

Meaning of Bond Valuation

Bond valuation is the process of determining the fair or current value of a bond by calculating the present value of its future cash flows.

The future cash flows consist of periodic coupon (interest) payments and the redemption or maturity value.

$$\text{Value of Bond} = \text{Present Value of Coupon Payments} + \text{Present Value of Redemption Value}$$

Important Terms

Term	Meaning
Face Value (F)	The nominal or par value of the bond.
Coupon Rate	The annual rate of interest paid on the face value of the bond.
Coupon Payment (R)	The actual periodic interest received by the bondholder.
Maturity Period (n)	The period after which the bond becomes due for redemption.
Maturity / Redemption Value (C)	The amount received by the investor when the bond matures.
Current Price (V)	The price at which the bond can currently be bought or sold.
Yield Rate (i)	The rate used to discount future cash flows to their present value.

Present Value Approach

Money received in the future is worth less than the same amount received today. Therefore, every future coupon payment and the maturity value are converted into their present values.

Present Value of Coupon Payments

The coupon payments form an annuity. Therefore,

$$PV_{\text{coupon}} = R [1 - (1 + i)^{-n}] / i$$

Present Value of Maturity Value

The maturity value C is received after n periods. Therefore,

$$PV_{\text{maturity}} = C / (1 + i)^n = C(1 + i)^{-n}$$

Formula for Valuation of Bond

$$V = R [1 - (1 + i)^{-n}] / i + C(1 + i)^{-n}$$

Where: V = value of bond, R = periodic coupon payment, C = maturity value, i = yield rate per period, and n = number of periods.

Memory Trick

$$\text{Bond Price} = \text{PV of Coupons} + \text{PV of Redemption}$$

Example

A bond has a face value of ₦1,000 and a coupon rate of 10% p.a. It matures after 4 years. If the required rate of return is 8% p.a., find the value of the bond.

Solution

Given: F = ₦1,000, Coupon Rate = 10%, n = 4 years, i = 0.08, C = ₦1,000

$$R = 1,000 \times 10/100 = ₦100$$

$$V = 100 [1 - (1.08)^{-4}] / 0.08 + 1,000(1.08)^{-4}$$

$$(1.08)^{-4} \approx 0.7350$$

$$V = 100[(1 - 0.7350)/0.08] + 1,000(0.7350)$$

$$V = 331.25 + 735.00 = \text{■}1,066.25$$

Therefore, the value of the bond is approximately **■1,066.25**.

Steps to Solve Any Bond Valuation Question

Step 1: Find the coupon payment R.

$$R = F \times \text{Coupon Rate} / 100$$

Step 2: Identify the yield rate i.

Use the required rate of return per period.

Step 3: Find the number of periods n.

For annual payments, n = number of years.

Step 4: Find the present value of coupon payments.

$$PV\text{■} = R [1 - (1 + i)^{-n}] / i$$

Step 5: Find the present value of maturity value.

$$PV\text{■} = C(1 + i)^{-n}$$