

Analyzing Fixed-Income Securities and Strategies

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With interest rates near their lowest levels since the early 1960s, the role of fixed-income in investment portfolios has been a greater concern for many advisors. In this environment, they may find it increasingly difficult to reduce portfolio volatility in equity-tilted portfolios while continuing to provide consistent income for client distributions without taking on levels of risk that run counter to a client's risk tolerance.

Additionally, advisors may feel that the portfolio stability provided by fixed-income instruments comes at the cost of diverting assets from other higher-returning asset classes. An advisor's ability to add value using fixed-income instruments depends on identifying the specific role of fixed-income within a diversified portfolio and subsequent implementation of an efficient strategy to achieve it.

The first part of this article identifies the type of fixed-income instruments that best reduces portfolio volatility. We conclude that U.S. government-backed fixed-income instruments are able to effectively

Executive Summary

- Fixed-income instruments are largely used within a portfolio to reduce volatility and provide a more consistent distribution stream for clients. Holding non-callable instruments backed by the U.S. government offer significant protection in times of financial crisis while reducing the long-term opportunity cost of bonds.
- U.S. government instruments with maturities from one to five years present the most favorable risk/reward profile. Additionally, the term premiums for extending maturities begin to decline for longer-term bonds.
- Mutual fund managers among the high-quality short-term (HS) and high-quality intermediate-term (HI) bond funds underperformed their corresponding government indexes and index funds over an entire decade. The average top quartile fixed-income

managers in the HS and HI classes also underperformed their corresponding index funds.

- We analyzed the credit composition of the ten top-performing actively managed portfolios across the HS and HI mutual funds. Much of the value-added returns from these actively managed portfolios seem to stem from additional credit and call-option risk.
- There seems to be a direct inverse relationship between investment performance and fund expenses. The higher the investment return, the lower the fund expense ratio. Differences in expense ratios explain much of the differences in net returns.
- Further analysis of the top performing funds reveals that non-active strategies such as an indexing or variable maturity approach may be an investor's best option.

reduce risk within a client's portfolio. We also examine the degree to which extending maturities among U.S. government instruments is worth the added portfolio risk. This investigation supports previous findings indicating that U.S. government instruments with maturities between one and five years present the most favorable risk/reward profile and that the term premiums for extending maturities begin to decline for longer-term bonds. The last part of the article examines which fixed-income investment management strategy best achieves these goals. Returns data comparing the average and top quartile

mutual fund bond managers among the high quality short-term and high quality intermediate-term asset classes indicate that a non-active fixed-income management strategy is more effective than active approaches.

Fixed-Income Instruments

Over the long term and during market upswings, fixed-income instruments exhibit positive correlations with the equity market. Thus, during most of an investment lifetime, the diversification effects of

fixed-income come at the expense of lower expected returns. This is an increased opportunity cost for owning bonds. To compensate for lower returns, some advisors increase their fixed-income allocation with instruments that exhibit riskier equity characteristics such as corporate or high-yield bonds. It is during market downturns, however, when fixed-income instruments serve to significantly reduce portfolio volatility and many times outperform riskier assets.

During severe U.S. stock market crashes, most equity markets tend to move down in concert. This contagion effect causes a reduction in the diversification benefits of many equity asset classes, but Gulko (2002) finds that during such market conditions there is a decoupling effect between the general equity markets and U.S. government fixed-income securities. A stock market crash is defined as a day the S&P 500 index loses more than five percent of its value. Table 1 indicates that during one-day stock market crashes from 1945–2000, Treasury bonds decouple from equity prices and have provided portfolio stability.

