

The Index Investor

Why Pay More for Less?

Model Portfolio Performance Update

Through the end of September, our model portfolios have generally underperformed their respective benchmarks. In comparison to last year, when the diversification of our model portfolios into non-U.S. markets generated significant outperformance versus our benchmarks, this year we have seen the opposite effect, as U.S. equity, bond, and currency markets have substantially outperformed most others around the globe. This trend was already very much in evidence before the tragic events of September 11th; since then, the traditional reaction to global crises (“head for the U.S. bond market”) has further reinforced it. With respect to U.S. equity market valuations, the best that can be said at this point is that they appear to have finally returned to levels that seem reasonable from a historical perspective, and, in some cases, even attractive in this regard. Still, in light of high current levels of uncertainty, aggressive bargain hunting is truly a game that only active managers with very strong stomachs should be playing at this point. As always, we believe that great majority of investors are better off sticking with index funds and balanced asset allocations that should outperform most actively managed portfolios over the medium and long term.

Our first set of model portfolios are designed to deliver returns that are superior to their respective benchmarks, while taking on the same amount of risk (that is, having the same expected standard deviation of returns). Thus far this year, they have underperformed their benchmarks. Our first portfolio is benchmarked against a mix of 80% U.S. equities (as measured by the Dow Jones Total Market iShare, IYY) and 20% U.S. bonds (as measured by the Vanguard Total Bond Market Fund, VBMFX). Year to date, this benchmark is down (16.2%), while our model portfolio is down (23.8%).

The second portfolio in this group is benchmarked against a mix of 60% U.S. equities and 40% U.S. bonds. Year-to-date, this benchmark portfolio is down (10.0%), while our

model portfolio is down (17.1%). The third benchmark portfolio is a mix of 20% U.S. equities and 80% U.S. bonds. Through the end of September, it is up 2.3%, while our model portfolio is down between (2.2%) and (3.4%), depending on the international Foreign Bond fund (which takes a more active management approach to exchange rate exposure) continues to outperform both the Fidelity International Bond and the Price International Bond funds.

Our second set of model portfolios are designed to match the returns of their respective benchmarks, while taking on less risk. They have also underperformed. While the 80/20 benchmark is down (16.2%) year-to-date, the model portfolio is down (24.0%). The 60/40 benchmark is down (10.0%) year-to-date, while our model portfolio is down (13.6%). Finally, the 20/80 portfolio has a 2.3% return through the end of September, while the model portfolio is down between (1.9%) and (3.2%), depending on the international bond fund used.

Our last set of model portfolios are designed differently. They assume that an investor wants to maximize the probability of achieving at least a minimum target level of return, while taking on the least amount of risk possible. Year-to-date, our 12% target return portfolio is down (23.8%), our 10% target return portfolio is down (24.0%), our 8% target return portfolio is down (15.3%), and our 6% target return portfolio is down (8.0%).

Finally, our experimental actively managed portfolio is down (13.7%) year to date, versus a positive 2.1% year to date by its benchmark, the Fidelity Global Balanced Fund. To some extent, our active management performance has been hampered by the limitation we placed on our trading, which allowed us to switch portfolio asset allocations only four times, at the end of December, March, June, and September. That being said, we are still lagging well behind our benchmark, as rallies we had expected in foreign equities, and then U.S. equities failed to materialized. Looking forward to the next three months, we are allocating 100% of our active portfolio to U.S. bonds, as we see little

prospect for a near term rally in global equity markets until future events reduce current levels of uncertainty.

In Focus: Bond Market Tilts

Over the last few months, we have been systematically exploring investors' options for using different types of "tilts", or overweightings of sub-asset classes, to enhance their expected risk adjusted returns. This month we will move away from equities, and on to a discussion of the U.S. bond market. We use the Lehman Brothers Aggregate Bond Market Index to track the performance of this asset class. This index includes investment grade government and corporate bonds, as well as mortgages backed securities.

Before we get into a more detailed discussion of potential tilts, we need to say a few words about the bond market as a whole. First of all, despite its staid reputation, in its own way it is every bit as confusing as the equity market. Two factors account for most of the frustration it has caused people in the past. First, relative to the equity market, the bond market has a lot more illiquid issues trading. Just think of the range of entities that have issued debt obligations – from California education districts to mortgage aggregators to highly leveraged start up telecomms companies to the U.S. government. Moreover, unlike a stock, a single entity can issue more than one type of bonds – many more, in fact, if you consider different maturities, seniority (e.g., senior versus subordinated), and collateralization (e.g., debentures, which are unsecured, versus bonds backed by a mortgage on a company's plant). In recent decades, the impact of this underlying illiquidity was to some extent masked by the existence of a very large and liquid government bond market. However, with the U.S. government running consistent surpluses, the amount of government debt outstanding has been contracting, which has forced fixed income investors to place relatively more of their funds in less liquid issues, and thereby raised the potential volatility of bond market prices and returns.

