

Understanding Interest Rate Risk and Duration



Buying a fixed income security can offer many benefits to the purchaser. Generally, with a fixed coupon and a defined maturity, fixed income securities offer a more definitive schedule and can be a useful tool for investors seeking cash flow consistency. However, fixed income instruments are not without risk. Whether the borrower is a government, state, municipality, or corporation, all fixed income securities inherently carry risk. One of those risks is interest rate risk.

Interest rate risk exists in a security when the bond's price fluctuates due to a change in interest rates. By definition, a fixed income security pays a fixed amount over a fixed schedule. As interest

rates change in the overall market, the secondary market value of the existing cash flows also change.

The relationship between a fixed coupon bond's price and interest rates are inversely related; when interest rates go up, the bond price falls and when interest rates go down, the bond price rises. The amount by which the price changes is primarily affected by the coupon rate, the bond's price/yield, and the time left to maturity. Measuring the amount of change allows an investor to analyze their potential exposure to interest rate risk.



Fixed Income

There are a few different methods of calculating this risk. For the purposes of this discussion, we're going to be focusing on **Modified Duration**. **Modified Duration** measures the sensitivity of a bond's price in response to a change in interest rates, and is expressed in percentage.

Normally when duration is quoted, it is most often referring to **Modified duration**, but there are other types of Duration formulas including Macaulay, Effective, and Key-Rate duration. The below explanation and figures all use the **Modified Duration** formula.

“Modified Duration measures the sensitivity of a bond’s price in response to a change in interest rates.”

Table 1 – Maturity Effect on Duration

Same coupon bonds that have different maturities will have different durations.

Term	Coupon	Price	Yield	Duration	New Price / New Yield (Assuming 1% Rate Rise in Overall Market)	
5 Year	5%	109.22	3%	4.512	104.491	4%
10 Year	5%	100.00	5%	7.989	92.561	6%
30 Year	5%	86.162	6%	14.77	75.055	7%

The longer the bond, the higher duration and the more sensitive a bond's price is to a change in interest rates. In this example, interest rates rise by 1% for every maturity. The 30-year bond's price falls much more than the 10-year and the 5-year bonds.

Table 2 – Coupon Effect on Duration

Same maturity bonds that have different coupons will also have different durations.

Term	Coupon	Price	Yield	Duration	New Price / New Yield (Assuming 1% Rate Rise in Overall Market)	
30 Year	0%	22.728	5%	30.000	16.973	6%
30 Year	4%	84.546	5%	16.602	72.324	6%
30 Year	7%	130.909	5%	14.857	113.838	6%



Fixed Income

The lower the coupon, the higher the duration and the more sensitive a bond's price is to a change in interest rates. In this example, interest rates rise by 1% in the 30-year term. The lower coupon bonds prices fall by a much higher percentage than the higher coupon bonds.

In certain market scenarios, it may make sense to increase or decrease your portfolio's duration in order to deliberately increase or decrease the risk profile of your fixed income assets. Knowing, understanding, and implementing the proper use of duration weighting can have a significant effect on the performance of your portfolio. If interest rates are expected to go up, you may want to shorten duration to reduce your exposure to interest rate risk.

If interest rates are expected to fall, increasing duration may allow for a higher degree of appreciation of your fixed income assets. Talk to your Benjamin F. Edwards advisor to learn more.

It is also important to understand other risks associated with your fixed income portfolio. For more information on credit risk, liquidity risk, call risk, and other relevant topics involving your fixed income assets, speak to your Benjamin F. Edwards advisor today. ■

IMPORTANT DISCLOSURES Past performance is not a guarantee of future results. These figures do not represent specific investments. Bond quotations may not be representative of the bonds offered at Benjamin F. Edwards & Co. The yield and rates presented here are the typical average of those available for each type of investment as of the date listed. This information is obtained from sources and data considered to be reliable, but its accuracy and completeness is not guaranteed by Benjamin F. Edwards & Co.

The material has been prepared or is distributed solely for informational purposes and is not a solicitation or an offer to buy any security or instrument or to participate in any trading strategy. Bond prices fluctuate inversely to changes in interest rates. Therefore, a general rise in interest rates can result in the decline of the value in your investment. Although Treasuries securities are considered free from credit risk they are subject to other types of risks. These risks include interest rate risk, which may cause the underlying value of the bond to fluctuate, and deflation risk, which may cause principal to decline and the securities to underperform traditional Treasury securities.

Income from municipal securities is generally free from federal taxes and state taxes for residents of the issuing state. While the interest income may be tax-free, capital gains, if any, will be subject to taxes. Income for some investors may be subject to the federal Alternative Minimum Tax (AMT). Investing in fixed-income securities involves certain risks such as market risk if sold prior to maturity and credit risk. All fixed-income investments may be worth less than original cost up redemption or maturity. Government bonds and Treasury bills, unlike stocks, are guaranteed as to payment of principal and interest by the U.S. Government if held to maturity.