On average, the correlations between Treasury bonds and the S&P 500 for the ten days leading up to a crash have been positive ($r = .26$). During the crash, the relationship becomes negative ($r = -.45$) as a flight to quality ensues. Shortly after a crash, the relationship reverts to a more historical one. During these one-day crashes, the S&P 500 has lost on average –5.7 percent, while T-bonds have returned 3.70 percent. Gulko also finds that corporate bonds and mortgage securities often decouple from Treasuries and decline during severe market downturns. More recently, during the entire month of September 2001, the S&P 500 and long-term corporate bonds declined –8.08 percent and –1.52 percent, respectively. In contrast, one-year Treasuries and five-year T-notes returned 1.09 percent and 2.53 percent, respectively. Advisors trying to attain extra

TABLE 1
Single-Day Stock Market Crashes Since 1945

Crash Date	S&P 500 Decline (%)	T-Bond Reaction (%)	Possible Trigger
9/03/1946	–9.9	–.21	International tensions
6/26/1950	–5.4	0.0	Korean War declared on 6/25/1950
9/26/1955	–6.6	.33	President Eisenhower's heart attack
5/28/1962	–6.7	.28	Government intention to control wages and prices, particularly steel
10/16/1987	–5.2	.39	October crash
10/19/1987	–20.5	3.7	
10/26/1987	–8.3	2.1	
10/13/1989	–6.1	2.0	Falling Tokyo stocks
10/27/1997	–6.9	1.9	Asian currency crisis
8/31/1998	–6.8	.96	Russian debt crisis
4/14/2000	–5.8	.22	Internet bubble

Source: Gulko 2002. The T-bonds are the Victory bonds of 12/72 for 1946–1955 and on-the-run Treasuries for 1962–2000.

yield within their fixed-income allocation may inadvertently own the wrong type of fixed-income instruments to protect against a hostile equity environment.

Maturity Decision

Once an advisor identifies the type of fixed-income instrument that best serves to mitigate portfolio volatility, he or she must determine the appropriate maturity. Is there a benefit to holding shorter-term versus longer-term securities? Table 2 presents correlations between the S&P 500, long-term corporate bonds, and U.S. government securities across various maturities from 1964 to 2003. Over this 40-year period, the correlations with the general equity market of the one-month T-bills ($r = -.034$), six-month T-bills ($r = .021$), and one-year T-notes ($r = .036$) were negligible. Five-year T-notes ($r = .18$) and long-term government bonds ($r = .24$) exhibited a more positive correlation with the S&P 500. Long-term corporate bonds ($r = .32$) had the strongest positive relationship with equities. A similar pattern appears in split-sample periods. The correlations among the U.S. fixed-income instruments increase as the maturities are extended. Hence, shorter-term fixed-income maturities show

TABLE 2
Monthly Correlations for the S&P 500 and Various Fixed-Income Instruments, 1964–2003

	1964–2003	1964–1983	1984–2003
1-Month T-Bills	–.034	–.077	.045
6 Month T-Bills	.021	.016	.058
1-Year U.S. Treasury	.036	.040	.049
5-Year Note	.180	.258	.090
Long-Term Government Bonds	.245	.332	.156
Long-Term Corporate Bonds	.320	.422	.203

Source: See appendix.

greater independence from equity markets.

Many investors may feel longer-term bonds provide higher returns. During the bull market in bonds from 1983 to 1993, long-term bonds significantly outperformed shorter-term maturities, and they almost matched the returns of the S&P 500 (15.26 percent versus the S&P 500's 16.09 percent). From 1982 to 1993, long-term interest rates declined from 16 percent to 6 percent. During the previous five years, from 1977 to 1981, interest rates rose from 7 percent to 16 percent and long-term gov-

TABLE 3

Average Term Premiums During an Entire Interest Rate Cycle

	1-Month T-Bill	6-Month T-Bill	1-Year Treasury	5-Year T-Notes	Long-Term Government Bonds
1977–1993					
Annualized Return (%)	7.71	8.74	8.81	10.03	10.20
Std. Deviation	3.00	3.49	3.59	7.17	12.98
Term Premium		1.03*	1.10*	2.32	2.49
Sharpe Ratio		0.30	0.31	0.32	0.19

* p < 0.5.

Source: See appendix.

