KEEPING COSTS LOW: INTELLIGENT INDEXING WITH BONDS

By Albert J. Fredman

Indexing makes sense for bonds: Ultra-low costs are crucial with bonds because bond returns tend to be lower than stock returns, and there's less opportunity for managers to add value with bonds than stocks because high-grade bonds are more homogeneous.

A portfolio needs some bond exposure to be truly diversified. Granted, bonds normally deliver lower multi-year returns than stocks. Yet their ability to dampen a portfolio's volatility often outweighs the sacrifice in return.

This is particularly true of large-dollar-value portfolios, which normally experience an uncomfortably large shrinkage in value during market setbacks. Many individuals can reach their long-term net worth goals without assuming the risk of an all-stock portfolio. The harsh reality of last year's equity market volatility underscores the need for some bond exposure.

In fact, there's a good chance that stocks will outperform bonds by a smaller margin over the next 10 to 15 years. It is unlikely that stocks will continue to deliver anything remotely close to the 28.5% average annual return that the Vanguard 500 Index fund cranked out over the five years ending December 1999. It is more likely that large-cap U.S. equity returns will move closer to their nominal average of about 11%, realized since 1926. Relatively speaking, bond funds are now looking better. And indexing makes as much sense for bonds as it does for equities.

Keeping costs low is the most basic lesson bond fund investors need to remember. Index funds offer low-cost, broad bond-market diversification. Although most index funds track equities, you can find a distinct minority that replicate benchmarks of high-grade taxable bonds. These funds primarily target issues of the U.S. Treasury, federal government agencies, and corporations. Their assets have steadily climbed since December 1986 when Vanguard introduced the first, Total Bond Market Index Fund. Now as the third largest taxable bond fund with more than $14 billion in assets, it replicates Lehman Brothers aggregate bond index.

Recently, there were 29 bond index funds with assets totaling $22 billion, according to Morningstar, Inc. In addition to the overall bond market, index funds track short-, intermediate-, and long-term bonds. T. Rowe Price, the latest entrant into bond indexing, recently brought out a fund that also tracks the popular Lehman Brothers aggregate. Yet only about 6% of total corporate and government bond fund assets are indexed, according to Morningstar data. The lion's share of indexed money has flowed into equities, thanks to the stellar performance of stocks during the last decade.

BOND INDEXING ATTRIBUTES

The typical bond fund has an expense ratio close to 1%, in contrast to the 1.4% expenses of the typical stock fund. Yet because bonds, on average, return less than equities, expenses take a much larger bite out of returns. Expenses on high-cost bond funds may devour up to 25% or more of the return. Tapping into the high-quality taxable bond market can be done most economically through a low-cost index fund. Such funds differ from their managed counterparts in several ways:

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TABLE 1. EXPENSE RATIO IMPACT ON RETURN

	Bond Index Fund (%)	Active Bond Fund* (%)
Bond Market Yield	7.4	7.4
Expense Ratio	0.2	1.0
Net Yield	7.2	6.4
Percent of Bond Market Yield	**97.3**	**86.5**

**Average*
Source: The Vanguard Group

- Index fund managers don't make interest-rate bets by lengthening or shortening the portfolio's duration (a sophisticated measure of a bond's "average" life) to match interest-rate expectations. Most interest-rate forecasters have a poor track record.
- Index funds don't significantly overweight or underweight bond market sectors as active managers may. (Some index-fund managers may moderately overweight bond sectors, as I will explain.)
- Bond-index funds are likely to be far more diversified among different corporate issuers and bond market sectors. This minimizes issuer-specific credit risk with corporate bonds.
- Bond-index managers steer clear of high-yield corporate bonds or those rated below triple-B. This should put conservative investors at ease, given the level of fear that recently has engulfed the junk bond market due to an uncomfortably high default rate.
- Thanks to their low costs, bond-index funds tend to outperform at least 60% of their actively managed peers.

Table 1 illustrates the impact of expenses on returns by comparing a hypothetical bond index fund with a 0.2% expense ratio against the average actively managed bond fund charging 1%. The former captures 97.3% of the bond market yield versus only 86.5% for the latter. This yearly performance edge can compound to a significant sum over time, particularly with a large dollar investment.

INDEXING BONDS VS. STOCKS

Like their equity counterparts, bond index portfolios have served the test of time. Table 2 compares the benefits of indexing bonds with those of indexing stocks. Returns of actively managed bond and stock funds are compared with the returns from the Vanguard Total Bond Market Index and the equity-based Vanguard 500 Index over various trailing periods. While these results are sensitive to the period used, they show that bond indexing holds a clear performance edge over investing in comparable actively managed bond funds. This is akin to the advantage that equity index funds normally have over their managed relatives.

