10. Long-Term Debt. Term Structure of Interest Rates. Leasing

1. Valuation of Securities

1.1 Sources of Long-Term Financing

There are three main reasons for the widespread use of long term debt:

1. Compared with equity, it is less costly because of the tax deductibility of the interest costs.
2. Debt provides financial leverage, which allows for a magnification of profits (and losses).
3. Compared with short-term debt, long term debt offers greater flexibility to the borrower in that it allows much longer periods for repayment.

1.1.1 Term loans

Term loans are borrowings on which amounts of principal and interest are regularly paid over the life of the loan. Term loans are typically used by smaller companies. Term loans are privately arranged. Companies find private placements desirable because they are far less costly than public placements.

1.1.2 Bonds

Usually the term bond refers to long-term debt that is **secured** by assets. **Debentures**, often called „debs" are unsecured bonds, **not secured** by assets. Security refers to the recourse of the debt holder in the event of default. Bonds secured by a mortgage are called mortgage bonds, and bonds secured by the company's stocks or bonds are collateral trust bonds.Convertible bonds (converts) permit bondholders to change (at their option) their debt to equity at certain prespecified prices.

1.2 Bond features

coupons	The stated interest payments made on a bond. Also coupon amount.
face value	The principal amount of a bond that is repaid at the end of the term. Also par value or maturity value.
coupon rate	The annual coupon divided by the face value of a bond. Also known as the promised rate.
maturity	Specified date at which the principal amount of a bond is paid. Bonds mature in 7 to 30 years from issue.
yield to maturity (YTM)	The market interest rate that equates a bond's present value of interest payments and principal repayment with its price. Also internal rate of return (IRR) on the bond.
call provisions	When a company redeems bonds before their maturity, it is said to *call* them. Most bonds today are callable.
put bonds	Sometimes the holder may redeem bonds at par value at a specified time before maturity.
sinking fund	Originally referred to an actual money fund that was set aside, invested and then used to retire bonds at maturity.
restrictive covenants	The indenture specifies restrictive covenants, which are the conditions under which a company must operate to ensure the bond's value over time.
ratings	Ratings firms „grade" bonds on their default risk. Ratings range from triple A to C or D.

1.3 Valuation of bonds

Financial instruments often have market values, which can be observed. In the same time they have economic (fair, theoretical, intrinsic) values, which can be calculated using theoretical formula (model), based on sound economic assumptions. The differences between the market value and the economic value reveal arbitrage opportunities. With the higher market value than the fair value, a security is assumed to be overpriced (overvalued) - you should sell it. With the lower the market value than the fair value, a security is underpriced (undervalued) - you should buy it.

Instead of determining value, investors often price financial instruments in terms of interest rates (yields). Rate of interest is just rate of return for an investor or in the same time cost of capital for a borrower.

The value of a bond or any financial instrument equals the present value of its expected cash flow. The traditional or standard technique is to use a single interest rate, which is the required rate of return on bond.

The following bond valuation formula assumes annual compounding.

(1) $$P = \frac{cB}{(1+i)^1} + \frac{cB}{(1+i)^2} + \ldots + \frac{cB+B}{(1+i)^T} \quad \text{or} \quad P = \frac{B\left(c\left[(1+i)^T - 1\right] + i\right)}{i(1+i)^T}$$

With semiannual compounding the bond price is equal to:

(2) $$P = \frac{\frac{c}{2}B}{\left(1+\frac{y}{2}\right)^1} + \frac{\frac{c}{2}B}{\left(1+\frac{y}{2}\right)^2} + \ldots + \frac{\frac{c}{2}B+B}{\left(1+\frac{y}{2}\right)^T} \quad \text{or} \quad P = \frac{B\left(c\left[\left(1+\frac{y}{2}\right)^T - 1\right] + y\right)}{y\left(1+\frac{y}{2}\right)^T}$$

With m coupons in a year a bond price is equal to

(3) $$P = \frac{\frac{c}{m}B}{\left(1+\frac{y}{m}\right)^1} + \frac{\frac{c}{m}B}{\left(1+\frac{y}{m}\right)^2} + \ldots + \frac{\frac{c}{m}B}{\left(1+\frac{y}{m}\right)^{nm}} + \frac{B}{\left(1+\frac{y}{m}\right)^{nm}}$$

or

(4) $$P = B\frac{c\left[\left(1+\frac{y}{m}\right)^{nm} - 1\right] + y}{y\left(1+\frac{y}{m}\right)^{nm}}$$

The relationship between a bond's yield y with m-coupons and an effective yield i (bond with annual cash flows) is

$$(1+i)^n = \left(1+\frac{y}{m}\right)^{mn}$$

and

$$y = m\left[(1+i)^{\frac{1}{m}} - 1\right]$$

Thus the price of a bond with m coupons is:

$$(5) \qquad P = B\frac{c\left[(1+i)^{n}-1\right]+m\left[(1+i)^{\frac{1}{m}}-1\right]}{m\left[(1+i)^{\frac{1}{m}}-1\right](1+i)^{n}}$$