TABLE 4

Average Term Premiums, 1964–2003, and Successive Ten-Year Periods

		1-Month T-Bill	6-Month T-Bill	1-Year Treasury	5-Year T-Notes	Long-Term Government Bonds
1964–2003						
Annualized Return (%)		6.03	6.82	7.05	7.70	7.56
Standard Deviation		2.69	3.09	3.17	6.60	11.65
Term Premium			0.79*	1.02*	1.67	1.53
Sharpe Ratio			0.26	0.32	0.25	0.13
10-Year Periods	Net Change 5-Year Par Yield	1-Month T-Bill	6-Month T-Bill	1-Year Treasury	5-Year T-Notes	Long-Term Government Bonds
1964–1973	2.76					
Annualized Return (%)		4.98	5.60	5.93	4.89	2.11
Standard Deviation		1.26	1.42	1.96	4.95	6.97
Term Premium			0.62*	0.95*	-0.09	-2.87
Sharpe Ratio			0.44	0.48	-0.02	-0.41
1974–1983	4.71					
Annualized Return (%)		8.65	9.65	9.33	8.28	5.96
Standard Deviation		3.09	3.75	3.83	7.96	13.33
Term Premium			1.00	0.68	-0.37	-2.69
Sharpe Ratio			0.27	0.18	-0.05	-0.20
1984–1993	-6.38					
Annualized Return (%)		6.35	7.43	7.89	11.42	14.55
Standard Deviation		2.14	2.41	2.83	5.16	9.62
Term Premium			1.08*	1.54*	5.07*	8.2*
Sharpe Ratio			0.45	0.54	0.98	0.85
1994–2003	-2.04					
Annualized Return (%)		4.18	4.66	5.10	6.34	8.01
Standard Deviation		1.65	1.74	2.19	6.91	13.33
Term Premium		N/A	0.48*	0.92*	2.16	3.83
Sharpe Ratio		N/A	0.28	0.42	0.31	0.29

* p < 0.5.

Source: See appendix.

ernment bonds significantly underperformed shorter maturities.

When this entire interest rate cycle (1977–1993) is considered, however, there was no significant term premium for extending maturities past one year. Table 3 indicates that the six-month T-bill and the one-year Treasury had a significant term premium when compared with the one-month T-bill (at the 5 percent level of significance, this is the level used throughout the study). Although the five-year and long-term government bonds had higher returns, the significant increase in volatility prevented their premiums from being statistically significant. The long-term bond was more than 3.5 times more volatile than the six-month T-bill, which helps to show why the shorter-term securities exhibited more favorable Sharpe ratios during the entire interest-rate cycle. The one-year and five-year Treasuries had Sharpe ratios of .31 and .32, compared with .19 for the long-term government instruments.

Table 4 shows that from 1964 to 2003, longer-term bonds have not significantly outperformed shorter-term maturities. Additionally, on a risk-adjusted basis, there does not seem to be a return premium for extending maturities past one to five years. For the entire 40-year period, five-year Treasury notes had an annualized return of 7.70 percent and a standard deviation of 6.60 percent. Long-term government bonds returned 7.56 percent with a standard deviation of 11.65 percent. The long-term government bond exhibited over 4 times the volatility of the one-month T-bill and over 3.5 times the volatility of the one-year T-bill. Only the six-month and one-year instruments had a significant term premium. In addition, the shorter-term securities had the most favorable Sharpe ratios.

Analysis of the four different consecutive ten-year periods in Table 4 also finds similar results. During these periods, we show the net change in a five-year par yield in order to indicate the directional change of the prevailing interest rates. The results

TABLE 5

Rolling Five-Year Monthly Comparisons of Various Fixed-Income Returns

1964–2003	Percentage of Time That...			
	1-Month T-Bill Outperforms	6-Month T-Bill Outperforms	1-Year Treasury Outperforms	5-Year T-Notes Outperform
6-Month T-Bill	0%			
1-Year Treasury	6%	22%		
5-Year T-Notes	23%	35%	39%	
Long-Term Government Bonds	38%	45%	45%	50%

Source: See appendix.

indicate that extending maturities past five years does not improve the returns on a risk-adjusted basis. Only during one ten-year period (1984–1993) were the five-year and long-term bond premiums statistically significant. And this was during a period that followed an extended period of very poor returns for longer-term, fixed-income instruments. Both the six-month and one-year securities had significant term premiums in three of the four sample periods.

