other adjustments proposed in section VII. Other Adjustments of this Consultation Paper are added). Correlation matrices will be used to combine the various components into each of the first four modules as necessary, including replacing the current concentration adjustment within premium and reserve risks. Schematically the structure of the BSCR standard formula will be as follows:



40. The operational risk charge will continue to be added once all other amounts have been combined. Additional adjustments are added to the BSCR (post diversification) and operational risk charge arriving at the (final) BSCR.

41. The correlation matrix for combining the major risk types is proposed as follows:

	Market	**Credit**	**P&C Ins**	**LT Ins**
Market	1			
Credit	0.25	1		
P&C Insurance	0.125	0.5	1	
LT Insurance	0.125	0.25	0	1

42. The changes made from the March 2017 version of the Consultation Paper to the overall correlation matrix were the reductions in the correlation parameters between market risk and insurance risk (both P&C and Long-Term). The new parameters were calibrated based on expert judgment from looking at the drivers of dependencies between the different risks and taking into account the mix of risks and lines of business relevant to the Bermuda market.

43. Market risk would comprise fixed income risk, equity risk, interest rate risk, currency risk and concentration risk, and is proposed to be aggregated as follows:

	FI	**Eq**	**Int**	**Curr**	**Conc**
Fixed Income	1				
Equity	0.5	1			
Interest Rate	A	A	1		
Currency	0.25	0.25	0.25	1	
Concentration	0	0	0	0	1

- A = 0 (if upward interest rate risk shock is used)
- A = 0.25 (if downward interest rate risk shock or the duration approach is used)

44. The changes made from the March 2017 version of the Consultation Paper to the market risk correlation matrix were the revision (reduction) of the correlation parameters between interest rate risk and fixed income and equity risks. This revision was triggered by the introduction of the alternative (scenario) methodology to calculate interest rate and liquidity risk. The new parameters were calibrated based on historical financial data and supervisory benchmarking.

45. Credit risk would simply be determined as the sum of the charges in respect of the four components identified.

46. For P&C risk, the current approach for premium risk and reserve risk contains an adjustment to allow for the degree of concentration of risk in the portfolio, but not necessarily for the relationship between different lines of business. We are therefore proposing to combine the various lines of business using the following correlation matrices (applied to post geographical diversified charges).

Premium risk

	Prop Cat	Prop	Prop NP	PA	PA NP	Aviatn	AviatnNP	C/S	C/S NP	Ergy O/M	Ergy O/MNP	US Cas	US CasNP	US Prof	US ProfNP	US Spec	US SpecNP	IntMotor	IntMotorNP	IntCas	IntCasNP	Retro Prop	Str/Fin Re	Health
Prop Cat	1																							
Prop	0.25	1																						
Prop NP	0.25	0.5	1																					
PA	0.25	0.25	0.25	1																				
PA NP	0.25	0.25	0.25	0.5	1																			
Aviatn	0.25	0.25	0.25	0.25	0.25	1																		
AviatnNP	0.25	0.25	0.25	0.25	0.25	0.5	1																	
C/S	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1																
C/S NP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	1															
Ergy O/M	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1														
Ergy O/MNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	1													
US Cas	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1												
US CasNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	1											
US Prof	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	1										
US ProfNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	0.5	1									
US Spec	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1								
US SpecNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	1							
IntMotor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1						
IntMotorNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	1					
IntCas	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.25	0.25	1				
IntCasNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.25	0.25	0.5	1			
Retro Prop	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1		
Str/Fin Re	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	
Health	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1

Reserve Risk

	Prop Cat	Prop	Prop NP	PA	PA NP	Aviatn	AviatnNP	C/S	C/S NP	Ergy O/M	Ergy O/MNP	US Cas	US CasNP	US Prof	US ProfNP	US Spec	US SpecNP	IntMotor	IntMotorNP	IntCas	IntCasNP	Retro Prop	Str/Fin Re	Health
Prop Cat	1																							
Prop	0.25	1																						
Prop NP	0.25	0.5	1																					
PA	0.25	0.25	0.25	1																				
PA NP	0.25	0.25	0.25	0.5	1																			
Aviatn	0.25	0.25	0.25	0.25	0.25	1																		
AviatnNP	0.25	0.25	0.25	0.25	0.25	0.5	1																	
C/S	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1																
C/S NP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	1															
Ergy O/M	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1														
Ergy O/MNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	1													
US Cas	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1												
US CasNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	1											
US Prof	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	1										
US ProfNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	0.5	1									
US Spec	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1								
US SpecNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	1							
IntMotor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1						
IntMotorNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	1					
IntCas	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.25	0.25	1				
IntCasNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.25	0.25	0.5	1			
Retro Prop	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1		
Str/Fin Re	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	
Health	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1

47. The correlation matrix for combining the P&C insurance risk is proposed as follows:

	Prem	**Res**	**Cat**
Premium	1		
Reserve	0.25	1	
CAT	0.125	0	1

48. The changes made from the March 2017 version of the Consultation Paper to the P&C insurance risk correlation matrix were the reduction in the correlation parameters between CAT risk and premium and reserve risks. The new parameters were calibrated based on expert judgment looking at the drivers of dependencies between the different risks and taking into account the mix of risks and lines of business relevant to the Bermuda market.

49. The correlation matrix for combining the long term insurance risk is proposed as follows:

	Mort	**Stop Loss**	**Riders**	**Morbi& Dis**	**Long**	**VA Guar**	**Other**
Mortality	1						
Stop Loss	0.75	1					
Riders	0.75	0.75	1				
Morbidity& Disability	0.25	0	0	1			
Longevity	-0.5	-0.5	-0.5	0	1		
VA Guarantee	0	0	0	0	0	1	
Other Insurance	0.125	0.25	0.25	0.25	0.25	0.25	1

Question 7: *Do you see any practical issues that the proposals may introduce?*

VI. Operational Risk

50. Operational risk is currently being modeled in the BSCR standard formula as a10% uplift to the BSCR (post diversification) combined with a scorecard approach that takes into account operational risks and their associated risk management and control framework in order to arrive at a final adjusted uplift factor.

51. The Authority believes this approach remains suitable but proposed to change the calibration of the uplifting factors in the previous version of the Consultation Paper by effectively doubling them. While this change had no material impact for insurers with very high scores (low capital charges), it did have a more material impact for the other insurers.

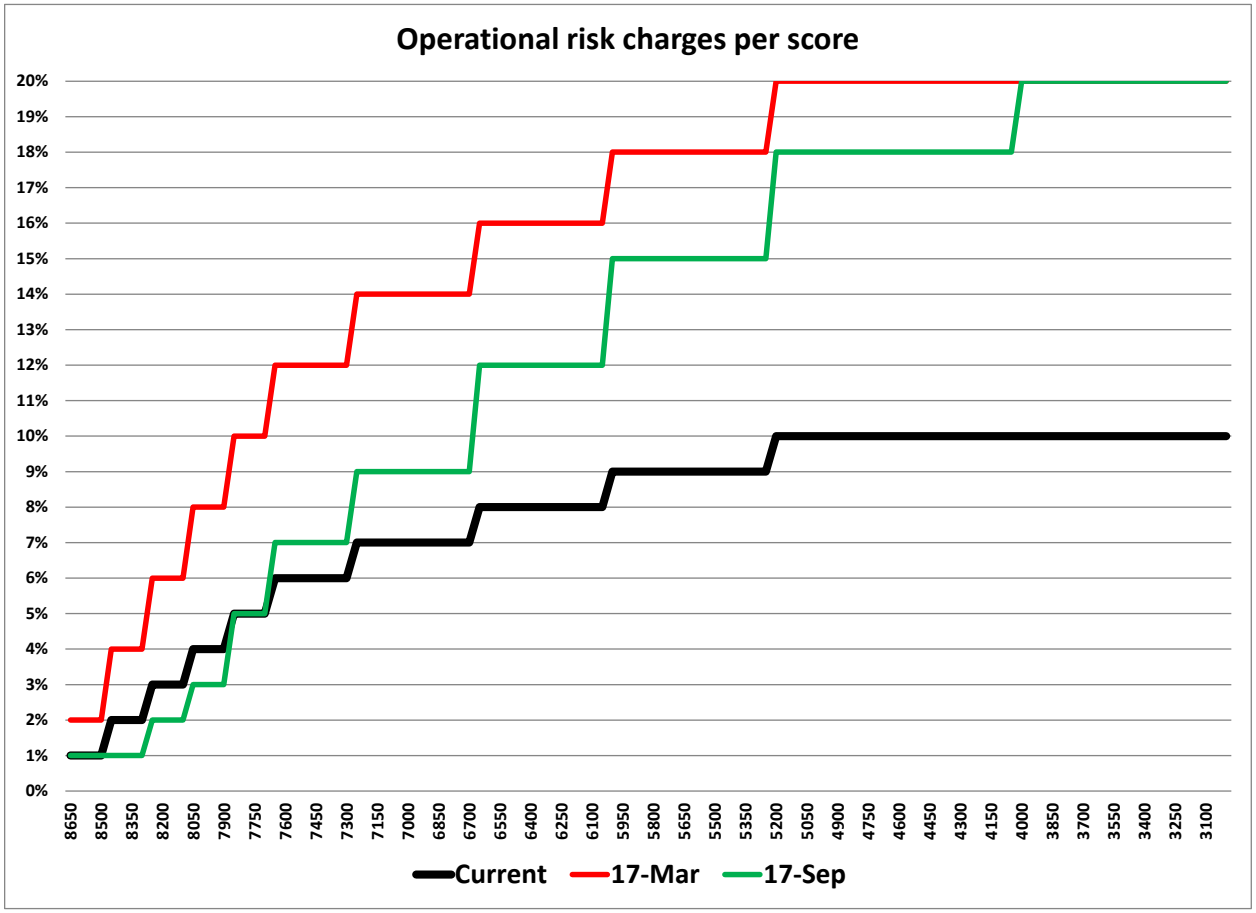
52. The scorecard approach has some limitations in that it involves some degree of subjectivity, and the current thresholds at each loading percentage are closely bunched at the top which may lead to undue capital charges differences for insurers with a fairly similar operational risk profile, risk management and control framework. In addition, scores are broadly spaced at the bottom and do not differentiate between bad scores (5,200) and truly concerning scores (below 3,000). Also the calibration of operational risk involves a significant degree of uncertainty and expert judgment, and only recently industry and regulatory benchmarks have become available and sufficiently stable. A maximum cap of 10% is not in line with the charges produced by other leading risk based solvency regimes (and is particularly inappropriate for newly formed insurers or insurers going through significant M&A or restructuring activity).

