

# Documenting a Correlation Between High-Yield Spreads and Forward Investment Returns

Christopher C. Smith

2022-06-22

## Introduction

High-yield spreads, the difference in yield between investment-grade and high-yield bonds, can be interpreted as a measure of credit market stress. In a good economy, default rates are relatively low, and high-yield bonds pay average yields fairly close to their average coupon rates. But in a bad economy, default rates rise—especially for high-yield bonds—and average yields fall somewhat below average coupon rates. Investment grade bonds, in contrast, have less default risk and remain relatively unaffected by economic downturns. Thus, when investors see a bad economy ahead, they discount high-yield bonds relative to investment grade bonds, demanding a higher yield in exchange for more credit risk.

Notably, high-yield spreads tend to peak around the same time that US stock markets bottom. Might high-yield spread data then contain a tradeable signal for stocks? There's reason to think it might. Whereas stock markets tend to go up over time, high-yield spreads tend to move in a more predictable (and thus easier-to-interpret) range. Conventional stock market wisdom also holds that the bond market is “smarter” than the stock market, so perhaps informational signals from bonds will front-run moves in stocks. In this short paper, my goal is simply to demonstrate and document the correlation between high-yield spreads and forward investment returns for stocks, as well as for investment-grade and high-yield bonds.

## Analyzing S&P 500 Forward Returns

We begin by looking at correlation coefficients between high-yield spreads and forward returns over various timeframes.

pearsons_6mo	pearsons_1yr	pearsons_2yr	pearsons_3yr
0.3798508	0.5258197	0.5256414	0.1503448

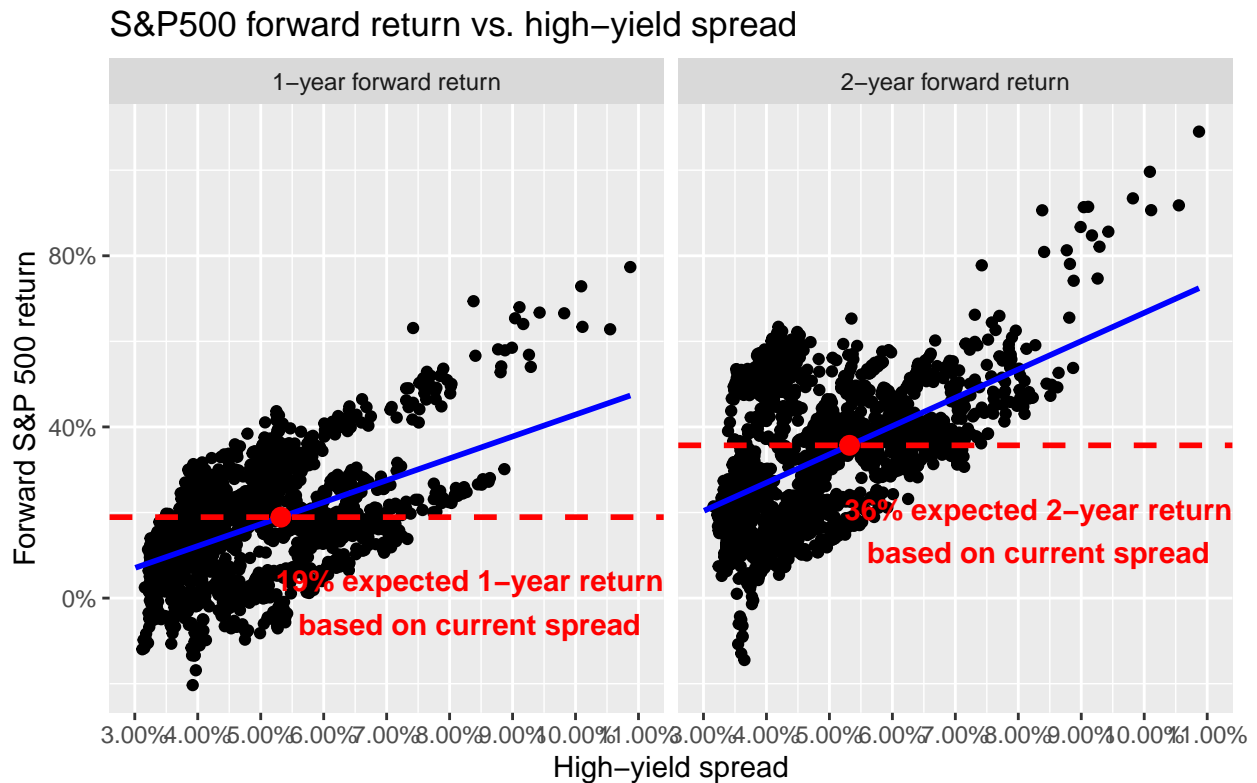
Examining this data, it appears that high-yield spreads have predictive power for returns over a one-year and two-year timeframe, but that correlations are weaker on shorter and longer timeframes. Thus, we will focus on the one-year and two-year timeframes.