These results indicate that shorter-term securities consistently provide the highest Sharpe ratios and capture a significant amount of the term premium. There is no significant premium for extending maturities past five years. Among the selected securities, results indicate that the one-year Treasury offers the most favorable risk-adjusted term premium. This finding is consistent with Domian, Maness, and Reichenstein (1998) and Ilmanen (1996). They find that average premiums and Sharpe ratios rise through about one year, peak at three years, and begin to flatten past five years. In addition, they find that the return premium falls as maturities extend beyond 15 years. Thus, the greatest rewards for extending securities occur at the short end of the bond market.

Examining rolling returns from 1964 to 2003 (Table 5), we find similar results. The table describes the percentage of five-year monthly rolling periods ($n = 421$) in which one fixed-income instrument outperformed another. One-month T-bills outperformed long-term bonds 38 percent of the time. In

addition, six-month T-bills and one-year Treasuries outperformed long-term bonds 45 percent of the time. Thus, longer-term securities are significantly more volatile and carry a significant risk of underperformance versus shorter-term securities. It is, however, worth extending the maturities of these securities past six months to a year. Results indicate an opportunity cost of remaining in a one-month T-bill for extended periods. The six-month T-bill and the one-year Treasury outperformed the one-month T-bill 100 percent and 94 percent of the time, respectively. Advisors employing fixed-income securities to mitigate portfolio volatility and provide a more consistent income stream for their clients would be better served investing in short-to intermediate-term government fixed-income instruments.

So why invest in longer-term bonds and bond funds? The intuitive answer is that investors enjoy the added yield they receive in longer-term securities. Obviously investors demand a higher rate of return for taking on the added risks (such as interest rate and default risk) with the longer maturities. These investors will require a premium for tying up their funds for a longer time, while the borrowers will pay a premium in order to obtain the longer-term financing. This is the heart of the liquidity preference theory.

But as we've shown above, the added premium does not appear to fully compensate an investor for the risk he or she takes. Although a detailed discussion is beyond

the scope of this article, these findings provide support for the preferred habitat model that states that investors prefer to buy bonds within certain maturity ranges. For example, certain institutions and individuals prefer short-term bonds and view risk as volatility of returns.

Larger institutions such as defined-benefit pensions and life insurance companies prefer longer-term bonds and consider them less risky because they better match their liability structure. They prefer to immunize their portfolio by matching the duration of their assets and liabilities. This structuring of a bond portfolio may have its benefits, but it requires a constant rebalancing of one's portfolio as interest rates change. For individual investors, the transaction costs associated with such a strategy may completely offset any gains involved with such efforts.

Effective Bond Strategies

Fixed-income investment management strategies can be characterized as non-forecasting or active approaches. Although U.S. government fixed-income securities are among the most liquid and safest assets in the world, an active manager needs to consistently find undervalued government securities or correctly anticipate interest rate changes in order to achieve superior returns. Within this context, research has shown that over the long term, active fixed-income mutual fund managers do not consistently provide excess market returns (Philpot, Hearth, Rimbey, and Schuman 1998; Blake, Elton, and Gruber 1995; Blake, et al. 1993). In addition, Brooks and Gray (2004) detail the inability of the nation's most distinguished economists to accurately forecast interest-rate changes. A naïve strategy that simply chose the current yield as the best estimate of the future six-month yield on long-term government bonds was superior to expert opinion.

Using Morningstar Principia, we

TABLE 6

Performance of High-Quality Bond Funds for Ten Years Ending August 2004

Short-Term Quartiles	1	2	3	4	Average Fund Return	Short-Term Index Fund	Lehman Brothers 1–3 Year Government Index
Annualized Return	5.99	5.38	5	4.43	5.2	6.17	5.76
Return Difference from 1st Quartile		-0.61	-0.99	-1.56	-0.79	0.18	-0.23
Sharpe	0.75	0.65	0.52	0.24	0.57	0.89	1.05
Expense Ratio	0.69	0.84	0.96	1.35	0.96	0.15	
Intermediate-Term Quartiles	1	2	3	4	Average Fund Return	Intermediate-Term Index Fund	Lehman Brothers Government Intermediate-Term Index
Annualized Return	7.21	6.56	6.11	5.53	6.36	7.89	6.62
Return Difference from 1st Quartile		-0.65	-1.1	-1.68	-0.85	0.68	-0.59
Sharpe	0.73	0.61	0.51	0.38	0.56	0.69	0.83
Expense Ratio	0.71	0.94	1.26	1.64	1.13	0.15	

Source: Morningstar Principia.

selected all high-quality short-term (HS) and high-quality intermediate-term (HI) bond mutual funds with at least a ten-year performance history. A further description of the selection criteria is described in the appendix. Mutual fund returns were separated into quartiles based on their performance history and compared against the average manager return and an index mutual fund. Because our investigation has shown the significant benefits of shorter-term U.S. fixed-income securities, we will include a comparable U.S. government fixed-income index for the HS and HI categories.