The second important factor to keep in mind is that until very recently, the bond market has been a much more opaque and inefficient place than the equity markets. For

example, whereas for many years now investors have been able to type “IBM” into their computer and get back a deluge of information about the company and its stock. However, the same could not be said for the company’s bonds; to find out how they were trading you had to call a broker. And if you wanted to buy an IBM bond from said broker, you would have to pay a hefty commission. And corporates weren’t the worst example in this regard – for a retail investor, getting good information about individual mortgage securities (more specifically, about the nature of the mortgages backing them) has been all-but-impossible. More recently, this has begun to change, with the advent of services like bondsonline.com. But overall, the bond market is still more opaque than the equity market.

Beyond these overall factors, we should also briefly review the major approaches to dividing the bond market into sub-segments. Four of the most common approaches are maturity, credit quality, type of issuer, and tax status.

Maturity means the length of time until the bond in question matures. It can be calculated on a simple basis (when does the bond come due), or on a more complicated basis, called “duration”, which is based on the time weighted present value of the cash flows to the bondholder (that is, payments of interest and principal). While there are no industry-definitions of what constitutes short, intermediate, and long term, Morningstar’s definitions are good guidelines: short term bond funds have average weighted durations of 3.5 years or less (or 4.5 in the case of municipal bond funds – go figure); intermediate term funds have an weighted average duration of between 3.5 and 6 years (or 4.5 and 7 years for municipals), and long term bond funds have weighted average durations of more than 6 (or 7!) years.

Credit quality refers to the probability that the issuer of the bond will make the payments due to the bondholder; in other words, bonds with low credit quality have a high default risk. Credit quality ratings are assigned to bonds by three major “rating services”, including Standard and Poor’s, Moody’s, and Fitch. These firms use letter rating systems to signify different levels of perceived credit quality. For example, the highest S&P rating

is AAA. Along these lines, a term one frequently hears is “investment grade”, as in “the fund only invests in investment grade bonds.” A bond is said to be “investment grade” when it has a rating of BBB or higher. Below this, bonds are often said to be “high yield”, or, less charitably, “junk”.

Segmenting the bond market by maturity and credit quality makes good sense, because both factors are theoretically related to expected returns. Longer maturity bonds should earn higher returns because the owner has more risk of a loss due to a rise in interest rates, while lower credit quality bonds should earn higher returns because they have a greater risk of default.

A third approach to segmenting the bond market is by type of issuer. For example, one can talk about government bonds, or corporate bonds. Along similar lines, one can talk about mortgage or, more broadly, “asset-backed” bonds, which are issued by special purpose entities that hold as assets a portfolio of mortgages or other type of receivable (e.g., credit card or auto loan receivables). Mortgages are somewhat unique among bond market instruments because of their high exposure to what is known as prepayment risk – that is, the risk that the underlying mortgages will be refinanced when interest rates fall. For example, suppose you bought a 30 year mortgage security that had a high yield, that was based on the stream of interest and principal payments on an underlying portfolio of high interest rate mortgages. If you were counting on receiving these high yields for a long period (say, to pay for your retirement), you could be in for a rude surprise if rates fell, and a substantial portion of the underlying mortgages were prepaid (that is, refinanced at lower rates). In this simplified case, your principal would be paid back to you more quickly than you had expected, and you would have to invest it in new bonds with lower yields.

The final approach to segmenting the bond market is by tax status, or, more specifically, by whether or not interest payments from a bond are subject to income taxation by states and other local entities. When payments are exempt, the issue is generally known as a municipal bond. As in the case of taxable bonds, municipals can be further sub-divided

by maturity, credit quality, and issuer (e.g., general obligation bonds are backed by the “full faith and credit” of the issuing entity, which is usually a state or municipality, while revenue bonds depend on revenues from a specific project or facility to cover bond interest and principal payments).

Let’s move on now to take a look at historical risk/return relationships within these sub-segments.

Our data set for this analysis covers January, 1991 through December, 2000, or the last ten years. Over this period, the average annual return on the Lehman Brothers Aggregate Bond Index was 8.03%, with a standard deviation of returns of 4.02%, or about 2.00% of return per unit of risk taken on.

