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Viewpoint

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Case Study: Optimizing Investment Returns for a US Insurer

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In this short paper we explore the opportunities available to insurers to improve their asset allocations through customized analysis.

Introduction & Background

Insurance companies have historically relied on fixed-income asset classes and corporate bonds due to their predictable cash flows and relatively stable yields. While traditionally considered lower-risk assets, trade and political risks are also proving to be viable contenders across fixed-income asset classes. These increased risks, coupled with a low-rate environment that appears to be here for the long term, have tightened fixed-income spreads. As a result, many insurers are seeking alternative asset classes with higher-yield opportunities as part of their investment strategy.

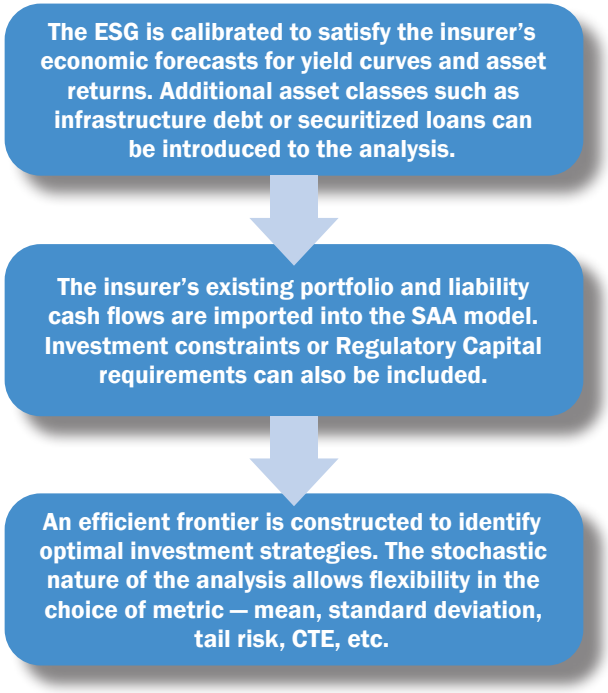
With moves to new asset classes comes increased credit and market risk. Insurers need to effectively balance the search for increasing yield while reducing their risk exposure. For example, added diversification — and thereby multiple return sources — can translate to a better-adjusted portfolio that focuses on taking smart risks as opposed to simply chasing yield.

Many insurers are taking a fresh look at their asset allocation methodology to see how they can optimize their investment strategy. Insurers not only need to reassess whether their investment strategies are appropriate, but also to:

a) ensure that they are optimizing the overall contribution of the investment portfolio to the long-term value of the company, and

b) demonstrate that they have a robust approach to market risk management and integrate both actuarial and investment departments in the decision-making process.

This requires a new approach to investment decision making, an approach requiring a holistic view of the company. It is no longer adequate for investment teams to maximize returns with a set of constraints given by actuarial colleagues. Modern investment managers optimize risk and return while balancing the frequently competing impacts of liquidity, capital adequacy, diversification, and the requirements resulting from the liability side of the business. The traditional mean-variance approaches to strategic asset allocation (SAA) are therefore no longer adequate to help the investment function achieve their goals.



A New Framework for Strategic Asset Allocation

A holistic SAA approach uses stochastic asset returns from an appropriately calibrated Economic Scenario Generator (ESG) and simultaneously projects liability cashflows, enabling a rigorous assessment of the impact of each investment strategy on the overall performance of the enterprise.

This framework addresses several deficiencies in traditional SAA approaches:

