Basic Data Set Validation Report Summary

The NAIC GOES Basic Data Set contains ninety-four variables simulated over 10,000 paths and 1,200 months (100 years). The validation report is a tool that helps us understand the statistical characteristics of the scenario set and ensures distribution results align with the NAIC GOES calibration targets. The summary charts allow viewers to explore yield behavior, return distributions, and asset relationships. Each page illustrates a unique perspective of the data, and a tour through all pages gives the viewer a full picture of each new monthly scenario set.



Figure 1: Page selection bar at the top of the report. ©2026 Conning, Inc.

By clicking on any given tab, the page will refresh a distinct report for the selected view of the data. There are filters for various parts of the data, such as the type of coupon rate, return, distribution or time horizon. This allows the user to seamlessly navigate through the data based on their preference.

Yield Percentiles

The first page presents the percentile distribution of yields and their volatilities across 1,200 simulation months for US Treasury securities, both spot and coupon rates.

Main Visuals:

- **Treasury Yield Percentile Fan Chart:** Shows yield percentiles (Pctl 01 to Pctl 99) across simulation months.
- **Cross-Sectional Volatility Chart:** Displays standard deviation of yields over time.

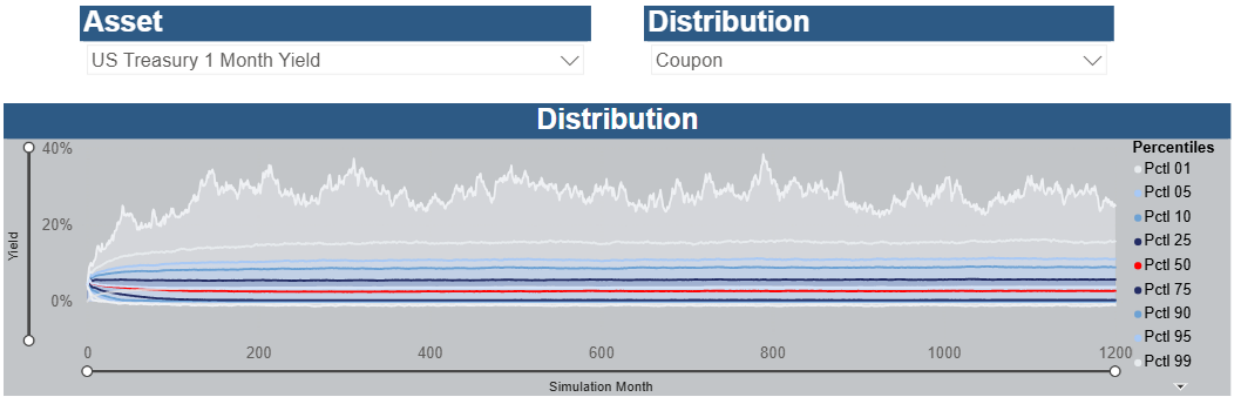


Figure 2: Treasury yield percentile fan chart. Prepared by Conning, Inc. Source: ©2026 Conning, Inc.

The user can choose the specific treasury maturity to view in the report, as well as a choice between coupon or spot rates. This selection prompts the graph to update a range of percentiles for any given maturity over the simulated 1,200-month period. Using the cursor, the user can hover over the

simulated periods to display the percentile, mean, and standard deviation statistics at each period. Below the graph, there are two tables with the same statistics for year 1 and year 30. This is a useful way to compare the short-term versus long-term behavior of any given maturity. At the bottom of the page, the cross-sectional volatility chart highlights how yield uncertainty evolves over time.

List of Assets:

- US Treasury X Month Yield – Spot
    - Projected yields, expressed as continuously compounded rates, for the following tenors:
        - 1 Month, 3 Month, 6 Month, 1-30 Year
- US Treasury X Month Yield – Coupon
    - Projected yields, expressed as semi-annual coupon rates, for the following tenors:
        - 1 Month, 3 Month, 6 Month, 1-30 Year

Negative Yields

The next page shows the probability of par yields turning negative across different maturities (1M to 30Y). These probabilities help identify which tenors are more susceptible to negative rates under stressed conditions.

