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Viewpoint

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RISK SOLUTIONS | WHITE PAPER

# AIRG vs. GOES: Efficient Portfolio Analysis

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## Overview

To help users better understand the impact of moving from the Academy Interest Rate Generator (AIRG) to the new Generator of Economic Scenarios (GOES) scenarios, Conning has prepared a series of short articles that focus on small, easily comparable differences between the two sets of scenarios. The first three articles compared the results for three different types of assets:

- Part 1 looked at included bond classes
- Part 2 looked at equity classes
- Part 3 looked at derived asset classes, including MBS, CMBS, CLOs and private equity

In this paper, we pull this information together and look at its impact on potential asset allocation decisions, constructing efficient portfolios based upon the respective AIRG and GOES scenarios. This will give us valuable insights into the asset class risk/reward trade-offs and asset allocation implications under each scenario set.

## Allocation Optimization

To construct the efficient frontier, we used the Conning Allocation Optimizer®, a cloud-enabled software tool used by Conning and other institutional investors to perform strategic asset allocation analysis. The Coning Allocation Optimizer® uses advanced optimization techniques to find the set of portfolio allocations that produce the highest reward for each given level of risk, subject to a set of user-specified constraints. In the tool, the definitions of reward and risk are flexible and include asset-only as well as asset-liability objectives. For this application, we used an asset-only objective, where reward is defined as the cumulative return and risk is defined as the standard deviation of cumulative return. Both metrics are calculated over a five-year horizon. To make the results more intuitive, both reward and risk statistics are presented on an annualized basis.

## AIRG and GOES Scenarios

For this analysis, we ran 1,000 AIRG scenarios for five years with a December 2023 start date. These scenarios included simulated total returns for the seven standard asset classes included in the ARIG plus four additional asset classes:

- Money market
- Intermediate government bonds
- Long investment grade corporate bonds
- Large cap equity
- Small cap equity
- International diversified equity
- Aggressive equity
- MBS
- CMBS
- CLO IG
- Private equity

The MBS, CMBS, CLO and private equity asset classes were modeled according to the approach described in our previous paper AIRG vs. GOES: Robust Asset Classes.

We also created a comparable five-year, 1,000-scenario set using the GOES model for Conning's Robust Data Set based on a December 2023 start date.[1] This included the asset classes from the basic data set plus a number of additional asset classes. For this analysis, we included MBS, CMBS, CLO and private equity asset classes, just as we did for the AIRG. Unlike the AIRG, the GOES scenarios include separate results for price and income returns. While this difference is not relevant to this analysis, having separate price and income returns allows for optimization on more sophisticated metrics such as the present value of distributable earnings (PVDE).

1 The GOES scenarios are based on the latest proposed parameters, including the Dynamic GFF and updated equity parameters.

## Efficient Frontiers

Once the simulation results were loaded into the Allocation Optimizer, we ran an optimization to produce an efficient frontier. To better enable a comparison between the two sets, we created a user-specified portfolio so that we could compare the same allocation under both scenario sets. This reference portfolio is based on the average life industry allocation shown in **Figure 1**.

We used the 2024 allocation with 16% allocated to MBS and 1% to large cap. The 4% allocation to BA assets was mapped 75% to long investment-grade corporate bonds and 25% to small cap, while the 3% allocation to "other" was assigned to private equity. The 76% allocation to cash and bonds was mapped 64.5% to long investment-grade corporates, 16% to intermediate government, 9% to CMBS, 6.5% to CLO, and 4% to money market.

**Table 1: Mapping of Life Industry Allocation to Asset Classes**

| Asset Class | Life Industry Portfolio % |
|---|---|
| Money Market | 3 |
| Intermediate Government Bonds | 12 |
| Long Investment Grade Corporate Bonds | 52 |
| Large Cap Equity | 1 |
| Small Cap Equity | 1 |
| Aggressive (US) Equity | - |
| International Diversified Equity | - |
| MBS | 16 |
| Private Equity | 3 |
| CMBS | 7 |
| CLO IG | 5 |

For ease of comparison, we use the GOES asset class labels consistently for both the AIRG and GOES frontiers.

For our initial optimizations, we wanted to observe an efficient frontier with as few asset class constraints as possible. However, to keep the frontier focused on a relevant set of allocations, we individually constrained equity asset classes to 10%.