Assessing the differences in average returns between the top quartile and general bond managers should indicate the top managers' ability to add value and the degree of efficiency in the fixed-income markets. By separating the active managers into quartiles, we are able to address concerns about presenting average returns that wash out the returns of the superior managers. This also allows us to measure the degree to which the top quartile managers outperformed their peers and corresponding index. Large differences between the top-performing managers and the index would indicate that the market is providing opportunities for the astute manager to take advantage of certain mispriced assets or information regarding future interest rates.

Small differences in return would indicate that the particular market is fairly efficient and that expenses may play a significant role in differentiating performance.

In both the HS and HI categories, the average bond fund return was less than the government index and a corresponding index fund. For the ten years ending in 8/30/2004, the average HS bond manager returned 5.20 percent versus 5.76 percent for the Lehman Brothers 1–3 Year Government Index and 6.17 percent for the Vanguard short-term index fund. HI bond managers underperformed the Lehman Brothers Intermediate Government Index and the Vanguard intermediate-term index fund, 6.36 percent versus 6.62 percent and 7.89 percent respectively.

Even though active managers in both groups invest in riskier corporate securities, on average they did not outperform an index of similar duration made up of "risk-free" government securities. Results also indicate that for the HS and HI categories, the government index outperformed all but the top-performing quartile of fixed-income managers. Surprisingly, the bond index funds finished in the top first percentile of all bond mutual funds in the HI category ($n = 549$) and in the top sixth percentile in the HS category ($n = 338$).

The average of the top-quartile fixed-income managers in the HS and HI classes

also underperformed their corresponding index funds by .18 percent and .68 percent annually over an entire decade. Although underperformance by the top managers was by a slim margin, an advisor choosing these managers ten years ago would have likely expected the top managers to have outperformed an index fund by a significant amount. If not, why take on the extra risk and exposure? These top HS and HI managers outperformed a much safer government fixed-income index by only .23 percent and .59 percent annually. Compared with their peer average, the top-quartile managers had an advantage of .79 percent in the HS and .85 percent in the HI categories. These results indicate that even if an advisor is able to select a manager who outperforms 75 percent of his or her peers, an active management approach among the HS and HI bond classes may still underperform an index strategy. In spite of the attempts by active managers to add value over the long term, historical returns data in these highly efficient asset classes do not support their ability to match, much less surpass, the returns available for index funds.

Top-quartile managers' risk-adjusted returns do not compare favorably with a corresponding index fund and less risky government index. The Sharpe ratios of the Lehman Brothers 1–3 Year Govern-

TABLE 7

Credit Quality Percentage Breakdown as of 8/30/2004 of the Top Ten Funds in Each Bond Category

	Quality of Asset			
	Treasury & Agency	AAA-A	BBB	Below IG
High Quality Short-Term				
Short-Term Index Fund	65	25	10	0
Top Ten Active funds	57.9	37.5	4.4	0.2
Difference	-7.1	12.5	-5.6	0.2
High Quality Intermediate-Term				
Intermediate-Term Index Fund	46	28	26	0
Top 10 Active Funds	29.5	44.4	17.9	8.2
Difference	-16.5	16.4	-8.1	8.2

Source: Morningstar Principia.

ment Index (1.05) and the Lehman Brothers Government Intermediate Index (.83) are the highest in their respective HS and HI categories. Hence, top-quartile managers did not provide superior risk-adjusted returns relative to a U.S. government fixed-income index. The short-term (.89) and intermediate-term (.69) index funds also provide favorable Sharpe ratios when compared with the different quartiles. Not surprisingly, Sharpe ratios across the quartiles consistently decline among the lower-performing quartiles. Results indicate that advisors choosing active HS and HI fixed-income managers to provide superior risk-adjusted returns face serious obstacles.

