



State Street Associates | *Current Trends*

The Shifting Role of Bonds

By Megan Czasonis and David Turkington

Key takeaways

- Our latest research on the stock-bond correlation projects that bonds will be a valuable diversifier over the next five years. But at what price?
- The Capital Asset Pricing Model (CAPM) is surprisingly effective at explaining expected return variation in stocks and bonds. From a fair value pricing perspective, current bond yields are not unreasonable if stocks become relatively more volatile and bonds offer strong diversification.
- Still, one may worry that low yields limit the upside potential of bonds. We argue that current low bond premiums do have precedent, and bonds may still offer helpful diversification to stocks in the future.

In its simplest form, asset allocation might be viewed as the choice between stocks, bonds, and cash. Stocks offer an engine for growth. Cash provides safety. The role of bonds, however, is less clear.

In the 1970s and 80s, US bonds offered high yields and behaved similarly to stocks. In the 1960s and 2000s, bonds had much lower yields but provided valuable diversification by tending to rise when stocks fell. What determines the properties of bonds as an asset class?

The extent to which bonds diversify stocks depends heavily on economic conditions. An increase in inflation affects stocks and bonds similarly, by eroding the value of their cash flows, so inflation risks tend to induce a positive relationship between stock and bond prices. On the other hand, a drop in economic growth is bad for stocks but generally good for bonds, because central banks may cut rates to stimulate the economy, and investors may exit stocks and seek the relative safety of bonds. The relative importance of inflation risks versus growth risks in the economy largely dictates the correlation between stocks and bonds. We apply the model presented in Czasonis et al. (2020), available [here](#), to forecast the stock-bond correlation for the five years following 2020 based on statistically similar trends in growth and inflation that have prevailed in history. This model currently predicts a very large negative correlation, implying that bonds will play a diversifying role in coming years.

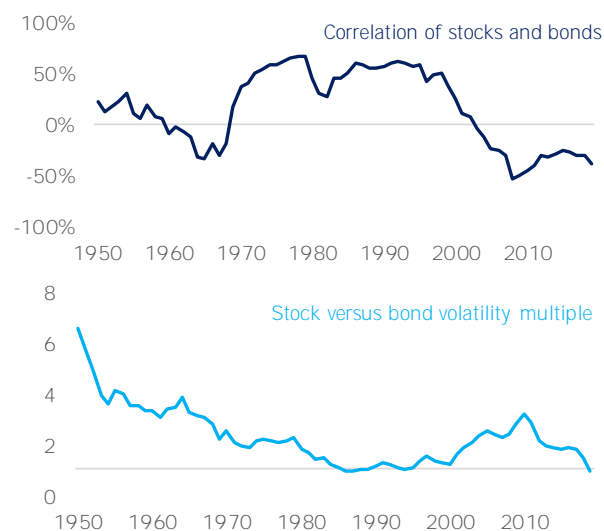
But diversification at what price? In principle, the correlation between stocks and bonds, together with their volatilities, should determine how appealing they are relative to each other, and relative to cash. The more appealing an asset class is, the higher its price should be, and the lower its expected future return. This is the essence of asset pricing. Stocks are usually much riskier than bonds, so on a stand-alone basis they should almost always command a higher long-run premium in terms of expected return. A low or negative correlation between the two asset classes makes both more attractive – because they hedge each other’s risks when combined – but they may change in different proportions depending on their relative volatilities. According to expected utility theory, the expected return that an investor requires of stocks and bonds should depend on the investor’s perception of their volatilities and correlations. This perspective can offer a useful guide to current yields. If we add in a few more assumptions about portfolios that all investors hold in equilibrium (as per Sharpe, 1964), we end up with the famous Capital Asset Pricing Model (CAPM) applied at the asset class level.

Many researchers have deemed the CAPM a failure when it comes to explaining the prices of individual stocks, as a litany of additional variables (value, momentum, etc.) appear to describe security prices above and beyond the singular “market portfolio” beta prescribed by CAPM. Even worse, stocks with a low market beta stubbornly outperform the CAPM’s prediction while high-beta stocks systematically underperform. However, we find that it provides more useful guidance for long-term performance of the stock and bond markets in aggregate.