53. To more closely align with the charges of other risk-based regimes and market developments and to take into account the market feedback on our previous approach and its associated limitations, the Authority proposes to revise both the scorecard adjusted uplift factors and ranges as follows:

Overall Score	**Operational Risk Charge in % of the "BSCR post diversification"**
<=4000	20%
>4000<= 5200	18%
>5200<= 6000	15%
>6000<= 6650	12%
>6650<= 7250	9%
>7250<= 7650	7%
>7650<= 7850	5%
>7850<= 8050	3%
>8050<= 8250	2%
>8250	1%

54. Comparison against the current charges and the proposed approach on the March 2017 version of the Consultation Paper are performed on the table and graph bellow.

Score	Sept. 2017	Mar. 2107	Current
<=4000	20%	20%	10%
>4000 <=5200	18%	20%	10%
>5200 <=6000	15%	18%	9%
>6000 <=6650	12%	16%	8%
>6650 <=7250	9%	14%	7%
>7250 <=7650	7%	12%	6%
>7650 <=7850	5%	10%	5%
>7850 <=8050	3%	8%	4%
>8050 <=8250	2%	6%	3%
>8250	1%	2-4%	1-2%



55. These two combined measures will have little impact on the capital position of insurers with effectively sound operational risk management (i.e. those with lower adjustment factors), and in fact will provide lower capital charges for those insurers who currently have an adjusted factor of 4% or below; however, they will provide further incentive for those insurers with higher adjustment factors to adequately develop, implement and document appropriate operational risk frameworks. The increase in capital charges for those insurers with an adjusted factor of 6% and above is more progressive than in the previous March 2017 version of the Consultation Paper.

Question 8: *Do you see any practical issues that the proposals may introduce?*

VII. Other Adjustments

Background

56. Several Bermuda-licensed insurance and reinsurance companies pay taxes in a foreign jurisdiction. Most common are the US Internal Revenue Code Section 953(d) companies, which have elected to pay US federal income tax. The ECR represents additional assets that Bermuda deems necessary to cover losses under adverse circumstances. In a loss scenario, tax-paying companies should be able to consider the impact on current and future taxes when determining the amount of additional assets. To the extent the losses would result in refunds of prior taxes paid or would simply be absorbed by existing or future taxable profits, it is appropriate and reasonable to consider this tax benefit within the requirements. This reduction in current or future taxes payable can serve to dampen the utilisation of capital upon a large loss, which is prudent and reasonable. Other regimes, such as the US and Solvency II, recognise this dampening effect in their required capital calculation.

57. As part of their financial reporting requirements, tax-paying companies analyse and record both current and deferred taxes within their jurisdiction's required accounting guidelines. Deferred Tax Assets (DTA) are established where it can be supported that recovery and recognition of the DTAs is expected based on the relevant accounting guidelines and tax laws enacted by the applicable jurisdiction. For example, losses generated in the current year may be utilised by carrying back to prior years and recouping taxes paid, or may be utilised through the ability to offset existing income deferred for tax purposes (i.e. existing Deferred Tax Liabilities (DTL)), or may be carried forward and utilised against future taxable profits as provided for under the applicable tax laws for the specific jurisdiction. In the US, losses generated in the current year can be carried back two to three years and carried forward 15 to 20 years depending on the entity. As such, the tax laws provide for considerable past and future time periods to utilise the losses and obtain the economic tax benefits.

58. Capital is held to defray losses upon a shock scenario. Upon the occurrence of a shock that produces a loss the tax-paying company would be able to first recoup prior year taxes paid (carryback) or reduce future tax in the form of lowering existing net DTLs or establishing a DTA (carryforward). When a net DTA position (i.e. future deductions) exists, additional scrutiny is necessary and the tax-paying company would need to demonstrate its ability to recognise these future deductions through the ability to produce future taxable income.

59. A company's Loss Absorbing Capacity (LAC) is determined by its ability to demonstrate that enough future profits or DTLs will be available to utilise the DTA. A company's Risk Margin, for example, could serve as a proxy for the amount of future profit embedded in the company's business. A higher Risk Margin is likely to signal a larger LAC.

Proposal

60. We propose a simplified approach to adjusting the ECR for taxes that reflects company-specific parameters. These parameters limit the amount of the adjustment based on each company's past, current and future tax situation as follows:

    Adjustment = min (BSCR x t, Limit, BSCR x 20%)

    Where:

    - BSCR: the BSCR (post correlation and including operational risk and loss-absorbing capacity of technical provisions – please refer to paragraphs 111-116 of this Consultation Paper) but excluding this "Adjustment"

    - t: company's standard federal tax rate or in case of an Insurance Group a blended effective (federal) tax rate

    - **Limit = Max (Past LAC + Current LAC + Future LAC, 0), as described below.**

      Where:

      - Past LAC: A company can recoup tax losses via a Loss Carryback provision, which represents the company's taxable income from previous years used to offset current year losses. The Carryback period varies by jurisdiction and is generally three years for US and Canada.

        Past LAC = Loss Carryback Provision x t

        The Loss Carryback Provision would need to be added as an input item to the BSCR.

      - Current LAC: A company's current tax loss absorbency is represented by its Net DTL position, i.e. current DTL less current DTA. A net DTL position means that the company owes tax to its Tax Authority. The amount owed (DTL) can be reduced by the tax deductibility arising from net losses under a shock scenario. A net DTA position means that the company already has accumulated tax deductions on its books. This reduces the ability to utilise additional tax deductions arising from net losses upon a shock.

        Current LAC = Current DTL – Current DTA

        Both of these items are readily available on the BSCR spreadsheet.

- Future LAC: the Authority proposes utilising the Risk Margin as a proxy for a company's future income, and therefore its ability to absorb future tax losses. The risk margin is the discounted cost of holding future capital requirements and represents to some extent the cost of doing business for in-force business. It is reasonable to assume that future profitability will have to cover this amount and under this assumption may serve as a conservative proxy for a company's future income.

  Future LAC = Risk Margin x t

In summary, the proposed adjustment is:

Min (ECR x t, Limit, 20%),

Where:

Limit = Max [(Loss Carryback x t) + (Current DTL - Current DTA) + (Risk Margin x t), 0]

61. The loss absorbing capacity of deferred taxes is a new and untested concept in risk based supervisory regimes that may lead to significant capital reductions. The Authority wishes to introduce this concept in a careful and prudent manner. Therefore we will limit the maximum credit allowed from the tax adjustment to the maximum cap set for operational risk (20%). The Authority may revisit this cap on the tax adjustment in due course, once this concept has been properly implemented and supervised in our regime.

Question 9: *Do you see any practical issues that the proposals may introduce?*

VIII. BSCR Charges for Run-Off Insurers

62. A significant number of run-off insurers are currently exempted from calculating the ECR although their existing available capital and surplus (which was by definition higher than the Target Capital Level (120% of the ECR)) at the time of run-off conversion was frozen and capital reductions or distributions can only be made with the prior written approval of the Authority. Run-off insurers in this context means "pure"/"traditional" run-off insurers and those insurers whose business model consists primarily of acquiring run-off books of business, namely through loss portfolio transfers and excludes insurers that operate on a going concern basis that may have a few legacy portfolios that were put into run-off.

63. The Authority will request all run-off insurers to calculate annually the ECR using the BSCR standard formula and applying standard BSCR factors for all risks. For loss portfolio transfers, insurers should apply for a BSCR modification to avoid potential double counting of exposure in premium and reserve risks (i.e. exposure will only count toward reserve risk).

64. Additionally, as part of the annual filing to the Authority, "pure"/"traditional" run-off insurers will have to include on the actuarial and run-off report comments and supporting analysis on the adequacy of the standard BSCR reserve risk factors taking into account the adverse loss reserve development potential of the carried reserves. Those insurers whose business model consists primarily of acquiring run-off books of business will have to include similar comments and supporting analysis as part of their Commercial Insurers Solvency Self-Assessment (CISSA) and Group Solvency Self-Assessment (GSSA) reports.

65. Additionally, the Authority wishes to clarify and emphasise that having capital in excess of the 120% ECR ratio is not in itself sufficient reason for the Authority to approve dividend requests. The BSCR reserve risk charge may underestimate the risk profile of certain run-off reinsurers (e.g. for insurers with asbestos, medical malpractice, long term care and other highly volatile and/or long tailed lines of business). Should this underestimation be material, the Authority may impose capital add-ons.

66. In addition to providing the BSCR as part of the dividend request, run-off insurers will have to include actuarial and run-off supporting analysis to assess the adequacy of the standard BSCR reserve risk factors taking into account the adverse loss reserve development and Incurred But Not Reported (IBNR) potential of the carried reserves and also to assess that the remaining capital is sufficient to ensure the complete run-off of the liabilities and all related expenses with high probability. Connected with these two points, run-off insurers should also provide details about their capital management strategy and how the implementation of this strategy is monitored.

Question 10: *Do you see any practical issues that the proposals may introduce?*

IX. Currency risk

67. The Authority is keeping the fundamentals of its currency risk approach, however it will no longer be a factor based approach but rather a shock based approach to better capture the risk mitigation effect of risk mitigation arrangements and the loss-absorbing capacity of technical provisions (please refer to paragraphs 111-116 of this Consultation Paper). Additionally we will also allow for reduced shocks for pegged currencies that fulfil certain criteria.

68. Currently insurers whose asset value in a foreign currency is lower than the corresponding liabilities and proxy BSCR in such currency are subject to a capital factor of 25%. We propose to keep the current methodology but replace the 25% capital factor by a 25% downward shock to the reporting currency (which in most cases for the Bermudian market will correspond to a 25% depreciation of the US Dollar).

69. Certain pegged currencies can qualify for a reduced currency shock, to be set in the Authority's Instructions, in relation to the reporting currency, if they comply with the criteria below to be set in the Instructions:
    a) The pegging arrangement shall ensure that the relative changes in the exchange rate over a one-year period do not exceed the relative adjustments to the 25% shock.
    b) One of the following criteria is complied with:
        i. Establishment of the pegging arrangement by the law of country establishing the country's currency.
        ii. Participation of the currency in the European Exchange Rate Mechanism (ERM II) for currencies pegged to the euro.
        iii. Existence of a decision from the European Council which recognises pegging arrangements between this currency and the Euro for currencies pegged to the Euro.

