Advanced Finance - Cheatsheet

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Terminology

Derivatives: Any financial instrument that is derived from another e.g. options, warrants, futures, swaps

Option: gives the holder the right to buy or sell a security at a specified price during a specified time period

Call Option: The right to buy a security at a specified price within a specified time

Option Premium: The price paid for the option, above the price of the underlying security

Intrinsic Value: Difference between the strike price and the stock price

Time Premium: Value of option above the intrinsic value

Exercise Price: (Strike Price) The price at which you uby or sell the security

American Option: Can be exercised at any time prior to and including the expiration date

European Option: Can be exercised only on the expiration date

Exercise price ↑: **Call Price ↓**, **Put Price ↑**

Put Option: The right to sell a security at a specified price within a specified time

Butterfly

Straddle

Strategy of buying a call: Bild einfügen

Value of company's assets ↑, **Value of default put ↓**

Std dev asset value ↑, **Value of default put ↑**

Amount of outstanding debt ↑, **Value of default put ↑**

Debt maturity ↑, **Value of default put ↑**

Default-free interest rate ↑, **Value of default put ↓**

Dividend payments ↑, **Value of default put ↑**

Indenture or trust deed: The bond agreement between the borrower and a trust company

Registered bond: A bond in which the company's records show ownership and interest and principal are paid directly to each owner.

Bearer bonds: The bondholder must send in coupons to claim interest and mus send a certificate to claim the final payment of principal

Accrued interest: The amount of accumulated interest since the last coupon payment

Coupon: Interest paid on a bond

Debentures: Long-term unsecured issues on debt

Mortgage bond: Long-term secured debt, often containing a claim against a specific building or property

Collateral trust bonds: Bonds secured by common stocks or other securities that are owned by te borrower

Equipmnet trust certificate: Secured debt generally used to finance railroad equipment. The trustee retains equipment ownership until the debt is repaid.

Asset-backed securities: The sale of cash flows derived directly from a specific set of bundled assets

Mortgage-backed securites: Package of mortgage loans sold; owners of package receive portion of mortgage payments

Callable bond: Allows the issuer to repay the debt, valuable to reduce leverage

Puttable (retractable) bond: Allows the investor to be reapid for the debt, A protective covenant for the investor

Sinking fund: A fund established to retire debt before maturity

Bond covenants: Debt ratios, Security, Dividends, Event risk, (+) working capital, (+) net worth

Lease: Rental agreement that involves fixed payments from lessee to lessor (*Reasons: convenient, provided maintenance, low cost through standardization, tax shields, financial distress, avoid capital expenditure controls, preserve capital off-balance sheet financing*) **Direct Lease**: The lessor buy the equipment from the manufacturer **Full Service Lease**: The lessor provides maintenance and insurance **Operating Lease**: The initial lease period is shorter than the economic life of the asset **Financial Lease**: The initial lease period is long enough for the lessor to recover the cost of the asset **Net Lease**: The lessee provides maintenance and insurance **Leveraged Lease**: The lessor finances the lease contract by issuing debt and equity claims against it **Sale and Leaseback**: The lessors buys the equipment from the prospective lessee

Formulas

Put-Call-Parity

$$C + PV(EX) = P + S$$

where:

- C = Price of the European call option
- $PV(EX)$ = Present value of the strike price = $\frac{Ex.Price}{(1+r)}$
- P = Price of a European Put
- S = Share Price

Option Δ

$$Option\Delta = \frac{C_u - C_d}{S_u - S_d} = \frac{P_u - P_d}{S_u - S_d}$$

where:

- C_u = Call upside
- C_d = Call downside
- P = Put
- S = Stock

Risk neutral probability of rising value

$$p^* = \frac{(1+r) - d}{u - d}$$

where:

- r = Interest rate
- d = Relative downward change
- u = Relative upward change

Expected Value

$$ExpectedValue = (p^* * PayOff_u) + ([1 - p^*] * PayOff_d)$$

Present Value

$$PresentValue = \frac{ExpectedValue}{(1+r)} = ValueShares - ValueLoan$$

$$ValueLoan = \frac{ValueShares_d}{(1+r)}$$

Up and Down Changes

$$1 + UpsideChange = u = e^{\sigma * \sqrt{h}}$$

$$1 + DownsideChange = d = \frac{1}{u}$$

where:

- σ = Standard Deviation
- h = Fraction of Year

Black-Scholes Formula(weg wenn zu viel)

$$C = (N[d_1] * S) - (N[d_2] * PV[EX])$$

$$d_1 = \frac{log(\frac{S}{PV[EX]})}{\sigma * \sqrt{t}} + \frac{\sigma\sqrt{2}}{2}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

where:

- C = Call Value
- $N[d]$ = Cummulative normal probability
- $PV(EX)$ = Ex. Price at risk-free interest rate
- S = Stock price
- t = number of periods tp exercise date
- σ = Standard Deviation
- $if d_1 is large, N(d_1) is close to 1.0$
- $if d_1 is zero, N(d_1) is close to 0.5$

Present Value Formlua BOND

$$PV = \sum_{t=1}^{T} \frac{cpn}{(1+r)^t} + \frac{par}{(1+r)^T}$$

$$PromisedYield = \frac{Payoff}{PV} - 1$$

where:

- cpn = Coupon rate
- r = Interest rate
- T = Number of periods
- par = Face value

Predicting Default: Altman's Z-score

$$Z = 1.2x_1 + 1.4x_2 + 3.3x_3 + 0.6x_4 + 1.0x_5$$

where:

- x_1 = working capital/total assets
- x_2 = retained earnings/total assets
- x_3 = earnings before interest and tax (EBIT)/total assets
- x_4 = market value of equity / total liabilities
- x_5 = sales/total assets

Convertible Securities

$$ConversionPrice = \frac{FaceValue(1000\$)}{ConversionRatio}$$

$$ConversionValue = Conversionratio * shareprice$$

Take or Die

Expansion Options: Uncertainty ↑ - Valoue of exp. option ↑ **Value of a call (takeaways)**:

- Never worth more than the stock price itself.
- When the share is worthless, the option is worthless.

Lease or Buy

- Buy if equivalent annual cost of ownership and operation is less than the best lease rate
- For using extended periods, buying tends to be cheaper
- Leasing, because lessor might be able to manage asset at less expense than lessee
- Leasing has useful options in leasing agreement

$$NPV_{lease} = InitialFinancing - \sum_{t=1}^{T} \frac{LeaseCashFlow}{[1 + r_D * (1 - T_c)]^t}$$

$$NPV = PV_{EquivalentLoan} + InitialFinancing$$

- r_D = discount rate
- t_c = marginal tax rate

Binomial Method