

## THE MYTH OF HOLDING TO MATURITY: BOND FUNDS VS. INDIVIDUAL BONDS



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Some investors believe individual bonds are less risky than bond mutual funds because individual bonds can be held to maturity. This “myth about holding to maturity” tends to emerge when investors fear rising interest rates. What they fail to recognize is that bond funds are merely diversified portfolios of individual bonds, and both are equally exposed to the same market pricing mechanism. In this commentary, which will focus on municipal bonds, we will debunk the myth about holding bonds to maturity and provide guidance to investors about how they should view their bond mutual fund holdings.

The same principles apply to taxable bonds as to municipal bonds. Municipal bond funds can offer significant benefits over owning individual municipal bonds. These benefits relate to economies of scale, as bond funds pool investor capital to construct more-diversified portfolios and trade more efficiently. While an individual investor might have sufficient assets to purchase 10 or 20 different municipal bonds, a municipal bond fund typically holds several hundred bonds diversified across regions, sectors, issuers and maturities. Municipal bond trading costs can be high for smaller-sized trades. For example, the average spreads are roughly 1.2% for a \$100,000 trade, 0.5% for a \$1 million trade and 0.1% for a \$5 million trade.<sup>1</sup> Although trade desks may pool individual purchase orders for better trade execution, this scale benefit is typically not available when investors seek liquidity by selling individual bonds. Furthermore, bond funds optimize daily fund flows for investment or liquidity, which

allows funds to offer daily liquidity in precise amounts, resulting in more efficient and timely investment of capital, redemption and portfolio rebalancing.

The scale benefits of bond mutual funds outweigh owning individual bonds for all but the largest private investors, who can achieve similar scale on their own. So why do some investors still prefer to own individual bonds? Investors commonly believe they can avoid interest-rate risk by simply holding their individual bonds to maturity (assuming no default) but that bond funds are evergreen and do not mature, thereby subjecting investors to avoidable interest-rate risk. We debunk this myth by illustrating that both bond funds and individual bonds are subject to the same market pricing mechanism through time. This pricing mechanism is the set of current and future interest rates across maturities – the term structure of interest rates.

To simplify the illustration, we use a five-year bond held for one year (when it becomes a four-year bond) as a proxy for an evergreen, stable-maturity bond mutual fund. We sell and then immediately repurchase the five-year-maturity bond, repeating this sell/buy pattern each year to replicate the relatively stable maturity profile of a typical intermediate-term bond fund. We call this our “bond fund proxy.” To further simplify this illustration, we assume bonds are zero-coupon discount bonds so that the bond’s duration (a measure of interest-rate sensitivity) equals its maturity and that there are no interim cash flows.

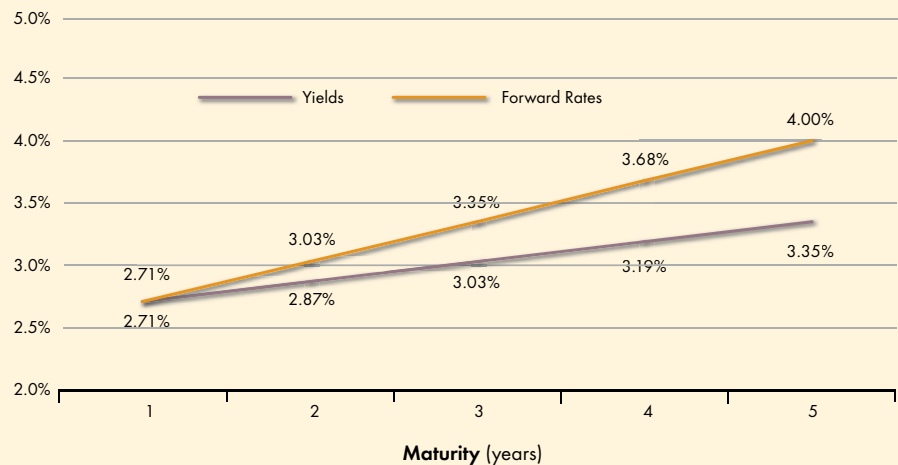
1. “Trading Costs in the Municipal Bond Market,” Harris and Piwowar, *Journal of Finance* (2006)



The yield curve (purple line) in Exhibit 1 represents average historical municipal bond yields for one- to five-year maturities.<sup>2</sup> Forward rates (orange line) are the period-to-period returns. A bond's yield to maturity is not earned equally each year but through compounding its period-to-period returns each year. Assuming no change in interest rates and no riskless arbitrage, the five-year bond that yields 3.35% to maturity would return 4.00% in the first year, 3.68% in the second year, 3.35% in the third year, 3.03% in the fourth year and 2.71% in the final year before maturing.