Where the CAPM is Capable

We begin by computing the expected return premiums that a mean-variance optimal investor would require to hold a portfolio of 60 percent stocks (US large cap) and 40 percent bonds (US long term Treasuries). These values derive from the regression betas of stocks and bonds versus a 60/40 portfolio, and we can decompose the beta into two components which vary over time, as shown in Exhibit 1. The first component is the correlation between stocks and bonds, shown here over a rolling 10-year window of annual returns. The lower the correlation, the less risk a diversified portfolio has, and thus the lower the required return on both assets. But the effect on both assets will not be equal, because stocks often contribute

Exhibit 1: Rolling 10-year correlations and relative volatilities of stocks and bonds



Source: State Street Global Markets. Based on annual observations from 1950 to 2019.

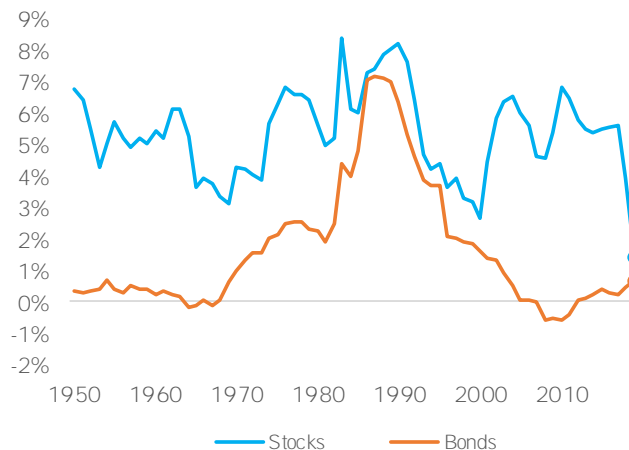
much more volatility to a portfolio than bonds. The second panel of Exhibit 1 shows the multiple of stock volatility above that of bonds. The gray line indicates a ratio of one, meaning both asset classes experienced the same level of annual return volatility in the preceding 10 years. All else equal, more volatile assets should require a higher expected return premium.

Exhibit 2 shows the required premiums that result from this approach at the end of each calendar year, ending in 2019. These premiums may also be interpreted as “fair” yields according to the CAPM, if a 60/40 mix represents the market portfolio and investors use the past 10 years of risk and correlation as their expectations for the future. In other words, these estimates are “betas” of annual returns in the preceding 10 years. There are a few notable observations:

- The risk and correlation properties of bonds implied a high required premium during the 1980s and early 90s. The required premium of bonds has turned negative in the 1960s and in 2008-2009.
- The required premium for stocks has always been positive, but varies a lot in size.
- The required premium for stocks as of 2019 (the latest full year value shown) is the lowest ever, as a result of stocks’ decade-long low risk and the ability to offset much of that volatility by investing in bonds.

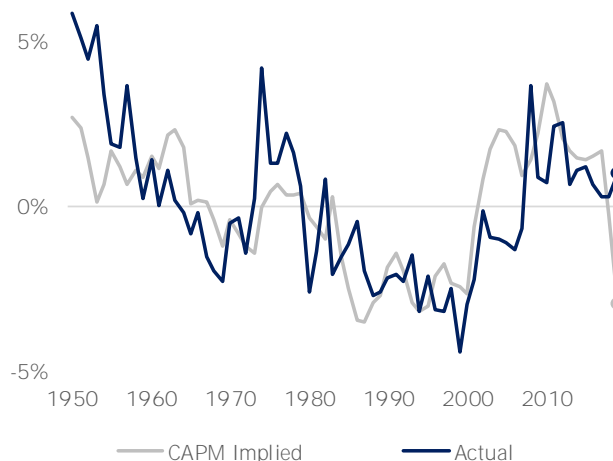
It turns out that the CAPM has been surprisingly effective in explaining the actual relative yields of stocks versus bonds. In Exhibit 3, we show the relative yield implied solely by the CAPM looking at trailing 10 year volatilities and correlations, along with the actual relative earnings yield of

Exhibit 2: Required expected return premiums for stocks (blue) and bonds (orange) assuming a 60/40 portfolio



Source: State Street Global Markets. Based on annual observations from 1950 to 2019. We calibrate the risk aversion parameter, or “lambda”, such that it roughly aligns with the long-run equity premium. This does not affect the time variation of the implied premiums which is more important than the level in our analysis.

