Asia e-Alert

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Hong Kong RBC – Second Quantitative Impact Study (QIS 2)

Introduction

On 6 August 2018, the Insurance Authority (IA) of Hong Kong released the technical specifications for the Second Quantitative Impact Study (QIS 2) associated with its developing Risk-based Capital regime (HKRBC). Following the release of these specifications, life insurance companies in Hong Kong will need to submit QIS 2 results by 30 November 2018 with a valuation date of 31 December 2017. The IA has emphasised that QIS 2 is an important step to evaluate holistically the solvency position of individual insurers and of the industry and to define the key criteria for risk capital.

In this e-Alert, we give an overview of QIS 2 and highlight some of the key differences from the First Quantitative Impact Study (QIS 1).

Key points of focus:

- Stochastic valuation for Time Value of Options and Guarantees
- Margin Over Current Estimate
- Correlation matrices for risk aggregation
- Matching adjustment

Valuation of insurance liabilities

VALUATION OF OPTIONS AND GUARANTEES

HKRBC requires insurers to value the cost of options and guarantees embedded in contracts. In QIS 1, the methodology to determine the time value of options and guarantees (TVOG) was not strictly defined and provided flexibility to insurers to select from the four approaches: stochastic, deterministic, analytical and factor approach.

To align with TVOG methodologies in different regulatory regimes and facilitate comparison across companies, insurers in QIS 2 are required to value material options and guarantees using a market consistent asset model with stochastic scenarios. For insurers without stochastic capacity, 20% of deterministic current estimate of liabilities can be used as a proxy for TVOG. Other immaterial options and guarantees can alternatively be valued using either the deterministic or factor approaches.

In the calibration of stochastic scenarios, the minimum requirements for the economic scenario generator (ESG) are defined in QIS 2, which should have at least 1,000 economic scenarios considering material financial risks including models for interest rate, inflation, fixed income asset returns and equity asset returns, with correlation between assets. Martingale and market consistency tests should be performed to ensure the economic scenarios are risk neutral and market consistent.

MARGIN OVER CURRENT ESTIMATE (MOCE)

The technical provisions consist of the current estimate of liabilities (including TVOG) and a risk adjustment for non-hedgeable risks or MOCE.

The IA introduces a margin for prudence approach to calculate the MOCE in QIS 2, which is in line with other RBC regimes in Asia. Additional sensitivity on MOCE based on a cost of capital approach can be provided by insurers on a voluntary basis.

The non-hedgeable risk modules in MOCE include insurance risks similar to prescribed capital requirement (PCR) calculation. The stress parameters are based on the 75th percentile confidence level in each sub-risk module. Correlation matrices between sub-risks is introduced and is similar to that used under Solvency II. The stress levels for calculating MOCE and PCR in QIS 2 are summarised in Figure 1.

FIGURE 1: PRESCRIBED STRESS LEVELS FOR PCR AND MOCE

Insurance sub-risk	MOCE stress level (75th percentile)	PCR stress level (99.5th percentile)
Mortality risk	3.9%	15.0%
Longevity risk	(6.5%)	(25.0%)
Morbidity and disability risk	First year: 9.2% After first year: 6.5% Recovery: (5.2%)	First year: 35.0% After first year: 25.0% Recovery: (20.0%)
Expense risk	Expense: 2.6% Inflation: 0.3% additive	Expense: 10.0% Inflation: 1.0% additive
Lapse risk	Lapse: multiplicative +/-10.5% Mass lapse: 0.0%	Lapse: multiplicative +/- 40.0% Mass lapse: immediate 30.0% (individual); immediate 50.0% (non-individual)
Life catastrophe risk	Excluded from MOCE	First year: additive +0.15% to mortality rates

PRESCRIBED YIELD CURVE

Four new currencies are introduced in the prescribed yield curves in QIS 2, namely Thai Baht, British Pound, Japanese Yen and New Taiwanese Dollars (NTD). The last liquid point (LLP), convergence points and ultimate forward rates (UFR) used to construct the prescribed yield curves have been revised from QIS 1 to QIS 2. The changes to the base risk-free curves are summarised in Figure 2.

FIGURE 2: SUMMARY OF CHANGES IN PRESCRIBED YIELD CURVE

Currency	HKRBC QIS 1 (December 2016)	HKRBC QIS 2 (December 2017)
Hong Kong Dollars (HKD)	LLP: 15 years UFR: 3.5% Converged in year 60	LLP: 30 years UFR: 3.65% Converged in year 70
US Dollars (USD)	LLP: 30 years UFR: 3.5% Converged in year 60	LLP: 30 years UFR: 3.65% Converged in year 70
Renminbi (RMB)	LLP: 10 years UFR: 6.8% Converged in year 60	LLP: 10 years UFR: 4.65% Converged in year 70

Consistent with Solvency II and some other RBC regimes in Asia, an illiquidity premium is applied on risk-free rates in determining the best estimate of liabilities, with either one of the following adjustments:

- Volatility adjustment (VA) has been fine-tuned from 50bps applied to the entire yield curve in QIS 1 to 32bps applied until LLP in QIS 2 (converging to zero at the convergence point). The same VA is applied to all currencies. An additional sensitivity with VA of 58bps will be used in the QIS 2 credit spread stresses for testing the applicability of dynamic VA.
- Matching adjustment (MA) is allowed in QIS 2 for restrictive sets of products where fixed income assets are identified and managed separately to closely match with the liability.