In contrast to the norm, actively managed stock funds had a striking performance edge over indexed funds in the recent 12-month period. But bond index funds maintained their advantage over their managed peers. Many actively managed stock funds probably reacted to the sharp sell-off in technology by rotating into other sectors, thereby beating the S&P 500 with its inflexible technology weighting.

Stock index funds are popular vehicles for deferring gains in taxable accounts. However, bond index funds normally are far less tax-efficient because they have both higher yields and higher turnover rates. A much greater proportion of total return on a bond portfolio consists of net investment income or yield. At recent interest-rate levels, an intermediate-term bond index fund might yield 6% or 7%. Conversely, S&P 500 index funds yielded less than 1%.

Gains on investments will not be deferred unless turnover is low. Indexed bond portfolios have higher turnover rates than the typical S&P 500 fund because a bond index will change as its component bonds mature or are dropped from the benchmark and new ones are included. For instance, Vanguard Total Bond Index had annual turnover rates ranging from 36% to 57% over the past five years.

TABLE 2. INDEXING'S PERFORMANCE EDGE*

	Index Funds (%)	Active Funds (%)	Difference (%)	Difference as % of Return (%)
Bond Funds:				
1 Year	6.99	5.73	1.26	21.99
3 Years	5.88	4.78	1.10	23.01
5 Years	6.44	5.49	0.95	17.30
10 Years	7.94	7.30	0.64	8.77
Stock Funds:				
1 Year	13.41	16.58	–3.17	–19.12
3 Years	16.46	14.15	2.31	16.33
5 Years	21.66	18.38	3.28	17.85
10 Years	19.32	17.26	2.06	11.94

**Actively managed corporate/government intermediate-term bond funds are compared with the Vanguard Total Bond Market Index; actively managed large-cap blend funds are compared with the Vanguard 500 Index. All periods end 9/30/2000.*
Source: Morningstar, Inc.

Conversely, the typical S&P 500 index fund has turnover of 4% to 6% yearly. The turnover tends to run from 2% to 3% with Wilshire 5000 index funds, which track the total domestic market. Conversely, a small-stock index fund tends to experience far higher turnover because of changes in index components as companies outgrow the benchmark.

In any case, bonds generate fewer gains to defer than stocks. Prices must trend gradually upward to be able to defer gains. That happens with stocks, but bond prices exhibit no general tendency to trend upward—unless the economy experiences a prolonged period of declining interest rates. This is unlikely to happen to a significant extent in the foreseeable future as long-term interest rates have trended down to relatively low levels during the past two decades.

Thus, the suitability of bond index funds for an individual depends largely on the investor's personal tax situation. They are well-suited for tax-deferred accounts, such as IRAs and 401(k) plans. Such funds also make sense in taxable accounts where the individual's tax bracket is relatively low.

BOND INDEXING STRATEGIES

Indexing strategies vary among fund types. Stock and bond indexers may use one of two basic indexing methods:

- *Total (or full) replication*: The index fund holds all the stocks included in the underlying index proportional to their weightings. For example, an S&P 500 index fund holds all 500 stocks listed in the S&P 500, and a company that comprises 5% of the market value of the universe would receive a 5% weight in the index fund.
- *Sampling:* Often, index funds merely sample the universe if the index contains an extremely large number of issues. This is true, for example, with stock funds targeting the Russell 2000, Russell 3000, Wilshire 5000, and all bond index funds. The objective is to use sophisticated techniques to select a sample of securities that closely mimics the characteristics of the underlying index.

Lehman Brothers aggregate bond index is the benchmark of choice for the majority of indexed bond assets. Composed of a wide spectrum of fixed-income investments, it includes the intermediate and long-term portions of the Lehman Brothers government/corporate index and the Lehman Brothers mortgage-backed securities index. More than 5,500 taxable government, investment-grade corporate (rated triple-B or better), mortgage-backed, and international dollar-denominated bonds make up the benchmark. The total value of all securities in the index exceeds $5 trillion.

A particular fund may track either the entire Lehman Brothers aggregate or a subset of that benchmark, depending on its objectives. For example, a short-duration portfolio would track a one- to five-year government/corporate index. Table 3 contains the target index composition for each of the four Vanguard funds. Note that the four numbers across each row total 100%, representing the complete index. As evident, bond category targets differ significantly among funds. For instance, the Short-, Intermediate-, and Long-Term fund targets contain no mortgage-backed bonds, whereas 35.6% of the Total Bond Market target is comprised of mortgage-backed bonds.