1. When using a stochastic asset projection, yield curves evolve from their initial position towards the steady-state target, ensuring that the returns of bonds and other asset classes reflect the current economic environment and are not static over time. In contrast, a mean-variance approach relies on a single mean return assumption for each asset class which does not vary over time. This deficiency is further compounded when the model allows for future liability cash flows which cause fixed income assets to be bought or sold in a future where yield curves are expected to be at a different level from their current position.
2. A robust Economic Scenario Generator will generate returns with heavier, asymmetric tails which more closely resemble historical data than the Normal distribution assumed under the mean-variance approach. Any approach which ignores the skewness and kurtosis of returns can result in investors underestimating the risk of the strategies that they model.
3. A stochastic SAA supported by an appropriately calibrated Economic Scenario Generator will produce non-constant correlation of asset class returns, capturing higher correlations in times of extreme economic events. An approach which assumes constant correlation between asset class returns is not only ignoring economic reality but also risks producing questionable analyses which overstate diversification benefits.
4. Including liability cash flows has several benefits. First, as noted above, changes in the yield curve over time will impact the market value of assets, meaning the timing and amount of liability cash flows will affect the choice of optimal investment strategy. Secondly, a sufficient quantity of liquid assets (with the appropriate accounting classification) should always be available to meet the liability cash flows. Lastly, incorporating liability cash flows allows the optimization to target alternative metrics such as Economic Capital.
5. Following on from the previous point, a stochastic SAA approach can use a variety of risk measures; for example, the tail value at risk can illustrate the potential capital shortfall a company might face in an adverse event, and hence provide a valuable data point in the decision-making process. In contrast, most traditional methods only focus on the mean and standard deviation of returns.

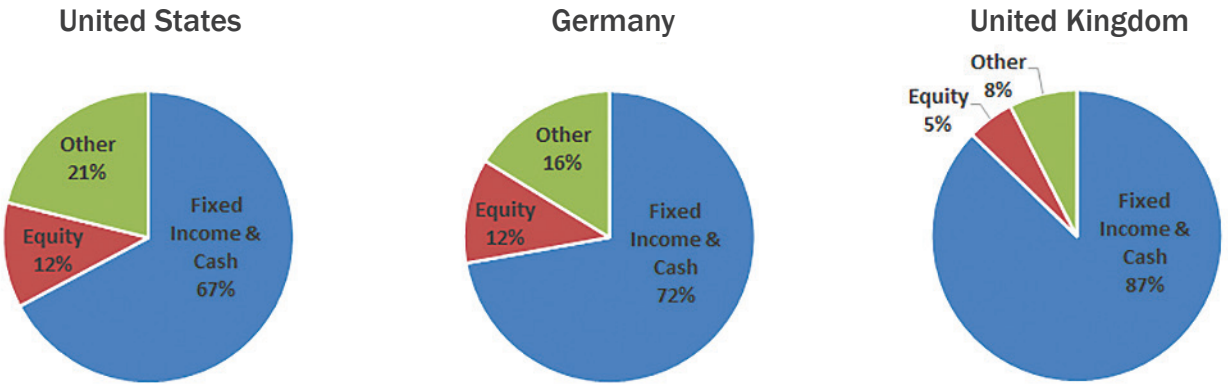


Figure 1: Asset allocation of domestic insurance companies (all sectors) as at 31st December 2018. Prepared by Conning, Inc. Source: OCED/2020, Insurance Markets in Figures, https://www.oecd.org/daf/fin/insurance/Global-Insurance-Market-Trends-2019.xlsx.