Main Visuals:

- **Negative Yield Ratio Chart:** Probability of yields falling below zero across different maturities.
- **Table of Probabilities:** For 1M to 30Y maturities at different simulation months during the first fifty years.

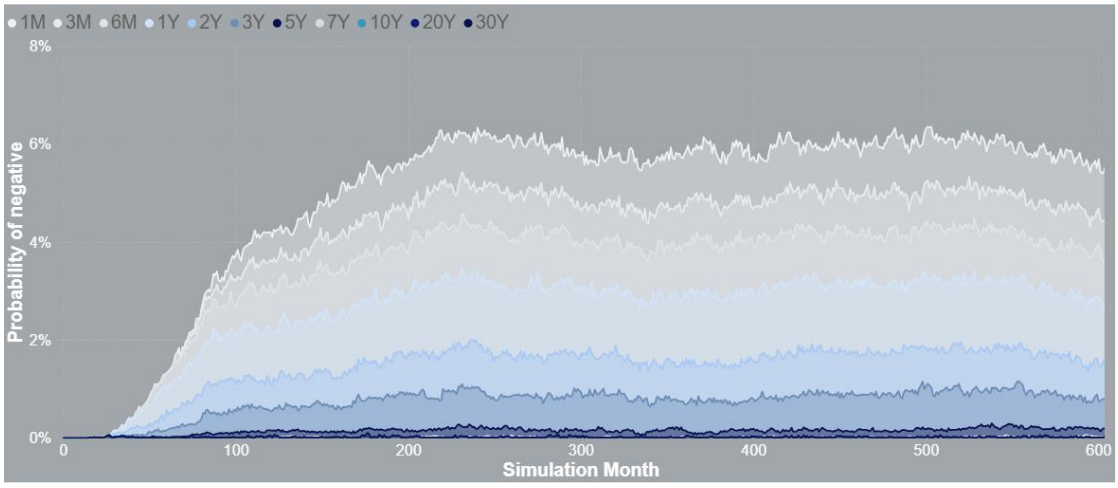


Figure 3: Negative yield ratio chart. Prepared by Conning, Inc. Source: ©2026 Conning, Inc

Average Yields

This page shows the distribution of average yields by maturity at several points in the simulation. The graph can highlight the progression of the average yield curve over the simulation period.

Main Visuals:

- **Average Yields Chart:** Shows the average treasury yield curve across all maturities at different points into the simulation.

