

## Viewpoints

March 2009

### The Equity Risk in a Bond Manager's World

By [Vineer Bhansali](#)

Bond people like to think of bonds as an entirely separate asset class from stocks, but the performance of fixed income markets in 2008 taught them a stark lesson: bonds have plenty of equity risk. Until the Lehman bankruptcy in September 2008, the equity market was living in its own world. But the Lehman default brought home the truth that equity holders are ultimately taking the bulk of the enterprise risk in the marketplace. Since then, virtually every class of bonds other than Treasuries have tracked the gyrations of the equity markets. Conceptually, this makes sense: Equity markets are where the collective animal spirits live, and increasing risk aversion is experienced first hand when one meets equity markets in a freefall.

The well-known Merton model that links credit spreads to equities is indeed based on the relationship between a corporation's underlying assets and its equity and debt, and so it's hardly surprising that a drop in the asset value of a company impacts both corporate stocks and bonds. What is shocking is that so many asset classes having nothing to do with corporate assets have become so correlated to equities. Recently, many so-called "pure alpha" strategies have actually shown little alpha and lots of equity market beta.

#### All Risk Leads to Equities

Over the last few months, a watchful investor could generally guess the daily direction of bond prices, the yield curve, currencies, commodities and credit by just observing the changes in the equity market. This correlation of assets at the macro level has driven home the point that much of the real risk of investments resides in the equity markets, and when the cuts from deleveraging get as close to the backbone of finance as they did last year, the equity market becomes the final risk shock absorber.

Even though the stock market itself has remained fairly liquid through the crisis (so far), falling equity prices are more likely than rising equity prices to result in a decrease in liquidity for other asset classes. At the end of the day – in a leveraged economy in which assets are being supported by a diminishing equity base – each unit of falling equity prices drastically magnifies the economy-wide leverage. If we are on a path of deleveraging that hasn't ended, then this "denominator effect" (where equity is the denominator and the net assets are the numerator) will require a further downward adjustment of the numerator, i.e., of asset valuation broadly. Indeed, as Leibowitz and Bova have observed recently,<sup>1</sup> widely diversified asset portfolios show an uncanny lack of risk reduction. The benefit of asset class diversification is not so much to reduce risk, they observe, but to provide sources of excess alpha.

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<sup>1</sup> Martin Leibowitz and Anthony Bova, "The Endowment Model: Theory and More Experience," Morgan Stanley Research (October 9, 2008)

## Viewpoints

March 2009

In 2008, the explosive environment that destroyed the structured credit markets drastically simplified investing and asset allocation by calling into question decades-old paradigms of asset class diversification as a mechanism for risk reduction. Long-term investing lore says that a 60/30/10 (equity, bond, cash) mix is a stable long-term portfolio. There are other handy aids that preceded mean-variance optimizers and structured products, such as subtracting an investor's age from 100 to determine the ideal percentage allocation to equities. In light of the fallacy of asset class diversification, I believe that these rules of thumb are just as good (or maybe even better) than classic asset allocation optimization, provided the portion not in equities is really not exposed to the equity market.

### Looking for Stocks in All the Bond Places

Major fixed income indices that represent the broad bond market actually have considerable exposure to equity market risk because they contain significant amounts of mortgages and corporate bonds. It's easy to see why this equity risk in bonds exists – traditional bond indices operate on the convention of market weighting. In other words, issuers with the largest outstanding bond issues have the highest representation in the index. Keeping in mind that issuing bonds means borrowing, it follows that the more a corporation borrows, the more it is represented in traditional bond indices. But more borrowing – typically referred to as leverage – is positively related to the probability of a severe default. Would you lend money to a neighbor who has already maxed out his credit cards?

As borrowing goes up, so does the risk of a default, which causes bond prices to fall. Similarly, the typical causes of falling equity prices – declining profitability, capital shortages, or the prospect of significant shareholder dilution – also raise the risk of default and cause bond prices to fall. Thus, it follows that most representative bond indices have a lot of equity risk, or default risk, mixed in. In periods of market stress, that means that a “diversified portfolio,” such as a 60/30/10 mix, will behave as if it's almost completely in equities! The largest issuers in the most widely followed index of fixed income markets (the Barclays Capital U.S. Aggregate Index) are Fannie Mae and Freddie Mac!

Consider the beta of various bonds and bond indices versus the S&P 500. By definition, the beta of the stock market to itself is 1. The beta of any other security is the correlation of its returns multiplied by the ratio of its volatility to the stock market's volatility. If a security such as a Treasury bond has a beta of  $-0.10$ , it means that its returns are negatively correlated to the stock market. On the other hand, high yield bonds typically show an equity beta of almost 1, meaning that not only are they positively correlated to the stock market, but they have volatility in the same order of magnitude as the equity market. One would want to buy such a security only if the compensation for holding the default risk exceeded the risk of equity market volatility by a wide margin. Many hedge funds and other absolute return strategies turned out significantly negative performance in 2008 for similar reasons – they were long hidden equity, or (what amounts to the same) liquidity risk. Higher equity beta should, in efficient markets, compensate with higher returns over the long term, or so says the Capital Asset Pricing Model. But higher equity beta also means higher drawdown and “tail risk” during times of market crisis.

## Viewpoints

March 2009

### The Human Factor

This all leads to the question of what can be done to limit the equity risk in a bond portfolio. Once uncorrelated and low volatility assets become highly correlated to volatile markets, risk management requires nothing less than aggressive control of the exposure to equity factor risk. Instead of deciding on the allocation to assets by percentage, we can do a much simpler exercise that starts with risk as the key decision variable. If we assume that equities will exhibit volatility of 30% over a long holding horizon (currently, the VIX index that measures short term equity volatility is trading in the 40%–50% range), then a beta of 1 to equities in your portfolio means that you should be willing to tolerate a very high likelihood (almost 35%) of losing 30% of the value of your portfolio over the next year! This, I submit, would be a very hard thing for most people to digest in the economic environment we are facing, even with the understanding that the risk comes with the potential reward of 30% upside with the same 35% probability.