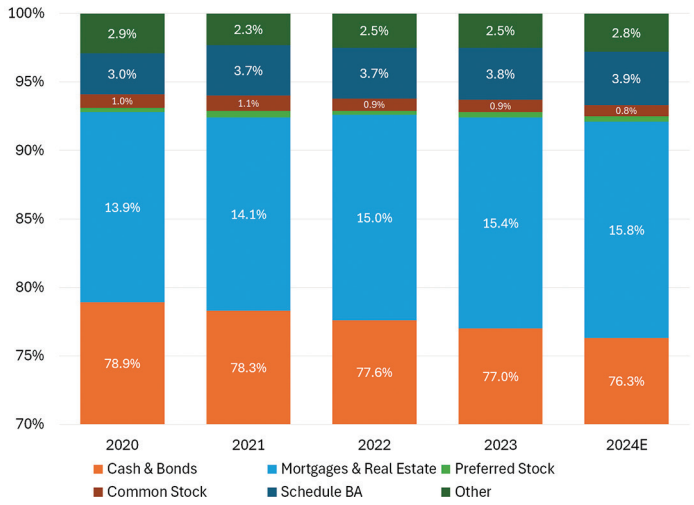
## Frontier Comparison

Our first observation is that the life industry allocation produces a lower return and higher risk under the GOES scenarios than under the AIRG scenarios. Under the GOES scenarios, return is 14 bps lower while risk is 59 bps higher.

**Table 2: Life Industry Portfolio Statistics**

| | AIRG Scenarios | GOES Scenarios |
|---|---|---|
| Mean Return (Reward) | 4.93% | 4.79% |
| Standard Deviation (Risk) | 2.00% | 2.59% |
| 95th Percentile Return | 8.3% | 9.0% |
| 5th Percentile Return | 1.8% | 0.4% |

**Figure 1: Life Industry Average Asset Allocation**

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Consistent with the higher standard deviation, the range of portfolio returns is wider under the GOES scenarios. Under the AIRG scenarios, there is a 90% chance of observing returns between 1.8% and 8.3%, for a range of 6.5%. Under the GOES scenarios, this range increases to 8.6%.

These conclusions are consistent with the observations in our prior papers AIRG vs. GOES: Comparing Bond Classes and AIRG vs. GOES: Robust Asset Classes, which found that fixed income returns are significantly more volatile in the GOES scenarios than the AIRG.

Next, we compare the frontier allocations. Under the AIRG scenarios shown in **Figure 2** (page 3) long investment-grade corporate bonds and MBS dominate while intermediate government bonds and CLOs are more prominent under the GOES scenarios shown in **Figure 3** (page 4). For example, the maximum-reward portfolios (portfolio I) on the two frontiers contain a 50% allocation to long investment-grade corporate bonds on the AIRG frontier and a 50% allocation to CLO IG on the GOES frontier.

