



Capital Optimization in Bermuda

Illustrative case studies on value maximizing capital decisions under the proposed BSCR changes

April 2017

Introduction





On November 30, 2016, the Bermuda Monetary Authority (BMA) issued a consultation paper outlining a series of proposed changes to the BSCR. The consultation paper was subsequently reissued on March 15, 2017 to reflect industry commentary.

As noted in the proposal, these changes reflect the ongoing commitment by the BMA to maintain full equivalence with the European Solvency Regime (Solvency II), and will apply to the commercial classes of insurance companies in Bermuda, i.e., classes 3A, 3B, 4, C, D, E, and Groups. It is noted that the changes will be linearly graded in over three reporting years beginning with the 2018 year-end filings.

In this article, we explore how insurers can prepare for and adapt to the impending changes, and manage their capital profile efficiently under the updated solvency framework. We additionally identify common themes we expect to unfold as a result of the changes.

In Table 1, we summarize the proposed changes and our observations.

Table 1

Area	Proposed change	Impact on capital	Our observations
Equity risk	<p>Currently, equity risk charges range from 5% to 55% by type of holding. The BMA proposes various changes to these charges, notably increasing the charge on common stocks from 14.4% to 35%. Additionally, strategic or duration based holdings are now charged 20%.</p> <p>Additionally, equity holdings are classified into three buckets, which are assumed to be 75% pairwise correlated, as opposed to perfect correlation in the current framework.</p>		<p>The proposed framework is less conservative than Solvency II, which prescribes a 46.5% charge for Type 1 holdings and a 56.5% for Type 2 holdings, while strategic or duration based holdings receive a 22% charge.</p> <p>The BMA also introduces Type 3 holdings corresponding to infrastructure investments, and allows diversification of this bucket with other equity holdings. All else equal, this creates an incentive for insurers to increase allocation to infrastructure.</p>
Premium risk	<p>Currently, premium risk exposure is determined by "net premium written" during the reporting period. The BMA proposes increasing this exposure base to reflect additional risk due to bound but not incepted (BBNI) business, and multi-year coverages.</p>		<p>The ultimate effect of this proposed change is an increase in the premium risk exposure base, thereby increasing standalone premium risk capital requirements.</p>
Risk aggregation	<p>Currently, risks are generally considered to be independent, with a few exceptions, leading to generous diversification benefits. The BMA proposes using multiple layers of correlation matrices, consistent with the Solvency II approach.</p>		<p>Of the proposed changes, risk aggregation will have the most significant impact on insurers' capital profile, and the interdependencies introduced also present very interesting capital optimization implications.</p>
Operational risk	<p>Currently, the operational risk surcharge ranges from 1% to 10% according to the insurer's score on the CIRA. The scoring process is unchanged; however, the BMA proposes changing the associated range of surcharges to 2% to 20% (i.e., doubling the current charge).</p>		<p>The operational risk surcharge in Solvency II is capped at 30%; however, very few insurers approach this limit. The Solvency II charge is a function of earned premiums, technical provisions and expenses.</p> <p>Overall, this change effectively doubles the capital incentive to improve CIRA inputs.</p>
Other changes	<p>Other relatively minor changes are proposed relating to credit risk, currency risk, and deferred tax assets, which we ignore in this analysis for brevity.</p> <p>We also note the BMA's desire to recalibrate their method for other long-term insurance risks; however, this has now been deferred to a future consultation.</p>		

Model

In light of the proposed changes, we developed a stylized model with the dual purpose of:

- a) Quantifying the aggregate impact on capital requirements
- b) Illustrating potential value maximizing strategies under the new framework

The pivotal change in the consultation paper is moving from the current risk aggregation methodology to a correlation-based approach. The other changes are relatively simple to administer, and can be classified as either a change in exposure or a change in risk charge.

Changes in exposure

We apply the proposed changes to premium risk by determining an *exposure factor* for each risk type. As discussed, we expect premium risk exposure to increase.

Changes in risk charge

We apply the proposed changes to equity risk and operational risk by determining a *charge factor* for each risk type. As discussed, equity risk charges are overall increased, and operational risk charges are effectively doubled. As operational risk is quantified as a surcharge and does not influence the aggregation process, we discuss the implications separately.

It is important to note that we are only modeling changes to required capital for the purposes of this exercise, and practitioners need to also consider changes to total asset requirements, resulting from various other BMA guidance, in order to holistically evaluate their solvency position going forward.



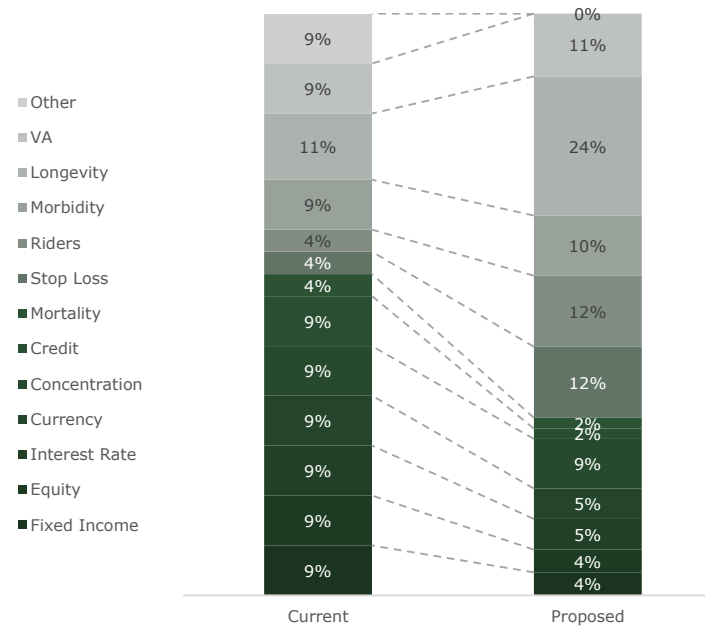
Diversification

The primary motivation of the capital strategies presented in this article is to maximize diversification. With that in mind, we calculated the “most diversifying portfolio” (MDP) under both the current and proposed aggregation frameworks. The MDP is described in terms of the allocation of capital to each risk type, such that the diversification benefit is maximized. Our results are shown below.