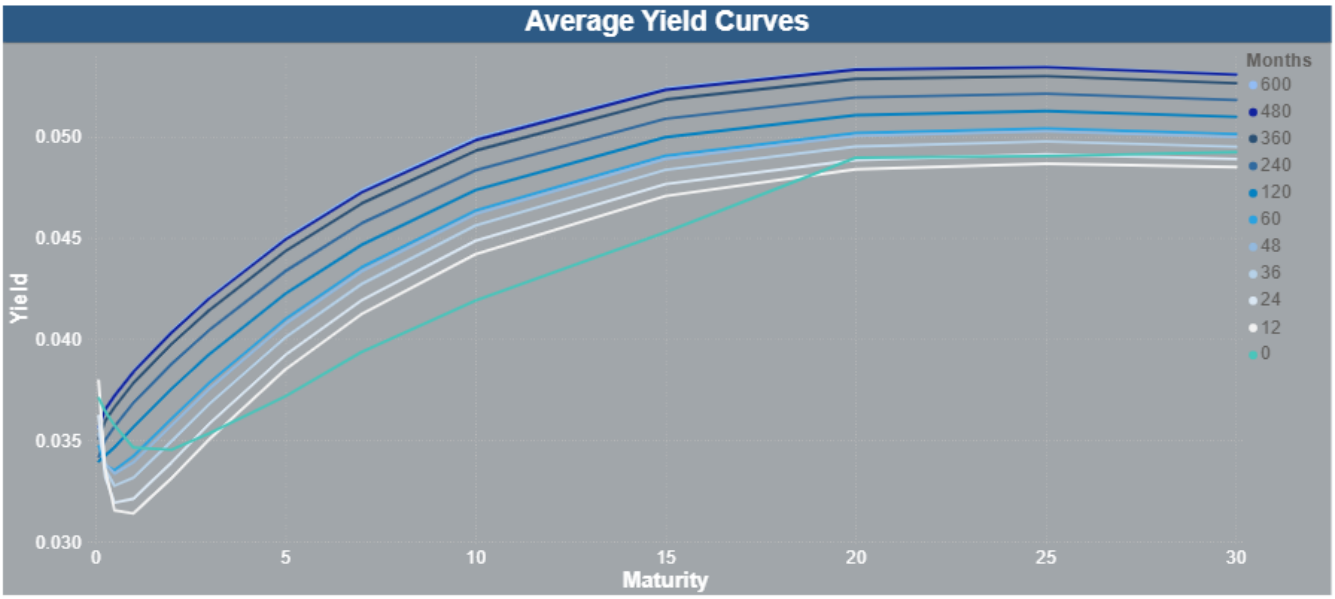


Figure 4: Average yield curves chart. Prepared by Conning, Inc. Source: ©2026 Conning, Inc

The following simulation months are shown on the graph:

- Month 0
- Month 12
- Month 24
- Month 36
- Month 48
- Month 60
- Month 120
- Month 240
- Month 360
- Month 480
- Month 600

Corporate Percentiles

This page shows the percentile distributions for spreads, excess returns and volatility for short, intermediate, long, and high-yield corporate bonds over a 100-year time horizon. The range of returns highlights the risk profile of each asset class.

Main Visuals:

- **Return Distribution Chart:** Shows percentiles of returns for a list of bond and equity assets.
- **Cross-Sectional Volatility Chart:** Standard deviation of returns over time.

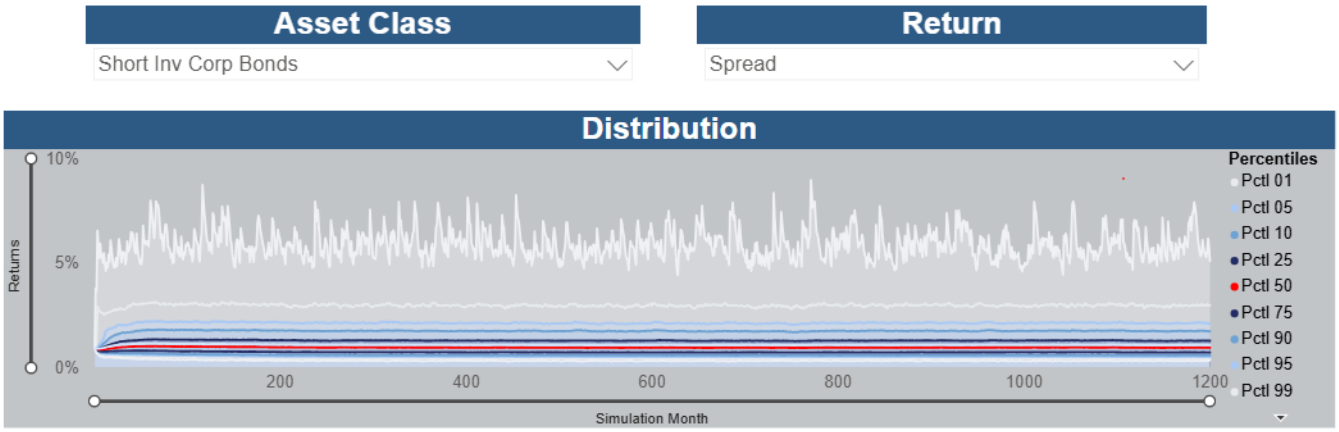


Figure 5: Corporate Spread and excess return percentile fan chart.
Prepared by Conning, Inc. Source: ©2026 Conning, Inc