two. In contrast, the bond fund proxy sells the four-year bond after the first year and re-purchases the five-year bond, thereby earning 4.00% yet again in the second year. In each subsequent year, the individual bond continues to roll down the upward sloping yield curve, earning consecutively lower forward rates (lower returns) until it matures at \$50,000 par. In contrast, the bond fund proxy maintains its evergreen constant maturity of five years and earns 4.00% each year. This is scenario one (stable interest rates) in Exhibit 2, which shows that the bond fund proxy generates more economic

EXHIBIT 1: HISTORICAL MUNICIPAL YIELD CURVE



Source: Morningstar for bond yields.

At inception, the illustration shows that the five-year individual bond and the bond fund proxy have the same value and offer the same yield to maturity because they are identical. Assuming no change in yield curve and no riskless arbitrage, both the individual bond and the bond fund proxy earn the 4.00% forward rate in year one. After year one, the individual bond becomes a four-year bond and earns the 3.68% forward rate in year

value over time because it earns the higher forward rate.

In scenario two, we stress test scenario one with a 1% unexpected rise in interest rates across maturities that occurs at the end of year one (i.e., each yield and forward rate in Exhibit 1 increases 1%). And thereafter, we assume a stable yield curve with no riskless arbitrage to isolate the effect. Both the individual bond and the bond fund proxy

2. This historical average yield curve is linearly interpolated from average historical yields of Barclays 1-, 3-, 5-, 7- and 10-year municipal bond indexes over the longest common period (1993 – 2013). The historical relationship in average yields is very close to linear over this time period.

## EXHIBIT 2: BOND VALUES THROUGH TIME

### Scenario 1 – Stable Interest Rates

	INCEPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Individual 5-Yr Bond	\$42,401	\$44,097	\$45,717	\$47,250	\$48,682	\$50,000
Bond Fund Proxy	\$42,401	\$44,097	\$45,860	\$47,693	\$49,600	\$51,583

### Scenario 2 – Interest Rates Rise Unexpectedly

	INCEPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Individual 5-Yr Bond	\$42,401	\$42,428	\$44,412	\$46,345	\$48,212	\$50,000
Bond Fund Proxy	\$42,401	\$42,428	\$44,549	\$46,775	\$49,113	\$51,568

experience the same initial loss in value at the end of year one, as they are still identical. Exhibit 2 shows that both are worth \$42,428 at the end of year one instead of \$44,097 (if rates did not change), losing \$1,669 in value due to the unexpected rise in interest rates. Whether or not the investor holds the individual bond to maturity, it is worth \$42,428 at the end of year one, and that is what the investor would receive if he were to sell it. The individual bond continues to roll down the new yield curve, earning the new higher forward rates each period, which facilitates a claw-back in value until it matures at \$50,000 par.

In contrast, the bond fund proxy sells the four-year bond right after the unexpected rise in interest rates at the end of year one and repurchases the five-year bond to maintain its evergreen constant maturity profile. It now earns the higher 5% forward rate each year, which facilitates a larger and faster claw-back in value than the individual bond experiences. Once again, Exhibit 2 shows that the bond fund proxy generates more economic value over time because it earns the higher forward rate.

The point is not necessarily to show that the bond fund proxy delivers more economic value than the individual bond, though investors should appreciate the claw-back

in value associated with its higher forward rates. Rather, the main point is that both the individual bond and the bond fund proxy are subject to the exact same term structure of interest rates, which determines their prices. The only reason the bond fund proxy delivered more economic value is that it offered forward rates associated with a longer average maturity. There is no unique interest-rate protection over bond funds in holding individual bonds to maturity, other than capturing shrinking duration (and return) as maturity approaches. But this same interest-rate protection is easily achieved by simply owning lower-duration bond funds.

Finally, we also consider the potential tax drag of maintaining a municipal bond fund's relatively stable maturity profile. Morningstar's tax-cost ratio measures how much of a fund's annualized return is reduced by taxes. The short- and intermediate-term municipal bond funds offered at Northern Trust have tax-cost ratios close to zero, indicating that municipal bond fund managers can tax-efficiently maintain a fund's maturity profile.

With the myth about holding to maturity debunked, municipal bond funds offer investors the scale benefits of increased diversification, improved liquidity and lower trading costs over owning individual bonds.

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