Valuation approaches - Income approach	**Valuation method # 1 : Direct capitalisation method** $Value = V_0 = \frac{NOI_1}{Cap\ rate}$ $Capitalisation\ rate = Cap\ rate = Discount\ rate\ - Growth\ rate$ $All\ risk\ yield\ (ARY) = \frac{Rent_1}{Comparable\ sale\ price} = \frac{Rent_1}{Value}$ $Rental\ income\ if\ fully\ occupied$ $+Other\ income$ $= Potential\ gross\ income$ $-Vacancy\ and\ collection\ loss$ $= Effective\ gross\ income$ $-OPEX\ (ecluding\ interest\ and\ tax)$ $= Net\ operating\ income\ (NOI)$ (*) Tentants are required to pay all expenses → ARY = cap rate (*) Rents are expected to increase @ constant rate each year → IRR = Cap rate + Growth rate Stabilised NOI : when NOI is not representative of NOI of similar properties due to temporary issue (e.g.: renovation) → NOI should be calculated as no impact of temporary issue Gross income multiplier : similar to cap rate, but ignore the impact of vacancy rates and OPEX Value = Gross income × Gross income multiplier **Valuation method #2 : DCF** - Discount rate = Cap rate - Growth rate - Terminal cap rate : estimated residual value of property using direct capitalisation method - OPEX assumptions : fixed expenses can change due to inflation ; variable expenses vary with occupancy Valuation with different Lease structure : - Reversionary potential : adjust rent to current market rent @ lease expiration + discount rate applied to contract rent : lower than reversion rate, because contract rent is less risky - Layer method : + Layer 1- Contract rent : assume to continue in perpetuity → cap rate = ARY (contract rent is less risky) + Layer 2 - Incremental rent : higher cap rate than contract rent
Valuation approaches - Cost approach	**Step 1: Estimate MV of land** (sales comparison approach) **Step 2 : Estimate building's replacement cost** (based on current construction cost and standards + builder/developer's profit) **Step 3 : Deduct physical deterioration** (curable and non-curable) **functional obsolescence, location obsolescence and economic obsolescence** - Physical deterioration : wear and tear of the building overtime + Curable : if benefit of fixing ≥ cost to cure + Incurable : $Depreciation = (Building's\ replacement\ cost - Cost\ of\ fixing\ curable\ items) \times \frac{Effective\ age}{Total\ economic\ life}$ - Functional obsolescence : loss in value from defects in design and impairs building's facilities (estimated by capitalising the decline in NOI) - Locational obsolescence : occur when location no longer optimal. Part of the loss might already be reflected in MV of land - Economic obsolescence : occur when new construction is not feasible under current economic conditions (*) Cost approach is considered the upper limit of value since an investor would never pay more than the cost to build a comparable building
Valuation approaches - Sale comparison approach	Value of subjected property = sales prices of comparable properties ± adjustments for differences Differences may relate to : size, age, location, property condition, market conditions - Upward adjustments for undesirable difference with subject property - Downward adjustments for desirable difference with subject property
Highest and best use	**Highest and best use :** the use that produces highest implied land value Implied land value = Value of property once contruction is complete − Cost of constructing the improvement (including profit to the developer)
Due diligence in private equity real estate investment	**Due diligence :** to confirm the fact + conditions that might affect the value of the transaction → lower the risk of unexpected legal and physical problems - Lease review and rental history - Confirm OPEX by examining bills - Review CF statements - Obtain environment report → identify possible contamination - Physical / Engineer inspection → identify structural issues + Check condition of the building system - Inspect the title and other legal documents for deficiencies - Survey the property → confirm the boundaries + identify easements - Verify compliance with zoning laws, building codes and environment regulations - Verify payment of taxes, insurance, special assessments and other expenditures
Appraisal-based indices	**Appraisal-based indices:** combine valuations of individual properties that can be used to measure market movements → could compare performance with other asset classes MCREIF Property index (NPI) : popular index in US. NCREIF calculate return as follows: $Return = \frac{NOI - CAPEX + (End\ market\ value - Beg.market\ value)}{Beg.market\ value} = \frac{NOI}{Beg.MV} + \frac{End\ MV - Beg.MV - CAPEX}{Beg.MV} = current\ yield + capital\ return$ If increase in MV > CAPEX → Positive capital return Cons of appraisal-based indices : - Actual transactions occur before appraisals → appraisal-based indices tend to lag actual transaction → smooth the index - Appraisal lag → lowe correlation with other asset classes
Transaction-based Indices	**Transaction-based indices :** constructed using repeat-sales index and hedonic index Repeat-sale index : rely on repeat sale of same property → regression is developed to allocate change in value each quarter Hedonic index : require only 1 sale → regression is developed based on changes in property characteristics (age, location, etc.)