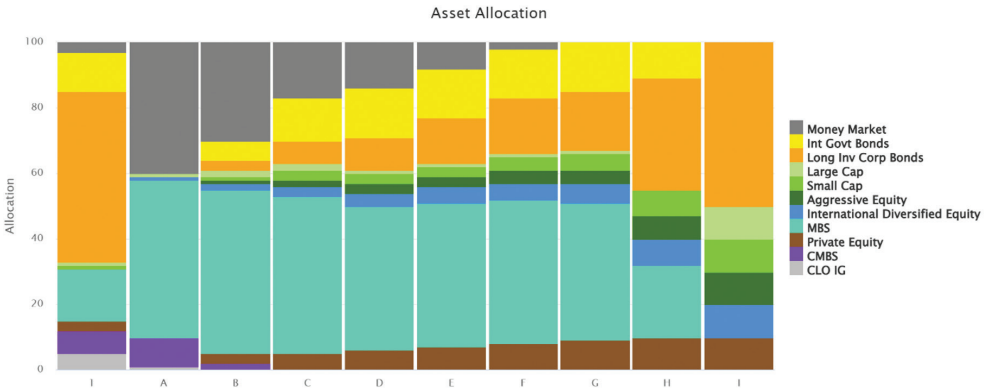
## Constrained Optimizations

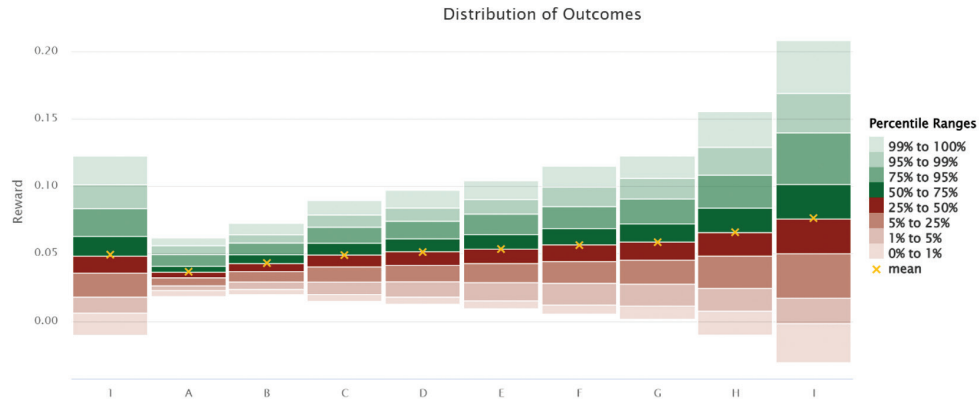
The Allocation Optimizer allows users to specify constraints, both at an individual asset class level and at a group level. Constraints can also be specified for relative asset allocations, portfolio duration, quality, etc. Ideally, we would like the optimization to focus on portfolios in the middle of the frontier and ignore the more extreme allocations at the ends of the frontier. To encourage this, we introduced the constraints shown in **Table 3** (page 5).

## Figure 2: AIRG Optimization Results


Strategy Summary Table

| | Life Industry 1 | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|---|
| Money Market | 3.00% | 40% | 30% | 17% | 14% | 8% | 2% | 0% | 0% | 0% |
| Int Govt Bonds | 12.00% | 0% | 6% | 13% | 15% | 15% | 15% | 15% | 11% | 0% |
| Long Inv Corp Bonds | 52.00% | 0% | 3% | 7% | 10% | 14% | 17% | 18% | 34% | 50% |
| Large Cap | 1.00% | 1% | 2% | 2% | 1% | 1% | 1% | 1% | 0% | 10% |
| Small Cap | 1.00% | 0% | 1% | 3% | 3% | 3% | 4% | 5% | 8% | 10% |
| Aggressive Equity | 0.00% | 0% | 1% | 2% | 3% | 3% | 4% | 4% | 7% | 10% |
| International Diversified Equity | 0.00% | 1% | 2% | 3% | 4% | 5% | 5% | 6% | 8% | 10% |
| MBS | 16.00% | 48% | 50% | 48% | 44% | 44% | 44% | 42% | 22% | 0% |
| Private Equity | 3.00% | 0% | 3% | 5% | 6% | 7% | 8% | 9% | 10% | 10% |
| CMBS | 7.00% | 9% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| CLO IG | 5.00% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Total | 100% | 100% | 100% | 100% | 100.00% | 100% | 100.00% | 100.00% | 100% | 100.00% |

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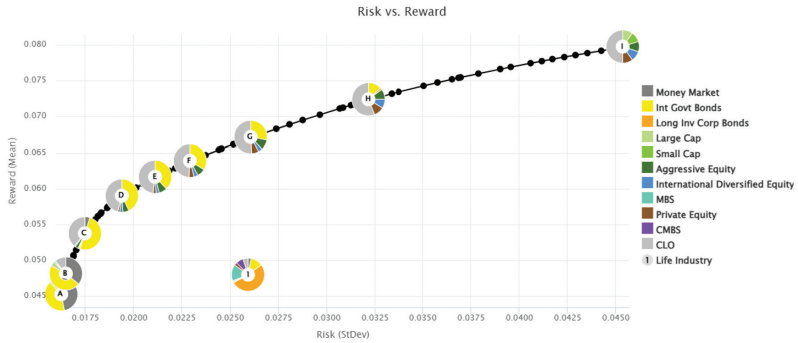
## Figure 3: GOES Optimization Results