Matching adjustment (MA)

ELIGIBILITY

The matching adjustment aims to reduce the impact from short-term fluctuation in asset values for portfolios where insurers have full risk mitigation in place. This can be achieved by matching the expected liability cash flows with asset cash flows generated from fixed income assets. The qualitative criteria for the eligibility of an MA portfolio are summarised below.

- The projected asset and liability cash flows should be matched within the defined consecutive 3-year projection bands until the longest LLP of the currencies in the portfolio. Any cash flow shortfall (liability cash flow in excess of asset cash flow) should be addressed by the surplus carried forward from previous maturities and should be immaterial in comparison with total liability cash flows up to the LPP.
- Liability cash flows should be projected with certainty. Non-contractual future premiums are not allowed. However, premium holiday features and top-up premiums can be included.
- Any surrender option should not have a surrender value exceeding the asset value. Options with the surrender value exceeding the asset value may be included when the lapse risk capital is immaterial in comparison with the present value of contract benefits and expenses.

There are some other requirements listed under the technical specification as placeholders and not used under QIS 2.

It is reasonable to have immaterial underwriting risks within an MA portfolio. However, the level of other underwriting risks is not specified as a criterion in the technical specifications, whereas it is additionally collected in the MA template for further analysis.

CALCULATION

The matching adjustment is calculated for eligible assets as 90% of the adjusted spread and is added to the risk-free yield curve used to discount insurance liability cashflows. The calculation of the adjusted spread is performed based on the weighted average asset spread (weighted by modified duration and split by different credit ratings and term to maturity) minus risk correction. The weighted average asset spread is further adjusted by the portion of eligible assets considered.

As the expected loss from the risk of default and downgrade is not quantified in the projection of asset cash flows, the risk correction serves as an adjustment for these risks.

TIMELINE

Valuation results for MA portfolios will be reported in a separate template based on a specific set of technical specifications, which was released by the IA on 13 August 2018. The valuation date and the submission deadline is the same as the QIS 2 packaged template.

It is encouraged that insurers identify and test the proposed approach on their eligible portfolios. The quantitative threshold for the eligibility criteria will be determined based on data collected in QIS 2.

Tiering of capital resources

ELIGIBILITY

In QIS 1, insurers submitted capital assets under current statutory basis (Cap. 41) and no criteria on the quality of assets was specified. In QIS 2, rules are set up for the eligibility of capital resources with reference to Insurance Core Principles (ICP) 17 and Insurance Capital Standard (ICS) Version 1.0 issued by International Association of Insurance Supervisors (IAIS), with considerations of the loss-absorbing capacity, probability of insolvency on a going-concern or run-off basis, and the loss to policyholders in the event of insolvency. There are three tiers of capital resources, as set out below:

- Tier 1 unlimited capital

- Tier 1 limited capital
- Tier 2 paid-up capital

Non-paid-up capital is not included as eligible capital in QIS 2 but the IA commented that more considerations to include non-paid-up capital could be given in the future.

COMPOSITION LIMITS

Composition limits are applied for Tier 1 limited capital (10% of PCR) and Tier 2 capital (50% of PCR). Any eligible capital that exceeds the limit of Tier 1 limited capital can be included in Tier 2 capital, subject to the limit in Tier 2.

Prescribed capital requirement (PCR)

ADDITIONAL RISK MODULE

The risk charge for operational risk is introduced in QIS 2 using a factor-based approach, and is the maximum of premium-based and liability-based operational risk charges. The risk factors vary by types of business and only liability risk factor is applied to unit-linked business. The total operational risk charge is capped by 30% of diversified PCR (before taking account of operational risk charge) in QIS 2.

RISK AGGREGATION AND RECALIBRATION OF STRESS FACTORS

In QIS 2, correlation matrices are defined for sub-risk modules of market risk, insurance risk and general insurance risk, and for aggregation of risk modules into overall PCR. The correlation matrices are similar to those adopted under Solvency II.

After reviewing the results and data collected in QIS 1, the IA has recalibrated the risk charges, especially for market and insurance risk charges. Level lapse shocks and mass lapse shocks are combined into one risk module. The changes on PCR in QIS 2 are highlighted in Appendix A.