This illustrates the important point that investors aren't robots and can't be expected to forget recent history when faced with the possibility of large losses piling on top of large losses. Indeed, I recently heard of a finance professor who believes in rational, efficient markets, and in long-term outperformance of equities, but sold all of his stocks (locking in losses), because he "could not take the pain any more."

One simple way to control risk is to look across a portfolio and dial down the equity risk factor beta to a level of risk that the investor can tolerate. For example, an investor might be willing to take no more than a 15% annual drawdown, so they could scale their portfolio's beta down to 0.5 (0.5 times 30% equals 15%). Yes, they might be giving up much of the upside potential, but if they're like me this year their marginal dollar might mean a lot more in their pocket than it does in the stock market, and in any case, since falling stock markets seem to be associated with falling prices, that marginal dollar buys more goods. And yes, when the equity market is less volatile, the investor would likely want to revisit this risk allocation and see if they believe prospective equity volatility is going to be low or high before they increase their equity risk.

### Spreading the Risk

So if we assume that Treasuries have an equity beta of  $-0.10$ , cash and Treasury Inflation-Protected Securities (TIPS) have an equity beta of 0, mortgages and municipal bonds have an equity beta of 0.25, corporate bonds have an equity beta of 0.50, and high yield bonds have an equity beta of 1, then I might be comfortable getting some of my equity beta from equities and the rest from bonds. For example, if I put 58% of my risk allocation in equities (100 minus my age), that portion gives me an equity beta of 0.58, which many investors might feel is too large given the risk. So another alternative an investor might choose is to put 30% in equities (with a beta of 0.3), 25% in mortgages or munis (with a beta contribution of 0.06), and the rest of the beta budget in corporate bonds (0.14 beta or roughly 30%). The rest (15%) goes into cash and TIPS. An added plus is that the equity beta from the corporate bond sector is higher up in the capital structure (i.e., if there is a default,

## Viewpoints

March 2009

the bondholder gets paid before the equity holder), and it should give the investor a yield even as stock dividends are being cut.

There are a few other ways of reducing portfolio equity beta. First, as we just illustrated, one can reduce exposure to assets that carry high equity beta by getting rid of them. The second way of reducing equity beta – if you absolutely have to keep your current high equity beta portfolio – is to plan against further equity factor risk by hedging, i.e., via put options (though in today's environment these might be too expensive). The third way is to look for uncorrelated or negatively correlated securities such as Treasuries (these also might currently be too expensive, given their low yields and precarious situation given impending government borrowing to fund bailouts and stimulus programs). Finally, we could use negatively correlated strategies, such as outright hedging of volatility risk using momentum or trend-following strategies.

Alas, value investors who have grown up in the school of mean-reversion have to allow for the possibility that when markets are in disarray, portfolio risk control and tail risk hedging is not a luxury, but a necessity. In a world where the risk of loss means forced liquidation and a knockout punch, anything short of aggressively managing the left tails of the return distribution is ignoring the clear lessons we learned in 2008.

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**Dr. Bhansali** is a managing director and head of analytics for portfolio management in the Newport Beach office. Prior to joining PIMCO in 2000, he was a vice president in proprietary fixed-income trading at Credit Suisse First Boston. He is the author of numerous scientific and financial papers and of the book *Pricing and Managing Exotic and Hybrid Options*. He currently serves as an associate editor for the *International Journal of Theoretical and Applied Finance*. He has 18 years of investment experience and holds a Ph.D. in theoretical particle physics from Harvard University. He has a master's degree in physics and an undergraduate degree from the California Institute of Technology.

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## Viewpoints

March 2009

investments may be worth more or less than the original cost when redeemed. Equities may decline in value due to both real and perceived general market, economic, and industry conditions. Mortgage and asset-backed securities may be sensitive to changes in interest rates, subject to early repayment risk, and while generally supported by a government, government-agency or private guarantor there is no assurance that the guarantor will meet its obligations. Income from municipal bonds may be subject to state and local taxes and at times the alternative minimum tax. Inflation-linked bonds (ILBs) issued by a government are fixed-income securities whose principal value is periodically adjusted according to the rate of inflation; ILBs decline in value when real interest rates rise. Treasury Inflation-Protected Securities (TIPS) are ILBs issued by the U.S. Government. Derivatives may involve certain costs and risks such as liquidity, interest rate, market, credit, management and the risk that a position could not be closed when most advantageous. Investing in derivatives could lose more than the amount invested. There is no guarantee that these investment strategies will work under all market conditions and each investor should evaluate their ability to invest for a long-term especially during periods of downturn in the market.

The Barclays Capital U.S. Aggregate Index represents securities that are SEC-registered, taxable, and dollar denominated. The index covers the U.S. investment grade fixed rate bond market, with index components for government and corporate securities, mortgage pass-through securities, and asset-backed securities. These major sectors are subdivided into more specific indices that are calculated and reported on a regular basis. Prior to November 1, 2008, this index was published by Lehman Brothers. The Standard & Poor's 500 Stock Price Index is an unmanaged market index generally considered representative of the stock market as a whole. The index focuses on the Large-Cap segment of the U.S. equities market. VIX measures the speed of price movement on the S&P 100 index (OEX), and mainly tells traders the average premium levels of the OEX options traded. It is not possible to invest directly in an unmanaged index.

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