Case Study — Implementing the Framework

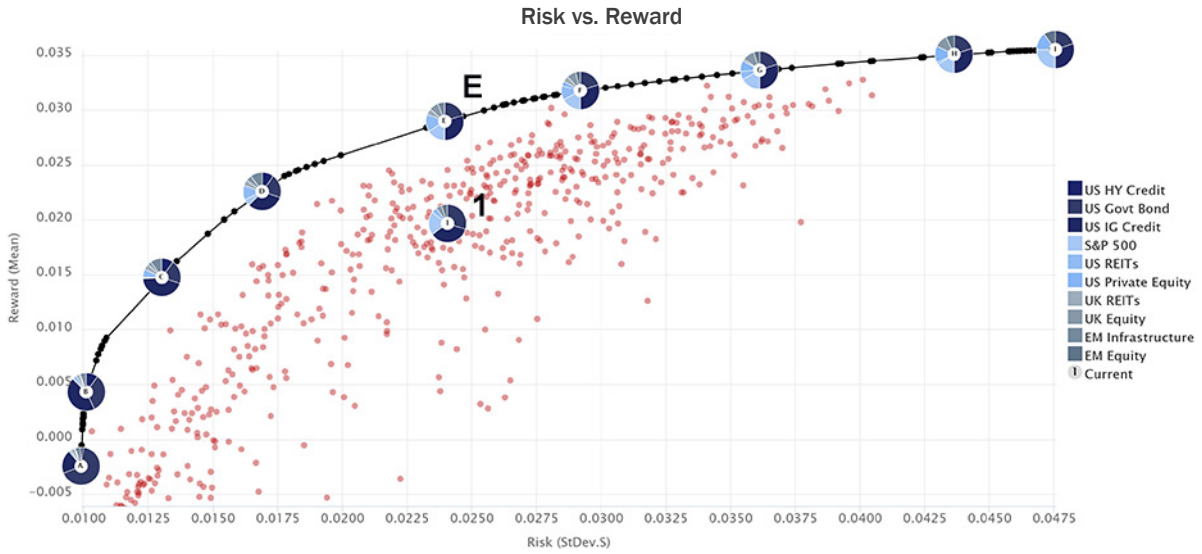
The case study considers a typical insurer with portfolio holdings of 65% fixed income and 35% risk assets. For the purposes of the SAA, the insurer decides on a minimum allocation constraint of 50% to fixed income and a minimum duration of 9 years. This analysis uses stochastic asset class projections from GEMS® Expert View calibration, which is trusted by Conning's client base across the world, but the model is highly flexible and can accommodate an insurer's own views.

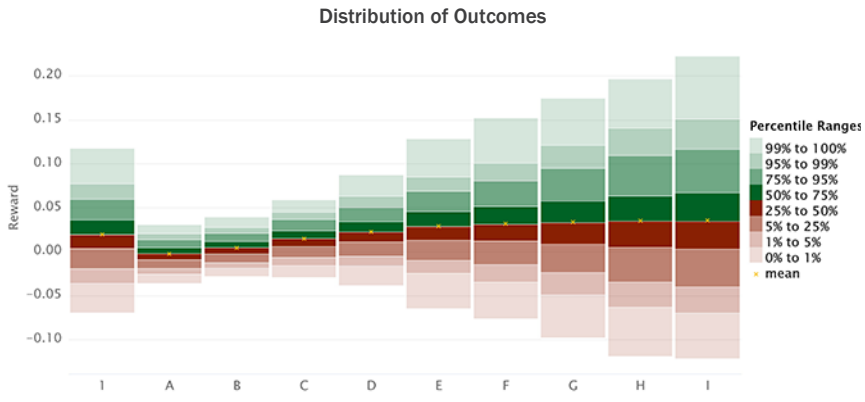
The framework follows a phased approach which allows each stage to be evaluated and validated before introducing additional detail and new analyses.

1. Stochastic SAA

This initial optimization is being performed on an "asset only" basis, which illustrates how the different portfolios could perform over a 5-year period. The insurer's current allocation is included in the analysis for reference as point 1.

The analysis shows that point E has the closest level of risk (standard deviation of asset returns) to the insurer's current portfolio, while offering a significantly higher average return. The analysis suggests the increased return could be achieved by rebalancing from fixed income into riskier assets, including overseas assets. To offset some of this increased risk point E has reduced the duration of the fixed income slightly, while still maintaining a duration above 9, and shifted slightly from US equity into US REITs and from EM equity into infrastructure-backed debt. Whilst the individual asset class allocations may appear riskier on a standalone basis the diversification benefit offsets some of that risk while generating a higher return than the current portfolio.