The user can choose the specific corporate bond quality to view in the report, as well as a choice between spread and excess return. This selection prompts the graph to update a range of percentiles for any given maturity over the simulated 1,200-month period. Using the cursor, the user can hover over the simulated periods to display the percentile, mean, and standard deviation statistics at each period. Below the graph, there are two tables with the same statistics for year 1 and year 30. This is a useful way to compare the short-term versus long-term behavior of any given maturity. At the bottom of the page, the cross-sectional volatility chart highlights how corporate spread and excess return uncertainty evolves over time.

Asset Return Percentiles

This page shows the percentile distributions for price, income, total, cumulative returns, and volatility for the full list of bond funds and equity assets over a 100-year time horizon. The range of returns highlights the risk profile of each asset class.

Main Visuals:

- **Return Distribution Chart:** Shows percentiles of returns for a list of bond and equity assets.
- **Cross-Sectional Volatility Chart:** Standard deviation of returns overtime.

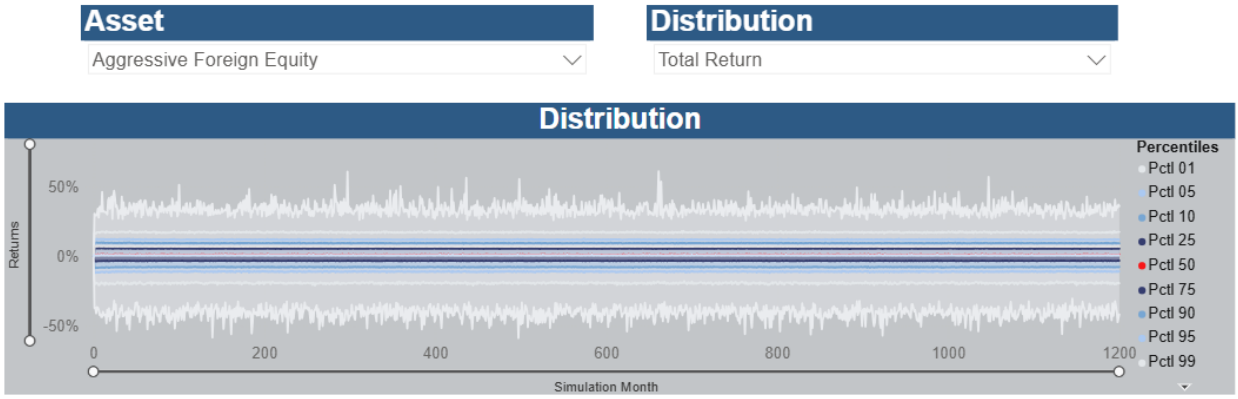


Figure 6: Return percentile fan chart. Prepared by Conning, Inc. Source: ©2026 Conning, Inc

Users can select the specific asset class to view in the report as well as a choice between the type of return to display in the graph (price, income, total or cumulative returns). This selection prompts the graph to update a range of percentiles for the chosen index over the simulated 1,200-month period. By hovering over any point on the graph, users can view detailed metrics, including percentile, mean, and standard deviation. Below the graph are two tables presenting these same statistics for Year 1 and Year 30, providing a clear comparison of short-term versus long-term index behavior. At the bottom of the page, the cross-sectional volatility chart highlights how uncertainty evolves over time.