70. For the purposes of point 69.a), the financial resources of the parties that guarantee the pegging and historical data shall be taken into account.

71. Where the reporting currency is the United States Dollar (USD), the standard 25% currency shock shall be reduced to:
    a) 0% for Bermuda Dollar (BMD) exposures.
    b) 5% for Qatari Riyal (QAR) exposures.
    c) 1% for Hong Kong Dollars (HKD) exposures.

72. Where the reporting currency is the BMD, the standard 25% currency shock shall be reduced to 0% for USD exposures.

73. Where the reporting currency is the QAR, the standard 25% currency shock shall be reduced to 5% for USD exposures.

74. Where the reporting currency is the HKD, the standard 25% currency shock shall be reduced to 1% for USD exposures.

75. Where the reporting currency is the Euro (EUR), the standard 25% currency shock shall be reduced to:
    a) 0.39% when the other currency is the Danish Krone (DKK).
    b) 1.81% when the other currency is the Bulgarian Lev (BGN).
    c) 2.18% when the other currency is the West African CFA Franc (XOF).
    d) 1.96% when the other currency is the Central African CFA Franc (XAF).
    e) 2.00% when the other currency is the Comorian Franc (KMF).

76. Where the reporting currency is the DKK, the standard 25% currency shock shall be reduced to 0.39% for EUR exposures.

77. Where the reporting currency is the BGN, the standard 25% currency shock shall be reduced to 1.81% for EUR exposures.

78. Where the reporting currency is the XOF, the standard 25% currency shock shall be reduced to 2.18% for EUR exposures.

79. Where the reporting currency is the XAF the standard 25% currency shock shall be reduced to1.96% for EUR exposures.

80. Where the reporting currency is the KMF the standard 25% currency shock shall be reduced to 2.00% for EUR exposures.

81. For the calculation of the currency risk capital charge, hedging and risk transfer mechanisms should be taken into account as long as they comply with the requirements set in section XI. Risk Mitigation of this Consultation Paper. Also, for the calculation of the currency risk capital charge, management actions should be taken into account as long as they comply with the requirements set in section XII. Management Actions of this Consultation Paper.

82. In order to prevent double-counting capital charges for Variable Annuity guarantees, the following additional provisions shall apply:
    a. Where companies are using an internal model for Variable Annuity risk, assets and liabilities associated with Variable Annuity (VA) guarantees may be excluded from the currency risk shock, if the following conditions are fulfilled:
        i. The company is able to identify and track assets associated with Variable Annuity guarantees.
        ii. Currency risk associated with both the VA guarantee liabilities and the associated assets is explicitly modeled in the internal model.
    b. Where currency risk is modelled for VA guarantees, but not for the associated assets; or the associated assets cannot be separately identified; only the VA guarantee liabilities may be excluded from the currency risk shock, but any assets may not.
    c. Where companies are using the BSCR Standard Formula to calculate Variable Annuity guarantee risk, only the VA guarantee liabilities may be excluded from the currency risk shock, but any assets may not.

Question 11: *Do you see any practical issues that the proposals may introduce?*

X. Interest Rate and Liquidity Risk

83. Currently the BSCR Standard Formula uses a duration approximation to calculate the capital charge associated with Interest Rate and Liquidity Risk. The advantages and limitations of this approach are widely known. It is a simple approach, but it assumes parallel shocks and, because it is a first order approximation it may not adequately reflect complex asset-liability profiles that exhibit material convexity. The limitations of the approach are compensated by the use of conservative assumptions such as assuming a minimum duration mismatch of one-year and allowing for the risk mitigating effect of a hedging programme to be considered in a crude manner and for Long Term insurers only.

New Shock-based approach

84. An alternative and more risk sensitive method for determining capital requirements for interest and liquidity risk has been developed. This method will require companies to apply shocks to the yield curve used for determining best estimate liabilities[11] and market values of assets[12] exposed to interest rate risk (e.g. fixed income and hybrid assets, bank deposits, etc.). Any changes in market values of assets and best estimate liabilities due to interest rate-sensitive cash flows should be accounted for. The capital requirement is then determined as the negative change to the net asset value (net balance sheet) of the highest magnitude resulting from these shocks.

85. The shocks will be determined using an adaptation of the Dynamic Nelson Siegel method developed by researchers at the San Francisco Federal Reserve. Under this adaptation, two shocks have been developed (one upward and one downward) per currency for those currencies that the Authority publishes discount yield curves for. The shocks have been calibrated using historical data and are reflective of the risk profile of the Bermuda market. The adaptation further takes into account the fact that the lower the rates are, the less scope they have to fall further. In particular, the downward shock is dependent on the level of rates, with large increases in rates more likely than large decreases when rates are already low.

86. The shocks are applied to the market-observed part of the spot curves, currently defined as consisting of maturities of up to 30 years. After 30 years, it is assumed that the forward rates, starting from the year 30 value, tend towards a LFTR at year 60, and stay at that level beyond year 60. The long-term forward rates are assumed to change by 50 bps upwards and downwards in the up and down shocks, respectively. That is, given a current LFTR of 4.2 %, the LFTRs in the up and down shocks will be 4.7 % and 3.7 %, respectively.

[11] And segregated account company liabilities, deposit liabilities and sundry liabilities.
[12] Including segregated account company assets, deposit assets and sundry assets.

87. For the calculation of the interest risk capital charge under this alternative method, hedging and risk transfer mechanisms should be taken into account as long as they comply with the requirements set in section XI. Risk Mitigation of this Consultation Paper. Also, management actions should be taken into account as long as they comply with the requirements set in section XII. Management Actions of this Consultation Paper.

88. The proposed interest rate shocks for the different currencies are as shown in Table A.1 in Appendix A. The shocks are absolute shocks, i.e., additive.

89. For the purposes of calculating capital requirements for interest rate risk, rates are allowed to go negative. If the application of the downward shock leads to negative rates, these shall not be floored at zero.

90. With respect to the frequency of updating the interest rate shocks, the Authority notes that there are two competing objectives: On the one hand, there is a need to capture genuine changes in the financial environment as well as trends that prove to be sustaining; on the other hand, it is important to avoid excessive volatility in the interest rate shocks used and to ensure a level of predictability in the magnitudes of the shocks. To this end, the following smoothing or moving average procedure is proposed to be used for updating the interest rate shocks:
    a. The Authority will recalculate shocks annually ("modelled shocks").
    b. The actual shock used will be equal to the last years' published shock plus 25 % of the difference between the modelled shock and the last year's shock.

Additional guidance on the new Shock-based approach

91. The shocks (per currency) are to be applied to the valuation date spot curve (per currency). The shocks are absolute shocks expressed in percentage points i.e. are added on top of the base spot curve.
    a. For companies using the standard approach to calculating best estimate liability (BEL), the shocks are applied to the standard spot curves published by the Authority.

92. The assets and liabilities need to be revalued under the shocks. For assets, this involves calculating the market value of assets after the shock (the shocked value). Depending on the asset, this may be a mark-to-model calculation. Conceptually the shocked value corresponds to the expected present value of cash flows projected under the stress scenario (taking into account that the amount and/or timing of cash flows themselves might change due to the shock, e.g. for bonds with call/put options, or for derivatives).

93. Revaluing the (best estimate) liabilities involves calculating the expected present value of cash flows projected under the stress scenarios. In particular, where the amount and/or timing of liability cash flows themselves depends on interest rates, the liability cash flows need to be projected (re-evaluated) under the stress scenarios, as opposed to e.g. simply discounting the base scenario cash flows.

Interaction between Shock-based approach and the Scenario-based approach for BEL

The alternative shock-based method would double-count the interest rate risk related component that is currently somewhat captured under the scenario-based approach used for determining EBS liabilities. Therefore, we propose to offset from the shocked capital charge an amount based on the difference in the best estimate liability between the "worst" scenario and the base scenario under the scenario-based approach. This proposed offset would only be available to companies that used the scenario-based approach. We are considering two alternative calculations for the net capital requirement

$$CR_{IR} - \min\left(0.5 \cdot \left(BEL_{worst}^{\mathrm{SBA}} - BEL_{base}^{\mathrm{SBA}}\right), 0.75 \cdot CR_{IR}\right)$$

a. The CR_{IR} is the relevant capital charge resulting from the interest rate shocks before the application of the offset and would be based on the shock to the balance sheet as if the ***worst*** scenario had been applied. The $BEL_{\cdot}^{\mathrm{SBA}}$ are the best estimate liabilities[13] using the scenario-based approach ***after*** application of the shock.
b. As an alternative, we are also considering CR_{IR} in the above formula to be based on the shock to the balance sheet as if the ***base*** scenario had been applied; also in this case , the $BEL_{\cdot}^{\mathrm{SBA}}$ are the best estimate liabilities using the scenario-based approach ***before*** application of the shock.

Interaction between Shock-based approach and interest rate risk captured in VA guarantee risk

94. In order to prevent double-counting capital charges for Variable Annuity guarantees when using the shock-based approach, the following additional provisions shall apply:
    a. Where companies are using an internal model for Variable Annuity risk, assets and liabilities associated with Variable Annuity (VA) guarantees may be excluded from the interest rate shock, if the following conditions are fulfilled:
        i. The company is able to identify and track assets associated with Variable Annuity guarantees.
        ii. Interest rate risk associated with both the VA guarantee liabilities and the associated assets is explicitly modeled in the internal model.
    b. Where interest rate risk is modelled for VA guarantees, but not for the associated assets, or the associated assets cannot be separately identified; then the VA guarantee liabilities may be excluded from the interest rate shock, but any assets may not.

[13] A liability being a positive figure here (and similarly, if the BEL is negative i.e. an asset, a negative figure should be entered).

c. Where companies are using the BSCR Standard Formula to calculate Variable Annuity guarantee risk, only the VA guarantee liabilities may be excluded from the interest rate shock, but any assets may not.

Option to use Duration-based method

95. Under the new BSCR basis, companies will have the option of continuing with a version of the duration-based BSCR method or moving to the proposed shock-based method. However, once in the proposed shock-based method insurers will not be able to revert back to the duration based method without prior supervisory approval.

