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Version: May 30, 2025

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 1: Call Price ↓, Put Price ↑ Put Option: The right to sell a security at a spec-

ified price within a specified time Butterfly Straddle Strategy of buying a call: Bild einfügen Value of company's assets ↑. Value of default put \downarrow Std dev asset value \uparrow , Value of default put \uparrow Amount of outstanding debt \(\frac{1}{2}\), Value of default put \(\frac{1}{2}\) Debt maturity ↑, Value of default put ↑ Default-free interest rate ↑, Value of default put \downarrow Dividend payments \uparrow , Value of default put \uparrow 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 repaid 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 Spot price: Price paid for immediate delivery Forward vs futures contract: Both contracts buy or sell at a specified future date at a specified price. However, compared to forwards, futures are traded on an exchange and they are marked to market. Futures fixes a price which has to be paved if market value is higher or lower Long vs short position: Investors who are long have agreed to buy the asset. Investors who are short have con- where: tracted to sell. Basis risk: The risk that arises because the price of the asset used to hedge is not perfectly correlated with that of the asset that is being hedged. Mark to market: Profits and

Exchange Rate: Amount of one currency needed to buy one unit on another Spot Rate of Exchange: Exchange rate for an immediate transaction Forward Exchange rate: Exchange rate for a forward transaction Trade Credit: Receivables from one company to another Consumer Credit: receivables from consumers Terms of sale: Credit, discount, and payment terms offered on a sale Credit Analysis: Procedure to determine the likelihood a customer will pay its bills Credit Policy: Standards set to determine the amount and nature of credit to extend to customers Credit Scoring: What your lender won't tell you Collection Policy: Procedures to collect

and monitor receivables Factoring: Arrangement whereby a finan-

cial institution buys a company's accounts receivable and collects

C + PV(EX) = P + S

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

losses on a position are settled on a regular basis Net convenience yield: The advantage from owning the commodity rather than the

promise of future delivery less the cost of storing the commodity

Formulas Put-Call-Parity

$$ullet$$
 $C=$ Price of the European call option

- PV(EX) = Present value of the strike price = $\frac{Ex.Price}{(1+x)}$
- \bullet P =Price of a European Put
- \bullet $S = \mathsf{Share Price}$
- Option Δ

• $C_u = \text{Call upside}$ • $C_d = \text{Call downside}$

- \bullet P = Put
- $S = \mathsf{Stock}$
- Risk neutral probability of rising value

 \bullet r =Interest rate

- d = Relative downward change

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

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

$$PresValue = \frac{ExpectedValue}{(1+r)} = ValShares - ValLoan$$

Up and Down Changes

$$1 + OpsideChange = u = e$$

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

- h = Fraction of Year

- Black-Scholes Formula(weg wenn zu viel)
 - $C = (N[d_1] * S) (N[d_2] * PV[EX])$ $d_1 = \frac{log(\frac{S}{PV[EX]})}{\sigma * \sqrt{t}} + \frac{\sigma\sqrt{2}}{2}$
 - ullet C = Call ValueN[d] = Cummulative normal probability
 - PV(EX) = Ex. Price at risk-free interest rate
 - S = Stock price
- \bullet t = number of periods tp exercise date
- $\sigma = Standard Deviation$ ifd₁islarge, N(d₁)iscloseto1.0
- ifd₁iszero, N(d₁)iscloseto0.5
- Present Value Formlua BOND

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

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

where:
$$\bullet \ cpn = {\sf Coupon \ rate}$$

- r = Interest rate \bullet 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:

- $x_3 = \text{earnings before interest and tax (EBIT)/total assets}$
- \bullet $x_4 = \text{market value of equity / total liabilities}$
- $x_5 = \text{sales/total assets}$ Convertible Securities

Take or Die

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

• $r_D = \text{discount rate}$

• $t_c = \text{marginal tax rate}$

• u = Relative upward change

Expected Value

Present Value

$$ValueLoan = rac{ValueShares_d}{(1+r)}$$

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

ere:

$$\sigma = \text{Standard Deviation}$$

- - **Pricing Futures Contracts**
 - $F_t = S_0 * (1 + r_f y)^t$ $= S_0 * (1 + StorageCost - CY)^t$

Managing Risks

NCY = ConvenienceYield - StorageCost• F_t = future price on contract of t length

Risks to a business: Cash shortfalls, Financial distress, Agency

costs, Currency fluctuations, Political instability, Weather changes

- S₀ = todav's spot price
- \bullet $r_f = \text{risk-free interest rate}$
- y = dividend yield NCY = NetConvenienceYield
- Hedging Rations and Basis Risk
- $ExpectedChangeInValueA = \alpha + \delta * (ChangInValueB)$ • $\delta = \text{sensitivity of A to change in the value of B (hedge ration)}$
- $\alpha = \text{offset}$

Premium- Discount Relationship $ForwardDiscount = \frac{1}{t_{vears}}*(\frac{SpotPrice}{ForwardRate} - 1)$

- Basic Relationships in the FX Market

- CurrSpotRate*Exp.Diff.InflationRates = Exp.SpotRate

Balance sheet

- ConversionValue = Conversionratio * shareprice
- of a call (takeaways): • Never worth more than the stock price itself.
 - Buy if equivalent annual cost of ownership and operation is

Expansion Options: Uncertainty \(\ - \) Valoue of exp. option \(\ \ \) Value

less than the best lease rate

• When the share is worthless, the option is worthless

- 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
- $NPV_{lease} = Initial Financing \sum_{t=1}^{T} \frac{LeaseCashFlow}{[1 + r_D*(1 T_c)]^t}$ • Net working capital = \$10,890 - 14,243 = -\$3,353 $NPV = PV_{EquivalentLoan} + InitialFinancing$
 - EBIT = TotalRevelue Costs Deprication