Life cycle of commodities	**Life cycle of crude oil** '1. Drill well → 2. Extract crude → 3. transport + storage for few months → 4. refine into various fuels (gasoline, heating oil, diesel oil, jet fuel) → 5. transport to customers **Life cycle of natural gas** 1. Extract → 2. transportation to consumer thru pipeline / or cooled to liquid form and transported by ship **Life cycle of industrial metals** 1. Extract ore → 2. Smelted into the quality of metal required by end users (*) Economies of scale due to large, efficient mining and smelting operations → most efficient running near capacity → producers hesistant to decrease production when price fall **Life cycle of lifestock** 1. Raise → 2. Slaughter (chichken : after weeks ; hogs : 6 months ; cattle : few years) → 3. Freezing for storage and international trade **Life cycle of grain** 1. Plant → 2. Harvest (5+ months after planting) → 3. Storage (*) Deliverable futures contracts are available on dates to coincide with the harvest **Life cycle of softs** - vary by products E.g. : Coffee 1. Plant → 2. Harvest (up to 4 years after plant for the 1st harvest) → 3. Transport + store in warehouse → 4. Roasted by local roaster → 5. deliver to end-users / retail sales outlets (*) Lag between investment in new capacity and increase in supply (*) Hedge price risk : producers sell futures for delivery to warehouse ; consumers by futures and take delivery from warehouse
Compare valuation of commodities vs. valuation of equities / bonds	1. Commodities are physical assets, have no CF, and may incur storage and transportation costs 2. Spot price of commodity can be viewed as discounted value of expected future selling price 3. Storage cost can lead to the higher forward prices the further the settlement date in the future
Participants in commodity futures markets	**1. Hedgers :** - Informed investors, either produce or use the commodity - Reduce risk by long / short futures contracts **2. Speculators :** - Take on commodity risk in futures markets - May act as informed investors - Exploit information / information processing advaantage to profit from trading with hedgers - Earn profit by providing liquidity to markets : long futures when commodity producers are selling ; short futures when commodity consumers are buying **3. Arbitrageurs :** - Buying, selling, storing the physical commodities when the differnce between spot and futures price is too large / too small, due to the actual cost of storing the commodity - Futures price > Spot price + Storage cost → buy and store commodity + short futures - Futures price < Spot price + Storage cost → Selling commodity + long futures **4. Commodity exchange** **5. Commodity market analysts :** non-market participants, use information to analyse for various entities **6. Commodity regulators :** regulate the commodity market
Basis / Calendar spread / Contango / Backwardation	**Basis** = spot price - futures price **Calendar spread** = Nearer future price - Further futures price **Contango** : Future prices are higher @ dates further in the future (Basis & Calendar spread < 0) **Backwardation** : Future price are lower @ dates further in the future (Basis & Calendar spread > 0)
Theories of commodity futures returns - Insurance theory - Hedging pressure Hypothesis - Theory of Storage	**1. Insurance theory :** Commodity producers want to reduce price risk → drives down futures price - <u>Disadvantages</u> : lack based on 2 empirical findings + No buyers' extra returns for providing insurance in backwardation markets + Cannot explain the buyers' negative return for providing insurance in contango markets **2. Hedging Pressure theory :** - Commodity producers want to reduce price risk → drives down futures price; and - Commodity consumers want to reduce price risk → drives up futures price → Producers' hedging behaviour > Consumers' hedging behaviour → Down pressure > Up pressure → Backwardation → Producers' hedging behaviour < Consumers' hedging behaviour → Up pressure > Down pressure → Contango - <u>Disadvantages</u> : + Producers typically face more concentrated price risk than consumers + Both producers and consumers may be speculators , not just hedgers + Heding pressure is not observable → cannot directly test the hypothesis **3. Theory of storage :** Backwardation / Contango futures markets depends on the relationship between storage costs of the commodity and benefits of holding physical commodity (<u>Convenience yield</u>) Future price = Spot price + Storage costs - Convenience yield → Storage costs < Convenience yield → Backwardation → Storage costs > Convenience yield → Contango
Total return for a fully collaterised commodity futures contract	- To take position in futures, investor must post collateral - Fully collateralised futures : Value of posted cash / accepted securities = notional value of futures contract Total return = Collateral return + Price return + Roll return <u>Collateral return (Collateral yield)</u> : holding period yield on the T-bills, if T-bills are deposited as collateral <u>Price return (Spot yield)</u> = (Current return - Previous price) / Previous price <u>Roll return (Roll yield)</u> : gains / losses for rollover the position of the future when commodity deriative contract expires - Backwardation market : longer-dated futures are trading @ lower price → buy more contracts to hold the value of long position - Contango market : longer-dated futures are trading @ higher price → buy less contracts to hold the value of long position $Roll\ return = \frac{Price\ of\ expiring\ futures\ contract\ - Price\ of\ new\ futures\ contract}{Price\ of\ expiring\ futures\ contract}$