



## MAY 2018 NEWSLETTER



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## Duration- An Easy Way to Measure Risk in your Bond Portfolio

By Carol Smith, *Vice President*

The concept of duration originated in 1938. The impact of interest rate risk can be lessened using the concept of duration. If you know the duration of a bond, you can anticipate how much interest rate risk you are assuming before purchasing.

It is one of the ways you can quantify interest rate risk. Duration is particularly useful because it is a forward-looking number, as opposed to total return, which tells you what happened in the past.

Duration serves a dual purpose:

1. It provides an estimate of how a bond price will move based on a change in interest rates. It enables you to predict how exposed you are to interest rate moves.
2. It shows investors the average-weighted amount of time it takes to receive back the true cost of the bond.

### The Formula

The formula is a complicated calculation involving present value, yield, coupon, final maturity, and call features and is expressed as a number of years.

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1. For every 100 basis points (1%) that interest rates move up or down, the price of a bond will increase or decrease by the duration. For example, if interest rates move 100 basis points and the duration is 3, the price of the bond will move 3%. (the estimated price will go down 3% if interest rates rise, and the price will increase 3% if interest rates move lower). Remember there are other factors in addition to duration that affect price changes including credit rating changes and issuer disclosures during the life of the bonds.

2. Duration is also a measurement of how long it takes to receive the true cost of a bond. Duration changes as the coupons are paid to the bondholder. Duration also changes as time moves closer to maturity. It is the point in time in the life of a bond where the bond return remains the same or unchanged despite the movement of market interest rates.

**Bonds with lower coupons have longer durations than bonds with larger coupons.** This is one of the reasons that bond prices for lower coupons are more volatile than bonds with higher coupons. The calculation is taking into consideration the 'interest cash flow' as well as all other indicators in the formula. This explains the reason Institutional Investors and Bond Funds prefer 5.00% or higher coupons.

## Premium and Discount Prices

Bonds with the same YTM (yield to maturity), but one a discount bond and the other a premium bond will have different durations. If you own a premium bond with high coupons, you receive larger sums earlier, which can be reinvested to earn interest-on-interest. If you own discount bonds, with low coupons, you have less money to reinvest to earn interest-on-interest. As a result bonds with lower coupons have longer durations than bonds with higher coupons.

**Example:**

Bond	Coupon	Maturity	YTM	Price	Duration
Bond #1	3.000	05-01-2044	3.700	88.384	<b>17.30</b>
Bond #2	4.000	02-01-2047	3.700	105.273	<b>7.279</b>

## Zero Coupons

If you have 3 bonds with same YTM, one a discount, one a premium and one a zero, the premium bond would be the least volatile, the discount would be more volatile, and the zero the most volatile (this is because zeros do not throw off any interest, so duration will match the maturity).

**Example:**

Bond	Coupon	Maturity	YTM	Price	Duration
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Bond #2	4.000	02-01-2047	3.700	105.273	<b>7.279</b>
Bond #3	0.000	07-01-2042	3.700	41.295	<b>23.68</b>

## Summary

- Bonds with higher durations carry more risk and price volatility.
- Duration indicates the years it takes to receive a bond's true cost, weighing in the present value of all future coupon and principal payments.
- Duration is calculated to maturity (if non-callable) or to the shortest call (if callable). This is important to know when reviewing bond portfolios and mutual bond funds.
- By matching the duration to the time period when funds will be needed, interest rate risk is minimized.
- Even though duration is expressed in years, one should also consider the 'average maturity'. You can have a short duration with a longer average maturity if the portfolio of bonds (or bond fund) has an abundance of short calls.
- Duration is better used when considering incremental interest rate swings as opposed to large-swings. It is more precise for short to mid-term maturities rather than longer 30 year maturities.

Duration, as a measure of bond's sensitivity to interest rates, shows only part of the risk profile. Credit exposure and other risk factors are also important. No matter what kind of roller coaster ride interest rates take during the life of a bond, its value will always be par when the bond reaches its maturity. It is important to remember that if you own individual bonds, they all eventually mature. For more information, contact us at (925) 472-5700 or [information@alamocapital.com](mailto:information@alamocapital.com).

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