Zero-coupon bonds

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Bond

Bond - it is a debt instrument whose issuer commits to the buyer (investor) to pay interest (if any) and to redeem bonds at a face value at a maturity date

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Types of bonds

- Zero-coupon bonds (discount bonds) – bonds from which interest is not paid, and the owner's income is the difference between the face value and the selling price
- Coupon bonds – bonds from which interest is paid and which are taken out at face value
- Perpetual bonds – bonds that are not taken out and their holder receives interest indefinitely

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Valuation of zero-coupon bonds

$$P = \frac{FV}{(1+r)^n}$$

P – bond price
FV – face value
r – market rate of return
n – number of years to maturity

YTM - yield to maturity

It is the annual income rate of the investor who buys the bonds and holds them until maturity

Rate of return on holding the zero-coupon bonds to maturity (yield to maturity)

$$YTM = \left(\frac{FV}{P}\right)^{\frac{1}{n}} - 1$$

- YTM – yield to maturity
- P - bond price
- FV – face value
- n – number of years to maturity

The rate of return on the zero-coupon bonds in the case of sale before the maturity date

$$r = \left(\frac{(1 + r_p)^{n_p}}{(1 + r_s)^{n_s}} \right)^{\frac{1}{n_p - n_s}} - 1$$

- r – rate of return
- r_p – market rate of return on the date of purchase
- n_p – the number of years between the purchase date and the maturity date
- r_s – market rate of return on the date of sale
- n_s - the number of years between the date of sale and the maturity date

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