INTELLIGENT INDEXING

Full or total replication generally is not a practical, cost-effective approach with a bond index fund. This is due largely to the way the bond market works. For instance, many bonds in the index are illiquid. Older agency and corporate bonds are locked away in the portfolios of long-term investors. Thus, a bond-index portfolio doesn't replicate the weightings of the securities in the benchmark like an S&P 500 index fund.

Bond index fund managers often use a so-called "enhanced" or "intelligent" indexing approach, where they seek to match the risk factors of the index (such as interest-rate risk and credit quality), perhaps with minor variations. Managers use their best judgment along with sophisticated computer programs to select a meaningful sample based on maturity, credit quality, and industrial sector. At year-end 1999, Vanguard Total Bond Market held 721 of the 5,545 bonds in the Lehman Brothers aggregate.

Actually, there's a lot more active management involved in running a bond index fund than most investors

TABLE 3. BOND INDEX TARGETS

	Lehman Brothers Target Index Composition*			
Vanguard Fund	U.S. Gov't. (%)	Corp. (%)	Mortg.-Backed (%)	Int'l Dollar-Denom. (%)
Total Bond Market Index	41.6	18.2	35.6	4.6
Short-Term Bond Index	74.0	20.3	0.0	5.7
Intermediate-Term Bond Index	52.5	35.5	0.0	12.0
Long-Term Bond Index	63.6	30.2	0.0	6.2

**As of December 31, 1999.*
Source: The Vanguard Group

realize. In sampling their target indexes, for instance, Vanguard's funds have the flexibility to overweight particular types of bonds relative to their index representation. For the Total Bond Market Index and Short-Term Bond Index, this normally involves substituting corporate bonds for government bonds of the same maturity. The corporate substitution strategy increases income, but also marginally increases credit risk. A manager often purchases corporates late in the fourth quarter when their prices are depressed due to intense selling by Wall Street firms, coupled with weak demand. The funds limit corporate substitutions to bonds with remaining maturity of less than five years, and each fund will limit such substitutions to less than 15% of net assets. A major part of Vanguard's intelligent indexing strategy seeks to take maximum advantage of its team of credit analysts to find credits that show promise of improving over time.

In addition, fund managers can invest a portion of their assets in bonds outside of the Lehman Brothers index that have characteristics similar to those in the benchmark. A fund might invest up to 20% of its portfolio outside the index. Enhanced indexing results in a portfolio with some index tracking error, but it can be implemented at far lower cost, resulting in after-cost returns that are much closer to those of the index.

FUND PROFILES

Table 4 profiles some older no-load bond index funds available to individual investors. (A complete listing of bond index funds is available from IndexFunds.com at www.indexfunds.com.) As evident, bond index funds are available with different target maturity objectives. Galaxy II U.S. Treasury Index invests exclusively in U.S. Treasury bonds and notes. Tracking the Salomon Smith Barney U.S. Treasury Index, its $158-million portfolio recently contained 25 securities. Because the fund holds Treasuries, virtually all of its income is exempt from taxation at the state level. Introduced in 1991, the fund has a 0.41% expense ratio. Alternatively, a cost-conscious investor may buy Treasury notes or bonds directly through the Federal Reserve. The absence of credit risk in the Treasury market greatly reduces the need for diversification.

Important differences exist between the short-term, intermediate-term, and long-term portfolios. For example, a long-term fund with a duration of 10 years has much greater interest-rate risk than a short-term fund with a duration of 2.4 years. Yet the former has a lot less income risk than the latter. Interest-rate risk and income risk are two of the most important risk factors to understand before purchasing a bond index fund.

