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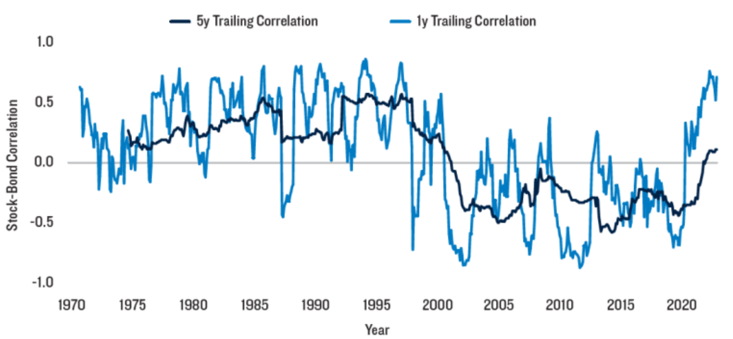
POSITIVE STOCK-BOND CORRELATION

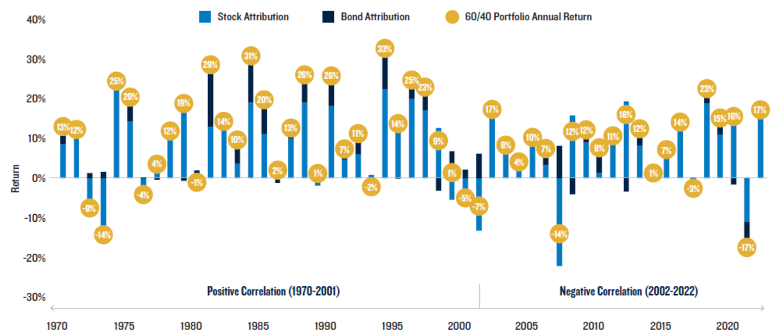
Prospects & Portfolio Construction Implications

US Stock-Bond Correlation (1970 – 2023)



Note: Trailing 5y & 1y rolling correlations of 1m %-change in S&P 500 Total Return Index and 1m %-change in US 10y Treasury Constant Maturity Total Return Index. Source: Haver Analytics, Standard & Poor's, U.S. Treasury and PGIM IAS. For illustrative purposes only.

60/40 Portfolio Annual Return, with Attribution to Stocks and Bonds (1970 – 2023)

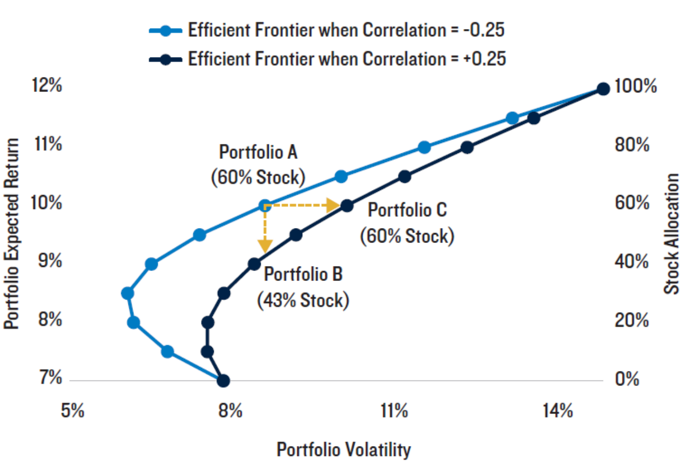


Note: Annual %-change in end-of period S&P 500 Total Return Index, annual %-change in end-of-period US 10y Treasury Constant Maturity Total Return Index, annual %-change in costlessly, annually rebalanced 60/40 portfolio of stocks (S&P 500 Total Return Index) and bonds (US 10y Treasury Constant Maturity Total Return Index). Source: Haver Analytics, Standard & Poor's, U.S. Treasury and PGIM IAS. For illustrative purposes only.

US stock and bond prices declined sharply in 2022 and then rebounded in tandem, pushing stock-bond correlation into positive territory for the first time in 20y. Correlation regimes tend to be driven by the prevailing macroeconomic landscape and can be long lived. Fiscal sustainability concerns, monetary policy uncertainty, elevated interest rate volatility, and the supply-driven nature of recent economic fluctuations have helped push correlation into positive territory and could support a prolonged period of positive stock-bond correlation, much like the 1970-2000 period.

A positive stock-bond correlation regime is a new investing environment for many market participants. The onset of this new regime coincided with a record bad year for the venerable 60/40 portfolio in 2022, which was down 17% owing to steep declines in both stocks and bonds. Some have mistakenly taken 2022's performance as indicative of what to expect when correlation is positive.

Efficient Frontier as a Function of Assumed Stock-Bond Correlation



Note: Capital market assumptions are based on the 1970-2022 (annualized) mean and volatility of 1m %-changes in the S&P 500 Total Return Index (12% and 15%, respectively) and in the US 10y Treasury Constant Maturity Total Return Index (7% and 8%, respectively). Negative correlation is assumed to be -0.25 and positive correlation is assumed to be +0.25. Source: Haver Analytics, Standard & Poor's, U.S. Treasury and PGIM IAS. For illustrative purposes only.

While painful, it is important not to learn the wrong lessons from 2022. True, a change in correlation from negative to positive shifts the "efficient frontier" inward, making some risk-reward pairs unattainable and leading to a deterioration in risk-adjusted performance. Yet, both history and theory point to the enduring value of a balanced portfolio regardless of correlation regime, with little to suggest that periods of positive stock-bond correlation are particularly challenging for multi-asset investing.

Given the unfamiliar landscape, it is worth emphasizing that even when correlation is positive and bonds are not as strong a hedge for equity risk, the optimal allocation to bonds remains little changed, with bonds continuing to play a critical role in the construction of a balanced portfolio. Historically, portfolio returns are higher when correlation is positive than when negative. Moreover, the current narrowed stock-bond valuation gap is consistent with future risk-adjusted outperformance of bonds, underscoring their importance in a balanced portfolio.

60/40 Portfolio Performance by Correlation Regime (1970 – 2022)

Correlation Regime	Positive (1/1970-12/2001)	Negative (1/2002-12/2022)
Average Return	11.9%	7.0%
Avg. Excess Return	4.1%	5.4%
Volatility	10.8%	8.9%
Sharpe Ratio	0.4	0.6

Note: Annualized monthly performance of a costlessly monthly rebalanced 60/40 stock-bond portfolio; excess returns are calculated relative to the average monthly LIBOR rate; correlation regime is determined by the sign of trailing 5y correlation between stock and bond returns. Source: Haver Analytics, Standard & Poor's, U.S. Treasury and PGIM IAS. For illustrative purposes only.

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