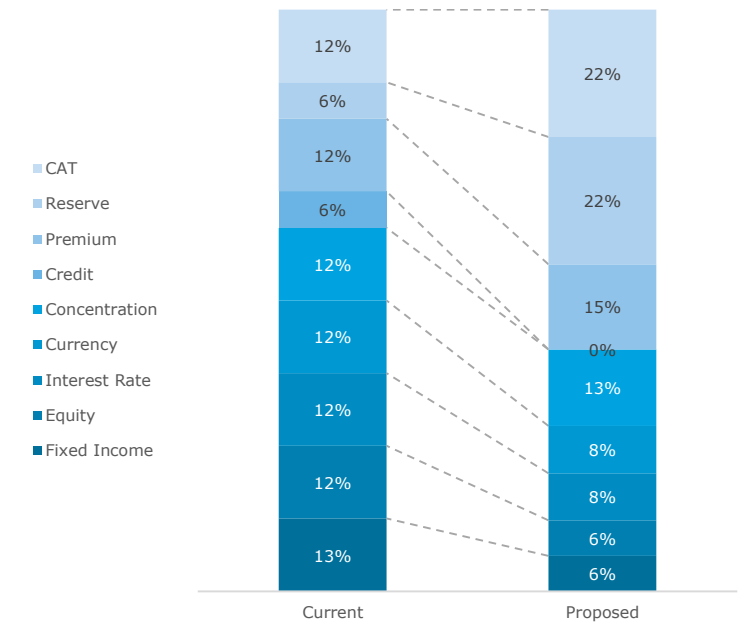
Most diversifying portfolio - Group



Most diversifying portfolio - Long Term



Most diversifying portfolio - General



Under the current framework, risks are primarily independent of each other (with a few exceptions), leading to a relatively uniform allocation. Under the new framework, the results support increasing exposure to insurance risks and decreasing exposure to investment risks. We illustrate practical examples of this theme, along with other insights, in our case studies.

Case study profiles

In order to illustrate the capital impact of the proposed changes with tangible examples, we constructed six risk profiles that are representative of common strategies in the Bermuda insurance market. In our case studies, we look at the capital drivers for each illustrative profile, and identify optimal capital strategies in light of the proposed changes. The six profiles are described below.



Traditional Life

- Products are predominantly mortality driven, including exposure to lapse risks
- Other products in wealth, retirement and living benefits
- Assets are predominantly fixed income, with some NFI exposure
- Some duration mismatch given long duration of liabilities



Annuity

- Products are wealth accumulation or retirement driven
- Relatively low insurance risk exposure
- Assets are predominantly fixed income, but more NFI than traditional life insurer
- Duration mismatch is higher by design



Traditional P&C

- Products are diversified across general insurance lines
- Assets are predominantly NFI as no explicit strategy to duration match
- Capital is largely driven by reserve risk
- Some exposure to catastrophe risk



Property Catastrophe

- Exclusively property catastrophe risk by design
- Risk profile is almost entirely driven by insurance risk



Run-off

- Portfolio is designed to be asset-intensive
- Diverse mix of certain life, annuity, and casualty lines
- Appetite for market guarantees



Group

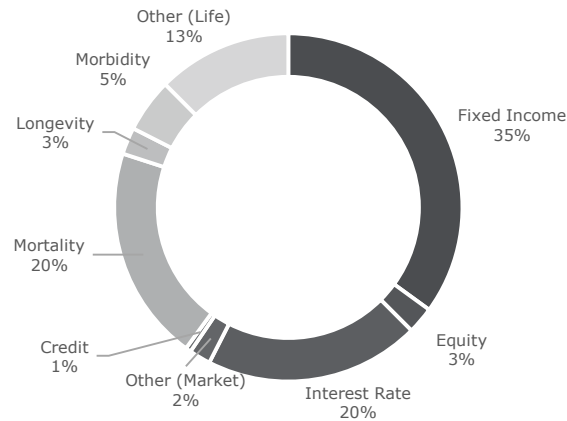
- Diversified across life and P&C insurance lines
- Relatively uniform blend of the other risk profiles considered

Case Study 1

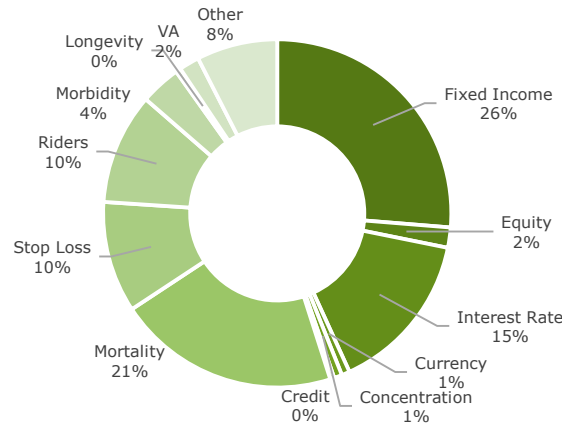
Traditional Life

26% increase in aggregate capital requirements
(prior to operational risk surcharge)