Exhibit 3: CAPM-implied (gray) and actual (blue) yield difference between stocks and bonds



Source: State Street Global Markets. Based on annual observations from 1950 to 2019. Both series are shifted to have a full-sample mean of zero, to remove the effect of the implied long-run equity premium. This has no effect on the trends or correlations between the series. We proxy the stock yield as the inverse of the Schiller CAPE ratio and the bond yield as the 10-year constant maturity rate of US Treasuries.

stocks minus that of 10 year US Treasury bonds. With a correlation of 61 percent, this tight relationship is unlikely to occur by random chance.¹

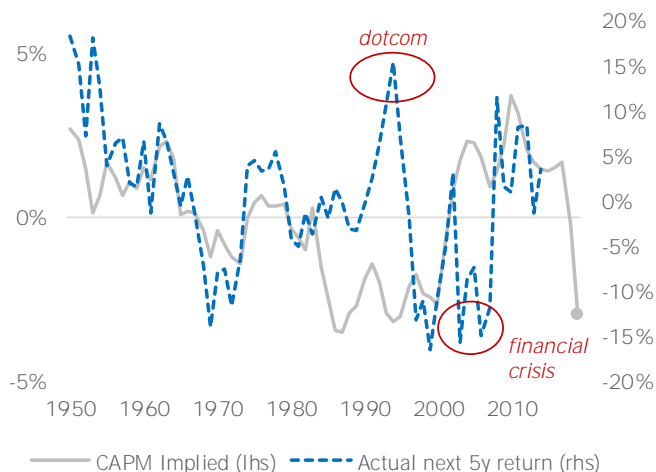
Moreover, actual stock returns in excess of bonds have often followed these relative yields (a phenomenon which is reflected in the oft-cited “Fed model”), but with notable breaks versus “fair” pricing during the dotcom bubble and global financial market crash (Exhibit 4).

Are Treasuries Too Expensive?

Bonds typically offer a lower expected return than stocks, so strategic allocations to bonds suffer an opportunity cost. The size of this expected yield sacrifice is measured as the premium of stocks minus bonds. As of June 2020, this means giving up 2.6% of yield per unit of allocation to bonds. The central question today is: do the diversification benefits of bonds justify this sacrifice, or are bond yields simply too low?

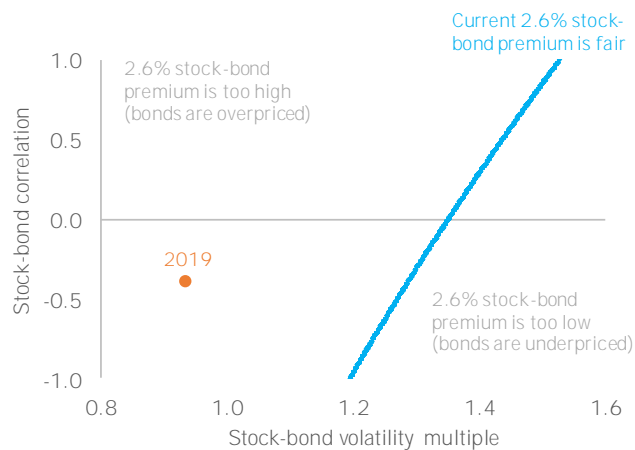
As of December 2019, the CAPM model we showed earlier – which we are viewing as a reasonable model of the reasonable price – implied that 60/40 investors should be willing to sacrifice only 0.7% of yield, meaning that bond yields are too low (bonds are overpriced). The reason is that stocks had low volatility on par with bonds (a ratio of 1.0), so there was little need to diversify. But if long-term equity risk jumps to a

Exhibit 4: CAPM-implied (gray) and actual next 5 year annualized returns (dotted blue) of stocks versus bonds



Source: State Street Global Markets. Based on annual observations from 1950 to 2019. Both series are shifted to have a full-sample mean of zero, to remove the effect of the implied long-run equity premium. This has no effect on the trends or correlations between the series.

Exhibit 5: Correlations and volatility multiples that justify the current stock-bond premium (2.6%)



Source: State Street Global Markets. Chart shows combinations of stock-bond volatility multiples and stock-bond correlations that result in a 2.6% stock-bond premium assuming a 60/40 market portfolio.

¹ The data includes 70 observations from 1950 to 2019. The overlapping observations do not impose any bias on the correlation estimate. However, we must impose an adjustment for any statistical significance tests because the 70 observations are not independent. Even if we conservatively assume 7 independent observations (due to the 10 year window used for estimation of risk parameters), the correlation of 61% has a statistical significance p-value of 0.07.

multiple of 1.3 times that of bonds, a 2.6% yield sacrifice is perfectly justified for a 60/40 portfolio in the name of diversification.

