

Concepts	Description															
Return concepts																
Holding period return	$Holding\ period\ return = \frac{P_1 + CF - P_0}{P_0}$															
Realised return / Expected return	Realised return : historical return, based on past observed prices and CFs Expected return : return based on forecasts of future prices and CFs															
Required return	Minimum return required by an investor, given the asset's risks Riskier assets → Higher required return															
Price convergence	Price convergence : If expected return ≠ required return → additional return from convergence of price to intrinsic value $Expected\ return = Required\ return + Price\ convergence\ to\ intrinsic\ value = Required\ return + \frac{V_0 - P_0}{P_0}$															
Discount rate	Rate used to find the PV of investment. Discount rate is determined by the market															
IRR	Rate that equates the value of DCF to the current price of the security															
Equity risk premium	1. Definition : return in excess of risk-free rate that investors requires for holding equity securities Equity risk premium = Required return on equity index - Risk-free rate 2. Steps to estimate future equity risk premium : - Step 1 : Select an equity index - Select a time period - Calculate mean return on the index - Select a proxy for risk free rate (should correspond the time horizon for the investment, e.g.: T-bills for shorter term ; T-bonds for longer term)															
Types of estimates of equity risk premium : Historical estimates / Forward-looking estimates	<table><tr><td></td><td>Historical estimates</td><td>Forward-looking estimates</td></tr><tr><td>Definition :</td><td>- difference between historical mean return for a broad-based equity-market index vs. risk-free rate over time</td><td>- Use current info and expectations concerning economics and financial variables</td></tr><tr><td>Strength :</td><td>- Objective - Simple - If investors are rational → historical estimates is unbiased</td><td>- Does not rely on assumption of stationarity - Less subject to survivorship bias</td></tr><tr><td>Weakness :</td><td>- Assumption of constant mean and variance over time - Subject to survivorship bias, if only surviving firms are included in the sample → upward bias</td><td></td></tr><tr><td>Example:</td><td></td><td>- Gordon growth model - Supply-side model - Estimates from surveys</td></tr></table>		Historical estimates	Forward-looking estimates	Definition :	- difference between historical mean return for a broad-based equity-market index vs. risk-free rate over time	- Use current info and expectations concerning economics and financial variables	Strength :	- Objective - Simple - If investors are rational → historical estimates is unbiased	- Does not rely on assumption of stationarity - Less subject to survivorship bias	Weakness :	- Assumption of constant mean and variance over time - Subject to survivorship bias, if only surviving firms are included in the sample → upward bias		Example:		- Gordon growth model - Supply-side model - Estimates from surveys
	Historical estimates	Forward-looking estimates														
Definition :	- difference between historical mean return for a broad-based equity-market index vs. risk-free rate over time	- Use current info and expectations concerning economics and financial variables														
Strength :	- Objective - Simple - If investors are rational → historical estimates is unbiased	- Does not rely on assumption of stationarity - Less subject to survivorship bias														
Weakness :	- Assumption of constant mean and variance over time - Subject to survivorship bias, if only surviving firms are included in the sample → upward bias															
Example:		- Gordon growth model - Supply-side model - Estimates from surveys														
Gordon growth model	GGM equity-risk premium = (1-year forecast of dividend yield on market index) - (LT earnings growth rate) - (LT government bond yield) Weakness: - Estimates change over time → need to be updated - Economic boom → low dividend yield + high growth expectations ; Economic bust → high dividend yield + low growth expectations - Assumption of stable growth rate → not appropriate in rapid growth economies. In case of multiple growth stage, required rate of return = IRR from this equation : Equity index price = PV-rapid + PV-transition + PV-mature															