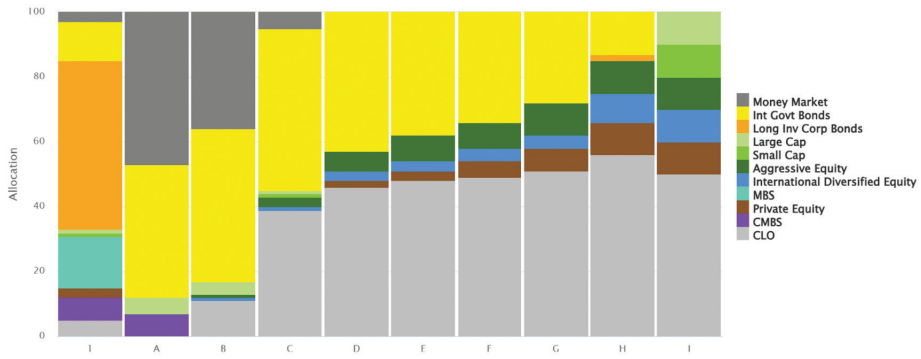
Efficient Frontier and Strategy Summary




Strategy Summary Table

| | Life Industry | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | I | A | B | C | D | E | F | G | H | I |
| Money Market | 3.00% | 47% | 36% | 5% | 0% | 0% | 0% | 0% | 0% | 0% |
| Int Govt Bonds | 12.00% | 41% | 47% | 50% | 43% | 38% | 34% | 28% | 13% | 0% |
| Long Inv Corp Bonds | 52.00% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 2% | 0% |
| Large Cap | 1.00% | 5% | 4% | 1% | 0% | 0% | 0% | 0% | 0% | 10% |
| Small Cap | 1.00% | 0% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 10% |
| Aggressive Equity | 0.00% | 0% | 1% | 3% | 6% | 8% | 8% | 10% | 10% | 10% |
| International Diversified Equity | 0.00% | 0% | 1% | 1% | 3% | 3% | 4% | 4% | 9% | 10% |
| MBS | 16.00% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Private Equity | 3.00% | 0% | 0% | 0% | 2% | 3% | 5% | 7% | 10% | 10% |
| CMBS | 7.00% | 7% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| CLO | 5.00% | 0% | 11% | 39% | 46% | 48% | 49% | 51% | 56% | 50% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

Asset Allocation




Distribution of Outcomes

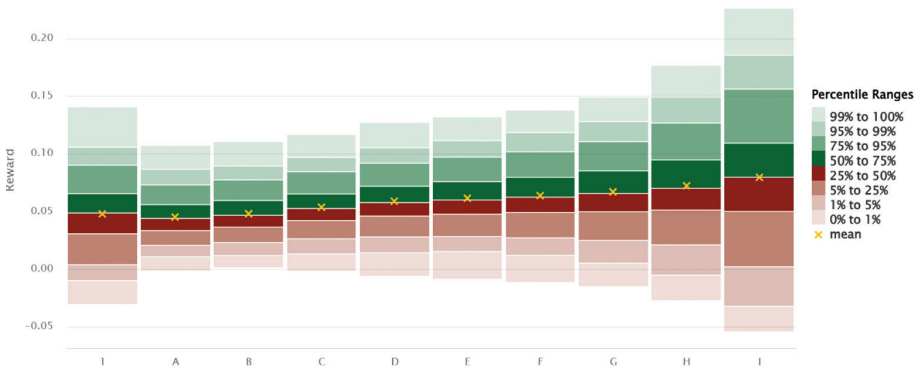



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Table 3: Allocation Optimizer Constraints

| Asset Class | Individual Class Constraints | | Multi-Class Constraint |
|---|---|---|---|
| | Minimum Allocation % | Maximum Allocation % | Total Equity <= 7% |
| Money Market | 0 | 5 | |
| Intermediate Government Bonds | 0 | 40 | |
| Long Investment-Grade Corporate Bonds | 0 | 80 | |
| MBS | 0 | 20 | |
| CMBS | 0 | 10 | |
| CLO IG | 0 | 10 | |
| Large Cap Equity | 0 | 3 | 1 |
| Small Cap Equity | 0 | 3 | 1 |
| International Diversified Equity | 0 | 3 | 1 |
| Aggressive Equity | 0 | 3 | 1 |
| Private Equity | 0 | 5 | 1 |
| Minimum | | | 0% |
| Maximum | | | 7% |

Public equity asset classes are individually constrained to 3%, while private equity is limited to 5%. The multi-class constraint limits the total of public and private equity to be less than or equal to 7%.