The blue line in Exhibit 5 shows every combination of correlation and risk forecasts that would justify a 2.6% yield spread. If stocks are proportionally riskier than what is assumed on that line, then a bond allocation is an even better deal right now, even at very low yields. Likewise, if the stock-bond correlation becomes more negative than what is assumed on this line (as our forecast mentioned previously suggests), then bonds are an even better deal. In short, holding all else constant:

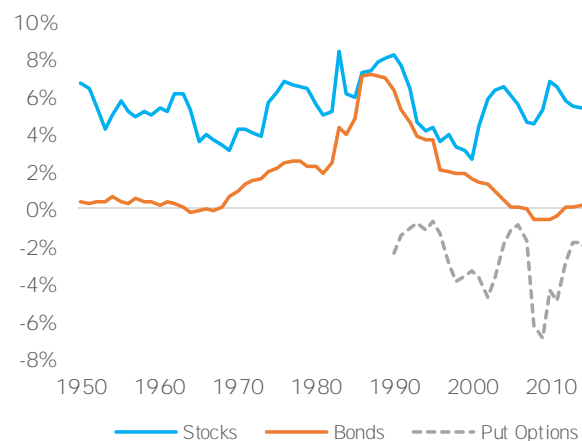
- bonds become more valuable as equity risk rises, and
- bonds become more valuable as the stock-bond correlation gets more negative.

While the current yield sacrifice required to hold bonds is much larger than its long-run average, it is reasonable if one expects the future to hold a combination of (1) high stock volatility compared to bond volatility, and (2) a large negative correlation between stocks and bonds. Though these conditions would require a shift from our experience over the last 10 years – characterized by remarkably low stock volatility paired with low correlations – the past decade is somewhat unprecedented (Exhibit 1). Therefore, it may not be unreasonable to expect stock volatility to rise while correlations remain negative, a combination which has occurred historically and would imply that historic lows in bond yields may be rational and fair, even if the yields themselves are extreme.

Can Treasuries Continue to Diversify?

Are bonds capable of providing an effective hedge to stock losses when their yields are so low? Diversification requires that when stocks fall the prices of bonds rise, which in turn means that yields must fall. Can they still fall meaningfully? One may question how many investors will line up to hold assets with lower (or negative) yields. We do not attempt to provide a definitive answer, but we offer a few points for consideration. In particular, we ask whether there are plausible scenarios where stocks would suffer large losses but Treasuries would perform well, and we contemplate whether these are

Exhibit 6: CAPM-implied expected return premiums versus the market price of put option protection (gray)



Source: State Street Global Markets. Based on annual observations from 1950 to 2019. We show the hypothetical price of buying 10% out-of-the-money one-year put options on the S&P 500 based on the average level of the CBOE Volatility Index (VIX) for each year. Option premiums are implied using the Black-Scholes-Merton model. The average premium is -2.6% since 1990.

conceivable in the context of today's market environment.

First, we note that long term bonds should always enjoy some basic level of demand if long-term investors seek assets that are risk free for a multi-year horizon. A negative yield need not deter them for the simple reason that there is no other risk free alternative. Though unpleasant, one may prefer a guaranteed small loss to a risky gamble that includes the chance of a larger loss. Recent years have provided some precedent for negative bond yields.

Second, there are at least some possible scenarios in which bonds should provide a very robust hedge for stocks. The most obvious is economic depression, wherein extremely bad economic conditions hurt stock prices and give way to deflation that boosts bond returns.

Third, we should also consider investor demand for hedging during more “normal” circumstances than a deflationary crisis. If treasuries act as an effective hedge for stock losses, this hedge could be valuable enough that it commands a premium in the form of a negative yield. When investors panic and demand rises for such a hedge, it is rational to pay for it. A good example of this phenomenon is 2008. The opportunity cost of the hedge position relative to stocks may matter most. As shown above, that opportunity cost may in fact be slim by historical standards, and significantly cheaper (with a positive rather than negative yield) than other hedging alternatives such as the premium of put option insurance, as shown in Exhibit 6.

References

- M. Czaronis, M. Kritzman and D. Turkington. 2020. “The Stock-Bond Correlation.” *Forthcoming in the Journal of Portfolio Management*.
- W. F. Sharpe. 1964. “Capital asset prices: A theory of market equilibrium under conditions of risk.” *Journal of Finance*, vol. 19, no. 3.

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