96. As part of the trial run, the Authority will be testing an alternative version of the duration-based method for Long-Term Insurers which will be kept functionally unchanged from the current one, but will be revised to allow for the use of management actions and risk-mitigating techniques in the calculation of effective durations, insofar as the management actions and risk-mitigating techniques comply with the requirements set in sections XI. Risk Mitigation and XII. Management Actions of this Consultation Paper, respectively. Upon review of the trial run results the Authority will decide which version of the duration based approach Long-Term insurers will be allowed to use in the future.

Question 12: *Do you see any practical issues that the proposals may introduce?*

Question 13: *What practical issues are there in deriving the inputs needed?*

XI. Risk Mitigation

97. Currently, there is limited allowance for the risk mitigating effect of risk mitigation techniques in the BSCR, especially for market risk. This risk mitigating effect is considered by default on the calibration of insurance risk (both P&C and Long-Term) as the exposure measures as well as the capital factors are calculated net of reinsurance; additionally, the reinsurance credit charge allows for collateral arrangements. This risk mitigating effect is also allowed for currency risk (subject to approval by the BMA) and is allowed in a crude fashion for interest rate and liquidity risk for Long-Term insurers only.

98. This section sets the criteria under which the risk mitigating effect of risk mitigation techniques is allowed in the calculation of the BSCR going forward. The BSCR template will be changed to allow the consideration of risk mitigating effect for market risk charges in an explicit manner. For the remaining risks, the risk mitigating effect of risk mitigation techniques is already incorporated by default to some extent in the construction of the BSCR standard formula[14], therefore for these remaining risks the BSCR template will not be changed. Consideration of more sophisticated risk mitigation arrangements (e.g. non-proportional reinsurance, longevity swaps) for non-market risks can only be made through BSCR adjustments and upon compliance with the criteria set in this section.

99. The calculation of the ECR will allow for the effects of risk mitigation techniques through a reduction in requirements commensurate with the extent of risk mitigation notwithstanding the provisions set in the paragraphs below.

100. The ECR calculation for market risk is made on the basis of the assets and liabilities existing at the reference date of the ECR calculation and through the use of scenario and factor based approaches; this design setting excludes by definition allowance for the full effect of dynamic hedging programs which can only be appropriately applied in a context where capital charges are being stochastically calculated.

101. Internal capital models (ICM) are allowed to be used in the context of the BSCR standard formula for the calculation of the variable annuity guarantees capital charge which, despite being part of the Long Term Insurance risk module, is predominantly market risk driven; concomitantly in these cases insurers may take into full account the effect of their dynamic hedging programs as long as they comply with the provisions set in paragraph 102 and 105 below. In all other cases, the risk mitigating effect of dynamic hedging programs will be subject to the provisions set in paragraph 102-104 and thus taken into account in a limited manner.

[14]Except for operational risk

102. When calculating the ECR, insurers shall only take into account risk-mitigation where all of the following qualitative criteria are met:

a. The contractual arrangements and transfer of risk are legally effective and enforceable in all relevant jurisdictions and there must be an effective transfer of risk to a third party.
b. The contractual arrangement ensures that the risk transfer is clearly defined.
c. The insurer has taken all appropriate steps to ensure the effectiveness of the arrangement and to address the risks related to that arrangement;
d. The insurer is able to monitor the effectiveness of the arrangement and the related risks on an ongoing basis;
e. The calculation of the ECR makes reasonable allowance for any basis risk effects due to changes in risk mitigation assumptions and relationships during a stress scenario and there is appropriate treatment of any corresponding risks embedded in the use of risk mitigation techniques (e.g. credit risk). These two effects should be separated.
f. Providers of risk mitigation should have adequate credit quality (demonstrable through either adequate rating, capitalisation or collateralisation levels) to guarantee with appropriate certainty that the insurer will receive the protection in the cases specified by the contracting parties.
g. The insurer has, in the event of a default, insolvency or bankruptcy of a counterparty or other credit event set out in the transaction documentation for the arrangement, a direct claim on that counterparty;
h. There is no double counting of risk-mitigation effects in technical provisions and in the calculation of the ECR or within the calculation of the ECR.

103. Only risk-mitigation techniques that are in force for at least the next 12 months and which meet the qualitative criteria set out in paragraph 102 shall be fully taken into account in the ECR. In all other cases, the effect of risk-mitigation techniques that are in force for a period shorter than 12 months and which meet the qualitative criteria set out in paragraph 102 shall be taken into account in the ECR in proportion to the length of time involved for the shorter of the full term of the risk exposure or the period that the risk-mitigation technique is in force.

104. Where contractual arrangements governing the risk-mitigation techniques will be in force for a period shorter than the next 12 months and the insurer intends to replace that risk-mitigation technique at the time of its expiry with a similar arrangement, the risk-mitigation technique shall be fully taken into account in the ECR provided all of the following qualitative criteria are met:

a. The insurer has a written policy on the replacement of that risk-mitigation technique.
b. The replacement of the risk-mitigation technique shall not take place more often than every month, except in duly justified circumstances which require prior approval from the Authority.
c. The replacement of the risk-mitigation technique is not conditional on any future event, which is outside of the control of the insurer. Where the replacement of the risk-mitigation technique is conditional on any future event, that is within the control

of the insurer, then the conditions should be clearly documented in the written policy referred to in point (a);

d. The replacement of the risk-mitigation technique shall be realistic based on replacements undertaken previously by the insurer and consistent with its current business practice and business strategy.
e. The risk that the risk-mitigation technique cannot be replaced due to an absence of liquidity in the market is not material under different market conditions and there is no material basis or operational risks compared to the risk mitigation effect.
f. The risk that the cost of replacing the risk-mitigation technique increases during the following 12 months is reflected in the ECR by deducting it from the value attributed to the risk-mitigation technique.
g. Any additional risk stemming from the risk mitigation arrangement (e.g. credit risk) is taken into account in the ECR.
h. The hedge effectiveness and any related risks are monitored on an ongoing basis.

105. In the cases of insurers using ICM in the context of the BSCR standard formula for the calculation of the variable annuity guarantees capital charge, where portfolio rebalancing is being performed, the risk-mitigation effect shall be fully taken into account in the ECR provided all of the following qualitative criteria are met:

i. The insurer has a written policy on portfolio rebalancing.
j. The portfolio rebalancing shall be realistic based on actions undertaken previously by the insurer and consistent with its current business practice and business strategy.
k. The risk that the portfolio rebalancing cannot be performed due to an absence of liquidity in the market is not material under different market conditions.
l. The risk that the cost of the portfolio rebalancing increases during the following 12 months is reflected in the ECR.
m. Any additional risk stemming from the portfolio rebalancing (e.g. credit risk) is taken into account in the ECR.
n. The hedge effectiveness and any related risks are monitored on an ongoing basis.

Question 14: *Do you see any practical issues that the proposals may introduce?*

Question 15: *What practical issues are there in deriving the inputs needed?*

XII. Management Actions

106. Management actions are to be confined to actions reducing liabilities for future bonuses or other discretionary benefits.

107. Management actions shall not be taken into account in the factor-based components of the BSCR standard formula. The exception to this is the duration-based approach to interest rate risk, where management actions may be taken into account in the calculation of effective durations for liabilities.

108. The shock-based components of the BSCR standard formula are based on the impact of instantaneous stresses (equity risk, interest rate and liquidity risk calculated under the alternative approach and currency risk), and insurers shall not take credit for future management actions at the time the stress occurs (i.e. during the stress), due to the instantaneous nature of the stresses.

   a. For the sake of clarity, it is noted that management actions may be taken immediately after the (instantaneous) stress has happened. Loosely put, the stresses are assumed to happen "overnight", and management actions can be taken immediately on "day 1" afterwards.

109. However, future management actions following the instantaneous shock may be taken into account for the shock-based components of the BSCR standard formula and for the variable annuity guarantees capital charges (when an ICM is being used) provided the management actions comply with paragraph 196 of the Guidance Notes for Commercial Insurers and Groups Statutory Reporting Regime of 30th November 2016. The BSCR template will be changed to allow the consideration of risk mitigating effect of future management actions in an explicit manner.

110. If management actions are used, the insurer needs to ensure that the effects of specific management actions are not effectively counted multiple times when the different scenario components are aggregated into total capital requirement.

   a. For example, assume that profit-sharing is reduced in both the equity stress and the interest rate stress as a response to adverse investment result, so that the net present value of future bonuses becomes zero in both. If the separate stresses are straightforwardly aggregated and are positively correlated, the loss-absorbing capacity of future bonuses will appear greater than the whole net present value of future bonuses was in the first place.

Loss absorbing capacity of future bonuses and other discretionary benefits

111. For the purpose of preventing double-counting, the capital requirement for each risk should be calculated both gross and net of the loss-absorbing capacity of technical provisions.

112. The gross BSCR (post diversification) ($BSCR^{div}$) is calculated by aggregating the gross capital requirements using the relevant correlation matrices.

113. The net BSCR (post diversification) ($nBSCR^{div}$) is calculated by aggregating the net capital requirements using the relevant correlation matrices.

a. For insurers using internal models to calculate variable annuity risk, the capital requirement presumably already includes the effect of management actions. Therefore there is expected to be no difference between the gross and net charge.

114. The adjustment to the ECR for the loss-absorbing capacity of technical provisions is then

$$Adj_{TP} = -\max\left(\min\left(BSCR^{div} - nBSCR^{div}, FDB\right), 0\right),$$

where FDB is the net present value of future bonuses or other discretionary benefits corresponding to the best estimate calculation. That is, the FDB amount is used as a cap on the overall credit allowed for in the capital requirement calculation.

115. The gross capital requirements per risk (component) shall be calculated by keeping the future discretionary benefits unchanged at the best estimate (base scenario) level.

116. The net capital requirements per risk (component) shall be calculated by allowing the future discretionary benefits to change, where the capital requirement is determined based on the impact of a shock.

117. In practice the gross capital requirements may be calculated in the way described below, based only on the base scenario and on the shocked scenario results, with management actions included. In particular, this method does not require another set of model runs to get the gross capital requirements.

a. Obtain the value of guaranteed benefits and future discretionary benefits, separately, in the base scenario.
b. Calculate guaranteed benefits and future discretionary benefits, with management actions included, in each applicable shock.
c. To derive the gross best estimate liabilities needed for the gross capital requirement calculations, add future discretionary benefits from the base scenario to the guaranteed benefits from the shock scenarios.

Question 16: *Do you see any practical issues that the proposals may introduce?*

Question 17: *What practical issues are there in deriving the inputs needed?*

XIII. Look-through

118. In order to properly assess the risks inherent in collective investment vehicles, other investments packaged as funds and other types of assets and liabilities, each of the assets underlying them shall be considered individually (the look-through approach) in the BSCR calculation.

