Advanced Finance - Cheatsheet

ehaller, seyohnp

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** ↑: **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 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 payed 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 contracted 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 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 **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 financial institution buys a company's accounts receivable and collects the debt **Spin-off:** New independent company created by detaching part of a parent company's assets and operations; shares given to existing shareholders **Carve-out:** Like a spin-off, except that shares in the new company are sold in a public offering **Asset sale or Divestiture:** The sale of a part of one firm to another **Privatization:** The sale of a government-owned company to private investors

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

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

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

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
- $if d_1 is large, N(d_1) is closeto 1.0$
- $if d_1 is zero, N(d_1) is closeto 0.5$

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

Managing Risks

Risks to a business: Cash shortfalls, Financial distress, Agency costs, Currency fluctuations, Political instability, Weather changes

Pricing Futures Contracts

$$F_t = S_0 * (1 + r_f - y)^t$$

$$= S_0 * (1 + StorageCost - CY)^t$$

$$NCY = ConvenienceYield - StorageCost$$

- F_t = future price on contract of t length
- S_0 = today's spot price
- r_f = risk-free interest rate
- y = dividend yield
- NCY = NetConvenienceYield

Hedging Rations and Basis Risk

$$ExpectedChangeInValueA = \alpha + \delta * (ChangInValueB)$$

- δ = sensitivity of A to change in the value of B (hedge ration)
- α = offset

Premium- Discount Relationship

$$ForwardDiscount = \frac{1}{t_{years}} * (\frac{SpotPrice}{ForwardRate} - 1)$$

Basic Relationships in the FX Market

$$CurrSpotRate * Exp.Diff.InflationRates = Exp.SpotRat$$

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

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

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

Balance sheet

- Assets are listed in declining order of liquidity
- Current assets are inventories of raw materials, work in process, and finished goods
- Current liabilities include debts that are due to be repaid and payables
- Net working capital is the difference between current assets and liabilities
- Net working capital = $10,890 – 14,243 = – $3,353

$$EBIT = TotalRevelue - Costs - Depriciation$$

ExampleTable

$$MarketCapitalization(MC) = \#SharesOutstd * SharePrice$$

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

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

$$EconomicValueAdded(EVA) = AfterTaxInterest + NetIncome - CostOfCapital * capital$$

Return Rates

Return on Capital

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

Return on Asset

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

$$= AssetTrunoverRatio * OpProfitMarg$$

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

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

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

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

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

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

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

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

Measuring Liquidity

$$NWCToTotalAssets = \frac{NetWorkingCapital}{TotalAssets}$$

$$CurrentRatio = \frac{CurrentAssets}{CurrentLiabilities}$$

$$QuickRatio = \frac{Cash + MarketableSecurities + Receivables}{CurrentLiabilities}$$

$$CashRatio = \frac{Cash + MarketableSecurities}{CurrentLiabilities}$$

Growth and External financing

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

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

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

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

$$SustainableGrowthRate = PlowbackRatio * ReturnOnEquity$$

The Operating and Cash Cycles

$$Op.Cycle(Days) = InventoryPeriod + AcountsReceivablePeriod$$

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

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

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

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

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 rises
- 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)

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

Trade Credit:receivables from one company to another
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 the same line of business **Vertical Merger:** Involves companies at different stages of production **Congomlerate Merger:** Involves companies in unrelated lines of business **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 other firm **Industry Consolidation:** These conditions typically lead to mergers and acquisitions, prompting cuts in capacity and jobs, and freeing up capital for reinvestment elsewhere in the economy **Diversification:** Diversification is easier and cheaper for the stockholder than for the corporation. There is little evidence that investors pay a premium for diversified firms **Increasing Earnings per Share (BootsTrap Game):** Acquiring firm has high P/E ratio, Selling firm has low P/E ratio, After merger, acquiring firm has short-term EPS rise, Long term, acquirer will have slower than normal EPS growth due to share dilution **Lower Borrowing Cost:** There might be economies of scale, e.g., if firms can make fewer, larger security issues by merging, there can be savings **Management Motives:** Manager hubris, Personal objectives (salary, reputation...), Unusual self-esteem leads to more frequent and larger acquisitions, higher premiums paid, value destroying mergers

$$PV(AB) > PV(A) + PV(B)$$

Stock Financing:

$$Cost = xPV_{AB} - PV_B$$

Merger Preoffer Defenses:White knight: Friendly potential acquirer sought by a target company threatened by an unwelcome suitor/**Shark repellent:** Amendments to a company charter made to forestall takeover attempts/**Poison pill:** Measure taken by a target firm to avoid acquisition; for example, the right for existing shareholders to buy additional shares at an attractive price if a bidder acquires a large holding Master
Merger Postoffer Defenses:Litigation: Target files suit against bidder for violating antitrust or securities laws.**Asset restructuring:** Target buys assets that bidder does not want or that will create an antitrust problem **Liability restructuring:**Target issues shares to a friendly third party, increases the number of shareholders, or repurchases shares from existing shareholders at a premium.

Leveraged restructuring

LBO: Purchase of a business using mostly debt financing. The company goes private so that its stock no longer trades in the open market. **MBO:** An LBO that is undertaken by existing management. **Spin-off:** A parent company creates a new company with part of its assets and operations. Shares in the new business are distributed to the parent's stockholders. **Carve-out:** Like a spin-off, but shares in the new business are sold in a public offering. **Asset-sale:** A sale of specific assets rather than the entire firm. **Privatization:** The purchase of a government-owned business by private investors. **Leveraged Restructuring:** A company increases its debt, pays the debt proceeds to stockholders, and thereby increases its debt–equity ratio.
Private–Equity Fund: Widely diversified, investment in unrelated industries/Limited-life partnership forces sale of portfolio companies/No financial links or transfers between portfolio companies/ General partners "do the deal," then monitor; lenders also monitor/Managers' compensation depends on exit value of company **Public Conglomerate:** Widely diversified, investment in unrelated industries/Public corporations designed to operate divisions for the long run/Internal capital market/ Hierarchy of corporate staff evaluates divisions' plans and performance/Divisional managers' compensation depends mostly on earnings—"smaller upside, softer downside"

Sustainable Finance

Corporate Social Responsibility (CSR): Companies are responsible for the effects of their activities on society and the environment. **Sustainability Development Goals (SDG):** Publishing and disseminating data and statistics on the SDG indicators for key stakeholders **Global Reporting Initiative (GRI):** International not-for-profit organisation, with a network-based structure. To enable all companies and organisations to report their economic, environmental, social and governance performance **EU taxonomy:** Cornerstone of the EU's sustainable finance framework and an important market transparency tool. It helps direct investments to the economic activities most needed for the transition, in line with the European Green Deal objectives **Corporate Sustainability Reporting Directive (CSRD):** Modernises and strengthens the rules concerning the social and environmental information that companies have to report **European Sustainability Reporting Standards (ESRS):** Companies subject to the CSRD will have to report according to European Sustainability Reporting Standards : : : : :