List of Assets:

All return information is split between Price, Income, Total and Cumulative returns

- Money Market
  - Model based on 3-Month A Corporate Bonds
- Short Govt Bonds
  - Model based on 1- to 5-Year Treasury Bonds
- Int Govt Bonds
  - Model based on 5- to 10-Year Treasury Bonds
- Long Govt Bonds
  - Model based on 10- to 30-Year Treasury Bonds
- Short Inv Corp Bonds

    - Model based on 1- to 5-Year A and BBB Corporate Bonds
- **Int Inv Corp Bonds**
    - Model based on 5- to 10-Year A and BBB Corporate Bonds
- **Long Inv Corp Bonds**
    - Model based on 10- to 30-Year A and BBB Corporate Bonds
- **High Yield Corp Bonds**
    - Model based on 1- to 10-Year BB Corporate Bonds
- **Large Cap** – S&P 500
- **Mid Cap** – Russel Midcap
- **Small Cap** – Russell 2000
- **Aggressive US Equity** – NASDAQ
- **Aggressive Foreign Equity** – MSCI Emerging Market
- **International Diversified Equity** – MSCI Europe, Australasia and Far East (EAFE)

Risk vs. Reward

This page displays a scatter plot of all asset classes listed above using the average and standard deviation of year-over-year total returns in the 30th simulation year.

Main Visual:

- **Risk vs. Reward Comparison:** Plots all asset classes based on their risk (st dev) and reward (avg) of YoY total returns in the 30th simulation year (360 months).

