Fixed Income- Bond Pricing

Topic Weight: 12%
# Bond Valuation

- **Par Bond**
  - Price of the Bond = Face Value of the Bond
  - Coupon = Yield to Maturity (YTM)
  - Price doesn’t change with time

- **Premium Bond**
  - Price of the Bond > Face Value of the Bond
  - Coupon > Yield to Maturity (YTM)
  - Price declines to the Face Value with the passage of time

- **Discount Bond**
  - Price of the Bond < Face Value of the Bond
  - Coupon < Yield to Maturity (YTM)
  - Price rises to the Face Value with the passage of time

The value of a bond can be calculated as:

\[
\text{Value of a Bond} = \frac{C_1}{(1 + \text{YTM})^1} + \frac{C_2}{(1 + \text{YTM})^2} + \frac{C_3}{(1 + \text{YTM})^3} + \ldots \frac{C_N + \text{Face Value}}{(1 + \text{YTM})^N}
\]
Consider a 5 year vanilla bond with a face value of $1000 and 10% annually paid coupon. Calculate its price if the interest rates are 9%, 10%, and 11%.

A. $1038, $1000 and $963 respectively
B. $1026, $1000 and $983 respectively
C. $1038, $1000 and $983 respectively
### Answer

- **A**

<table>
<thead>
<tr>
<th>Time</th>
<th>Cash flow</th>
<th>PV @11%</th>
<th>PV @ 10%</th>
<th>PV @ 9%</th>
</tr>
</thead>
<tbody>
<tr>
<td>T=1</td>
<td>100</td>
<td>90.09</td>
<td>90.91</td>
<td>91.74</td>
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<tr>
<td>T=2</td>
<td>100</td>
<td>81.16</td>
<td>82.64</td>
<td>84.17</td>
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<tr>
<td>T=3</td>
<td>100</td>
<td>73.12</td>
<td>75.13</td>
<td>77.22</td>
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<td>T=4</td>
<td>100</td>
<td>65.87</td>
<td>68.30</td>
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<td>T=5</td>
<td>1100</td>
<td>652.80</td>
<td>683.01</td>
<td>714.92</td>
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<td>Total</td>
<td></td>
<td>$963.04</td>
<td>$1,000</td>
<td>$1,038.90</td>
</tr>
</tbody>
</table>

- Bond trading at a **Discount**
- Bond trading at **Par**
- Bond trading at a **Premium**