	1	A	D	E	F	G
US Govt Bond — 1 to 5y	5%	29%	4%	7%	7%	7%
US Govt Bond — 5 to 15y	10%	11%	5%	4%	4%	4%
US Govt Bond — 15 to 30y	15%	27%	11%	9%	9%	9%
US IG Credit — 1 to 5y	20%	20%	10%	13%	13%	13%
US IG Credit — 5 to 15y	15%	0%	22%	17%	17%	17%
US HY Credit	0%	2%	10%	0%	0%	0%
S&P 500	20%	0%	6%	16%	17%	17%
US REITs	5%	2%	12%	15%	12%	7%
US Private Equity	0%	0%	0%	0%	4%	9%
UK REITs	0%	3%	5%	5%	5%	2%
UK Equity	5%	1%	5%	8%	8%	10%
EM Infrastructure	0%	5%	10%	6%	0%	0%
EM Equity	5%	0%	0%	0%	4%	5%
Duration	9.6	9.0	9.1	9.0	9.0	9.0
Risk — SD return	2.4%	1.0%	1.7%	2.4%	2.9%	3.6%
Reward — Avg return	2.0%	-0.3%	2.3%	2.9%	3.2%	3.4%

Figure 2: These charts show the distribution of investment return, including the mean and standard deviation, for a range of portfolio allocations. The investment return is the annualized figure from a 5-year projection which starts on 30th June 2020. Prepared by Conning, Inc. Source: Conning's Allocation Optimizer using investment returns from GEMS® Economic Scenario Generator.

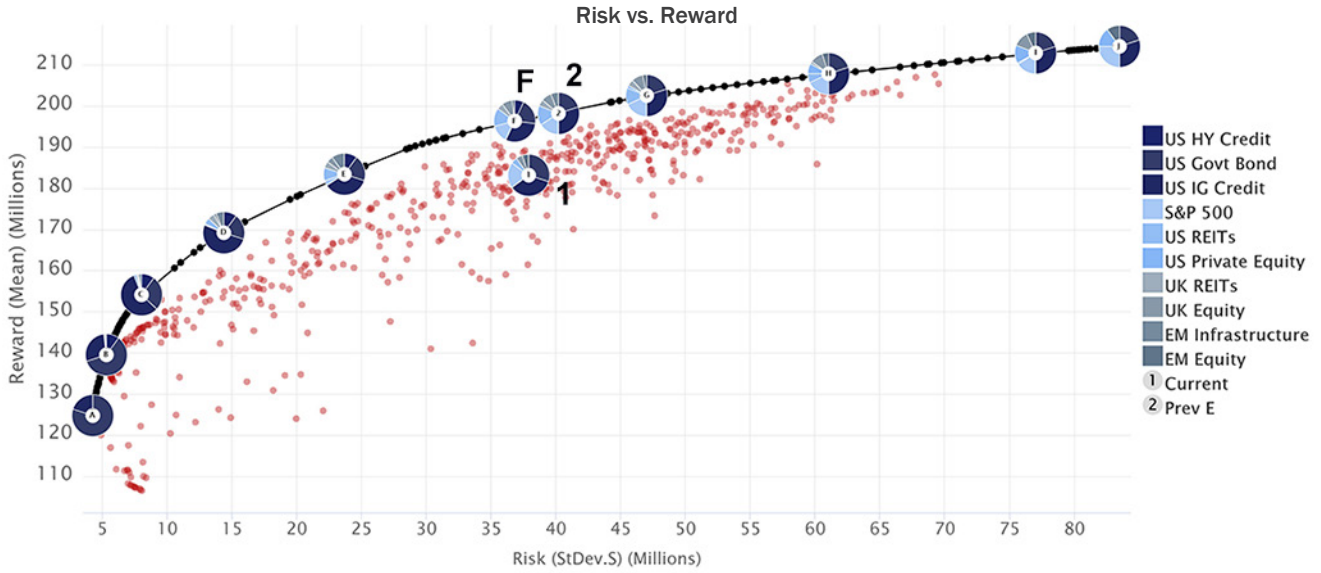
2. Incorporating Liabilities into the SAA