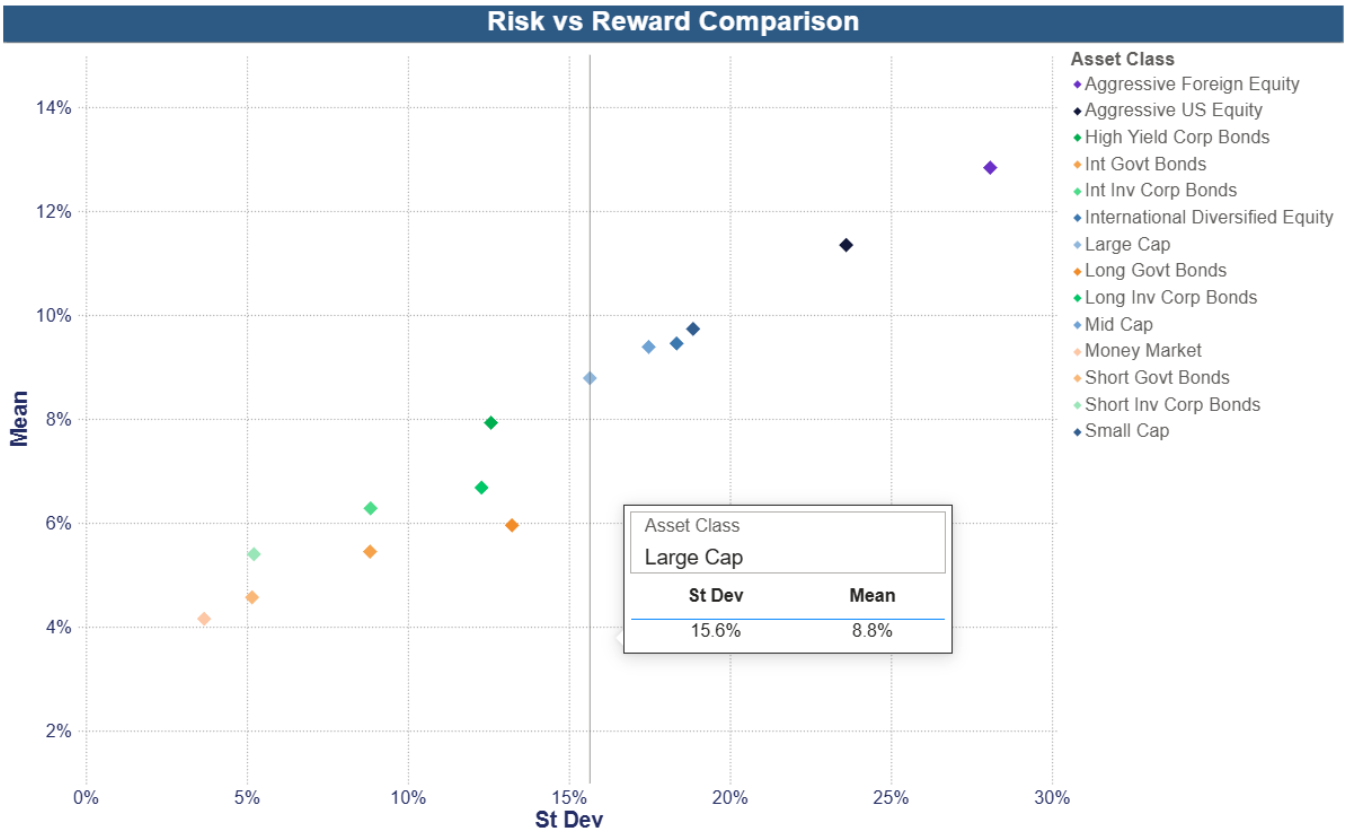


Figure 7: Risk vs reward chart. Prepared by Conning, Inc. Source: ©2026 Conning, Inc

The distribution provides insight into long-term asset performance and serves as a validation of cohesive asset class modeling. Users can hover over any point on the plot to view the underlying statistics associated with that asset.

Yield Distributions

These charts allow us to understand the frequency of encountering yield curve shapes categorized into Inverse, Bowl, and Hump scenarios. Since these shapes can occur under real-world conditions, they have been included in the regulatory scenario set. A scenario is allocated to each of these buckets when the par coupon rates meet the following criteria. The following charts represent the probability of the treasury yields meeting these three criteria:

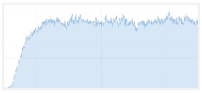
Distribution Criteria (Par Coupon rates):



Inverse – 1Y > 20Yr



Bowl – 3M > 1Y < 20Y



Hump – 3M < 1Y > 20Y

Main Visual:

- **Yield Distribution with Shape Labels:** Highlights yield curve shapes like Inverse, Bowl, and Hump.