 $r_{Real} = \frac{1 + r_{nom}}{1 + r_{exp}} - 1$

 $\frac{(1+r_{CHF})^t}{(1+r_{USD})^t} * S_{CHF/USD} = ForwardExchangeRates$

 $Req.Return = r_{Swiss} + \beta * MarketRiskPrem_{Swiss}$

· Current assets are inventories of raw materials, work in pro-

• Current liabilities include debts that are due to be repaid and

Net working capital is the difference between current assets

Assets are listed in declining order of liquidity

cess, and finished goods

and liabilities

MarketCapitalization(MC) = #SharesOutstd*ShareProperty (MC) = #SharesOutstd*SharesOutst

$$MarketValueAdded(MVA) = MC - Equity_{BookValue}$$

$$MarketToBookRatio = \frac{Value_{Market}}{Value_{Book}}$$

$$EconomicValueAdded(EVA) =$$

After TaxInterest + NetIncome - CostOfCapital*capital

Return Rates

Return on Capital

$$ROC = \frac{AfterTaxInterest + NetIncome}{TotalCapital}$$

Return on Asset

$$ROA = \frac{AfterTaxInterest + NetIncome}{TotalAssets}$$

= AssetTrunoverRatio * OpProfitMarq

Return on Equity

$$ROE = \frac{NetIncome}{Equity}$$

$$ProfitMarg. = \frac{NetIncome}{TotalSales}$$

$$OpProfitMarg. = \frac{AfterTaxInterest + NetIncome}{TotalSales}$$

$$AssetTrunoverRatio = \frac{Salse}{Assets@StartOfYear}$$

$$LeverageRatio = \frac{Assets}{Equity}$$

$$DebtBurden = \frac{NetIncome}{AfterTaxInterest + NetIncome}$$

Measuring Efficiency

$$Inv. Turnover Ratio = \frac{CostOfGoods}{Inventory@StartOfYear}$$

$$Rec.Turnover = \frac{Sales}{Receivables@StartOfYear}$$

$$LongTermDebtEquityRatio = \frac{LongTermDebt}{Equity}$$

$$LongTermDebtRatio = \frac{LongTermDebt}{LongTermDebt + Equity}$$

$$TotalDebtRatio = \frac{TotLiabilities}{TotalAssets}$$

$$TimeInterestEarned = \frac{EBIT}{InterestPayments}$$

$$CashCoverageRatio = \frac{EBIT + Deprication}{InterestPayments}$$

Measuring Liquidity

$$NWCToTotalAssets = rac{NetWorkingCapital}{TotalAssets}$$

$$CurrentRatio = rac{CurrentAssets}{CurrentLiabilities}$$

$$QuickRatio = \frac{Cash + MarketableSecurities + Receivable\$ rade}{CurrentLiabilities} \\ \frac{Consumer\ Credit: receivables\ from\ one\ company\ to\ another rade}{Consumer\ Credit: receivables\ from\ consumers} \\ CashRatio = \frac{Cash + MarketableSecurities}{Consumer\ Consumer\ Consumer\ CreditDecision = prob.*PV(COST-REV) - (1) +$$

SustainableGrowthRate: Highest growth rate a firm can maintain without increasing its financial leverage

$$InternalGrowthRate = \frac{ReinvestedEarnings}{NetAssets}$$

$$= \frac{ReinvestedEarnings}{NetIncome} * \frac{NetIncome}{Equity} * \frac{Equity}{NetAssets}$$

$$= PlowBack * ReturnOnEquity * \frac{Equity}{NetAssets}$$

The Operating and Cash Cycles

Op.Cycle(Days) = InventoryPeriod + AcountsReceivable

$$CashCycle(days) = Op.Cycle - AcountsPayablePeriod \\$$

$$Avg.InventoryPeriod = \frac{Inv.@StartOfYear}{DailyCostofGoodsSold}$$

$$Avg.ReceivablesPeriod = \frac{Receivables@StartOfYear}{DailySales}$$

$$Avg.PaymenPeriod = \frac{Payables@StartOfYear}{DailyCostofGoodsSold}$$

Inventory

Components:

- · Raw materials
- · Works in progress
- Finished Goods

The Goals is to minimize amount of cash tied up in Inventory Tools to minimize:

- Just-in-time
- As the firm increases its order size, the number of orders falls and therefore the order costs decline
- · However, an increase in order size also increases the average amount in inventory, so that the carrying cost of inventory
- The trick is to strike a balance between these two costs

Economic Order Qty: Order size that minimizes total inventory costs (generally applicable formula with some limitations)

$$EOQ = \sqrt{2*Sales*\frac{CostPerOrder}{CarryingCost}}$$

Consumer Credit: receivables from consumers

CreditDecision = prob.*PV(COST-REV)-(1-prob.)*PV(COST)

Mergers

Horizontaml Merger: One that takes place between two firms in

Vertical Merger: Involves companies at different stages of produc-

Congomlerate Merger: Involves companies in unrelated lines of

Economies of Scale: Reduce per-unit cost through spreading fixed cost across more units Economies of Vertical Integration: Control over suppliers may reduce cost - overintegration can have opposite effect Complementary Resources: Merging may result in each firm filling in the "missing pieces" of its firm with pieces from the $Sustainable Growth Rate = Plowback Ratio*Return On Equiver \textit{firm} \textbf{Industry Consolidation:} \ \textit{These conditions typically lead} \\$ to mergers and acquisitions, prompting cuts in capacity and jobs, and freeing up capital for reinvestment elsewhere in the economy

Binomial Method