119. The scope of the look-through covers the following:
   a. Collective investment vehicles and other investments packaged as funds, including related undertakings used as investment vehicles;
   b. Segregated accounts assets and liabilities;
   c. Deposit assets and liabilities;
   d. Other sundry assets and liabilities;
   e. Derivatives.

120. Look-through will apply to market risk calculated under a shock approach (equity, interest rate and currency risks) and concentration risk calculations.
   b. Look-through will be allowed for equity exposures classified as "strategic holdings" or "duration based" with underlying individual assets getting a 20 % charge each, in accordance with Section II. Equity Risk.

121. The look-through is to be based on the current underlying assets as of the BSCR valuation date (typically year-end). The valuation of assets and liabilities subject to application of the look through must be consistent with the EBS rules.

122. Where the full look-through approach cannot be applied to collective investment vehicles or other investments packaged as funds, the capital requirement may be calculated based on the target underlying asset allocation of the vehicle or fund, provided that such a target allocation is available at a level of granularity necessary for the calculation, and the underlying assets are managed strictly according to the target allocation.

123. Where conditions of paragraph 122 are not fulfilled, i.e. a target allocation does not exist or it cannot be determined that the assets are managed strictly according to the target allocation, the capital requirement may be calculated by assuming that the vehicle or fund first invests, to the maximum extent allowed under its investment limits, in the asset class with the highest capital charge, and then continues making investments in descending order until the maximum total investment level is reached. This approach requires that such allocation limits exist.
   a. For a hypothetical example, if a combination fund has allocation limits of, say, 50 – 80 % to equity and 20 % – 50 % to investment grade fixed income, with equity sub-limits of 50 – 100 % to EEA equities and 0 – 50 % to Eastern European (non-EEA) equities, the overall allocation would be considered to be 40 % to non-EEA equities, 40 % to EEA equities, and 20 % to fixed income with rating BBB-, in order to produce the most conservative capital charge consistent with the limits.

124. Where no look-through is possible and neither the target-based approach of paragraph 122 nor the limit-based approach of paragraph 123 can be applied, the full investment shall be treated as an equity holding of type "Other" for capital charge purposes.

125. Insurers should perform a sufficient number of iterations of the look-through approach, where appropriate (e.g. in the case of fund of funds), to capture all material risk.

Question 18: *Do you see any practical issues that the proposals may introduce?*

Question 19: *What practical issues are there in deriving the inputs needed?*

XIV. Treatment of Derivatives

126. Under the current BSCR rules, all derivatives assets are put together as one line item under the "sundry assets" category, and would attract a 45 % equity risk charge on the fair value of the derivative assets under the proposal made on the previous versions of the Consultation Paper. To better reflect the underlying economics and market risk of derivative contracts, the capital treatment will be changed as described below.

127. In order to calculate the associated capital charge(s), derivatives (both asset and liabilities) are to be revalued under all relevant shocks (risks) that these instruments are subject to, as determined from the application of the look-through provisions. The capital requirement associated with a derivative contract will then be equal to the change in mark-to-market value of the contract (i.e. shocked market value minus initial market value) together with any resulting change in liabilities. In other words, the capital charge will be equal to the change in net asset value before and after shock. This will always be the case for derivative positions that result in long exposures. Derivative positions that result in short exposures will only be allowed to reduce capital charge if they meet the requirements set forth in section XI. Risk Mitigation of this Consultation Paper.

128. Derivatives need to be considered under relevant capital charge calculations based on their underlying risk(s). For example, equity derivatives will be considered under the equity risk calculation, and interest rate derivatives under the interest rate and liquidity risk calculation.

   a. A given derivative contract could potentially need to be considered under several risk modules, if it is exposed to multiple sources of risk (e.g. contains both interest and equity exposure).

129. The shocks applied to a given derivative contract are determined by the underlying(s) of the contract.

   a. For example, consider an equity option on the S&P 500 index. S&P 500 falls under Type 1 (developed markets) listed equity, with the associated equity shock being -35 %. The capital requirement for the option will then be equal to the change in market value of the option given a 35 % drop in the underlying (S&P 500).
   b. For the sake of clarity, when revaluing a derivative, the shock applicable to the underlying asset of that derivative is the shock that would apply (to the underlying asset) if the company held the underlying instrument directly.[15] In particular, the shock used to revalue an option on an equity index and an option on an individual stock are the same, as long as the index and the stock are mapped to the same equity type in the equity risk calculation (e.g., the shock would be -35 % for both an option on S&P 500 index and an option on Microsoft).

[15] With the exception of credit derivatives.

130. We note that the revaluation of derivatives requires that a shock is specified. This is already the case under the proposed new BSCR rules for equity risk, interest rate risk, and currency risk. In addition, for credit derivatives only, credit spread shocks are specified – refer to subsection XIV.A Spread Shocks for Credit Derivatives.[16]

131. It is acknowledged that companies may have derivatives which are exposed to risks not explicitly captured in the BSCR framework, or for which no explicit shock is specified in BSCR. For such derivatives it is envisaged that, as a simple fallback solution, the current approach will be kept; in other words, the capital charge would correspond to 45 % of market value for the derivative contracts, or parts thereof, whose risks are not covered under any scenario.

132. Where insurers hold short positions in derivatives, these may be allowed to reduce the associated capital charge only if the short positions meet the requirements set forth in section XI. Risk Mitigation of this Consultation Paper. Any other short derivatives exposures (other than those embedded in the technical provisions, segregated account companies and deposit liabilities) will not be allowed to reduce the capital charges. Should the revaluation of the balance sheet exposure result in a negative capital charge for certain shocks then a null capital charge will be assigned.

133. In addition to market risk, counterparty credit risk associated with the use of derivatives needs to be accounted for, as follows:

a. For exchange traded derivatives, the charge for counterparty credit risk shall be nil.
b. For all other contracts, i.e. for over-the-counter (OTC) derivatives, the charge for counterparty credit risk will be equal to the market value, if positive, of the contract multiplied by a BSCR credit risk factor depending on the counterparty's credit rating. The credit risk factors will be the same as the ones currently applied in the BSCR standard formula for corporate and sovereign bonds.
    i. Collateral may be accounted for in the calculation of counterparty credit risk using a haircut approach (similar to the current approach for collateralized reinsurance exposures), whereas the stressed value of the collateral is allowed to reduce the underlying exposure. For simplicity, a 3% haircut is assumed corresponding to the BSCR factor for BBB rated corporate bond and sovereign exposures.

XIV.A Spread Shocks for Credit Derivatives

134. The spread risk[17] capital charge for credit derivatives will be based on the change in market value of the derivative under spread shocks.

[16] Credit risk calculation for any type of non-derivative credit-sensitive instruments, such as bonds, will not be changed.
[17] Credit risk other than counterparty credit risk.

135. Two spread shocks, up and down, are to be used. The capital charge will be equal to the greater of the losses (if any) resulting from the up and down shocks.

136. The Authority proposes to use spread shocks similar to Solvency II, which are based on credit default swap (CDS) spread data.

137. The spread up shock consists of a widening of credit spreads according to the rating of the underlying asset of the derivative. The shock, in absolute terms, is proposed to be the following (expressed in basis points):

BSCR Rating	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Up Shock (bps)	0	130	150	260	450	840	1,620	1,620	1,620

138. The spread down shock consists of a narrowing of credit spreads according to the rating of the underlying of the derivative. The shock, in relative terms, is proposed to be the following (expressed as a percentage):

BSCR Rating	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Down Shock	0 %	-75 %	-75 %	-75 %	-75 %	-75 %	-75 %	-75 %	-75 %

Question 20: *Do you see any practical issues that the proposals may introduce?*

Question 21: *What practical issues are there in deriving the inputs needed?*

XVI. Grade-in and Other Provisions

139. With the exception of the risk mitigating effect of deferred taxes and removal of the equity risk capital charge for deferred tax assets[18] ('tax related provisions'), a grade-in period applies to all changes introduced in this paper. The grade-in formula, therefore, allows for the full impact of the tax mitigating effects to be incorporated in the capital calculation as soon as the BSCR changes come in force. The early adoption of the tax mitigating effects is to allow for the increasing importance tax has on the Bermuda insurance market.

140. There will be a three-year grade-in period starting in the financial year beginning on or after 1st January 2019 (i.e. for year-end 2019 for most insurers) for all "commercial" insurers except Long Term insurers (Class C, D and E). Insurers should calculate the ECR under the current regime, i.e. without the changes proposed herein, but including the early adoption of the tax related provisions[19] and the ECR under the new regime and reflect:

- 33% of the difference between the two calculations in the financial year beginning on or after 1st January 2019 (i.e. for year-end 2019 for most insurers), which means that the ECR for that year will correspond to the ECR under the current regime plus the tax related provisions[19] plus the referred 33% of the difference.
- 66% of the difference between the two calculations in the financial year beginning on or after 1st January 2020 (i.e. for year-end 2020 for most insurers), which means that the ECR for that year will correspond to the ECR under the current regime plus the tax related provisions[19] plus the referred 66% of the difference.
- 100% the difference between the two calculations in the financial year beginning on or after 1st January 2021 (i.e. for year-end 2021 for most insurers), which means that the ECR for that year will correspond the ECR under the new regime.

141. For Long Term insurers (Class C, D and E) there will be a ten-year grade-in period starting in the financial year beginning on or after 1st January 2019 (i.e. for year-end 2019 for most insurers). The calculation of the ECR on the grade-in period will work on a similar fashion to the one described in the previous paragraph but working in 10% increments rather than in 33% increments. The full effect of the new capital charges will be therefore first achieved the financial year beginning on or after 1st January 2028 (i.e. for year-end 2028 for most insurers). This extended grade-in period reflects the long term nature of the liabilities underwritten by these insurers and their limited ability to reprice contracts.

142. For dual licensed insurers and groups, the grade-in period will reflect the relative proportions of long term and general business risk and will be determined as follows:

[18] As defined in the 'Other Adjustments' section and paragraph 13(f) of this document.
[19] The 'current ECR' should be calculated under the current rules but also include the early adoption of the tax related provisions as described in the 'Other Adjustments' section and paragraph 13(f) of this document.

c. Calculate (i) the capital requirements for all risks that apply only to long term business and (ii) the capital requirements for all risks that apply only to general business.
d. Calculate a weighted average transition period by applying the two above numbers to a 10-year and a 3-year period respectively and round the result to the nearest integer. This will be the transition period that will apply to the aggregate BSCR after adjustments to reflect covariance/correlation, operational risk, management actions and capital add-ons.
e. This transition period will remain fixed regardless of any changes in the future mix of general and long-term business.