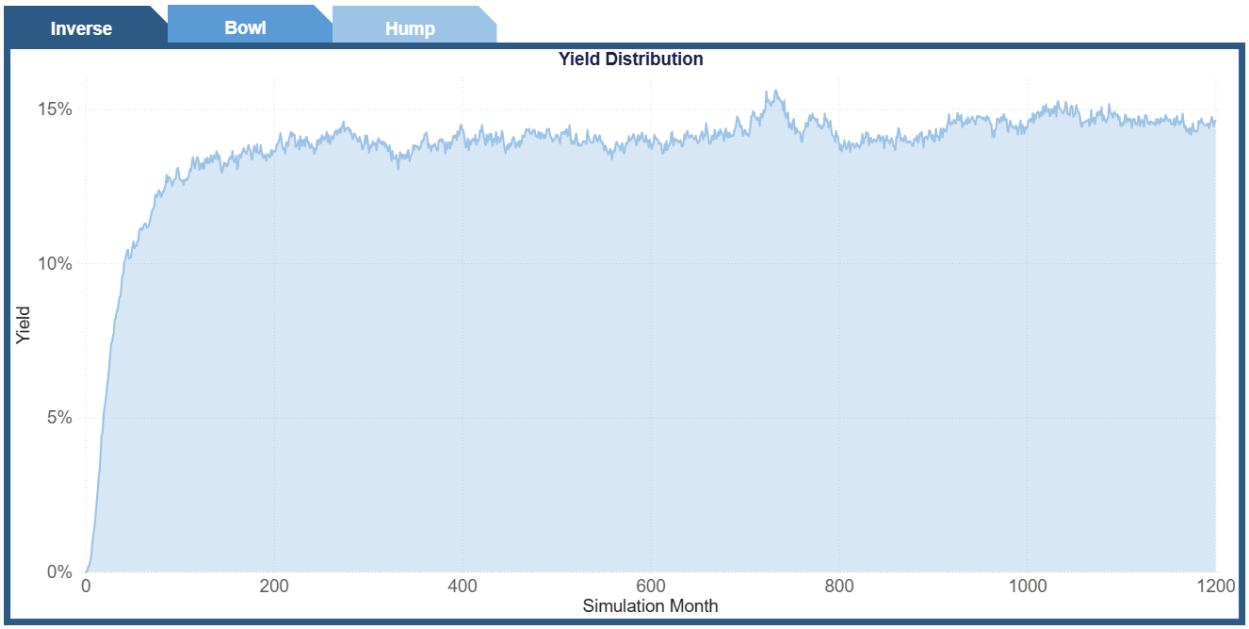


Figure 4: Yield distribution chart. Prepared by Conning, Inc. Source: ©2026 Conning, Inc

Asset Correlation Matrices

The correlation matrix compares relationships among all modeled asset classes listed above. Positive correlations suggest assets move together, while negative correlations indicate diversification potential. For instance, the strong negative correlation between High Yield Bonds and Money Market assets highlights their contrasting behavior.

1 Year | 30 Year

Matrix	Aggressive Foreign Equity	Aggressive US Equity	High Yield Corp Bonds	Int Govt Bonds	Int Inv Corp Bonds	International Diversified Equity	Large Cap	Long Govt Bonds	Long Inv Corp Bonds	Mid Cap	Money Market	Short Govt Bonds	Short Inv Corp Bonds	Small Cap
Aggressive Foreign Equity	100%	61%	11%	-11%	-2%	66%	75%	-12%	-2%	68%	7%	-10%	-3%	68%
Aggressive US Equity	61%	100%	14%	-15%	-3%	62%	82%	-16%	-3%	80%	9%	-13%	-5%	81%
High Yield Corp Bonds	11%	14%	100%	76%	91%	12%	16%	74%	89%	15%	-53%	75%	91%	14%
Int Govt Bonds	-11%	-15%	76%	100%	95%	-11%	-14%	99%	95%	-15%	-63%	99%	94%	-14%
Int Inv Corp Bonds	-2%	-3%	91%	95%	100%	-2%	-2%	93%	99%	-3%	-63%	94%	99%	-3%
International Diversified Equity	66%	62%	12%	-11%	-2%	100%	76%	-12%	-2%	68%	6%	-10%	-3%	68%
Large Cap	75%	82%	16%	-14%	-2%	76%	100%	-15%	-2%	90%	8%	-12%	-4%	90%
Long Govt Bonds	-12%	-16%	74%	99%	93%	-12%	-15%	100%	96%	-16%	-61%	95%	90%	-15%
Long Inv Corp Bonds	-2%	-3%	89%	95%	99%	-2%	-2%	96%	100%	-3%	-62%	93%	96%	-3%
Mid Cap	68%	80%	15%	-15%	-3%	68%	90%	-16%	-3%	100%	8%	-13%	-5%	93%
Money Market	7%	9%	-53%	-63%	-63%	6%	8%	-61%	-62%	8%	100%	-59%	-58%	8%
Short Govt Bonds	-10%	-13%	75%	99%	94%	-10%	-12%	95%	93%	-13%	-59%	100%	95%	-13%
Short Inv Corp Bonds	-3%	-5%	91%	94%	99%	-3%	-4%	90%	96%	-5%	-58%	95%	100%	-5%
Small Cap	68%	81%	14%	-14%	-3%	68%	90%	-15%	-3%	93%	8%	-13%	-5%	100%

Figure 5: Asset correlation matrix. Prepared by Conning, Inc. Source: ©2026 Conning, Inc

Visual:

- Matrix of Correlations for the 1-year and 30-year of the simulation between various asset classes as listed for Page 4 (e.g., Aggressive US Equity, High Yield Bonds, Money Market, etc.).

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