Interest-rate risk is a danger during times of rising rates. Specifically, it refers to the fact that bond prices vary inversely with interest-rate fluctuations—when interest rates rise bond prices fall, and vice versa. Duration is an estimate of how much a bond fund's net asset value will fluctuate in response to a change in interest rates. Simply multiply the fund's duration by the percentage point change in rates to see how a bond fund's net asset value would change. For instance, if

TABLE 4. PROFILES OF SELECTED BOND INDEX FUNDS

Fund (Target Index)	Ticker	Date Started	Total Net Assets* ($ Millions)	Portfolio Duration (Years)	Expense Ratio (%)	Portfolio Turnover (%)
Galaxy II U.S. Treasury Index (Salomon Smith Barney U.S. Treasury Index)	IUTIX	6/91	158.4	5.6	0.41	56
Schwab Short-Term Bond Market Index (Lehman Bros. Short Govt./Corp.)	SWBDX	11/91	224.4	2.4	0.35	195
Schwab Total Bond Market Index (Lehman Bros. Aggregate)	SWLDX	3/93	664.3	4.9	0.35	174
Vanguard Short-Term Bond Index (Lehman Bros. 1–5 Yr. Govt./Corp.)	VBISX	3/94	1,162.4	2.4	0.20	108
Vanguard Intermediate-Term Bond Index (Lehman Bros. 5–10 Yr. Govt./Corp.)	VBIIX	3/94	1,483.9	5.5	0.20	120
Vanguard Long-Term Bond Index (Lehman Bros. Long Govt./Corp.)	VBLTX	3/94	363.0	10.0	0.20	61
Vanguard Total Bond Market Index (Lehman Bros. Aggregate)	VBMFX	12/86	14,421.0	4.9	0.20	55

**As of 9/30/2000.*
Source: Morningstar, Inc. and individual funds.

interest rates surge by one percentage point, the price of a fund with a duration of five years would fall by 5%. The opposite would occur if rates decline by one percentage point. Short-term bond funds can provide higher yields than money-market funds at the cost of a little interest-rate risk. Money funds generally avoid securities coming due beyond a year.

Income risk is a danger when interest rates are falling. Many individuals wish only to spend the income produced by their portfolio, without being forced to consume principal. Income risk is the chance that a fund's dividends from net investment income will decline when interest rates fall. Income risk tends to be higher for short-term bond funds and lower for their long-term counterparts. In fact, it is greatest for money-market funds, which roll over their portfolios frequently, corresponding to the frequent maturities of their ultra short-term holdings.

It is insightful to compare a bond index fund's performance with its target index. This comparison shows whether or not the manager has added any value over a particular time period. Table 5 presents an analysis for Vanguard Total Bond Index. With a 0.2% expense ratio, the fund's performance has compared favorably to its Lehman Brothers benchmark. The manager deviates slightly from the Lehman index in an effort to earn back some or all of the fund's expenses. To add a little extra income, the portfolio tends to hold more short-term corporates and fewer Treasuries than does the index. This has helped the fund close its tracking error, as evident in Table 5. With a 0.2% expense ratio, we would expect the fund to underperform its benchmark by 20 basis points.

TABLE 5. PERFORMANCE OF VANGUARD TOTAL BOND INDEX

Trailing Periods*	Yearly Returns (%)	+/- Lehman Brothers Aggregate (%)
1 Year	6.99	0.00
3 Years	5.88	–0.04
5 Years	6.44	–0.03
10 Years	7.94	–0.10

**Periods ending 9/30/00.*
Source: Morningstar, Inc.

THE MUNI ALTERNATIVE

Indexing makes as much sense with taxable bonds as it does with stocks, provided your investments are held in a tax-deferred retirement account or you are in a low tax bracket.

For taxable accounts, particularly if you are in a higher tax bracket, municipal bonds often make more sense on an aftertax basis. However, the bond index funds currently available target only federally taxable issues. This is due to the difficulty of indexing the muni market with its extremely large number of small, illiquid issues.

If you plan to hold your fund in a taxable account, consider the taxable equivalent returns you could earn on a single state or national municipal bond fund. Compare low-cost, relatively low turnover muni bond funds with bond index funds.

For example, the $8 billion Vanguard Intermediate-Term Tax-Exempt portfolio is similar in terms of maturity and credit quality to the Vanguard Total Bond Market Index. It even has a lower portfolio turnover rate and slightly lower expense ratio than the latter. Thus, a low-cost, conservatively run muni bond fund may serve as a better alternative for investors in sufficiently high tax brackets.

KEEPING COSTS DOWN

The bottom line is that ultra-low costs are even more crucial with bonds than with equities because bond returns are lower, on average. In addition, there's less opportunity for managers to add value with bonds than stocks because high-grade bonds are more homogeneous than equities.

All else equal, lower costs lead to higher returns. At the minimum, a low-cost bond index fund with a 20-basis-point expense ratio should have an 80-basis-point yield advantage over an otherwise comparable managed bond fund with a 100-basis-point expense ratio.

Further benefits may be realized from reduced transaction costs and intelligent indexing. ❖