## Constrained Frontier Comparison

We can see that the GOES frontier in **Figure 5** (page 7) is initially very steep and quickly becomes very flat. In contrast, the AIRG frontier in **Figure 4** (page 6) remains upward sloping across the risk spectrum. The range of risk and return outcomes is significantly tighter for the GOES frontier, indicating that the constraints have a larger impact. The difference between the highest and lowest risk portfolios is 0.70% for the GOES frontier and 1.17% for the AIRG. The return difference is even tighter for the GOES frontier at 0.25% and 1.17% for the AIRG. In summary, the constraints limit the risk/return space much more for the GOES frontier than for the AIRG.

To gain insight into how the allocations differ between the two simulations, we compared portfolios with similar risk and return characteristics. The return target of 4.93% was selected to align with the expected return of our life industry portfolio under the AIRG scenarios. For the risk target, we selected a value of 2.1%, which is between the risk of our life industry portfolio under the AIRG and GOES scenarios.

This comparison in **Table 4** confirms our prior observation that the AIRG frontier prefers long investment-grade corporate bonds and MBS, while the GOES frontier prefers investment-grade government bonds and CLO IG.

## Conclusion

Based on our analysis, we find that the GOES scenarios produce lower returns and higher volatility for our life industry portfolio than the AIRG scenarios. This is consistent with our prior observations, that fixed-income asset classes have significantly higher volatility under the GOES scenarios than the AIRG.

Optimal portfolios tend to prefer investment-grade government bonds and CLO IG asset classes under the GOES scenarios, whereas they tend to prefer investment-grade corporate bonds and MBS under the AIRG. The addition of allocation constraints had a more significant impact on the GOES efficient frontier than on the AIRG frontier.

Given these differences, companies could reach very different allocation conclusions when using the new GOES scenarios. It is important that companies are aware of the potential impacts on investment risk and capital decisions.

Finally, we point out that we have limited our analysis to an asset-only objective and focused on a 5-year horizon with basic portfolio constraints. Individual companies could further enhance this analysis by including liabilities, using an asset-liability objective, focusing on relevant horizon, and/or reflecting their specific objectives and constraints.

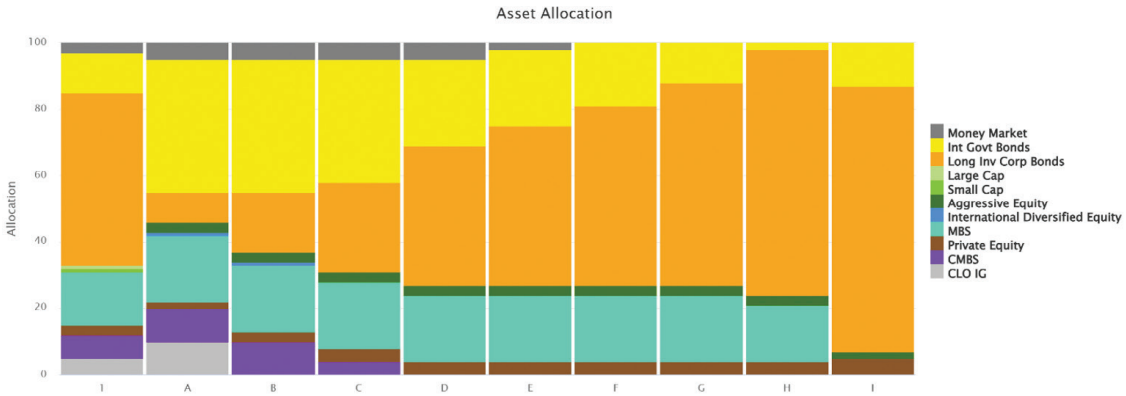
Table 4: Allocation Comparison for Targeted Risk and Reward Metrics