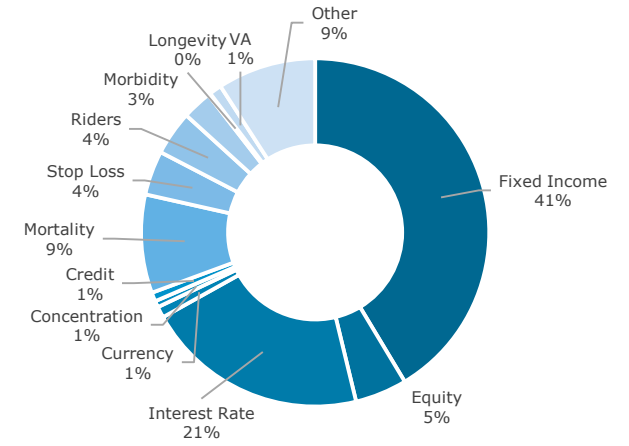
Standalone distribution



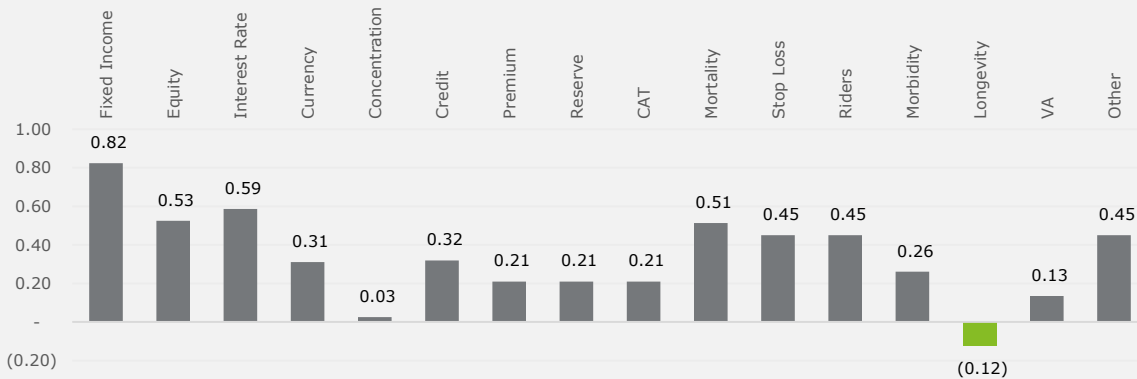
Allocation under current framework



Allocation under proposed framework



Marginal capital charge per risk type



On aggregate, capital requirements for the Traditional Life risk profile increase 26% under the proposed BSCR changes. The capital at risk is **more heavily allocated toward fixed income** asset risk under the proposed framework, due to decreased diversification benefits.

On the other hand, **mortality is less important** on aggregate, as the (albeit decreased) diversification benefits disproportionately accrue to life insurance risks given their low correlation with the predominantly market-driven risk profile.

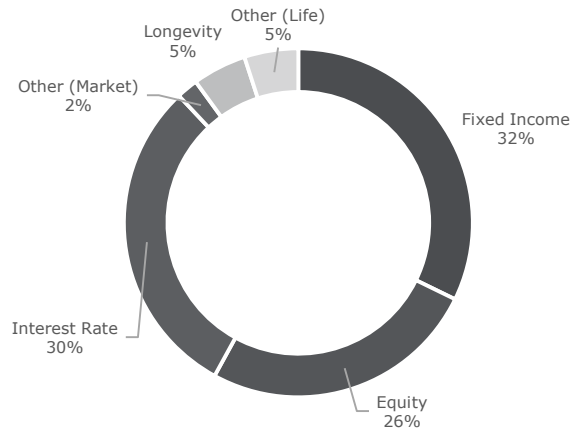
Longevity risk continues to be attractive in terms of diversification, and this is further emphasized in the proposed framework. In fact, adding longevity risk exposure actually *decreases* aggregate capital requirements.

Case Study 2

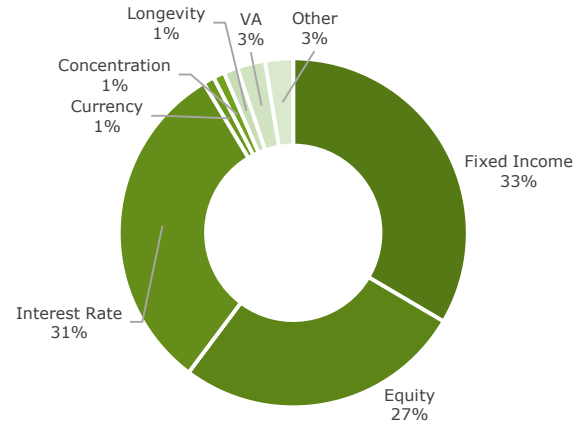
Annuity

46% increase in aggregate capital requirements (prior to operational risk surcharge)