What about the “exceptional” fixed-income managers? To address this, we analyzed the credit composition of the top ten performing actively managed portfolios across the HS and HI mutual funds. Because these managers are classified within the same Morningstar style boxes, their market-excess returns should be due to manager skill rather than simply exposing their portfolio to riskier assets. Table 7 provides the average credit breakdown as of 8/30/2003 of the top ten active managers in each of the HS and HI categories compared with the Vanguard short-term and intermediate-term index funds.

The top ten active HS managers had 7 percent less exposure to government securi-

ties and 12 percent more exposure to AAA–A rated securities than the Vanguard short-term index fund. These managers did have 5 percent less exposure to BBB rated securities. Cumulatively, however, the top ten managers in the HS category had more credit-risk exposure than the index fund. A similar pattern was found in the HI category. The Vanguard intermediate-term index fund had over 16.5 percent more exposure to Treasury securities and less combined exposure to AAA–BBB rated securities than the top ten managers. In addition, these active managers had over an 8 percent average exposure to below-investment-grade rated securities. Much of the value-added returns from these actively managed portfolios seem to stem from additional credit and call-option risk. By populating their portfolios with a greater amount of lower grade, callable, or longer-term securities, bond managers attempt to increase their expected returns over the index.

The results in Table 6 also point to the important role mutual fund expenses had on the top-quartile performing funds. The highest-return quartile had the lowest average expense ratio. Moreover, this pattern continued with lower-quartile returns associated with higher expense ratios. As with equity mutual funds, there seems to be a direct inverse relationship between invest-

ment performance and fund expenses. The higher the investment return, the lower the fund expense ratio. Differences in expense ratios explain much of the differences in net returns. Differences in gross returns (that is, the sum of net returns and expense ratios) were much narrower than differences in net returns. The difference in gross returns between the top quartile and the average fund decreases by over 34 percent. Among the HI fund category, this difference decreases by over 49 percent. Thus, within these asset classes, one of the most important decisions an actively managed bond mutual fund makes is not its anticipation of the directional change in interest rates but rather how much to charge investors.

Further analysis of the top-performing funds reveals that a variable maturity strategy was the top-performing mutual fund in the HS category. Developed by Fama (1984), a variable maturity approach is a fixed-income strategy that uses the information in the yield curve to buy the securities that have the best risk/return profile for the investor. Although this strategy selects securities based on the future rates, it is a structured approach that does not actively attempt to find inefficiencies in the bond market or forecast future interest rate movements. In addition to the variable maturity fund, the Vanguard short-term index fund was the 18th best-performing HS fund ($n = 338$).

In the HI category, the Vanguard intermediate fixed-income index fund was the 6th best-performing fund and another variable-maturity fund was the 21st best-performing fund ($n = 549$). Within the high-quality short- to intermediate-term bond market, there do not seem to be significant opportunities for outperformance by finding undervalued securities or forecasting interest-rate movements. Rather than being dependent on consistently finding undervalued securities or outmaneuvering other fixed-income managers, these non-actively managed funds simply and efficiently cap-

ture the market rates of return within their respective asset classes. If the underlying reason for holding fixed-income assets is to reduce portfolio risk, then a non-active fixed-income strategy should be the strategy of choice within the HS and HI classes.

Conclusions and Implications

Advisors have a wide array of available investment options to construct a diversified portfolio. Fixed-income instruments are used within a portfolio to reduce volatility and provide a more consistent distribution stream for clients. This paper attempts to serve as a starting point for advisors by identifying the types of fixed-income instruments that best complement primary portfolio needs. We then analyzed various management strategies within the high-quality short-term and high-quality long-term bond funds to assess the most effective way of implementing a fixed-income strategy within a portfolio.

Some advisors use bonds that exhibit equity characteristics or take on extra credit and option risk in order to increase the expected returns from their fixed-income allocation. By taking on extra risks, advisors may undermine the fundamental reason for holding fixed-income instruments. Although under normal economic conditions these types of fixed-income instruments may have a higher expected return than government securities, investors take on extra risk factors that may have been more effectively allocated elsewhere. The decoupling effect of U.S. government securities to equities returns during market downturns offers effective diversification benefits when it is needed most. Thus, holding non-callable instruments backed by the U.S. government offers significant protection in times of financial crisis while reducing the long-term opportunity cost of bonds.