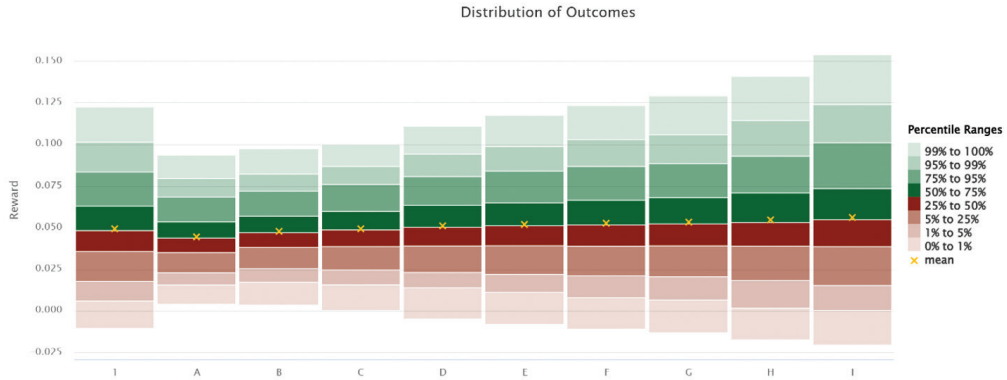
| | Return ~ 4.93% | | Risk ~ 2.10% | |
|---|---|---|---|---|
| | AIRG | GOES | AIRG | GOES |
| Investment | Port C % | Port B % | Port G % | Port G % |
| Money Market | 5 | 5 | 0 | 5 |
| Intermediate Government Bonds | 37 | 40 | 12 | 40 |
| Long Investment Grade Corporate Bonds | 27 | 8 | 61 | 16 |
| Large Cap Equity | 0 | 3 | 0 | 0 |
| Small Cap Equity | 0 | 1 | 0 | 0 |
| Aggressive Equity | 3 | 3 | 3 | 2 |
| International Diversified Equity | 0 | 0 | 0 | 0 |
| MBS | 20 | 20 | 20 | 12 |
| Private Equity | 4 | 0 | 4 | 5 |
| CMBS | 4 | 10 | 0 | 10 |
| CLO IG | 0 | 10 | 0 | 10 |
| Total | 100 | 100 | 100 | 100 |
| Portfolio Statistics: | | | | |
| Mean Return (Reward) | 4.93 | 4.92 | 5.33 | 5.09 |
| Standard Deviation (Risk) | 1.58 | 2.03 | 2.10 | 2.11 |
| 95th Percentile Return | 7.6 | 8.4 | 8.8 | 8.6 |
| 5th Percentile Return | 2.5 | 1.7 | 2.0 | 1.7 |

## Figure 4: AIRG Constrained Optimization Results


Strategy Summary Table

| | Life Industry 1 | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|---|
| Money Market | 3.00% | 5% | 5% | 5% | 5% | 3% | 0% | 0% | 0% | 0% |
| Int Govt Bonds | 12.00% | 40% | 40% | 37% | 30% | 24% | 19% | 7% | 2% | 13% |
| Long Inv Corp Bonds | 52.00% | 9% | 18% | 27% | 38% | 46% | 54% | 66% | 76% | 80% |
| Large Cap | 1.00% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Small Cap | 1.00% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Aggressive Equity | 0.00% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 2% |
| International Diversified Equity | 0.00% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| MBS | 16.00% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 15% | 0% |
| Private Equity | 3.00% | 2% | 3% | 4% | 4% | 4% | 4% | 4% | 4% | 5% |
| CMBS | 7.00% | 10% | 10% | 4% | 0% | 0% | 0% | 0% | 0% | 0% |
| CLO IG | 5.00% | 10% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Total | 100% | 100% | 100.00% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

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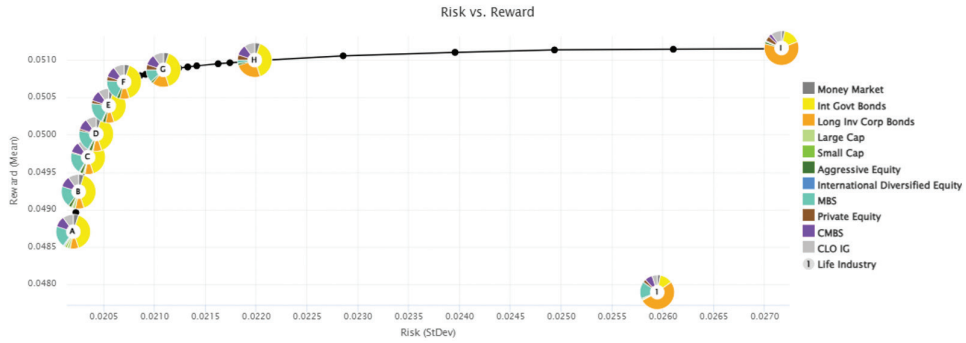
## Figure 5: GOES Constrained Optimization Results