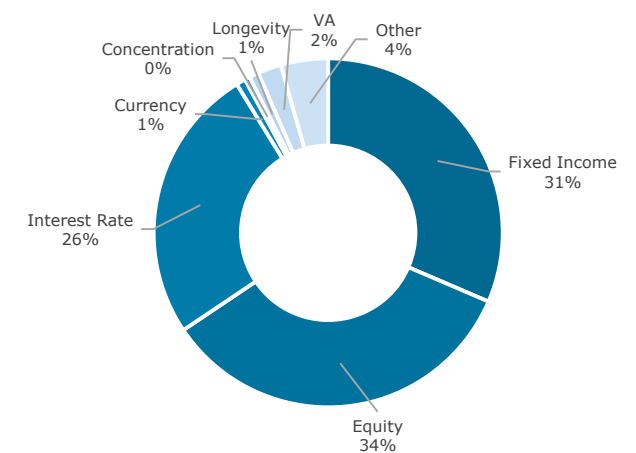
Standalone distribution



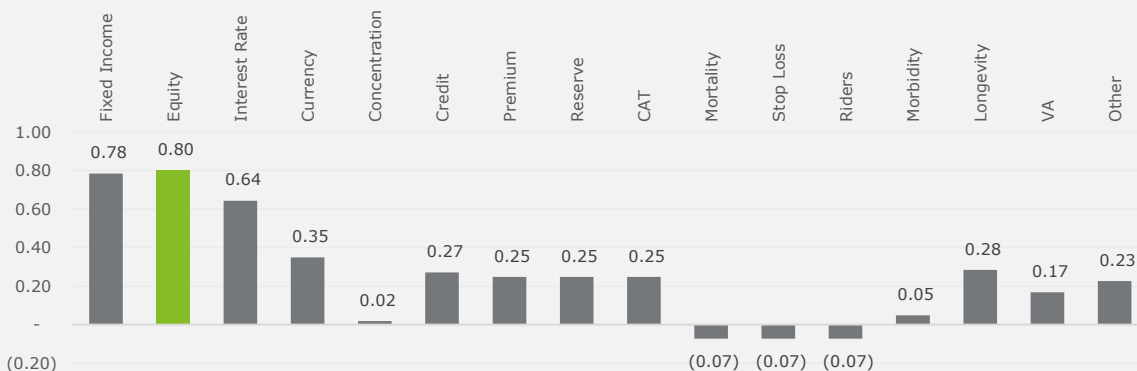
Allocation under current framework



Allocation under proposed framework



Marginal capital charge per risk type



On aggregate, capital requirements for the Annuity risk profile increase 46% under the proposed BSCR changes. Asset risk continues to dominate capital requirements, with **equity risk becoming more pronounced** in light of the proposed changes.

Fixed income and interest rate risks are proportionally unaffected, and in fact interest rate risk diversifies relatively better in the proposed framework. This presents an interesting opportunity to **increase exposure to less liquid fixed income asset classes**.

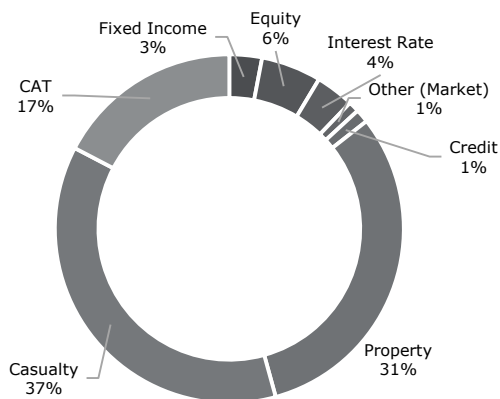
Overall, the proposed changes create a strong incentive to **de-risk the equity portfolio**, particularly in relation to "other" holdings namely non-OECD equities, hedge funds, and alternatives. Potentially, capital savings can be created if some "other" holdings can be classified as fixed income.

Case Study 3

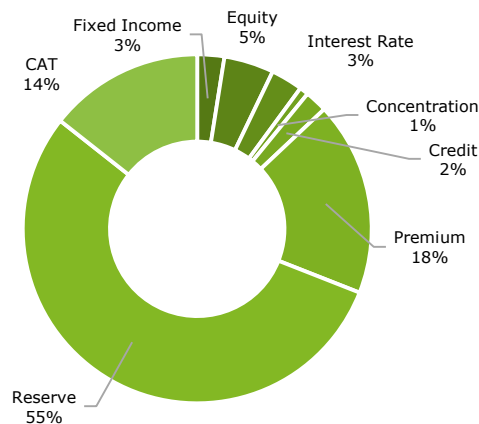
Traditional P&C

20% increase in aggregate capital requirements
(prior to operational risk surcharge)