Conclusion and future enhancement

While QIS 2 should be a key milestone in developing the HKRBC framework, insurers will require careful preparation in respect of ultimate compliance with the final rules. It should also be noted that extensive stochastic capacity is necessary to prepare the valuation results unless a proxy is used for the calculation of TVOG. Many insurers will need to build or enhance their existing modelling capabilities to be able to cope efficiently with the requirements. QIS 2 provides more comprehensive detail but several areas for future enhancement have been mentioned by the IA, including but not limited to:

- Refinement of volatility adjustment approach
- Further calibration of stress parameters and approaches
- Refinement of the rules on tiering of capital resources

If you have any questions on this e-Alert or would like to discuss this further, please contact any one of our consultants below.

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APPENDIX A: SUMMARY OF CHANGES IN PCR RISK CHARGES

		HKRBC QIS 1	HKRBC QIS 2
Market risk charge	Interest rate risk charge	Interest rate risk up/down shocks are applied as a % change. Up shocks (ranging from 100% to 25%) are slightly more severe than the down shocks (ranging from -75% to -25%).	Similar shock levels are applied. Slightly more severe for up shocks in the short term and slightly less severe for both up and down shocks in the long term compared to QIS 1.
	Equity risk charge	The equity risk charges are 38% for developed market-listed equities, 48% for other equities and 20% for strategic investments.	The equity risk charges are 40% for developed market-listed equities, 50% for private equities and other equities, and 20% for strategic investments and investment in affiliates.
	Property risk charge	A uniform 25% multiplicative stress is to be applied on all property assets including property held for self-use.	A 44% shock on investment property assets and a 22% shock for company-occupied property assets.
	Currency mismatch risk charge	The currency risk charge is calculated by applying the risk factor to the net exposure by currency. The net exposure equals the difference between the current estimate of liabilities and assets, floored by zero. The risk factor is 5% for HKD and USD and 25% for all other currencies. The total risk charge is the sum of the risk charge per currency with no offsets allowed among the currencies.	The currency risk charge is calculated based on the change in net exposure for each foreign currency against HKD. The net exposure equals the absolute value of the difference between the current estimate of liabilities and assets. In other words, the zero flooring is removed. The risk factor to the net exposure for foreign currencies (against HKD) is 1% for USD and Macanese Patacas, 10% for RMB and NTD and 20% for all other currencies.
	Spread risk	Prescribed credit spread shocks (vary by credit rating and term to maturity of asset) added to the Z-spread of the bond at the given maturity for revaluation.	For assets with low credit ratings, the prescribed credit spread shocks are generally higher than that in QIS 1.
Counterparty default risk		Prescribed default risk charges are based on the credit rating of the counterparties.	There are slightly lower prescribed default risk charges than in QIS 1 for each credit rating of the counterparties.
Insurance risk charge	Mortality risk charge	A 15% permanent multiplicative increase in mortality rates; for products subject to both mortality and longevity risks, diversification within product is allowed.	No change.
	Longevity risk charge	A 25% permanent multiplicative decrease in mortality rates; for products subject to both mortality and longevity risks, diversification within product is allowed.	No change.
	Catastrophe risk charge	A 0.15% additive increase to mortality rates in the first year from the valuation date.	No change.
	Morbidity risk charge	A 30% permanent multiplicative increase in accident & health morbidity rate and critical illness rate. A 20% permanent multiplicative increase in other disability rates. A 20% permanent multiplicative decrease in recovery rates.	A 35% multiplicative increase in disability and morbidity rates in the first year from valuation date and a 25% multiplicative increase thereafter. A 20% permanent multiplicative decrease in recovery rates.
	Lapse risk charge	A permanent multiplicative +/- 50% on the policyholder option exercise rate.	The lapse risk charge is combined and is calculated as the maximum of level lapse shocks and mass lapse shock.
	Mass lapse risk charge	An immediate 30% surrender of policies (for individual products and riders); an immediate 50% surrender of policies (for group products and riders). Two scenarios were requested where one floored PCR to zero at a company level and another floored PCR to zero at a product group level.	For level lapse shocks, permanent multiplicative +/- 40% shocks are applied on policyholder option exercise rates. The mass lapse shock levels remain the same as QIS 1, i.e. an immediate 30% and 50% surrender of individual and non-individual products, respectively. However, PCR is now floored at a product level.
	Expense risk charge	A 15% multiplicative increase in expense assumptions in the first year from valuation date and a 10% multiplicative increase thereafter.	A 10% multiplicative increase in expense assumptions for all years; absolute increase of 1% in inflation rate for all years.
Operational risk charge		Excluded in QIS 1	The maximum of premium-based operational risk charge and liability-based operational risk charge for both non-linked life business and general insurance business, plus liability-based operational risk charge for linked life business, subject to 30% of PCR before operational risk. The premium risk factor is applied to the preceding year premium and premium growth beyond the 20% threshold: 4% for non-linked life business and 3% for general insurance business. The risk factor on the current estimate of liability: 0.45% for life business (both non-linked and linked) and 3% for general insurance business.