Question 22: *Do you see any practical issues that the proposals may introduce?*

XVII. Grandfathering of Equity Risk Charges

143. For Long Term insurers (Class C, D, E, dual insurers and Groups with Long Term business) only, the current capital charges for equity securities backing existing long term insurance liabilities (only) will be grandfathered until the complete run-off of these long term liabilities. For dual-license companies, eligible equity securities will be apportioned between the long-term and P&C based on their technical provisions at the time of implementation; only those equities apportioned to the long-term business will be eligible for grandfathering.

144. As reserves on legacy business decrease in size, the amount of equities receiving the current capital charges declines in direct proportion. The grandfathering provision will be subject to the following rules and requirements:

a. The total amount of equities covered at the implementation date will be limited as follows:
    i. Determine the average value of equities as percentage of total assets over the prior 3 years (i.e., YE 2016 – YE 2018);
    ii. Apply this percentage to total assets as of the implementation date. The resulting value is the total amount of equities that may be grandfathered. This grandfathered amount shall not be greater than the amount of reserves on implementation date.
b. Equities may be traded or replaced within the grandfathered segment and still receive the grandfathered treatment.
c. In order to prevent insurers shifting higher risk equities into the grandfathered pool, limits will be set on the initial and future allocation of different classes of equities to the grandfathered pool as follows:
    i. For each class of equities, the amounts as a percentage of total equities will be determined over the prior 3 years as of the implementation date (31 December 2008).
    ii. For each class of equities, an average is taken of these 3 percentages.
    iii. These percentages serve as a cap on the amount of that class of equities that may be subject to grandfathering in all future years. Thus, for example, if the initial grandfathered equities are equal to $10M and the initial grandfathered infrastructure equities represent 10% of this amount (or $1M) then, if at some future date the total amount of grandfathered equities reduces to $6M, then no more than $600,000 of this can be infrastructure equities.
    iv. In the event that infrastructure equities held by the company at that date are less than $600,000, then it would be acceptable to substitute other equities that carried a lower capital charge (for instance strategic holdings that carry a 20% capital charge).
d. The amount of equities subject to grandfathering is limited to the amount of reserves on legacy business at each point in time.

e. Although reserves on legacy business may grow in future years, future applicable reserves are capped at the initial reserve. Thus, the amount of equities subject to grandfathering can never be greater than the initial amount.
f. Legacy business may include future premiums and current and future policies under existing reinsurance treaties, as long as these fall within the contract boundaries[20]. However, it would not cover renewals of such treaties (as these fall outside of contract boundaries).

145. The way that the grandfathering calculation will be done is as follows:

f. Determine the amount of equities in each category that are grandfathered (using the "equity grandfathering" tab in the BSCR).
g. Allocate the grandfathered equities to the prior categories and calculate the equity charge under the old method (using the "Equity Investments" tab in the BSCR).
h. Input the before and after-shock values for non-grandfathered equities (along with liabilities corresponding to the non-grandfathered equities only) into the schedule feeding the "Equity Investments (Draft)" tab of the BSCR in order to calculate the new equity charges on non-grandfathered equities.
i. Add the results from the two prior steps to determine the total equity risk charge (this will be done automatically in the "summary" tab of the BSCR).
j. It should be noted that, for purposes of field testing long term companies, we would assume that all equities are grandfathered. However, we request that companies complete the new calculation in full (for information purposes only) so that they and we can examine the impact of the grandfathering.

Question 23: *Do you see any practical issues that the proposals may introduce?*

Question 24: *What practical issues are there in deriving the inputs needed?*

[20] As defined on paragraph 122 of the Authority's Guidance Notes for Commercial Insurers and Insurance Groups' Statutory Reporting Regime, of 30thNovember 2016:"the cash flow projections used in the calculation of the best estimate should take account of all future cash in- and out-flows required to settle the insurance obligations attributable to the lifetime of the policy. This is defined to continue up to the point at which:
a) the insurer is no longer required to provide coverage;
b) the insurer has the right or the practical ability to reassess the risk of the particular policyholder and, as a result, can set a price that fully reflects that risk;
c) the insurer has the right or the practical ability to reassess the risk of the portfolio that contains the contract and, as a result, can set a price that fully reflects the risk of that portfolio."

Appendix A. Interest Rate Shocks

Table A.1 Shocks (in absolute terms) per currency and spot curve tenor.

USD		
Tenor	Up	Down
1	0.00%	-0.05%
2	0.59%	-0.51%
3	1.00%	-0.80%
4	1.27%	-1.00%
5	1.45%	-1.17%
6	1.59%	-1.29%
7	1.68%	-1.39%
8	1.75%	-1.47%
9	1.81%	-1.53%
10	1.85%	-1.59%
11	1.89%	-1.64%
12	1.92%	-1.68%
13	1.95%	-1.71%
14	1.97%	-1.74%
15	1.98%	-1.76%
16	2.00%	-1.79%
17	2.01%	-1.81%
18	2.03%	-1.81%
19	2.04%	-1.83%
20	2.05%	-1.84%
21	2.05%	-1.85%
22	2.06%	-1.86%
23	2.07%	-1.86%
24	2.06%	-1.88%
25	2.07%	-1.88%
26	2.07%	-1.89%
27	2.08%	-1.89%
28	2.08%	-1.89%
29	2.08%	-1.90%
30	2.09%	-1.90%
31	2.10%	-1.89%
32	2.11%	-1.89%
33	2.11%	-1.89%
34	2.11%	-1.88%
35	2.11%	-1.88%
36	2.11%	-1.87%
37	2.10%	-1.86%
38	2.10%	-1.85%
39	2.09%	-1.84%
40	2.08%	-1.83%

USD		
Tenor	Up	Down
41	2.07%	-1.82%
42	2.06%	-1.81%
43	2.05%	-1.80%
44	2.04%	-1.78%
45	2.02%	-1.77%
46	2.01%	-1.76%
47	2.00%	-1.74%
48	1.98%	-1.73%
49	1.96%	-1.72%
50	1.95%	-1.70%
51	1.93%	-1.69%
52	1.91%	-1.67%
53	1.89%	-1.65%
54	1.88%	-1.64%
55	1.86%	-1.62%
56	1.84%	-1.61%
57	1.82%	-1.59%
58	1.80%	-1.57%
59	1.78%	-1.56%
60	1.75%	-1.54%
61	1.73%	-1.52%
62	1.71%	-1.51%
63	1.70%	-1.49%
64	1.68%	-1.47%
65	1.66%	-1.46%
66	1.64%	-1.45%
67	1.62%	-1.43%
68	1.61%	-1.42%
69	1.59%	-1.40%
70	1.58%	-1.39%
71	1.56%	-1.38%
72	1.55%	-1.37%
73	1.53%	-1.36%
74	1.52%	-1.34%
75	1.51%	-1.33%
76	1.49%	-1.32%
77	1.48%	-1.31%
78	1.47%	-1.30%
79	1.45%	-1.29%
80	1.44%	-1.28%

USD		
Tenor	Up	Down
81	1.43%	-1.27%
82	1.42%	-1.26%
83	1.41%	-1.25%
84	1.40%	-1.25%
85	1.39%	-1.24%
86	1.38%	-1.23%
87	1.37%	-1.22%
88	1.36%	-1.21%
89	1.35%	-1.20%
90	1.34%	-1.20%
91	1.33%	-1.19%
92	1.32%	-1.18%
93	1.31%	-1.17%
94	1.30%	-1.17%
95	1.29%	-1.16%
96	1.29%	-1.15%
97	1.28%	-1.15%
98	1.27%	-1.14%
99	1.26%	-1.13%
100	1.25%	-1.13%

EUR		
Tenor	Up	Down
1	0.46%	-0.26%
2	0.73%	-0.33%
3	0.92%	-0.39%
4	1.06%	-0.45%
5	1.17%	-0.51%
6	1.25%	-0.56%
7	1.32%	-0.61%
8	1.37%	-0.66%
9	1.41%	-0.70%
10	1.44%	-0.73%
11	1.47%	-0.75%
12	1.49%	-0.77%
13	1.51%	-0.79%
14	1.53%	-0.82%
15	1.54%	-0.84%
16	1.56%	-0.86%
17	1.57%	-0.88%
18	1.58%	-0.91%
19	1.59%	-0.92%
20	1.60%	-0.94%
21	1.61%	-0.96%
22	1.62%	-0.97%
23	1.62%	-0.98%
24	1.63%	-0.99%
25	1.64%	-1.00%
26	1.64%	-1.01%
27	1.65%	-1.01%
28	1.65%	-1.02%
29	1.65%	-1.03%
30	1.66%	-1.03%
31	1.67%	-1.03%
32	1.67%	-1.03%
33	1.68%	-1.03%
34	1.68%	-1.02%
35	1.68%	-1.02%
36	1.68%	-1.02%
37	1.68%	-1.02%
38	1.68%	-1.01%
39	1.67%	-1.01%
40	1.67%	-1.01%

EUR		
Tenor	Up	Down
41	1.66%	-1.00%
42	1.65%	-1.00%
43	1.65%	-0.99%
44	1.64%	-0.99%
45	1.63%	-0.98%
46	1.62%	-0.98%
47	1.61%	-0.97%
48	1.60%	-0.97%
49	1.59%	-0.96%
50	1.57%	-0.96%
51	1.56%	-0.95%
52	1.55%	-0.95%
53	1.54%	-0.94%
54	1.52%	-0.93%
55	1.51%	-0.93%
56	1.49%	-0.92%
57	1.48%	-0.91%
58	1.46%	-0.91%
59	1.45%	-0.90%
60	1.43%	-0.89%
61	1.42%	-0.89%
62	1.40%	-0.88%
63	1.39%	-0.88%
64	1.38%	-0.87%
65	1.36%	-0.87%
66	1.35%	-0.86%
67	1.34%	-0.85%
68	1.33%	-0.85%
69	1.31%	-0.84%
70	1.30%	-0.84%
71	1.29%	-0.83%
72	1.28%	-0.83%
73	1.27%	-0.83%
74	1.26%	-0.82%
75	1.25%	-0.82%
76	1.24%	-0.81%
77	1.23%	-0.81%
78	1.22%	-0.81%
79	1.21%	-0.80%
80	1.20%	-0.80%