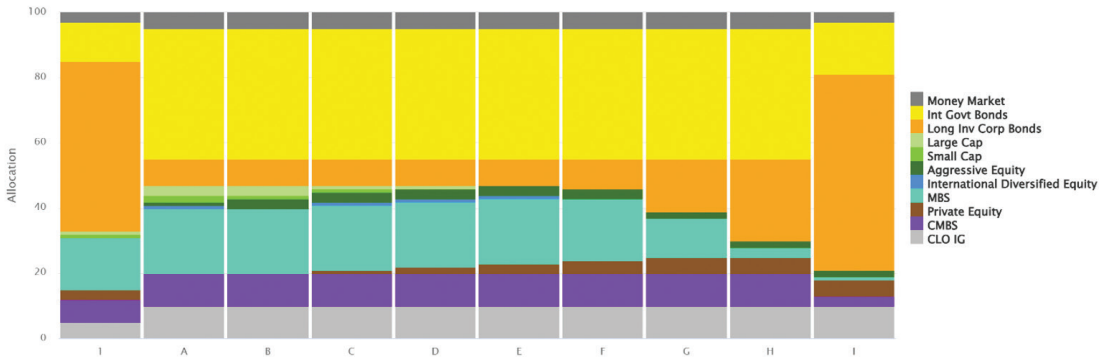
Efficient Frontier and Strategy Summary



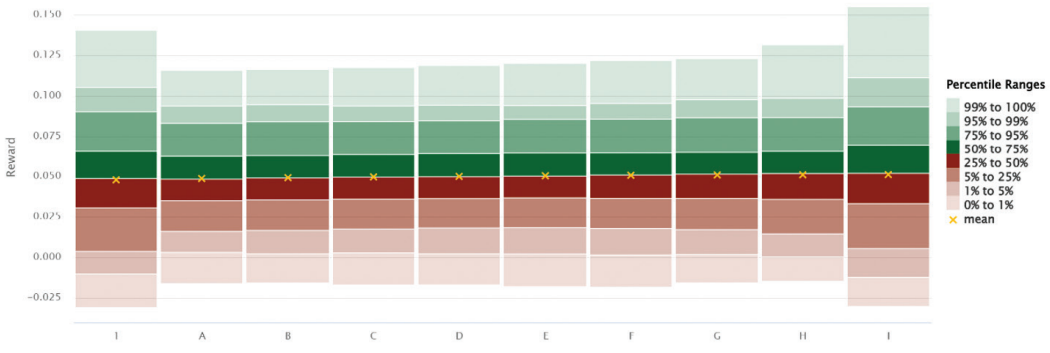

Strategy Summary Table

| | Life Industry (I) | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|---|
| Money Market | 3.00% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 3% |
| Int Govt Bonds | 12.00% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 16% |
| Long Inv Corp Bonds | 52.00% | 8% | 8% | 8% | 8% | 8% | 9% | 16% | 25% | 60% |
| Large Cap | 1.00% | 3% | 3% | 1% | 1% | 0% | 0% | 0% | 0% | 0% |
| Small Cap | 1.00% | 2% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% |
| Aggressive Equity | 0.00% | 1% | 3% | 3% | 3% | 3% | 3% | 2% | 2% | 2% |
| International Diversified Equity | 0.00% | 1% | 0% | 1% | 1% | 1% | 0% | 0% | 0% | 0% |
| MBS | 16.00% | 20% | 20% | 20% | 20% | 20% | 19% | 12% | 3% | 1% |
| Private Equity | 3.00% | 0% | 0% | 1% | 2% | 3% | 4% | 5% | 5% | 5% |
| CMBS | 7.00% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 3% |
| CLO IG | 5.00% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100.00% |

Asset Allocation




Distribution of Outcomes

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Conning's GEMS® Economic Scenario Generator uses leading-edge economic models and provides full market risk and asset class coverage, including alternative assets and derivatives. In 2023 and 2024 GEMS® won "Market Scenario Generator of the Year" in the Risk.net Risk Markets Technology Awards.*


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