Next, we will plot high-yield spreads against next-one-year and next-two-year returns, with a regression model to show expected return. To choose between linear and log regression models, we perform a ten-fold cross-validation and choose the model that minimizes residual mean-squared error, on average, across both timeframes. In this case, that's the linear regression model:

Model	Mean_RMSE
Linear	0.1146206

Model	Mean_RMSE
Log	0.2030653

When we create the plot, we see a nice, clear relationship between the two variables—with higher forward S&P 500 returns when high-yield spreads are high—across both timeframes. The relationship is just as strong on the two-year timeframe as on the one-year timeframe. The current yield spread is shown on the chart as a red dot, with the current expected return shown as a dashed line. Now appears to be a good time to buy the S&P 500, with expected forward two-year return at 36%.



Copyright 2022 Wall Street Petting Zoo  
Data courtesy FRED and Yahoo! Finance API

## Analyzing High-Yield Bond Forward Returns

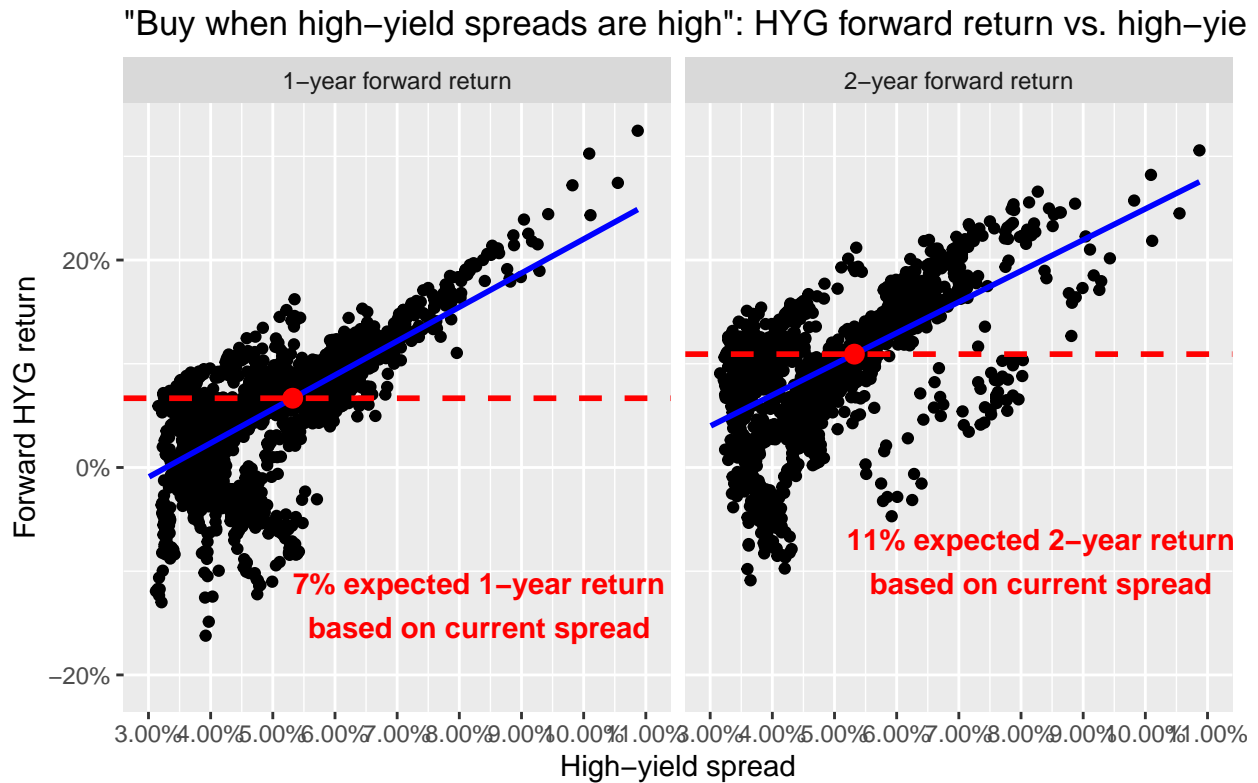
Since high-yield spreads are literally a measure of excess yield on high-yield bonds, we might expect a strong, positive relationship with forward return on a high-yield bond ETF. Looking at the correlation coefficients, that's indeed what we find. The coefficients are positive and similar to the coefficients for the S&P 500.