EUR		
Tenor	Up	Down
81	1.19%	-0.79%
82	1.19%	-0.79%
83	1.18%	-0.79%
84	1.17%	-0.78%
85	1.16%	-0.78%
86	1.15%	-0.78%
87	1.15%	-0.77%
88	1.14%	-0.77%
89	1.13%	-0.77%
90	1.13%	-0.77%
91	1.12%	-0.76%
92	1.11%	-0.76%
93	1.11%	-0.76%
94	1.10%	-0.75%
95	1.09%	-0.75%
96	1.09%	-0.75%
97	1.08%	-0.75%
98	1.08%	-0.74%
99	1.07%	-0.74%
100	1.06%	-0.74%

GBP		
Tenor	Up	Down
1	0.72%	-0.40%
2	0.95%	-0.51%
3	1.13%	-0.61%
4	1.27%	-0.69%
5	1.36%	-0.76%
6	1.43%	-0.79%
7	1.48%	-0.83%
8	1.51%	-0.86%
9	1.53%	-0.88%
10	1.53%	-0.91%
11	1.53%	-0.93%
12	1.53%	-0.96%
13	1.52%	-0.98%
14	1.50%	-1.00%
15	1.49%	-1.02%
16	1.47%	-1.03%
17	1.45%	-1.05%
18	1.43%	-1.07%
19	1.41%	-1.09%
20	1.39%	-1.11%
21	1.36%	-1.13%
22	1.34%	-1.13%
23	1.32%	-1.13%
24	1.30%	-1.13%
25	1.28%	-1.13%
26	1.26%	-1.13%
27	1.24%	-1.12%
28	1.22%	-1.11%
29	1.20%	-1.11%
30	1.18%	-1.10%
31	1.16%	-1.09%
32	1.14%	-1.08%
33	1.13%	-1.07%
34	1.11%	-1.06%
35	1.10%	-1.05%
36	1.08%	-1.05%
37	1.07%	-1.04%
38	1.06%	-1.03%
39	1.04%	-1.02%
40	1.03%	-1.01%

GBP		
Tenor	Up	Down
41	1.02%	-1.01%
42	1.01%	-1.00%
43	1.00%	-0.99%
44	0.99%	-0.98%
45	0.98%	-0.98%
46	0.97%	-0.97%
47	0.96%	-0.96%
48	0.95%	-0.96%
49	0.94%	-0.95%
50	0.94%	-0.94%
51	0.93%	-0.94%
52	0.92%	-0.93%
53	0.91%	-0.92%
54	0.91%	-0.92%
55	0.90%	-0.91%
56	0.89%	-0.90%
57	0.89%	-0.90%
58	0.88%	-0.89%
59	0.87%	-0.88%
60	0.87%	-0.88%
61	0.86%	-0.87%
62	0.85%	-0.87%
63	0.85%	-0.86%
64	0.84%	-0.85%
65	0.84%	-0.85%
66	0.83%	-0.84%
67	0.83%	-0.84%
68	0.82%	-0.83%
69	0.82%	-0.83%
70	0.82%	-0.82%
71	0.81%	-0.82%
72	0.81%	-0.82%
73	0.80%	-0.81%
74	0.80%	-0.81%
75	0.79%	-0.80%
76	0.79%	-0.80%
77	0.79%	-0.80%
78	0.78%	-0.79%
79	0.78%	-0.79%
80	0.78%	-0.78%

GBP		
Tenor	Up	Down
81	0.77%	-0.78%
82	0.77%	-0.78%
83	0.77%	-0.77%
84	0.76%	-0.77%
85	0.76%	-0.77%
86	0.76%	-0.76%
87	0.75%	-0.76%
88	0.75%	-0.76%
89	0.75%	-0.76%
90	0.75%	-0.75%
91	0.74%	-0.75%
92	0.74%	-0.75%
93	0.74%	-0.75%
94	0.74%	-0.74%
95	0.73%	-0.74%
96	0.73%	-0.74%
97	0.73%	-0.74%
98	0.73%	-0.73%
99	0.72%	-0.73%
100	0.72%	-0.73%

JPY		
Tenor	Up	Down
1	0.18%	-0.19%
2	0.26%	-0.20%
3	0.34%	-0.24%
4	0.42%	-0.29%
5	0.49%	-0.34%
6	0.55%	-0.39%
7	0.60%	-0.43%
8	0.65%	-0.46%
9	0.70%	-0.50%
10	0.74%	-0.53%
11	0.77%	-0.55%
12	0.80%	-0.56%
13	0.83%	-0.58%
14	0.85%	-0.59%
15	0.87%	-0.60%
16	0.89%	-0.61%
17	0.91%	-0.62%
18	0.92%	-0.63%
19	0.94%	-0.64%
20	0.95%	-0.65%
21	0.96%	-0.66%
22	0.97%	-0.67%
23	0.98%	-0.68%
24	0.99%	-0.69%
25	1.00%	-0.70%
26	1.01%	-0.71%
27	1.02%	-0.72%
28	1.02%	-0.73%
29	1.03%	-0.74%
30	1.04%	-0.75%
31	1.05%	-0.76%
32	1.06%	-0.77%
33	1.06%	-0.77%
34	1.07%	-0.78%
35	1.07%	-0.78%
36	1.07%	-0.79%
37	1.07%	-0.79%
38	1.07%	-0.79%
39	1.08%	-0.80%
40	1.07%	-0.80%

JPY		
Tenor	Up	Down
41	1.07%	-0.80%
42	1.07%	-0.80%
43	1.07%	-0.80%
44	1.07%	-0.80%
45	1.06%	-0.80%
46	1.06%	-0.80%
47	1.06%	-0.80%
48	1.05%	-0.79%
49	1.05%	-0.79%
50	1.04%	-0.79%
51	1.04%	-0.79%
52	1.03%	-0.79%
53	1.02%	-0.78%
54	1.02%	-0.78%
55	1.01%	-0.78%
56	1.00%	-0.77%
57	1.00%	-0.77%
58	0.99%	-0.76%
59	0.98%	-0.76%
60	0.97%	-0.76%
61	0.96%	-0.75%
62	0.96%	-0.75%
63	0.95%	-0.74%
64	0.94%	-0.74%
65	0.94%	-0.74%
66	0.93%	-0.73%
67	0.92%	-0.73%
68	0.92%	-0.73%
69	0.91%	-0.72%
70	0.91%	-0.72%
71	0.90%	-0.72%
72	0.90%	-0.71%
73	0.89%	-0.71%
74	0.88%	-0.71%
75	0.88%	-0.71%
76	0.87%	-0.70%
77	0.87%	-0.70%
78	0.87%	-0.70%
79	0.86%	-0.70%
80	0.86%	-0.69%

JPY		
Tenor	Up	Down
81	0.85%	-0.69%
82	0.85%	-0.69%
83	0.84%	-0.69%
84	0.84%	-0.68%
85	0.84%	-0.68%
86	0.83%	-0.68%
87	0.83%	-0.68%
88	0.82%	-0.68%
89	0.82%	-0.67%
90	0.82%	-0.67%
91	0.81%	-0.67%
92	0.81%	-0.67%
93	0.81%	-0.67%
94	0.80%	-0.67%
95	0.80%	-0.66%
96	0.80%	-0.66%
97	0.79%	-0.66%
98	0.79%	-0.66%
99	0.79%	-0.66%
100	0.79%	-0.66%

CHF		
Tenor	Up	Down
1	0.63%	-0.42%
2	0.76%	-0.45%
3	0.85%	-0.47%
4	0.92%	-0.51%
5	0.98%	-0.54%
6	1.02%	-0.57%
7	1.06%	-0.59%
8	1.08%	-0.61%
9	1.11%	-0.62%
10	1.12%	-0.62%
11	1.14%	-0.62%
12	1.15%	-0.62%
13	1.16%	-0.61%
14	1.16%	-0.61%
15	1.17%	-0.61%
16	1.18%	-0.60%
17	1.18%	-0.60%
18	1.18%	-0.60%
19	1.19%	-0.60%
20	1.19%	-0.60%
21	1.20%	-0.60%
22	1.20%	-0.60%
23	1.20%	-0.60%
24	1.20%	-0.60%
25	1.21%	-0.60%
26	1.21%	-0.61%
27	1.21%	-0.61%
28	1.21%	-0.61%
29	1.22%	-0.61%
30	1.22%	-0.61%
31	1.22%	-0.61%
32	1.22%	-0.61%
33	1.22%	-0.61%
34	1.21%	-0.61%
35	1.21%	-0.61%
36	1.21%	-0.61%
37	1.20%	-0.61%
38	1.20%	-0.61%
39	1.19%	-0.61%
40	1.19%	-0.61%

CHF		
Tenor	Up	Down
41	1.18%	-0.60%
42	1.18%	-0.60%
43	1.17%	-0.60%
44	1.16%	-0.60%
45	1.16%	-0.60%
46	1.15%	-0.60%
47	1.14%	-0.60%
48	1.14%	-0.60%
49	1.13%	-0.60%
50	1.12%	-0.59%
51	1.11%	-0.59%
52	1.10%	-0.59%
53	1.10%	-0.59%
54	1.09%	-0.59%
55	1.08%	-0.59%
56	1.07%	-0.59%
57	1.06%	-0.59%
58	1.05%	-0.58%
59	1.05%	-0.58%
60	1.04%	-0.58%
61	1.03%	-0.58%
62	1.02%	-0.58%
63	1.01%	-0.58%
64	1.00%	-0.58%
65	1.00%	-0.58%
66	0.99%	-0.57%
67	0.98%	-0.57%
68	0.97%	-0.57%
69	0.97%	-0.57%
70	0.96%	-0.57%
71	0.95%	-0.57%
72	0.95%	-0.57%
73	0.94%	-0.57%
74	0.94%	-0.57%
75	0.93%	-0.57%
76	0.93%	-0.57%
77	0.92%	-0.56%
78	0.91%	-0.56%
79	0.91%	-0.56%
80	0.90%	-0.56%