Supply-side estimates	1. Definition : Based on the relationship between macroeconomic variables and financial variables $Equity\ risk\ premium = (1 + i) \times (1 + rEg) \times (1 + PEg) - 1 + Y - r_f$ In which: $i = expected\ inflation = (YTM\ of\ 20\ year\ Tbonds) - (YTM\ of\ 20\ year\ Treasury\ Inflation\ Protected\ Securities)$ $rEg = expected\ real\ growth\ rate\ in\ EPS = Real\ GDP\ growth = Labor\ productivity\ growth\ rate + Labor\ supply\ growth\ rate$ $PEg = expected\ change\ in\ P/E\ ratio$ $Y = expected\ Yield\ on\ the\ index = estimated\ dividend\ on\ the\ index$ $PEg > 0 \rightarrow$ market is believed to be overvalued → P/E is expected to decrease $PEg < 0 \rightarrow$ Market is believed to be undervalued → P/E is expected to increase $PEg = 0 \rightarrow$ Market is correctly valued 2. Strength : Use proven and current info 3. Weakness : only appropriate for developed economies, where public equities represent a large share of the economy															
Survey estimates	1. Definition : use the opinion from a sample of people. If sample is experts in equity valuation only → more reliable 2. Strength : easy to obtain 3. Weakness : different result from different group sample															
Capital asset pricing model (CAPM)	$r = r_f + Equity\ risk\ premium \times \beta$															
Multifactor models	$r = R_f + Risk\ premium_1 + Risk\ premium_2 + \dots + Risk\ premium_n$ In which: $Risk\ premium_i = \beta_i \times Factor\ risk\ premium_i$ Factor risk premium : expected return above risk-free rate from 1 unit sensitivity to the factor and 0 sensitivity to all other factors 3 multifactor models : Fama-French model , Pastor-Stambaugh model , Macro multifactor model															

Fed Model Yardeni Model	Fed model : Overall market is overvalued when the earnings yield on S&P500 Index is lower than the yield of 10-year T-bonds Yardeni model : Expected earnings growth rate $CEY = CBY - k \times LTEG + \epsilon \rightarrow \frac{P}{E} = \frac{1}{CBY - k \times LTEG}$ In which : CEY = Current market earnings yield CBY = Current Moody's A-rated C-bond yield LTEG = 5-year growth rate k = constant value, assigned by the market to earnings growth ε = error
P/E to growth ratio (PEG ratio)	$PEG\ ratio = \frac{P/E\ ratio}{g}$ Rules : Stock with lower PEG is more attractive than stock with higher PEG, assuming similar required return Limitations - Relationship between PEG and g is not linear - PEG does not take into account risk (required return) - PEG does not reflect the duration of high growth period in multistage valuation model
Determine terminal value	1. Approach 1 : based on fundamentals $Terminal\ value_n = Justified\ leading\ P/E \times Forecasted\ earnings_{n+1}$ $Terminal\ value_n = Justified\ trailing\ P/E \times Forecasted\ earnings_n$ 2. Approach 2 : based on benchmark $Terminal\ value_n = Benchmark\ leading\ P/E \times Forecasted\ earnings_{n+1}$ $Terminal\ value_n = Benchmark\ trailing\ P/E \times Forecasted\ earnings_n$ - Strength of benchmark : Use only market data - Weakness of benchmark : Mispricing in benchmark will transferred to error in estimated terminal value
Alternative definitions of CF	1. Earnings + NCC (often ignores items that affect CF, e.g.: non-cash revenue, changes in net WC) 2. Adjusted CFO (Flexible classification of interest paid / interest received / dividends received under IFRS) 3. FCFE (more volatile) 4. EBITDA
Sources of differences in cross-border valuation	1. Differences in accounting methods (goodwill, DTA/DTL, FX adjustments, R&D, pension expense (angible assets revaluation)) 2. Differences in culture 3. Differences in risks 4. Differences in growth opportunities - Most affected : P/B ; P/E ; P/EBITDA ; EV/EBITDA (due to more influenced by management choices of accounting methods and estimates) - Least affected : P/FCFE
Momentum indicators	Momentum indicators relate to Market price / Fundamental metrics with Time series of historical / expected value Common indicators - Earnings surprise (unexpected earnings) = reported EPS - expected EPS - Standardised unexpected earnings (SUE) = Earnings surprise ÷ Standard deviation of earnings surprise - Relative strength : compare stock's price / return performance during a given time period with its own historical performance or with peer stocks
Method for calculate portfolio or index P/E	Best method for calculated portfolio or index P/E : weighted harmonic mean P/E $Weighted\ harmonic\ mean = \frac{1}{\sum_{i=1}^n \frac{w_i}{x_i}}$