Advisors using government fixed-

Appendix

Sources of Data for Tables 2–5:

1. "1-Month Treasury Bills, Long Term Government Bonds, and Long-Term Corporate Bonds," *Stocks, Bonds, Bills, and Inflation*, Chicago: Ibbotson and Sinquefeld, 1986.
2. 6-Month U.S. Treasury Bill Index: Jan 1978–2003: Merrill Lynch G002 Index, Jan 1964–Jan 1978: CRSP.
3. 1-Year US Treasury Note Index: Merrill Lynch GC03 Index, Jul 2000–2003: ML One Year US Treasury Note Index Jun 1991–Jun 2000: ML One Year Treasury Bill Index.
4. 1964–May 1991: CRSP.
5. 5-Year Treasury Notes: Coleman, Fisher, and Ibbotson, *Historical U.S. Treasury Yield Curves: 1926–1992*, with 1995 update.

The following are criteria for the High Short sample:

- Fixed-Inc Style Box = High Short
- Morningstar category = Short Government, General Bond-Ultrashort, or General Bond-Short-Term Bond, percent U.S. Stocks, percent Non-U.S. Stocks, and percent Other assets < 2 percent each
- Fund Name does not = Obj, Cat, Idx
- Total Annualized Return 10-Yr < 100 percent

Asset composition criteria—for example, percent U.S. stocks < 2 percent—eliminate many low-rated "bond funds" and balanced funds. Fund name criteria eliminate objective averages, category averages, and bond indexes; bond index funds are not eliminated. The ten-year return criteria eliminated funds with less than ten years of returns. The high intermediate sample is subject to the same category criteria. A further duration analysis of the funds removed two additional funds. They were the American Century Target 2005 and the Ivy Mortgage Securities bond funds.

income securities must then decide on the length of the bond maturities for their portfolios. Our findings support previous research (Domian et al. 1998, Ilmanen 1996) indicating that the most favorable risk/reward ratio for extending maturities is within the shorter end of the bond market. We find that most of the term premium for extending maturities occurs at around one year and that extending maturities past five years does not provide a more favorable risk/reward ratio. Sharpe ratios consistently decline for maturities past five years. Our research also shows that over significant time periods, shorter-term securities frequently outperform longer-term securities. Advisors seeking to provide excess returns by taking on more term risk may find that the extra return is not worth the risk. These advisors would most likely receive

higher rewards by simply switching to equities. As Domian et al. point out, the debt-equity decision is more important than the bond maturity decision.

An advisor can employ many fixed-income management strategies within a portfolio. Our research indicates that active bond managers in HS and HI bond funds did not outperform a corresponding index fund over the past ten years. Additionally, even the top quartile of these managers could not match the risk-adjusted returns provided by an index fund or an index made up of less risky U.S. government securities. A breakdown of the bond quality of the top ten actively managed funds in each category indicates that they take on more credit risk exposure than a comparable passive index fund. Results also lend support to previous findings (Potts and

Reichenstein 2004, Reichenstein 1999), indicating that differences in fund expense ratios were pronounced among the best- and worst-performing funds and may likely explain much of the differences in fund performance.

Future research should focus on the different types of fixed-income strategies within the HS and HI asset classes to further identify how these strategies would have fared across different interest-rate scenarios. Although shorter-term U.S. government securities should play an integral role in a client's portfolio, individual client situations and requirements also influence the selection and strategy of fixed-income instruments. For example, certain clients may have significant tax issues that warrant the inclusion of municipal fixed-income instruments. Treasury inflation-protected securities (TIPS) may also be an option for tax-exempt investors concerned about real returns. In addition, recent studies (Kothari and Shanken 2004, Roll 2004) have begun to identify the importance of TIPS within diversified portfolios. Additionally, the role of longer-term securities in bond immunization should be examined. Ultimately, although we have established a foundation within which to implement a fixed-income approach, all these issues need to be considered to provide a more personalized client solution.



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