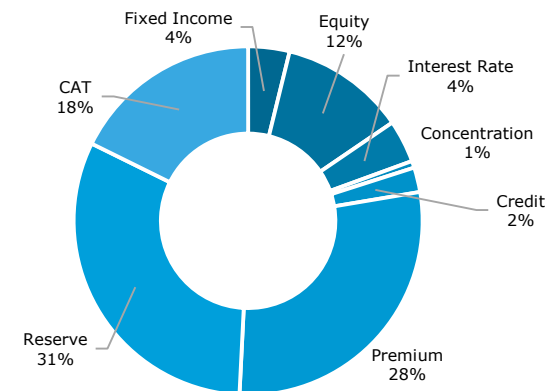
Standalone distribution



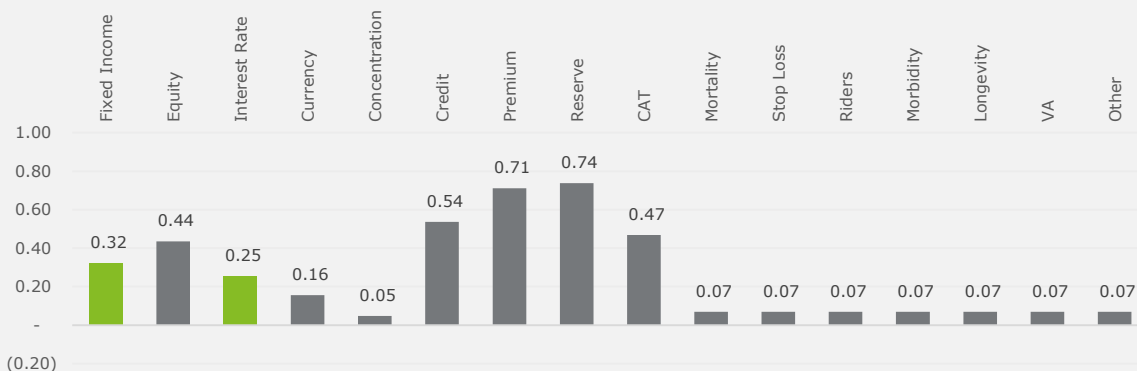
Allocation under current framework



Allocation under proposed framework



Marginal capital charge per risk type



On aggregate, capital requirements for the Traditional P&C risk profile increase 20% under the proposed BSCR changes. The impact is largely driven by the **increase in premium risk exposure and increase in equity risk charge.**

Capital requirements are dominated by insurance risks, which creates a **disproportionate diversification benefit accruing to asset risks.** Thus, the equity-dominant investment strategy is not as heavily penalized.

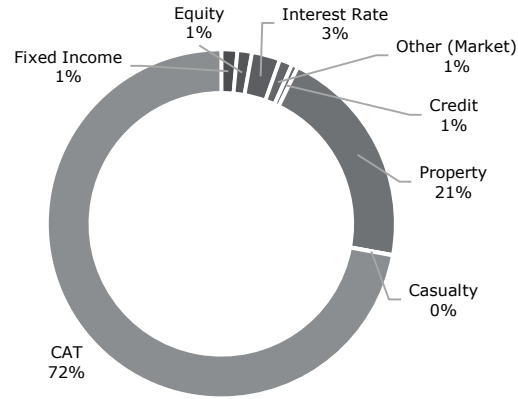
Overall, the proposed changes create a strong incentive to continue the reserve risk driven profile, and creates opportunities to shift investment risk away from equities. In particular, we note potential value creation in **moving into illiquid fixed income asset classes.**

Case Study 4

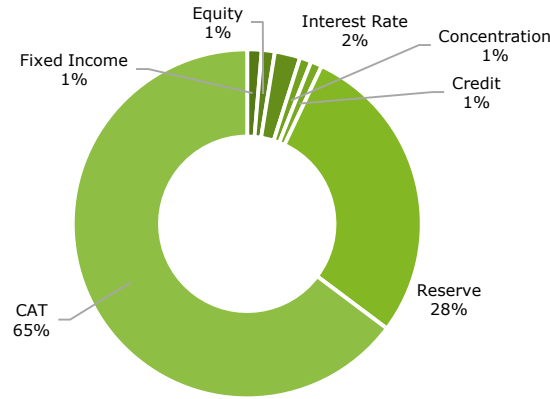
Property Catastrophe

2% increase in aggregate capital requirements
(prior to operational risk surcharge)

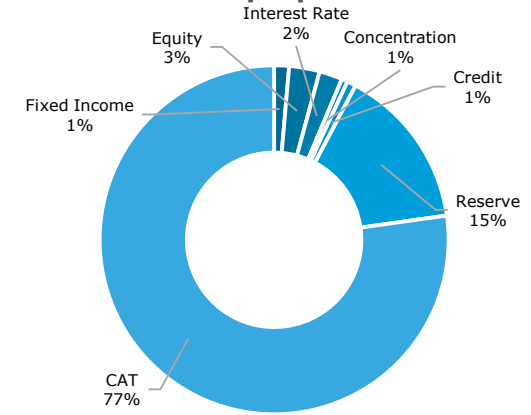
Standalone distribution



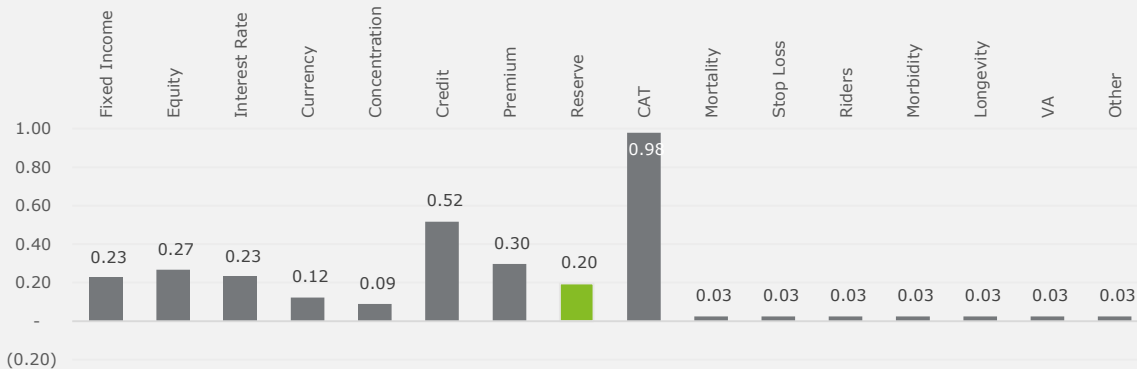
Allocation under current framework



Allocation under proposed framework



Marginal capital charge per risk type



On aggregate, capital requirements for the Property Catastrophe risk profile increase 2% under the proposed BSCR changes.