CHF		
Tenor	Up	Down
81	0.90%	-0.56%
82	0.89%	-0.56%
83	0.89%	-0.56%
84	0.89%	-0.56%
85	0.88%	-0.56%
86	0.88%	-0.56%
87	0.87%	-0.56%
88	0.87%	-0.56%
89	0.86%	-0.56%
90	0.86%	-0.56%
91	0.86%	-0.55%
92	0.85%	-0.55%
93	0.85%	-0.55%
94	0.85%	-0.55%
95	0.84%	-0.55%
96	0.84%	-0.55%
97	0.83%	-0.55%
98	0.83%	-0.55%
99	0.83%	-0.55%
100	0.82%	-0.55%

CAD		
Tenor	Up	Down
1	0.33%	-0.31%
2	0.69%	-0.54%
3	0.92%	-0.68%
4	1.08%	-0.81%
5	1.18%	-0.93%
6	1.26%	-1.04%
7	1.31%	-1.14%
8	1.35%	-1.22%
9	1.38%	-1.29%
10	1.40%	-1.35%
11	1.42%	-1.40%
12	1.43%	-1.45%
13	1.44%	-1.48%
14	1.45%	-1.48%
15	1.45%	-1.49%
16	1.46%	-1.49%
17	1.46%	-1.49%
18	1.46%	-1.50%
19	1.46%	-1.50%
20	1.47%	-1.50%
21	1.47%	-1.50%
22	1.47%	-1.50%
23	1.47%	-1.50%
24	1.47%	-1.51%
25	1.47%	-1.51%
26	1.48%	-1.51%
27	1.48%	-1.51%
28	1.48%	-1.51%
29	1.48%	-1.51%
30	1.48%	-1.51%
31	1.48%	-1.51%
32	1.48%	-1.51%
33	1.47%	-1.50%
34	1.47%	-1.50%
35	1.47%	-1.50%
36	1.46%	-1.49%
37	1.46%	-1.48%
38	1.45%	-1.48%
39	1.44%	-1.47%
40	1.44%	-1.46%

CAD		
Tenor	Up	Down
41	1.43%	-1.46%
42	1.42%	-1.45%
43	1.41%	-1.44%
44	1.40%	-1.43%
45	1.39%	-1.42%
46	1.38%	-1.41%
47	1.37%	-1.40%
48	1.36%	-1.39%
49	1.35%	-1.38%
50	1.34%	-1.37%
51	1.33%	-1.36%
52	1.32%	-1.35%
53	1.31%	-1.34%
54	1.30%	-1.32%
55	1.29%	-1.31%
56	1.28%	-1.30%
57	1.26%	-1.29%
58	1.25%	-1.28%
59	1.24%	-1.26%
60	1.23%	-1.25%
61	1.22%	-1.24%
62	1.20%	-1.23%
63	1.19%	-1.22%
64	1.18%	-1.21%
65	1.17%	-1.19%
66	1.16%	-1.18%
67	1.15%	-1.17%
68	1.14%	-1.16%
69	1.13%	-1.16%
70	1.13%	-1.15%
71	1.12%	-1.14%
72	1.11%	-1.13%
73	1.10%	-1.12%
74	1.09%	-1.11%
75	1.08%	-1.10%
76	1.08%	-1.10%
77	1.07%	-1.09%
78	1.06%	-1.08%
79	1.05%	-1.07%
80	1.05%	-1.07%

CAD		
Tenor	Up	Down
81	1.04%	-1.06%
82	1.03%	-1.05%
83	1.03%	-1.05%
84	1.02%	-1.04%
85	1.02%	-1.03%
86	1.01%	-1.03%
87	1.00%	-1.02%
88	1.00%	-1.02%
89	0.99%	-1.01%
90	0.99%	-1.00%
91	0.98%	-1.00%
92	0.98%	-0.99%
93	0.97%	-0.99%
94	0.97%	-0.98%
95	0.96%	-0.98%
96	0.96%	-0.97%
97	0.95%	-0.97%
98	0.95%	-0.96%
99	0.94%	-0.96%
100	0.94%	-0.95%

AUD		
Tenor	Up	Down
1	1.77%	-1.34%
2	1.86%	-1.53%
3	1.93%	-1.64%
4	2.00%	-1.75%
5	2.05%	-1.82%
6	2.09%	-1.88%
7	2.13%	-1.94%
8	2.17%	-2.00%
9	2.20%	-2.04%
10	2.23%	-2.09%
11	2.25%	-2.13%
12	2.28%	-2.16%
13	2.30%	-2.20%
14	2.32%	-2.23%
15	2.33%	-2.25%
16	2.35%	-2.28%
17	2.36%	-2.30%
18	2.37%	-2.32%
19	2.39%	-2.34%
20	2.39%	-2.36%
21	2.40%	-2.37%
22	2.41%	-2.38%
23	2.42%	-2.38%
24	2.42%	-2.39%
25	2.43%	-2.39%
26	2.43%	-2.40%
27	2.43%	-2.40%
28	2.43%	-2.40%
29	2.44%	-2.40%
30	2.44%	-2.40%
31	2.44%	-2.40%
32	2.43%	-2.39%
33	2.43%	-2.39%
34	2.42%	-2.38%
35	2.41%	-2.37%
36	2.40%	-2.36%
37	2.39%	-2.35%
38	2.38%	-2.34%
39	2.37%	-2.33%
40	2.35%	-2.31%

AUD		
Tenor	Up	Down
41	2.34%	-2.30%
42	2.32%	-2.28%
43	2.30%	-2.27%
44	2.29%	-2.25%
45	2.27%	-2.23%
46	2.25%	-2.21%
47	2.23%	-2.19%
48	2.21%	-2.18%
49	2.19%	-2.16%
50	2.17%	-2.14%
51	2.15%	-2.11%
52	2.13%	-2.09%
53	2.10%	-2.07%
54	2.08%	-2.05%
55	2.06%	-2.03%
56	2.03%	-2.01%
57	2.01%	-1.98%
58	1.99%	-1.96%
59	1.96%	-1.94%
60	1.94%	-1.91%
61	1.91%	-1.89%
62	1.89%	-1.87%
63	1.87%	-1.85%
64	1.85%	-1.83%
65	1.83%	-1.81%
66	1.81%	-1.79%
67	1.79%	-1.77%
68	1.77%	-1.75%
69	1.75%	-1.73%
70	1.73%	-1.71%
71	1.72%	-1.70%
72	1.70%	-1.68%
73	1.68%	-1.66%
74	1.67%	-1.65%
75	1.65%	-1.63%
76	1.64%	-1.62%
77	1.62%	-1.60%
78	1.61%	-1.59%
79	1.59%	-1.58%
80	1.58%	-1.56%

AUD		
Tenor	Up	Down
81	1.56%	-1.55%
82	1.55%	-1.54%
83	1.54%	-1.52%
84	1.53%	-1.51%
85	1.51%	-1.50%
86	1.50%	-1.49%
87	1.49%	-1.48%
88	1.48%	-1.47%
89	1.47%	-1.46%
90	1.46%	-1.45%
91	1.45%	-1.44%
92	1.44%	-1.43%
93	1.43%	-1.42%
94	1.42%	-1.41%
95	1.41%	-1.40%
96	1.40%	-1.39%
97	1.39%	-1.38%
98	1.38%	-1.37%
99	1.37%	-1.36%
100	1.36%	-1.35%

NZD		
Tenor	Up	Down
1	0.77%	-0.69%
2	1.14%	-1.10%
3	1.36%	-1.35%
4	1.50%	-1.51%
5	1.59%	-1.61%
6	1.65%	-1.67%
7	1.68%	-1.72%
8	1.71%	-1.75%
9	1.73%	-1.77%
10	1.74%	-1.78%
11	1.75%	-1.80%
12	1.76%	-1.81%
13	1.77%	-1.81%
14	1.77%	-1.82%
15	1.78%	-1.83%
16	1.78%	-1.83%
17	1.79%	-1.84%
18	1.79%	-1.84%
19	1.79%	-1.84%
20	1.79%	-1.85%
21	1.80%	-1.85%
22	1.80%	-1.85%
23	1.80%	-1.85%
24	1.80%	-1.86%
25	1.80%	-1.86%
26	1.80%	-1.86%
27	1.81%	-1.86%
28	1.81%	-1.86%
29	1.81%	-1.86%
30	1.81%	-1.87%
31	1.81%	-1.88%
32	1.81%	-1.88%
33	1.80%	-1.89%
34	1.80%	-1.89%
35	1.79%	-1.89%
36	1.78%	-1.89%
37	1.78%	-1.88%
38	1.77%	-1.88%
39	1.76%	-1.87%
40	1.75%	-1.87%

NZD		
Tenor	Up	Down
41	1.74%	-1.86%
42	1.73%	-1.85%
43	1.72%	-1.84%
44	1.71%	-1.83%
45	1.69%	-1.82%
46	1.68%	-1.81%
47	1.67%	-1.79%
48	1.65%	-1.78%
49	1.64%	-1.77%
50	1.63%	-1.75%
51	1.61%	-1.74%
52	1.60%	-1.72%
53	1.58%	-1.71%
54	1.57%	-1.69%
55	1.55%	-1.68%
56	1.54%	-1.66%
57	1.52%	-1.64%
58	1.50%	-1.62%
59	1.49%	-1.61%
60	1.47%	-1.59%
61	1.45%	-1.57%
62	1.44%	-1.55%
63	1.42%	-1.54%
64	1.41%	-1.52%
65	1.40%	-1.50%
66	1.38%	-1.49%
67	1.37%	-1.47%
68	1.36%	-1.46%
69	1.34%	-1.45%
70	1.33%	-1.43%
71	1.32%	-1.42%
72	1.31%	-1.41%
73	1.30%	-1.39%
74	1.29%	-1.38%
75	1.28%	-1.37%
76	1.27%	-1.36%
77	1.26%	-1.35%
78	1.25%	-1.34%
79	1.24%	-1.33%
80	1.23%	-1.32%

NZD		
Tenor	Up	Down
81	1.22%	-1.31%
82	1.21%	-1.30%
83	1.20%	-1.29%
84	1.19%	-1.28%
85	1.18%	-1.27%
86	1.18%	-1.26%
87	1.17%	-1.25%
88	1.16%	-1.24%
89	1.15%	-1.23%
90	1.15%	-1.23%
91	1.14%	-1.22%
92	1.13%	-1.21%
93	1.13%	-1.20%
94	1.12%	-1.20%
95	1.11%	-1.19%
96	1.11%	-1.18%
97	1.10%	-1.17%
98	1.09%	-1.17%
99	1.09%	-1.16%
100	1.08%	-1.15%