



“A duration of 7.9 means that for each 1% change in interest rates, the bond price will change by 7.9%.”

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### Bond prices move opposite to interest rates, but to what extent?

#### Bond prices rise when interest rates drop

To understand why bond prices move against interest rates, we can have a look at zero-coupon bonds, which do not pay coupons but derive their value from the difference between the purchase price and the par value paid at maturity. For instance, if a zero-coupon bond is trading at \$97 and has a par value of \$100 (paid at maturity in one year), the bond's rate of return at the present time will be 3.09%. However, if the prevailing interest rates rise, giving newly issued bonds a yield of 8.69%, then the zero-coupon bond yielding 3.09% will not be attractive at all. The price of the said zero-coupon bond will have to decline enough to match with the same return yielded by prevailing interest rates. In this instance, the bond will drop from \$97 (yielding 3.09%) to \$92 (yielding 8.69%). Now we have an idea of why a bond price will increase if interest rates drop. But how can we gauge the sensitivity of bond price changes to interest rate movements?

#### The concept of duration


Prices of different bonds change in different extents in react to interest rate movements. The sensitivity of a bond towards a change in interest rate can be captured by duration. The concept of duration was developed because coupon payments were received during the life of a bond, so a bond's maturity was not a good summary measure of the timing of the cashflows received from owning a bond. Therefore, duration takes into account the coupon payments as well as the final maturity payment and is denominated in years.

Theoretically, duration is the weighted average life of a bond, taking into consideration the present value of future cash flows relative to the present value of total cash flows. Practically, the main purpose of the duration measure is that it gives an indication of the sensitivity of a bond's price to a change in interest rates. Take the UK 4 1/2% Treasury Gilt 2019 as an illustration, it has a duration of around 7.9, which means that for each 1% change in interest rates, its price will change by around 7.9%. From another perspective, the price of a bond with high duration is more volatile.

#### Implications of bond duration

- A bond with a higher coupon will have a shorter (lower) duration: more of the cashflow from the bond will be received before the final redemption payment and hence the bond is less sensitive to interest rate changes
- A bond with a longer maturity will have a longer duration. Therefore, a zero-coupon long-dated bond will tend to have a high duration; and a high coupon, shorter-dated bond will have a relatively low duration

The concept of duration can be applied to an overall bond portfolio to give a crude guide as to the sensitivity of the bond portfolio to changes in interest rate. A bond portfolio with a low duration will tend to be characterised as more 'defensive' in the sense that its value is less affected by changes in interest rate. Hence, when a bond fund manager takes a generally bearish view about the prospects for bond yields, he would tend to favour a shorter duration in his portfolios.

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