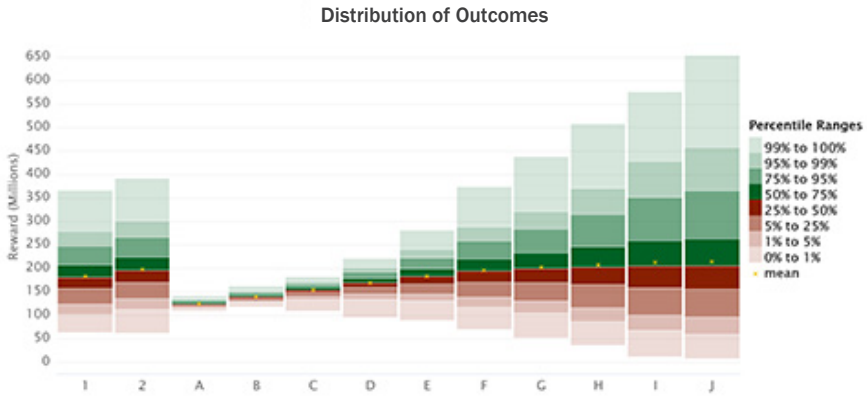
The next step in the analysis is to understand how the insurer's liabilities would affect the alternative investment strategy considered above. The efficient frontier now uses risk and reward metrics of standard deviation and average Economic Value respectively, where Economic Value is calculated as the market value of assets minus the present value of liabilities, with the present value of liabilities varying by path depending on the term structure of the discount curve calculated in the ESG. In addition to the insurer's current allocation (point 1), point E from the asset-only SAA is included in the analysis for comparison (point 2).

The Economic Value analysis is subtly different from the asset-only analysis, illustrating how incorporating liabilities will affect the optimal investment strategy.

In this analysis, point F has the closest level of risk to the insurer's current portfolio, measured as standard deviation of Economic Value. In common with the previous analysis, the higher return is achieved by moving from fixed income into riskier assets, although compared to the optimal portfolio from the previous analysis (point 2), point F allocates funds to high-yield credit instead of infrastructure debt. This change in the optimal portfolio can be explained by looking at the Expert View calibration, which projects that, on average, interest rates will rise over time; although the rising rates will hit the market value of assets, they will also decrease the (negative) present value of future liability claims, which offsets the overall hit to Economic Value. Therefore, the high-yield credit asset class becomes more attractive when liabilities are included in the analysis.

Additionally, to offset the short duration of the high-yield credit, the average duration of the investment-grade credit is increased, ensuring the portfolio duration remains at 9 years.





	1	2	D	E	F	G
US Govt Bond — 1 to 5y	5%	7%	7%	7%	7%	7%
US Govt Bond — 5 to 15y	10%	4%	4%	4%	4%	4%
US Govt Bond — 15 to 30y	15%	9%	9%	9%	9%	9%
US IG Credit — 1 to 5y	20%	13%	7%	5%	7%	13%
US IG Credit — 5 to 15y	15%	17%	44%	31%	23%	17%
US HY Credit	0%	0%	10%	10%	7%	0%
S&P 500	20%	16%	1%	4%	14%	18%
US REITs	5%	15%	5%	10%	14%	13%
US Private Equity	0%	0%	0%	0%	0%	2%
UK REITs	0%	5%	5%	5%	5%	5%
UK Equity	5%	8%	2%	5%	8%	9%
EM Infrastructure	0%	6%	6%	10%	0%	0%
EM Equity	5%	0%	0%	0%	2%	3%
Duration	9.6	9.0	9.0	9.0	9.0	9.0
Risk — SD return	37.9	40.2	14.4	23.7	36.9	47.0
Reward — Avg return	183.0	198.0	169.0	183.2	196.2	202.3

Figure 3: These charts show the distribution of Economic Value, including the mean and standard deviation, for a range of portfolio allocations. The Economic Value is calculated at the end of a 5-year projection which starts on 30th June 2020. Prepared by Conning, Inc. Source: Conning's Allocation Optimizer using investment returns and liability cash flows from GEMS® Economic Scenario Generator.

