

Treasury Bond Risk And Return

One of the cornerstones of money management is a wonderfully circular opinion by Judge Samuel Putnum in the 1830 Massachusetts case *Harvard College v. Armory* known today as the Prudent Man Rule: This directs trustees and by extension all those with a fiduciary duty “Do what you will, the capital is at hazard. All that can be required of a trustee to invest is that he shall conduct himself faithfully and exercise a sound discretion. He is to observe how men of prudence, discretion and intelligence manage their own affairs, not in regard to speculation, but in regard to the permanent disposition of their funds, considering the probable income, as well as the probable safety of the capital to be invested.”

In 77 words Judge Putnum both summarized the inescapability of risk and enshrined the prudence of lemmings. As all lemmings march over cliffs, marching over a cliff is a prudent thing for a lemming to do regardless of the certain death to follow. Judge Putnum also locked every fiduciary to follow into the straightjacket of remaining in bonds to meet actuarial obligations as they are viewed as less risky and speculative than equities, real estate and alternative investments. Bond investors were massacred unceremoniously between 1950 and 1981 as interest rates and inflation rose over time; this led many institutional investors to shift funds into riskier assets. By the credit bubble years in the middle of the past decade, it was considered prudent for university endowments to be in illiquid private equity investments and hedge funds. They were eviscerated without anesthetic in 2008; see the comment on the prudence of lemmings above.

The Secular Situation

While bonds in general and Treasury bonds in particular are supposed to be appeal to those focused on capital preservation and current income, the three-decade bear market in bonds set the market up for what was to be the most disbelieved 28-year bull market in human history. Between September 1981 and December 2008, the Merrill Lynch index of 15-year+ Treasury bonds had an average annual total return of 12.048%. In contrast, the average annual total return on U.S. stocks as measured by MSCI was 10.229%. Moreover, the Treasury investor got to sit out numerous highly entertaining downturns in the stock market.

Of course, all good things come to an end. Investors in those same 15-year+ Treasuries lost -17.625% during 2009; these were the worst since the bad old days of the 1970s and gave bond investors a taste of what risk could be after yields on ten-year U.S. Treasuries brush 2%. This is the simple tyranny of fixed-income mathematics: As the yield cannot go below zero for a coupon instrument, the potential for capital gains on the bond largely disappears. The opposite prevailed in September 1981 when ten-year Treasuries were over 15%.

A second factor entered into the equation in 2007-2009, and that was the Federal Reserve’s decision to push short-term interest rates toward 0%. Just as a large portion of stocks’ total return derives from dividends, much of a bond’s total return derives not only from the coupon income itself but from the reinvestment income on those coupons. If the short-term interest rate prevented a conservative – dare we say prudent? – reinvestment strategy, the total return on the bonds suffered perforce.

Incredibly, investors in long-term Treasuries were bailed out, pun intended fully, by another dive in long-term rates in 2010. The Federal Reserve kept short-term rates near 0% and promised, at least to those who believed their lying ears, to create inflation if necessary. The U.S. capital account surplus kept swelling, both China and Japan kept buying U.S. Treasuries as part of their currency, um, “stabilization” programs, and stock market investors remained remarkably unenthusiastic after the May 2010 Flash Crash. By the end of September 2010, yields on the ten-year Treasury were back below 2.50% and the total return on those 15-year+ Treasuries was an eye-popping 19.91%.

Enter Maturity And Quality

One of the oldest jokes in the bond market is bonds eventually mature while bond investors do not. If reinvestment returns were disappearing at the short end of the yield curve, investors could chase return in one of two other ways. The first was to lengthen the maturity of their investments and accept greater duration risk; the longer the bond’s maturity and the lower its coupon yield, the greater the duration or expected price change in the bond for a given move in interest rates. Duration cannot exceed maturity, and by September 2010, the duration on a ten-year Treasury was over 8.64. This meant a 100 basis point rise in interest rates could wipe out more than 3.25 years of coupon income. This is risk incarnate.

