**Bond Duration and Modified Duration**

**Bond Duration**

Bond **duration** measures how sensitive a bond's price is to changes in **interest rates**. It tells us the **average time (in years)** it takes to receive all cash flows (coupons and principal repayment) from a bond.

* Think of it as the "weighted average" time you’ll wait to get your money back.
* A **longer duration** means the bond price is more sensitive to interest rate changes.
* A **shorter duration** means the bond price is less sensitive to interest rate changes.

**Example**:  
If a bond has a duration of **5 years**, it means, on average, you will receive your money over 5 years, weighted by the bond's cash flows.

**Modified Duration**

**Modified duration** is an adjusted version of bond duration that specifically measures how much the **bond's price will change** if interest rates change by **1%**.

* It tells us the **percentage change in price** for a 1% change in interest rates.
* It’s a measure of interest rate **risk**.

**Example**:  
If a bond has a modified duration of **6 years**, a **1% increase** in interest rates will cause the bond price to **fall by 6%**. Similarly, a **1% decrease** in interest rates will cause the bond price to **rise by 6%**.

**Key Difference**

* **Duration** = The average waiting time to get your money back.
* **Modified Duration** = How much the bond price moves with a 1% change in interest rates.

**Practical Use**:

* Investors use these measures to understand risk.
* Bonds with longer durations are riskier when interest rates rise because their prices drop more.

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**Tata Green Energy Bond Caselet**

**Narrative**:  
Tata Green Energy Ltd. issued a bond on **February 15, 2017**, with a maturity date of **August 15, 2027**. The bond offers a **coupon rate** of **5.50%** (semi-annual payments) and is currently priced at ₹975 against its **face value** of ₹1,000. The **yield to maturity** on this bond is **7.25%**, and the day count convention followed is **Actual/Actual**.

You are tasked to compute the **Bond Duration** and **Modified Duration** . Assume the frequency of coupon payments is **2 (semi-annual)**.

**Tata Green Energy Bond Caselet**

**Narrative**:  
Tata Green Energy Ltd. issued a bond on **February 15, 2018**, with a maturity date of **December 15, 2028**. The bond offers a **coupon rate** of **4.75%** (quarterly payments) and is currently priced at ₹24,250, with a **face value** of ₹25,000. The bond's **yield** is **8.50%**, and the day count convention used is **Actual/360**.

**Tasks for Students**:

1. Calculate the **Bond Duration** using the given inputs.
2. Compute the **Modified Duration**, which measures the bond's price sensitivity to changes in yield.

**Infosys Corporate Bond Caselet**

**Narrative**:  
Infosys Ltd. issued a **corporate bond** on **January 10, 2024**, maturing on **July 10, 2030**. The bond has a **coupon rate** of **6.25%** (semi-annual payments) and is currently trading at ₹51,750, with a **face value** of ₹50,000. The bond offers a **yield** of **7.45%**, and the day count convention is **30/360**.

**Tasks for Students**:

1. Calculate the **Bond Duration** using the inputs provided.
2. Compute the **Modified Duration** to determine how sensitive the bond price is to interest rate changes.

**HDFC SecureBond Caselet**

**Narrative**:  
HDFC issued its **SecureBond** on **June 15, 2024**, with a maturity date of **January 15, 2034**. The bond carries a **coupon rate** of **5.75%** (quarterly payments) and is priced at ₹1,03,250, with a **face value** of ₹1,00,000. The **yield** on this bond is **7.25%**, and the day count convention followed is **Actual/365**.

**Tasks for Students**:

1. Calculate the **Bond Duration** using the inputs provided.
2. Compute the **Modified Duration**, which reflects price sensitivity to yield changes.

**SBI Dynamic Bond Caselet**

**Narrative**:  
State Bank of India (SBI) issued a **Dynamic Bond** on **March 20, 2024**, maturing on **March 20, 2044**. The bond pays a **coupon rate** of **5.25%** (semi-annual payments) and trades at a **price** of ₹51,750, with a **face value** of ₹50,000. The bond's **yield** is **6.95%**, and the day count convention is **30/360**.

**Tasks for Students**:

1. Calculate the **Bond Duration** for the given bond.
2. Compute the **Modified Duration**, which measures the bond's price change for a 1% change in yield.

**Adani Ports Bond Caselet**

Adani Ports issued a long-term bond on **September 10, 2024**, maturing on **March 20, 2044**. The bond pays a **6.75% coupon rate** on a **quarterly basis** and is currently priced at ₹26,250, with a **face value** of ₹25,000. Investors expect a **yield to maturity** of **7.45%**, and the bond follows the **Actual/Actual** day count convention.

**Tasks for Students**:

1. Calculate the **Bond Duration** for this bond.
2. Determine the **Modified Duration** to measure the bond’s sensitivity to interest rate changes.

**Bharti Airtel Corporate Bond Caselet**

Bharti Airtel issued a corporate bond on **June 10, 2024**, with a maturity date of **March 20, 2034**. The bond carries a **4.25% coupon rate**, with **semi-annual coupon payments**, and trades at ₹26,250 for a **face value** of ₹25,000. The expected **yield** is **7.25%**, and the bond follows the **30/360 day count convention**.

**Tasks for Students**:

1. Compute the **Bond Duration** of the bond.
2. Calculate the **Modified Duration** to determine price sensitivity to a 1% change in yield.

**ICICI Bank Bond Caselet**

ICICI Bank issued a bond on **June 10, 2024**, maturing on **June 20, 2029**. The bond pays a **5.45% coupon rate** quarterly and is currently priced at ₹11,250, with a **face value** of ₹10,000. The **yield to maturity** is **6.45%**, and the bond follows the **Actual/Actual** day count convention.

**Tasks for Students**:

1. Compute the **Bond Duration** for this bond.
2. Determine the **Modified Duration** as a measure of interest rate sensitivity.

**Tata Motors Debenture Caselet**

Tata Motors issued a debenture on **June 10, 2023**, with a maturity date of **June 20, 2033**. The bond offers a **5.25% coupon rate** on a **semi-annual basis**, trades at ₹51,550, and has a **face value** of ₹50,000. The **yield to maturity** is **7.25%**, and the day count convention is **30/360**.

**Tasks for Students**:

1. Calculate the **Bond Duration** for the debenture.
2. Compute the **Modified Duration** for evaluating price sensitivity to yield changes.

**Power Grid India Bond Caselet**

Power Grid India issued a long-term bond on **September 1, 2024**, maturing on **September 1, 2044**. The bond pays a **6.15% coupon rate** quarterly and is priced at ₹1,02,250, with a **face value** of ₹1,00,000. The bond's **yield to maturity** is **8.25%**, and the day count convention followed is **Actual/360**.

**Tasks for Students**:

1. Compute the **Bond Duration** using the provided details.
2. Calculate the **Modified Duration** to measure the bond’s price sensitivity to a 1% change in interest rates.