pearsons_6mo	pearsons_1yr	pearsons_2yr	pearsons_3yr
0.5914292	0.6810426	0.6040599	0.3985881

We again perform a ten-fold cross-validation to determine the best regression model. As with the S&P 500, a linear model minimizes residual mean-squared error better than a log model.

Model	Mean_RMSE
Linear	0.0450588
Log	0.0763361

Plotting actual and modeled returns, we again observe a highly positive and highly significant relationship between high-yield spreads and forward returns. Expected forward returns are lower than for the S&P 500, with current expected one-year return at 7%, and expected two-year return at 11%.



Copyright 2022 Wall Street Petting Zoo  
Data courtesy FRED and Yahoo! Finance API

## Analyzing Investment-Grade Bonds Forward Returns

What about investment-grade bonds? Investment-grade bond yields tend to be higher, on average, when high-yield spreads are higher, so we might expect a positive relationship with forward returns here, as well. In fact, many financial advisors will recommend investment-grade bonds as a “safe-haven” in a bad credit environment, when high-yield spreads are high. But in fact, we find the opposite. The relationship between high-yield spreads and forward returns for US Treasury bonds is robustly negative:

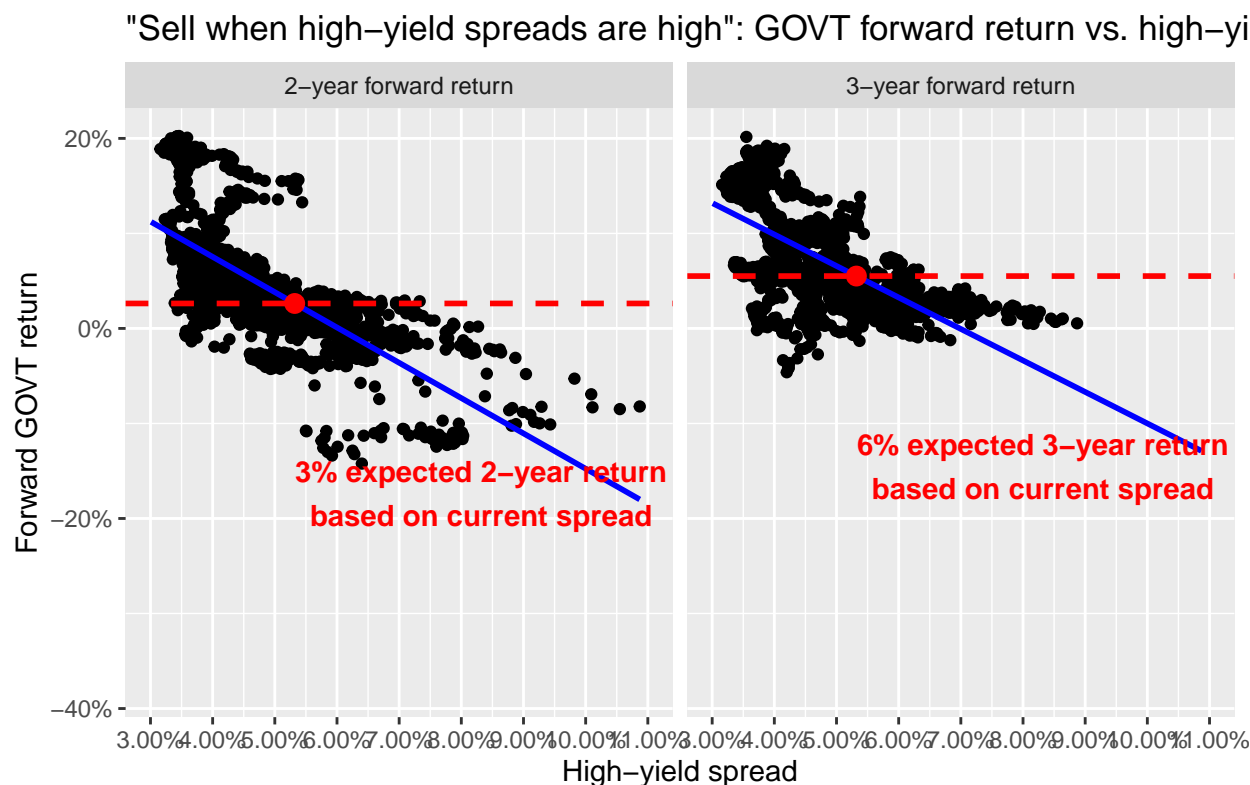
pearsons_6mo	pearsons_1yr	pearsons_2yr	pearsons_3yr
-0.0360815	-0.3514322	-0.7023261	-0.6446303

This suggests that when high-yield spreads are high, the “flight to safety” tends to be overdone and treasury bonds overpriced.

Here, it is the two-year and three-year timeframes that are most significant, so those are the timeframes we will focus on. (Perhaps investment-grade bonds respond to informational signals more slowly than higher-risk, more actively traded assets.) Performing our ten-fold cross validation, we again confirm that it is the linear model that minimizes residual mean-squared error.

Model	Mean_RMSE
Linear	0.0440421
Log	0.0642369

Finally, we plot our data. Current expected one-year return on the GOVT ETF (a medium-duration portfolio of US Treasury bonds) is merely 1%, making this probably *not* a good time to buy Treasury bonds. And expected returns will only get worse as high-yield spreads rise.



Copyright 2022 Wall Street Petting Zoo  
Data courtesy FRED and Yahoo! Finance API