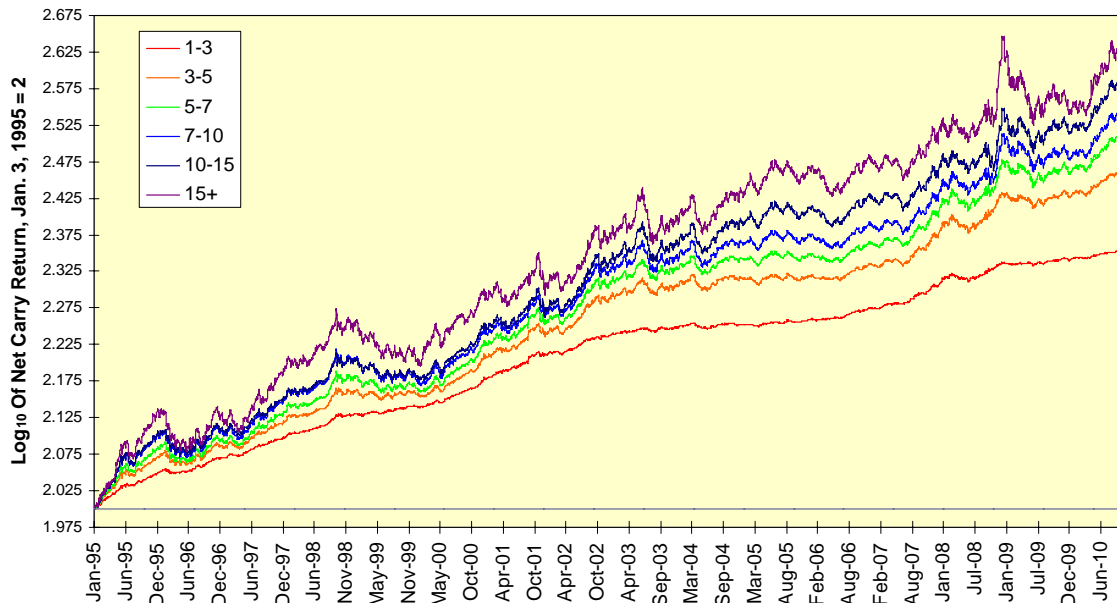
The second way to chase return is to shift from Treasuries to investment-grade and high-yield corporate bonds. The high-yield world had a terrific time of it in 2009 as credit spreads vis-à-vis the Treasury narrowed. The total return on the Merrill Lynch High-Yield Master II index was 57.51% in 2009. But they call it “junk” for a reason, and anyone who invested here was by definition eschewing prudence. Worse, the total return on this index fell to 11.26% through September 2010. Many institutional investors such as life insurance companies and pensions must stay within the investment-grade world.

Risk And Return

All investments are spreads whether we classify them as such or not; you swap the return on a cash instrument for that of a longer-date or higher-risk instrument. If and when short-term interest rates rise, the net return on this yield curve carry trade will get compressed unless long-term rates rise further and faster in what is known as a bearish steepening of the yield curve. The opposite is true when short-term interest rates plunge, as they did twice during the past decade, and the yield curve does not flatten.

We can subtract the three-month LIBOR funding cost (only the Treasury can borrow at the Treasury bill yield, so we will use LIBOR) from the Treasury bond’s total return path in Chart 1 for six-different Merrill Lynch maturity indices. The return path is depicted on a common logarithmic scale so that the initial net carry return in 1995 is 2.00.

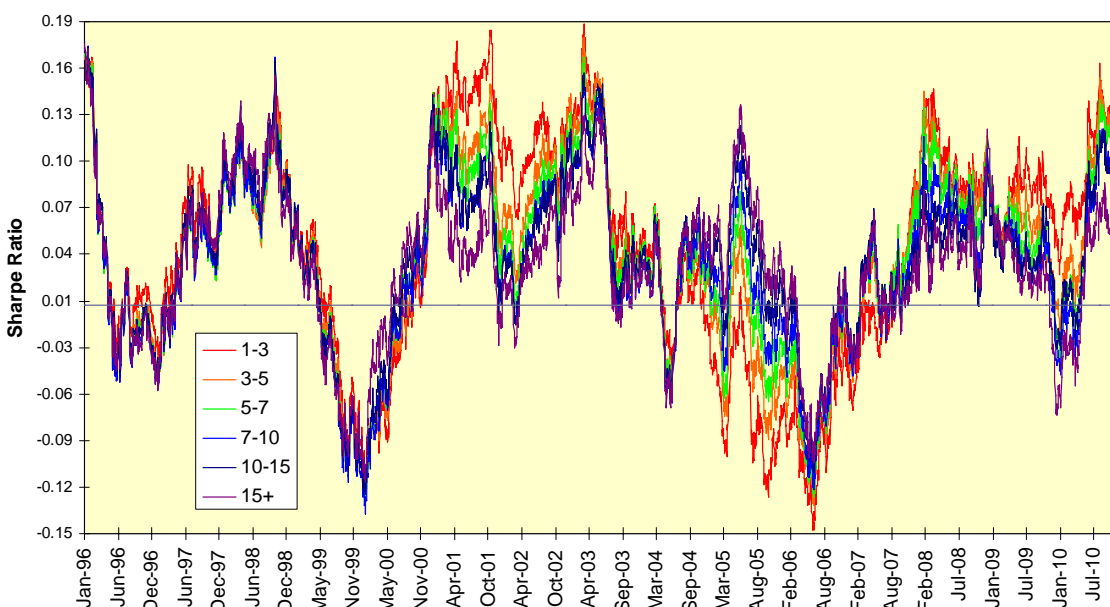
Chart 1: Net Treasury Carry Returns



What is striking here is not the greater total return for the long-dated bonds; we should expect that in a secular bull market, but the extent to which the long-dated bonds’ returns both jumped and retreated faster. This confirms the much greater volatility of returns for the long-dated Treasuries and suggests their Sharpe ratios, or excess returns divided by their standard deviation of returns, may not be consistently dominant over time.