Breaking this down by issuer, during this same period, the Merrill Lynch Treasury (Government Bond) Index delivered average annual returns of 8.01% with a standard deviation of 4.41%, or 1.82% of return per unit of risk. By comparison, the Merrill Lynch Mortgage Index had average returns of 7.98% with a standard deviation of 3.26%, or 2.45% of return per unit of risk.

Looking at maturity categories, the Lehman Intermediate Term Government/Corporate Index (which doesn’t include the mortgages that are in the Aggregate Bond Index) has average annual returns of 7.39% and a standard deviation of 3.28%, or 2.25% of return per unit of risk, while the Lehman Long Term Government/Corporate Index had average annual returns of 9.87% with a standard deviation of 7.78%, or only 1.27% of return per unit of risk.

Taking a credit quality perspective, the Lehman Brothers High Yield Index delivered average annual returns of 11.38% with a standard deviation of 6.98%, or 1.63% of return per unit of risk.

On the tax free side of the market, the Lehman Municipal Index (the equivalent of the Aggregate Bond Index) had average annual returns of 7.42%, with a standard deviation of 4.53%, or 1.64% of return per unit of risk. Within the municipal category, short term bonds had average annual returns of 5.57% with a standard deviation of 1.88%, or 2.96% of return per unit of risk; intermediates delivered average returns of 6.27% per year, with a standard deviation of 2.92%, or 2.15% of return per unit of risk, and long term issues had average annual returns of 7.53% with a standard deviation of 4.56%, or 1.65% of return per unit of risk.

Finally, two other sub-segments of the bond market should be noted, because they frequently come up in conversation. The first is convertible bonds, which are in essence a bond which carries the right (but not the obligation) to purchase equity in the issuing company at a predetermined price during some future period. Think of it as a bond with equity options attached to it. Over the period covered by our data, the average annual return on the Merrill Lynch Convertible Index has been 16.23%, with a standard deviation of 14.21%, or 1.14% of return per unit of risk.

The second subsegment is the relatively new area of inflation protected government bonds. There are two kinds of these. Since 1997, the U.S. Treasury has issued Treasury Inflation Protected Securities, or TIPS. Similar to inflation protected (also known as “real return”) bonds issued by the Canadian, Australian, U.K., and Swedish governments, TIPS set their initial coupon interest rate via an auction process at the time they are issued. Every six months thereafter, their principal amount is adjusted up or down on the basis of the rate of consumer price inflation over the previous six months. At maturity, you receive back the higher of your original principal or the inflation adjusted amount (that is, you are protected against a loss of principal due to prolonged deflation). In terms of average returns, since they were introduced in 1997, TIPS have generated average annual returns of 5.56% (based on the Salomon Brothers Inflation Linked Security Index), with a standard deviation of 2.72%, or 2.04% of return per unit of risk.

TIPS are something of a good news/bad news story. The main benefit of investing in TIPS is the protection it provides against inflation, which can ravage the value of a fixed income portfolio if it significantly rises while you are holding securities with long durations. The second most important advantage to holding tips is that there are enough of them outstanding that the market is reasonably liquid should you want to sell them before they mature. Finally, as with all U.S. Treasury securities, income on TIPS is exempt from state and local income taxes. Now for the bad news: at the federal level, the change in the value of the TIPS principal due to inflation is treated as taxable income in the year it occurs, even though you don't receive this money until the bond matures (or until you sell it). As you can imagine, this means that for most individual investors, the only place to hold TIPS is in a tax exempt account.

The second kind of inflation protected security issued by the U.S. Treasury is the Series I Savings Bond, which have been available since 1998. In this case, the inflation adjustment is made directly to the coupon rate on the bond, and not to the principal. For example, for the current six month period (which is changed every May and November), the rate on the bond is 5.88%, which is equal to 3% plus the previous six month's annualized rate of inflation, which was 2.88%. As with other savings bonds, you do not receive this interest until the bond is redeemed, at which time it is subject to federal income taxation. However, if the interest is used to pay for higher education, it is (under current regulations) exempt from income tax. Moreover, Series I Bond interest is not counted in provisional income for the purpose of calculating the tax status of social security benefits. Now for the bad news: there is a limit on how much you can invest in Series I Bonds. Currently, no more than \$30,000 in Series I Bonds may be sold each year to an individual, as identified by their social security number.

As frequent readers know, average returns and standard deviations are just two thirds of the optimization story; the correlation of returns between different assets (that is, the degree to which they vary together) is also important. Looking over the list of assets we have reviewed thus far turns up five interesting correlations. First, commercial real estate (as measured by the NAREIT index) has a low .23 correlation with both the bond market

(as measured by the Lehman Brothers Aggregate), and a low .32 correlation with the equity market too (as measured by the Wilshire 5000 Index). By this measure, commercial real estate is really a separate asset class. Second, as you would expect, convertible bonds had a much higher correlation with the Wilshire 5000 (.82) than with the Lehman Brothers Aggregate (.17). For all intents and purposes, from an asset class point of view, convertibles should be seen as a very attractive segment of the equity market.