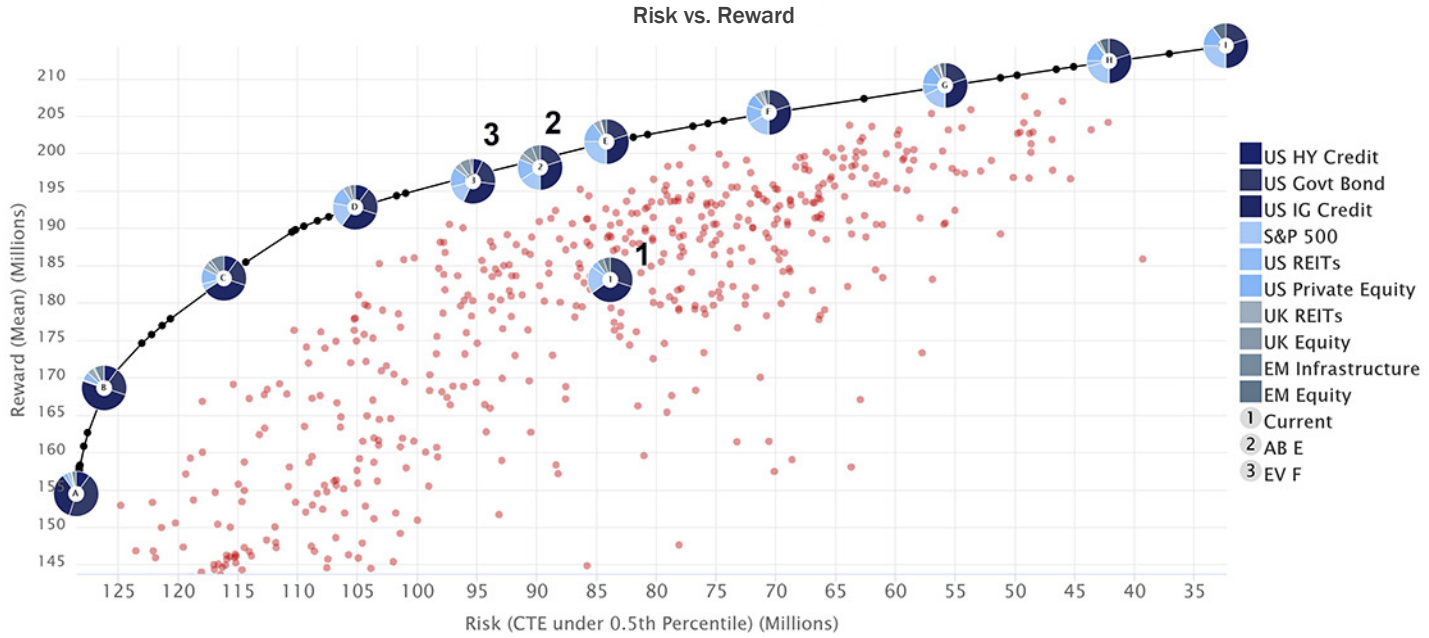
3. Alternative Measures of Risk

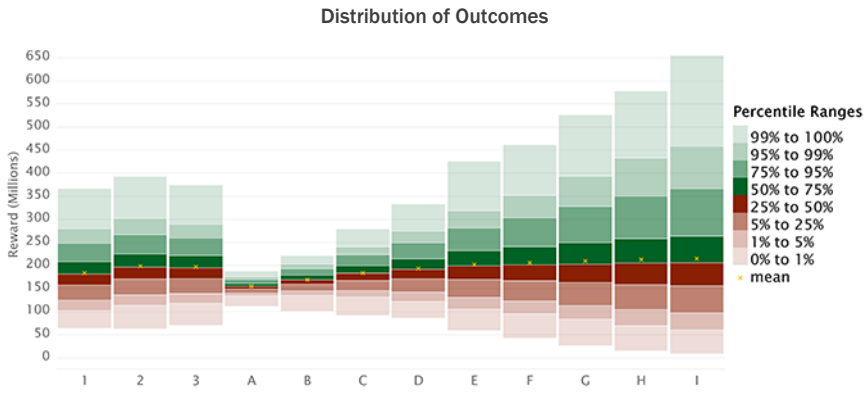
The analysis now looks at an alternative risk metric — the conditional tail expectation of the Economic Value at a 0.5% level. This risk metric shows the shareholder how much the portfolio may be worth in an extreme market event. This metric provides an additional perspective on the different allocations, giving the investment manager a deeper understanding of the potential investment risks.