If this is the case, we should see very unstable Sharpe ratios and times when the short-dated Treasuries have higher Sharpe ratios, and we do. The one-year rolling Sharpe ratios depicted in Chart 2 are notable for the two periods when they were negative during the Federal Reserve rate-hike campaigns of 1999-2000 and 2004-2006 and for the two periods of positive Sharpe ratios, 2001-2003 and 2008-2009 when the short-dated indices had higher Sharpe ratios. Anyone who can look at this history and proclaim fixed relationships in risk and return for fixed-income instruments is very creative.

Chart 2: One-Year Rolling Sharpe Ratio



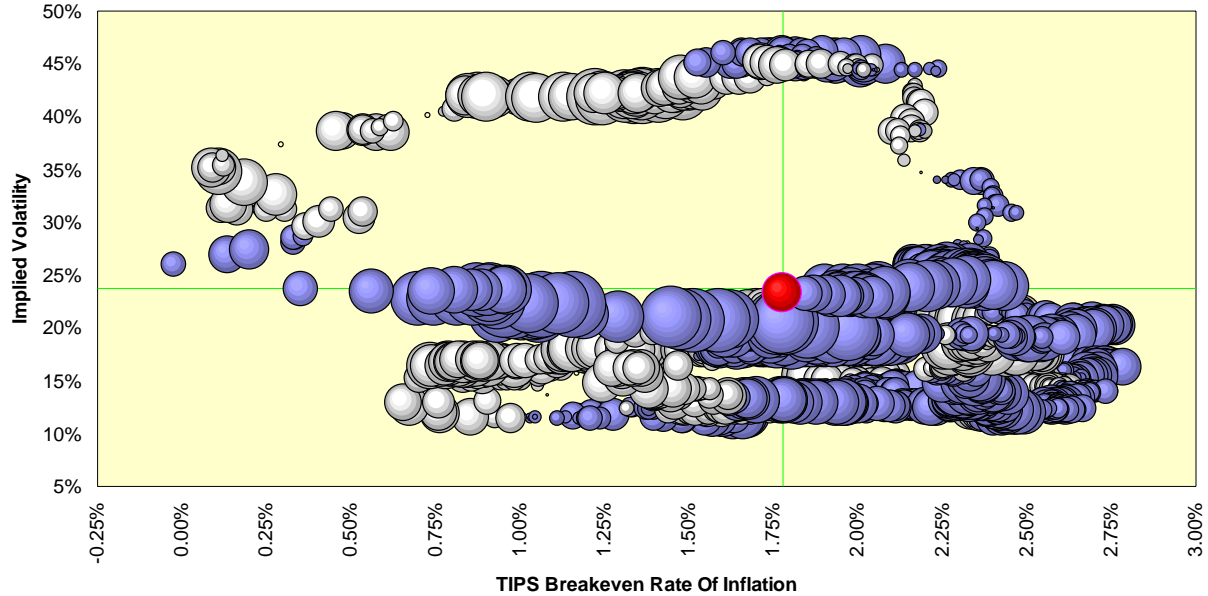
Two Other Risks

Now let's add two other risks into the mix, expected inflation and implied volatility. These are not the only two other dimensions of risk we could add; others include the reinvestment risks defined by the yield curve, currency volatility and the credit default risk of Treasury bonds. All else held equal, an investor faced with the prospect of higher inflation or with higher implied volatility should demand a higher yield to maturity at the trade's initiation.

We should assume the price of hedging against expected inflation in the Treasury Inflation-Protected Securities or TIPS market should be high enough to negate a return greater than that for conventional Treasuries (see "The Illusion Of TIPS Protection," May 2007). If this is the case, the times when breakeven rates of inflation, or the difference between nominal and TIPS yields, should be a good time to buy Treasuries as opposed to TIPS.

In addition, as higher implied volatility raises both hedge costs and widens the dispersal of outcomes, higher volatility should lower the prospective return on Treasuries. Let's blend these two dimensions together in Chart 3. The bubbles represent the total net carry return for the next three months for ten-year Treasuries. The blue bubbles are positive returns and the white bubbles are negative returns; the diameter of the bubbles depicts the absolute magnitude of the return. The datum three months before the end of the analysis is highlighted in red; the last data points used are highlighted with a green bombsight. As market conditions at the end of September 2010 were nearly identical to those at the end of June, the two points are quite close to each other.

Chart 3: Three-Month Ahead Returns On Ten-Year Carry



The results over time confirm a hypothesis for the ten-year Treasuries. Periods of low breakeven rates of inflation and high implied volatility, the northwest corner of Chart 3, lead to poor returns over the next three months; the opposite clustering is visible in the southeast corner of Chart 3.

Would buying in this southeast corner be considered prudent? Perhaps not; few encourage buying Treasuries when the volatility is low and expected inflation high. But prudence is not about profit; prudence is about running with the herd. Does anyone use a flock of sheep for a hedge fund logo? No? Our case exactly. Even for prudent assets, you have to take a little bit of a walk on the wild side.