This highlights the advantage a primarily property catastrophe risk driven profile has in possibly having **zero premium risk due to the catastrophe adjustment.**

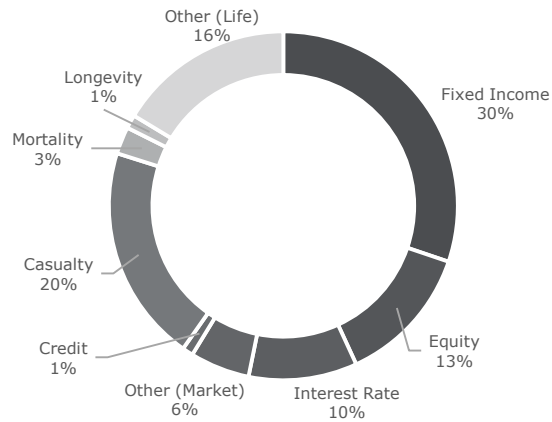
Overall, a primarily property catastrophe risk driven profile is relatively immune to the proposed changes. The changes highlight the **advantage in multi-year exposure relative to traditional peers** and **potential opportunity to add run-off exposure.**

Case Study 5

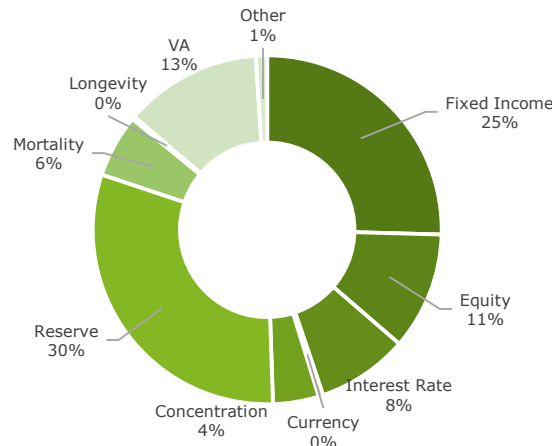
Run-off

39% increase in aggregate capital requirements
(prior to operational risk surcharge)

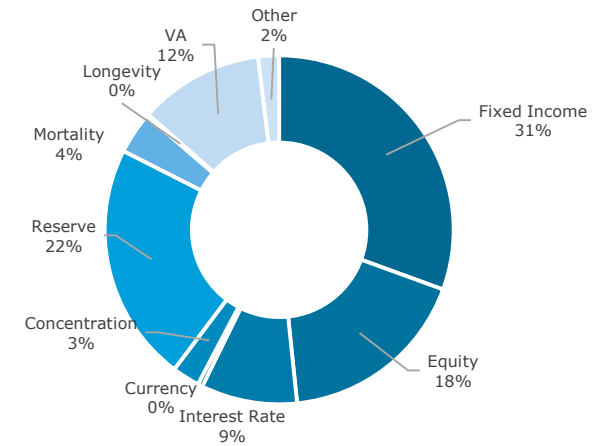
Standalone distribution



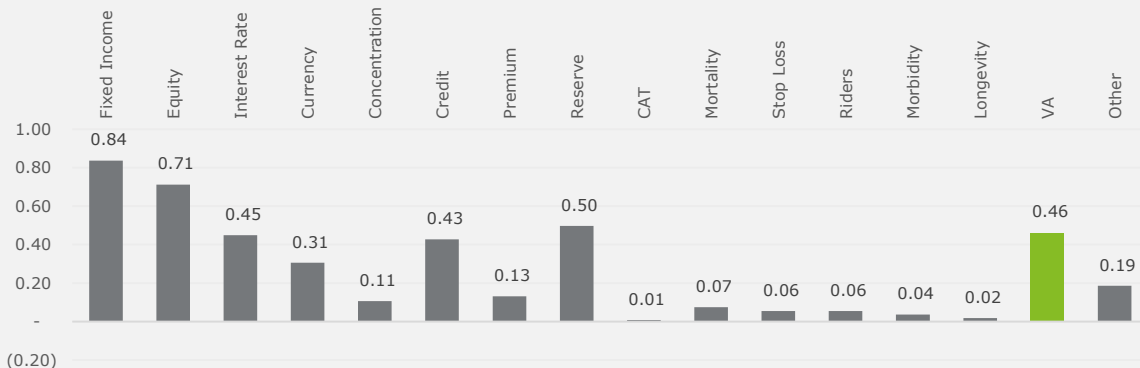
Allocation under current framework



Allocation under proposed framework



Marginal capital charge per risk type



On aggregate, capital requirements for the Run-off risk profile increase 39% under the proposed BSCR changes. This is predominantly because the **diminished diversification benefit is particularly pronounced on asset intensive businesses.**

As seen in other risk profiles, the **increased equity risk charges** also lead to higher capital requirements.

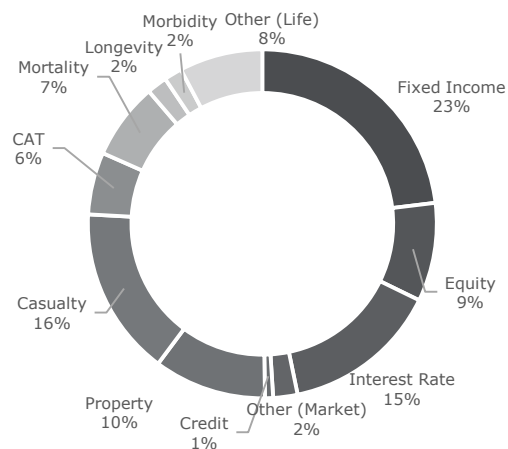
As one would expect, adding more insurance risk exposure to this deliberately asset-intensive profile would be the best source of diversification; however, it likely doesn't fit the business strategy. Alternatively, we note the **potential to stop hedging market guarantees** as a means of creating market exposure but still generating the diversification benefits afforded to variable annuities.

