

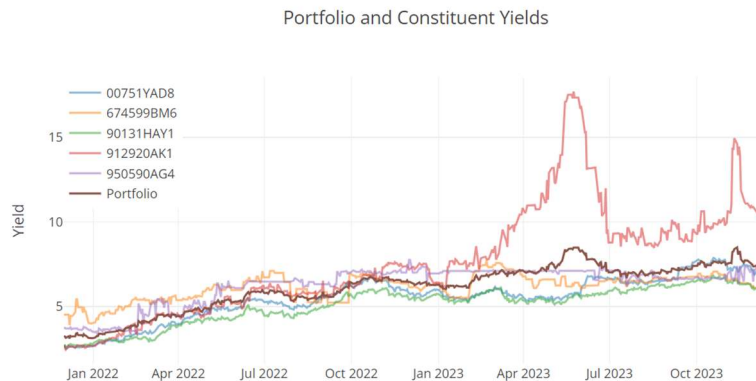
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Portfolio Constituents

- The portfolio can include up to 5 different corporate bonds.
- For the purpose of this exercise, all 5 bonds were chosen and equally weighted (20% each)
- The constituents were selected for their different industries and similar maturities with generally similar coupons

weight	cusip	issuer	coupon	maturity date
0.2	00751YAD8	ADVANCE AUTO PARTS INC	4.63	2030-04-15
0.2	674599BM6	OCCIDENTAL PETROLEUM CORP	7.2	2028-04-01
0.2	90131HAY1	TFCF AMERICA INC	7.43	2026-10-01
0.2	912920AK1	LUMEN TECHNOLOGIES INC	7.25	2025-09-15
0.2	950590AG4	WENDY'S INTERNATIONAL	7	2025-12-15

Portfolio Observations



Given the date range of observations (2021-12-01 to 2023-12-18) we can observe how a raising interests rates environment is a systemic risk as all of the bonds' yields rise starting from late January 2022 before roughly stabilizing around October 2022

Starting in January 2023 however, we can observe individual credit risk as the bond issued by Lumen Technologies (CUSIP 912920AK1) has a massive spike in its yield that drags the overall yield of the portfolio up. This bond's performance makes sense as it coincides with Lumen Technologies announcement of consistent negative revenue growth, dramatically lowered guidance, and its distinction as one of the worst performers in the S&P500 throughout 2023.

Portfolio Performance

Start NAV	End NAV	NAV Performance	Start Yield	End Yield	Max Daily Yield Change
\$ 114.82	\$ 98.65	-14.08%	3.20%	6.78%	0.66%

We can see that the overall portfolio performance was quite bad with a -14% return over the two-year period. This lines up with general fixed income performance over the past two years due to the rising interest rates regime that encapsulates the time frame of the portfolio performance.

Value at Risk

VaR	91%	93%	95%	97%	99%
Variance-Covariance	-2.28%	-2.53%	-2.84%	-3.80%	-4.62%
Historical Simulation	-1.93%	-2.37%	-2.84%	-3.27%	-4.08%

Along with historical simulation, I chose to include an alternate measure of Value at Risk (VaR) by using the Variance-Covariance method. This 2nd method is where the standard deviation and mean of the daily yield changes of the portfolio are used as inputs to create a normal distribution. From that distribution the value at the Xth percentile represents the VaR at the given confidence level for the portfolio

Since the historical simulation for VaR only considers results that had actually occurred in the past, it does not consider potentially more extreme events than what has previously occurred.

In contrast, the Variance-Covariance VaR considers possible outcomes that had not occurred in the past as long as those outcomes are part of a normal distribution. As such, we can see that the Variance-Covariance method produces larger values and assumes more negative outcomes than the Historical Simulation method.

However, since the Variance-Covariance method assumes a normal distribution, the accuracy of its VaR values are dependent on whether the returns actually have a normal distribution. As shown by the distribution below, the distribution has a low kurtosis (thin tails) suggesting that it is not a normal distribution and that the historical simulation VaR are probably more valuable in measuring the daily downside risk of the portfolio.