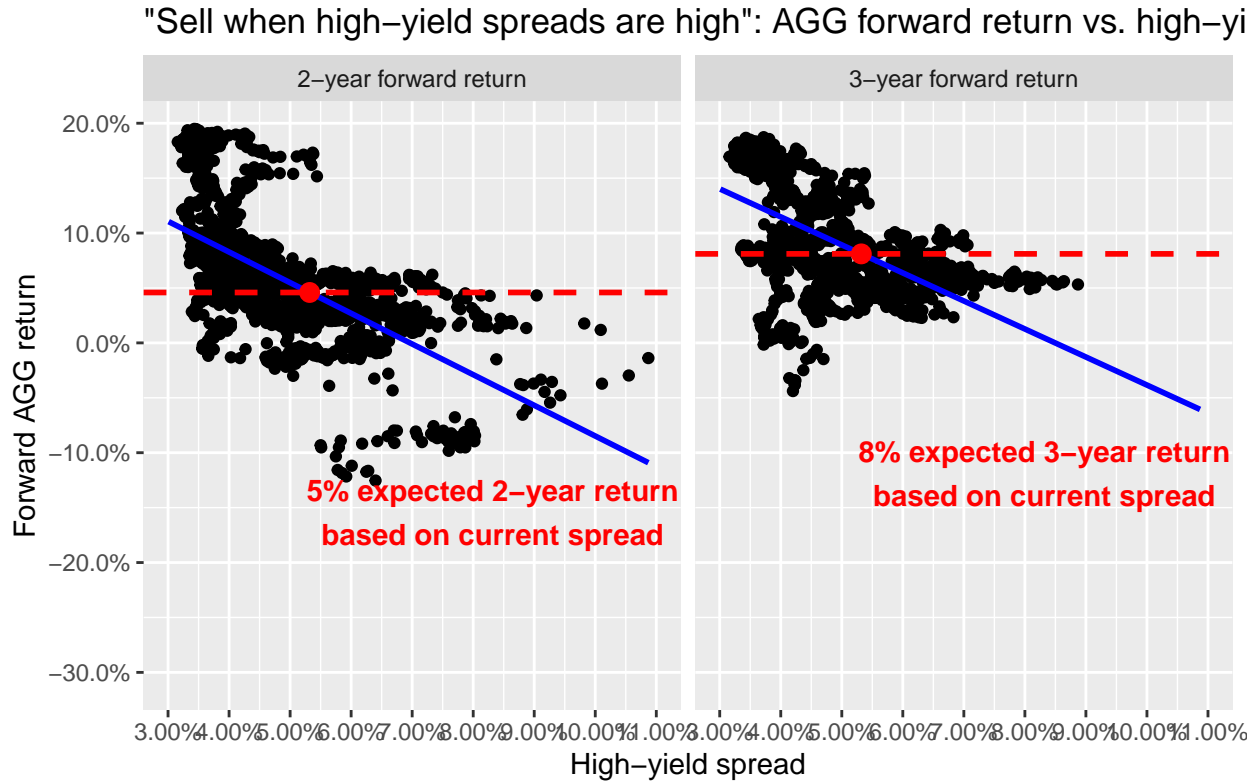
For investment-grade corporate bonds exhibit a similar dynamic. As with Treasury bonds, we find a negative relationship with forward returns, with the most significant signal on the two-year and three-year timeframes.

pearsons_6mo	pearsons_1yr	pearsons_2yr	pearsons_3yr
0.1512272	-0.1739625	-0.6257374	-0.570011

Ten-fold cross-validation again confirms that a linear model best minimizes residual mean-squared error.

Model	Mean_RMSE
Linear	0.0415688
Log	0.0608447

Plotting our data, we again find a negative relationship with forward returns, although expected returns are higher than for Treasury bonds.



Copyright 2022 Wall Street Petting Zoo  
Data courtesy FRED and Yahoo! Finance API

## Conclusion and Directions for Future Research

In conclusion, it makes good sense to rotate out of investment-grade bonds and into higher-risk assets such as stocks and high-yield bonds as high-yield spreads rise. And perhaps also the converse: as high-yield spreads fall, the risk involved in stocks and high-yield bonds may cease to be worth taking relative to the risk of investment-grade bonds. Rotation in and out of different asset classes could be scaled, staged, or triggered when a certain threshold is reached. We might, for instance, use the high-yield spread's percentile as a heuristic for asset allocation. As an example, the current high-yield spread is in the  $t$ th percentile of our historical data. Thus, we might go stocks or high-yield bonds, and investment-grade bonds. We could rebalance in accordance with changes in the high-yield spread's percentile rank.

In a future extension of this study, I will look at spreads between investment-grade and high-yield bonds in emerging markets, as well as between US and emerging markets bonds. I will experiment with incorporating information about the base discount rate, perhaps transforming yield spread as a percentage of discount rate, or perhaps rendering the base rate as a color gradient on the chart. I will see if the slope of a moving average of high-yield spreads (i.e. is the spread rising or falling?) affects forward returns. I will map date onto my charts as a color gradient and see if there are time effects I need to control for. I will use machine

learning techniques to determine how effective our models might be for forecasting out-of-sample. I will also incorporate information about the variance in the data to calculate Sharpe ratios for comparison across asset classes. And finally, I will propose a specific portfolio rebalancing strategy pegged to the high-yield spread.