Zero coupon bonds

The price of a zero coupon bond is

$$(6) \qquad P = \frac{CF_T}{(1+i)^T} = \frac{B}{(1+i)^T}$$

Yield to maturity (internal rate of return) is:

$$(7) \qquad YTM = \left(\frac{B}{P_M}\right)^{\frac{1}{T}} - 1$$

Consol bonds

A consol bond never matures. It is a perpetuity. There is no maturity. Note, that while maturity is infinite ∞), duration is finite.

$$(8) \qquad P = \sum_{t=1}^{\infty}\frac{CF_t}{(1+i)^t} = \frac{Bc}{i}$$

With semiannual compounding the consol price is equal to:

$$(9) \qquad P = \frac{B\frac{c}{2}}{\frac{y}{2}}$$

1.4 YTM

Assumptions:

a) You hold the bond to maturity
b) You reinvest all the interests at the YTM rate.

The fundamental principle in interest bearing instruments (bonds as an example) price behavior is that when market interest rates rise, bond prices fall. Conversely, when market interest rates fall, bond prices rise. As an interest bearing instrument especially with fixed coupon rate approaches its maturity date, its value come nearer to par value. Current yield is computed as

$$(10) \qquad \frac{cB}{P_M}$$

Japanese yield to maturity is computed as

$$(11) \qquad \frac{cB}{P_M} + \frac{(B - P_M)}{TP_M}$$

2. Leasing

2.1 Lease contract

Leasing represents financing alternative by which firms raise a substantial amount of capital. Leasing can be viewed as a type of debt through which the firm is able to obtain the use of physical asset, though not its legal ownership.

A **lease** is a contract in which one party grants to another party the right to use or occupy property owned by the former. The granting party is the **lessor**; the party using the property is the **lessee**.

For the lessee leasing represents alternative to borrowing, but it is fundamentally different in one respect - the legal ownership of the asset. The lessee is not the owner of the asset.

2.2 Why do companies lease assets ?

1. A lease contract is cancelable.
2. Lease contracts may include maintenance arrangements.
3. A company can lower its organizational and administrative costs.
4. The lessor firm can borrow money at a lower rate than the lessee firm can.

2.3 Types of Leases

Operating leases

The principal characteristics of operating leases is that the maintenance and service of the leased equipment is provided by the lessor. A cancellation clause gives the lessee the right to cancel the lease agreement before the expiration of the lease term.

Financial Lease

A financial or capital lease is a noncancelable, longer-term lease that fully amortizes the lessor's cost for equipment. Service and maintenance are usually provided by the lessee. Some financial leases provide for certain renewal or purchase options at the end of the lease term.

Sale and Leaseback

The sale of an asset and simultaneous agreement to lease it back from the purchaser.

Direct Lease

The lessor already owns or acquires the asset, which is then provided to the lessee. Often the lessor is a manufacturer or a leasing company that is providing the asset and its financing to the lessee.

Leveraged Leases

A leveraged lease is a special lease arrangement under which a lessor borrows a substantial portion of the acquisition cost of the leased asset from a third party.

True Lease

Under a true lease, the **lessee** is able to deduct the **lease payments** fully for tax purposes. The **lessor** may retain the **tax depreciation deductions**.

The five IRS requirements for a true lease are as follows:

1. The estimated fair market value of the leased asset at the expiration of the lease must equal or exceed 20% of the asset's original cost.
2. The estimated remaining useful life of the leased asset beyond the term of the lease must equal or exceed 20% of the original estimated useful life of the asset and must be at least one year.
3. The lessee must not have the right to purchase the asset from the lessor at a price less than the fair market value.
4. The lessor must have a minimum „at risk" investment equal to at least 20% of the cost of the leased asset.
5. The lessee must provide a reasonable return to the lessor, relative to the return on loans.

2.4 Purchase or Lease

To assess the impact of either alternative on firm value, a net present value (NPV) analysis for leasing is required.

The lease cash flows can be calculated as:

$$(1) \qquad LCF = \begin{cases} I - P_0(1 - T_B) & \text{for } t = 0 \\ -P_t(1 - T_B) - T_B D_t & \text{for } t > 0 \end{cases}$$

where

I is the cost of the equipment/property leased,
P is the lease payment
D_t is the foregone (lost) depreciation in period t
T_B is the firm's (lessee's) marginal tax rate.

If NPV is positive, a firm should accept the lease financing. IF NPV is negative, a firm should borrow an purchase the asset.

The lessor's cash flows are analogous to those of the lessee, but with a reversal sign. Of course, with different tax rates and costs of capital to the lessor and the lessee, both can benefit.