Case Study 6

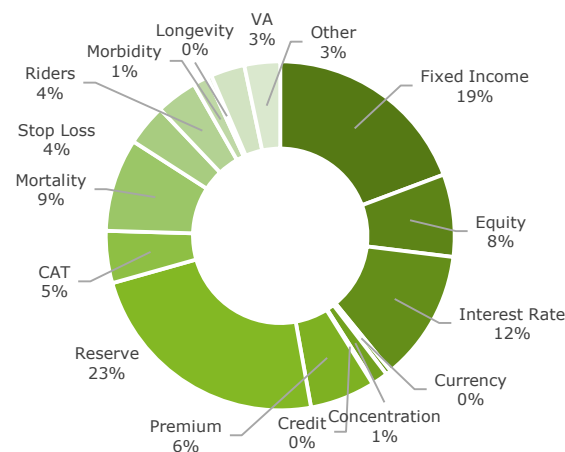
Group

44% increase in aggregate capital requirements
(prior to operational risk surcharge)

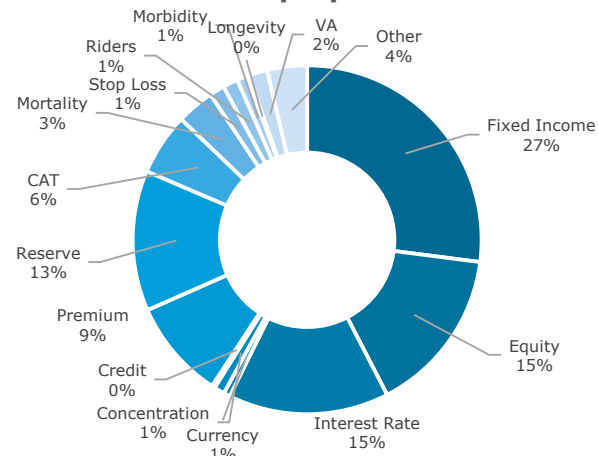
Standalone distribution



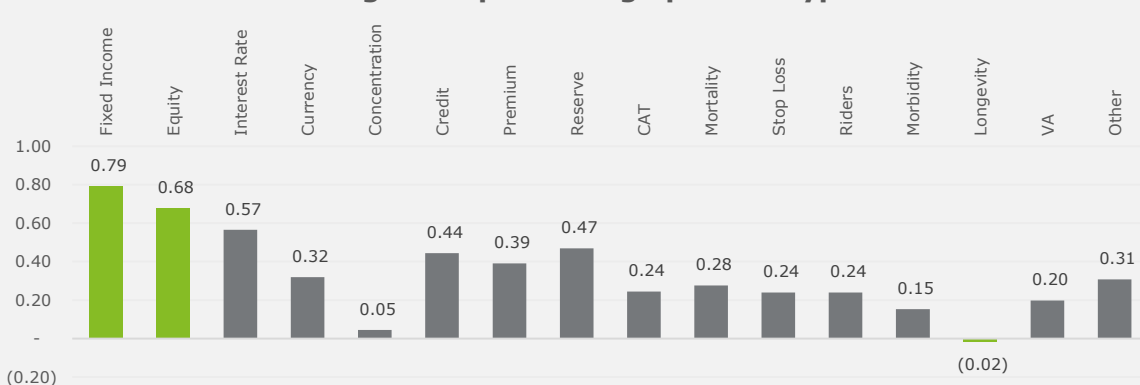
Allocation under current framework



Allocation under proposed framework



Marginal capital charge per risk type



On aggregate, capital requirements for the Group risk profile increase 44% under the proposed BSCR changes. This is predominantly driven by a **combination of factors described for other profiles**, namely increased equity risk and premium risk coupled with less diversification.

As seen with long-term risk profiles, **longevity is an attractive source of diversification**, and this is again emphasized in the Group context.

We note that the asset portfolio is less impacted for the Group profile relative to others, as we expect them to already have a diverse allocation between equity and fixed income, given the varying duration and liquidity profiles of their products. Thus, there is **no strong motivation to de-risk or otherwise rebalance the investment mix**.

Operational risk

The capital requirement for operational risk is determined as a percentage of the (diversified) aggregate capital for other risk types. As it has a linear impact on the overall capital requirements, we didn't consider it in the above case studies. However, the implication of the proposed changes to operational risk is nonetheless significant.