In addition to the insurer's current allocation (point 1), point E from the asset-only SAA (point 2) and point F from the Economic Value Mean-SD SAA (point 3) are included in the analysis for comparison.

The analysis shows that points 2 and 3 perform better than point 1 below the 0.5% level. It is interesting to note that the insurer's existing portfolio, point 1, performs quite badly on this metric. This is the result of too much concentration in vanilla fixed income and equity, without enough diversification, both across asset classes and also internationally to different economies.

The analysis shows that the riskier frontier points, from point E and above, do not contain any high-yield credit as the risk budget is allocated to the riskier asset classes such as private equity and EM equity. Although these scenarios have the highest Economic Value on average across all scenarios, the average loss in a 1-in-200 tail event can be in excess of 150 million over the 5-year horizon of the analysis. In contrast, from point D and below the portfolios allocate more to medium-risk assets such as high-yield credit and REITs which do not perform as badly in the 1-in-200 tail event.





	1	2	3	D	E	H
US Govt Bond — 1 to 5y	5%	7%	7%	7%	7%	7%
US Govt Bond — 5 to 15y	10%	4%	4%	4%	4%	4%
US Govt Bond — 15 to 30y	15%	9%	9%	9%	9%	9%
US IG Credit — 1 to 5y	20%	13%	7%	4%	13%	13%
US IG Credit — 5 to 15y	15%	17%	23%	26%	17%	17%
US HY Credit	0%	0%	7%	10%	0%	0%
S&P 500	20%	16%	14%	18%	25%	21%
US REITs	5%	15%	14%	13%	15%	4%
US Private Equity	0%	0%	0%	0%	0%	15%
UK REITs	0%	5%	5%	5%	5%	1%
UK Equity	5%	8%	8%	0%	1%	2%
EM Infrastructure	0%	6%	0%	4%	0%	0%
EM Equity	5%	0%	2%	0%	4%	7%
Duration	9.6	9.0	9.0	9.0	9.0	9.0
Risk — SD return	83.8	89.7	95.3	105.1	84.1	42.1
Reward — Avg return	183.0	198.0	196.2	192.7	201.5	212.3

Figure 4: These charts show the distribution of Economic Value, including the mean and conditional tail expectation, for a range of portfolio allocations. The Economic Value is calculated at the end of a 5-year projection which starts on 30th June 2020. Prepared by Conning, Inc. Source: Conning's Allocation Optimizer using investment returns and liability cash flows from GEMS® Economic Scenario Generator.

Conclusion

The case study shown above illustrates how Conning's stochastic SAA framework offers insurers multiple benefits, from accurately measuring asset returns, correlations, and tail risk, to capturing the impact of liabilities, all through a range of different risk metrics. Conning tools can also produce further analysis on the aggregation of risks at a group level, showing how each portfolio impacts regulatory capital requirements and how the portfolios may affect earnings.

About the Authors

Daniel Finn, FCAS, ASA, is a Managing Director at Conning, where he is the Head of North America for the Risk Solutions unit. In that role, he leads a team that is responsible for providing asset-liability and integrated risk management advisory services to life, health and property/casualty insurance company clients and pension clients.

Mark Saunders, FIA, CERA, is a Director within Conning's European Risk Solutions operations, where he is responsible for providing ALM and SAA modelling and advice to insurance companies and pension funds. He also leads the product management of Conning's stochastic modeling software.

Advantages of Conning's SAA Framework

- Browser-based tool provides useful analysis from day one, utilizing cloud computing to run stochastic optimizations in a few minutes.
- Conning's tool works with the GEMS® Economic Scenario Generator or allows clients to "drag-and-drop" asset class returns from their own model directly into the system.
- Incorporates investment constraints, duration limits, liability cash flows, taxes, and regulatory capital.

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About Conning

Conning (www.conning.com) is a leading investment management firm with a long history of serving the insurance industry. Conning supports institutional investors, including insurers and pension plans, with investment solutions, risk modeling software, and industry research. Conning's risk management software platform provides deeper insights for decision making, regulatory and rating agency compliance, strategic asset allocation, and capital management. Founded in 1912, Conning has investment centers in Asia, Europe and North America.