The third interesting correlation is between high yield bonds and the overall Lehman Brothers Aggregate Bond Index. At .32, it is quite low, suggesting, perhaps, that high yield bonds (because of their higher default rates when compared with investment grade issues) are really more like equities (as many commentators have written). We checked this, and found a correlation of returns of .49 versus the Wilshire 5000. To be sure, this is higher than the correlation of other bonds, so the writers are correct in the relative sense. However, we should keep in mind that .49 is still a low correlation, that seems to indicate that like commercial real estate, high yield bonds are really somewhere in-between the pure bond and equity asset classes.

The fourth point that emerged from our analysis was the correlation between TIPS and the overall bond and equity markets. With respect to the first, the correlation with the Lehman Aggregate was only .55, with the Wilshire 5000, it was .01, or basically zero. Once again, these correlations suggest that TIPS are actually a separate asset class, rather than a part of the class known as U.S. fixed income.

Finally, we checked the correlation of the Lehman Municipal Index with the Lehman Aggregate, and found it to be only .78. At first glance, this seems relatively low; however, when you consider that the muni market has far more smaller, less liquid issues than the taxable bond market, and is far more dominated by individual investor flows, then this makes more sense. Finally, the Muni Index has a low .29 degree of correlation with the Wilshire 5000, which is indistinguishable from the Lehman Aggregate's .28.

The last step in our analysis of bond market tilts was to put some of these assets into our optimizer, and see if we could outperform the 8.03% average return and 4.02% standard deviation (2.00% of return per unit of risk) delivered by the Lehman Aggregate between January, 1991 and December, 2000. In these experiments, we allowed maturity tilts (in the form of the Lehman Intermediate Term and Long Term Indexes), as well as the use of high yield bonds, TIPS, convertibles, and commercial real estate. The only constraint we set was that no asset class could comprise more than 50% of our model portfolio.

In our first experiment, we sought to design a portfolio that would deliver more than the Lehman Aggregate's 8.03% of return, while taking on the same level of risk. In this case, we were able to raise expected annual returns to 9.49% (2.36% of return per unit of risk) by giving the Lehman Intermediate Term Index a 50% weight, allocating 23% to high yield, 10% each to TIPS and Converts, and 7% to commercial real estate.

In our second experiment, we sought a portfolio that would deliver the Lehman Aggregate's 8.03% of average annual return with substantially less risk. In this case, we were able to reduce the expected standard deviation of returns to 2.91% (or 2.76% of return per unit of risk) by giving a 43% weight to TIPS, 31% to the Lehman Intermediate Term Index, 18% to high yield, and 8% to convertibles.

Of course, as with all other analyses, we must note that the past may be a poor predictor of the future, and that if this is the case, then our expected results may not materialize. Having said that, the analysis does make a couple of things clear. The first is that the bond market is a pretty efficient place, despite its opaque information flows – it would seem that the people who do have access to good information play a pretty good game of hardball with each other (as anybody visiting the pubs of lower and midtown Manhattan or the City of London after the markets close can observe firsthand!). The second is that enhancing expected indexed fixed income returns generally requires exposure to some additional asset classes that, while generally not equity, are still different from investment grade bonds.

Product and Strategy Notes

Having looked at bond market tilts, we also looked for funds that could be used to make them. Here are some that we liked:

For TIPS, we like the Vanguard Inflation Protected Securities Fund (VIPSX). It was introduced last June, and carries a very low .25% of total expenses. Another fund we liked in this category is the PIMCO Real Return Bond Fund (PRRDX), although its expense ratio was higher at .93%.

In the high yield category, we liked the Vanguard High Yield Corporate Fund (VWEHX) not only because of its low .27% expense ratio, but also because of a ten year record of outperforming the Lehman High Yield Index against which it is benchmarked. In this sector, credit quality assessment is critical, and Vanguard is apparently quite good at it.

For REITs, which we've discussed in past issues, we prefer the Vanguard Real Estate Index fund (VGSIX). We also liked their convertibles offering (VCVSX) because of its low expense loading (.59% versus an average of 1.49% for the convertible bond fund category).

Finally, for an intermediate duration tilt, we liked the Vanguard Intermediate Term Bond Index Fund (VBIIX). Its .20% total expense ratio is well below the category average, and its performance is regularly above it. You simply can't do better than that.