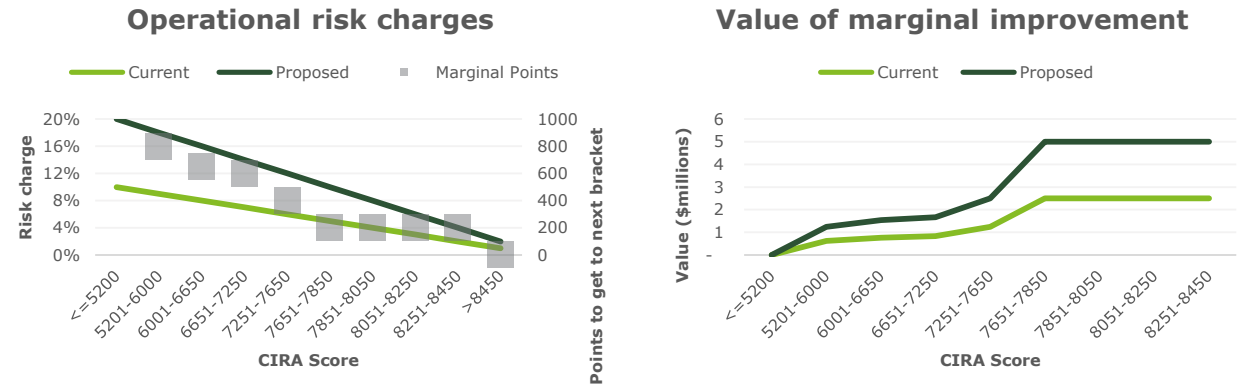
As mentioned, the operational risk surcharge under the proposed changes is doubled. This doubles the capital incentive to improve the insurer's score on the Commercial Insurer Risk Assessment (CIRA), which is mapped to a corresponding operational risk surcharge. The charges are summarized in Table 2.

Table 2

CIRA score	Current charge	Proposed charge
<=5200	10%	20%
5201-6000	9%	18%
6001-6650	8%	16%
6651-7250	7%	14%
7251-7650	6%	12%
7651-7850	5%	10%
7851-8050	4%	8%
8051-8250	3%	6%
8251-8450	2%	4%
>8450	1%	2%

Points are awarded based on the insurer's capabilities with respect to risk identification, measurement, response, and monitoring & reporting across various operational risk areas, as well as overall best practices of the corporate governance and risk management functions.

The interesting outcome of the proposed change is that the incentive to obtain enough points to move to the next tier is doubled. We illustrate this by looking at how much capital a hypothetical company would save by moving up to each next tier. Suppose our hypothetical company has an aggregate capital requirement (prior to the surcharge) of \$1B. Our analysis is summarized below.



In the schedule of charges, the lower tiers are wider, meaning that substantially more points need to be scored in order to realize capital savings. However, as the insurer moves to into higher CIRA score tiers, the linearity of the charge schedule implies that the value to be realized from investing in operational risk mitigation increases (and is doubled under the proposed changes). Our **hypothetical \$1B company saves \$5M in capital for each 50 points** scored in the higher brackets.

Conclusions

The proposed BSCR changes will have a significant impact on the capital profiles of Bermuda insurance companies. In general, we note that insurers can expect increased capital requirements on aggregate.

Furthermore, the changes to the method of risk aggregation present new and interesting capital optimization opportunities for practitioners. The new framework necessitates a more dynamic and holistic view on capital planning, and the interdependencies between risk exposures are emphasized. Of course, this is in addition to continued evaluation of other risk dimensions, such as impact on earnings volatility or liquidity.

Based on our illustrative risk profiles, we expect the aggregate capital increases to vary significantly, in the range of 2%-46%. Notwithstanding the unique property catastrophe profile, which appears relatively immune to the proposed changes, we expect traditional insurance strategies to observe moderate increases and asset-intensive strategies to observe significant increases in capital requirements. In light of these changes, we anticipate insurers to explore the use of company specific parameters and, eventually, internal models to better reflect their specific risk profiles.

Overall, the proposed changes incentivize the following value creating capital decisions:

- Balancing insurance and investment risk exposures on aggregate
- Creating a diversified mix of mortality and longevity exposures for long-term insurers
- De-risking equity exposure in favor of fixed income asset classes
- Exploring the reclassification of certain equity holdings as fixed income
- Diversifying across product lines for general insurers
- Adding multi-year exposures and/or run-off business to property catastrophe portfolios
- Leaving market guarantees unhedged
- Consolidating varying duration and liquidity profiles
- Investing in formal operational risk policies and processes

Gokul Sudarsana

Senior Manager

T: +1 441 298 1132

M: +1 441 524 1159

gokul.sudarsana@deloitte.com

Hana Alnajjab

Manager

T: +1 441 298 1144

M: +1 441 524 1144

hana.alnajjab@deloitte.com



Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee (“DTTL”), its network of member firms, and their related entities. DTTL and each of its member firms are legally separate and independent entities. DTTL (also referred to as “Deloitte Global”) does not provide services to clients. Please see www.deloitte.com/about for a more detailed description of DTTL and its member firms. Deloitte & Touche is an affiliate of DCB Holding Ltd., a member firm of Deloitte Touche Tohmatsu Limited.

Deloitte provides audit, consulting, financial advisory, risk management, tax and related services to public and private clients spanning multiple industries. Deloitte serves four out of five Fortune Global 500® companies through a globally connected network of member firms in more than 150 countries bringing world-class capabilities, insights and high-quality service to address clients’ most complex business challenges. To learn more about how Deloitte’s approximately 225,000 professionals make an impact that matters, please connect with us on Facebook, LinkedIn or Twitter.

The Deloitte Caribbean and Bermuda Countries (CBC) offices are affiliates of DCB Holding Ltd., a member firm of Deloitte Touche Tohmatsu Limited. Located in the Bahamas, Barbados, Bermuda, British and United States Virgin Islands, Cayman Islands and Trinidad & Tobago, the CBC team offers wide-ranging technical and commercial expertise, along with the market insights to help clients meet their business goals.

This communication contains general information only, and none of Deloitte Touche Tohmatsu Limited, its member firms, or their related entities (collectively, the “Deloitte Network”) is, by means of this communication, rendering professional advice or services. No entity in the Deloitte network shall be responsible for any loss whatsoever sustained by any person who relies on this communication.

© 2017 DCB Holding Ltd. and its affiliates.