Chapter 24
Debt Financing

24-1. In a public debt offering, a prospectus is created with details of the offering and a formal contract between the bond issuer and the trust company is signed. The trust company makes sure the terms of the contract are enforced. In a private offering there is no need for a prospectus or a formal contract. Instead a promissory note can be enough. Moreover, the contract in a private placement does not have to be standard.

24-2. Requiring coupon payments protects the bondholders from waiting a long time in case the debtor defaults. Without coupon payments default only happens when the bond matures, but by then the corporation might have depleted all of its assets. In contrast, with coupon payments the debtor would be in default the moment it misses one of the coupon payments, and the bondholders can then force the firm into bankruptcy. At this stage, they might be able to get a larger fraction of the value of the original debt than if they waited until maturity.

24-3. A secured corporate bond gives the bondholder the right over particular assets that serve as collateral in case of default. Unsecured corporate bond does not offer such protection to the bondholder. Thus, with an unsecured corporate bond the bondholders are residual claimants in the case of bankruptcy after the secured assets have been given to the corresponding bondholders.

24-4. A foreign bond is a bond issued by a foreign company in a local market. Eurobonds, on the other hand, are bonds denominated in a different currency of the country in which they are issued.

24-5. The U.S. government use treasury bills, note, bonds, and TIPS. Treasury bills are pure discount bonds with maturities of one year or less. Treasury notes are coupon bonds with semi-annual coupon payments with maturities between 1 and 10 years. Treasury bonds are semi-annual coupon bonds with maturities longer than 10 years. Finally, TIPS are bonds with coupon payments that adjust with the rate of inflation. The final payment is protected against deflation since the value of the final payment is the maximum between the face value and the inflation adjusted face value.

24-6. The CPI index appreciated by:

$$\frac{300}{250} = 1.2$$

Consequently, the principal amount of the bond increased by this amount, that is, the original face value of $1,000 increased to $1,200.

Since the bond pays semi-annual coupons, the coupon payment is:

$$1.2 \times \left( \frac{0.03}{2} \right) \times 1,000 = 18$$
24-7. The CPI index depreciated by

\[
\frac{300}{400} = 0.75
\]

Consequently, the principal amount of the bond decreased by this amount, that is, the original face value $1,000 decreased to $750.

Since the bonds pay semi-annual coupons, the coupon payment is:

\[
0.75 \times \left(0.06 \div 2\right) \times 1,000 = 22.5
\]

However, the final payment of the maturity (i.e. the principal) is protected against deflation. So since $750 is less than the original face value of $1,000, the original amount is repaid, i.e. $1,000.

24-8. Holders of the GNMA securities face payment risk because homeowners have the option to prepay their debt whenever they decide to do so. In particular, they will prepay if interest rates fall and they can obtain new debt at a lower interest rate. This is precisely when the holders of GNMA securities would like to avoid payments, since they can only reinvest at a lower interest rate.

24-9. The distinguishing feature is that income from municipal bonds is not taxed at the federal level.

24-10. Bond issuers benefit from placing restricting covenants because by doing so they can obtain a lower interest rate.

24-11. Timeline:

\begin{align*}
\text{Time} & \quad 0 & 1 & 2 & \cdots & 9 & 10 \\
\text{Cash Flows} & \quad 6 & 6 & \cdots & 6 & 100 & + 6
\end{align*}

The present value formula to be solved is:

\[
102 = \frac{6}{YTM} \left(1 - \frac{1}{(1 + YTM)^{10}}\right) + \frac{100}{(1 + YTM)^{10}}
\]

Using the annuity calculator:

\[
YTM = 5.73\%
\]
YTC:

Timeline:

<table>
<thead>
<tr>
<th>Time</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Flows</td>
<td>$100</td>
<td>+ $6</td>
</tr>
</tbody>
</table>

The present value formula to be solved is:

\[
102 = \frac{106}{1 + \text{YTC}}
\]

\[\Rightarrow \text{YTC} = \frac{106}{102} - 1 = 3.92\%
\]

24-12. Timeline:

<table>
<thead>
<tr>
<th>Years</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periods</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Cash Flows</td>
<td>$2.5</td>
<td>$2.5</td>
<td>$2.5</td>
<td>$2.5</td>
</tr>
</tbody>
</table>

The present value formula to be solved is:

\[
99 = \frac{2.5}{i} \left( \frac{1 - \frac{1}{(1+i)^6}}{(1+i)^6} \right) + \frac{100}{(1+i)^6}
\]

Using the annuity calculator:

\[i = 2.68\%
\]

So since YTM are quoted as APR’s:

\[\text{YTM} = i \times 2 = 2.68\% \times 2 = 5.36\%
\]

YTC:

Timeline:

<table>
<thead>
<tr>
<th>Years</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periods</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Cash Flows</td>
<td>$2.5</td>
<td>$2.5</td>
<td>$2.5</td>
</tr>
</tbody>
</table>

+ $2.5
The present value formula to be solved is:

\[
99 = \frac{2.5}{i} \left( \frac{1}{1+i} \right)^3 + \frac{100}{(1+i)^4}
\]

Using the annuity calculator:

\[i = 2.77\%\]

Since YTM (and therefore YTC) are quoted as APR’s:

\[YTC = i \times 2\]
\[= 5.54\%\]

24-13. The option to convert the bond into stock is valuable and hence its price will be higher and therefore its yield lower.

24-14. The conversion price is the face value of the bond divided by the conversion ratio. In this case:

\[
P = \frac{\text{Face value}}{\text{Conversion ratio}} = \frac{$10,000}{450} = $22.22\]