

Understanding Cap Rates

- Educational Presentation #5 – Real Estate
- 16.01.2025
- Property of the Alternative Investment Society (AIS)
- Sources: WallStreetPrep, BIWS, REFM, FT, Bloomberg

Section I: Cap Rate Basics

Net Operating Income (NOI)

- Net Operating Income (frequently, NOI) measures the profitability of income-generating properties (it is conceptually the gross profit)
- It is calculated by adding the rental incomes and other any ancillary income sources of the property, and deducting the direct operating expenses of that same property, hence excluding non-operating expenses:

$$\text{Net Operating Income (NOI)} = \text{Rental Income} + \text{Ancillary Income} - \text{Operating Expenses}$$

Operating Expenses vs Non-operating Expenses

- Operating Expenses are necessary for day-to-day property operations to generate rental income. However, Non-Operating Expenses are not directly tied to the daily operations of the property

Purpose of NOI

- The NOI provides a measure of how much income the property generates for the investor under normal conditions (i.e. no CAPEX needed, or leasing commissions)
- The NOI is a particularly insightful measure for Stabilized NOI; it being expected annual NOI after property construction and development are complete, with a systematic level of vacancy

Cap Rate Fundamentals

- Cap rate, or Capitalization rate, is a financial metric used for valuation of properties, based on the expected rate of return on an income-generating property

Use of Cap Rates

- Investors use cap rates to estimate what the potential return will be on real estate investments by easily analyzing similar properties side-by-side
- As cap rates can vary a lot between different markets and property types it is important to compare the property with other similar properties
- The cap rate is the ratio, expressed as a percentage, of how big the stabilized Net Operating Income (NOI) of a property is compared to its current market value

$$\text{Cap Rate (\%)} = \text{Net Operating Income (NOI)} / \text{Purchase Price}$$

Interpretation of Cap Rates

- A higher cap rate may indicate higher risk but potentially higher returns, while a lower cap rate implies the opposite
- To successfully value an investment property, cap rates must be combined with other investment considerations

Cap Rates as Income Multiples

- The cap rate can be translated into a multiple by taking its inverse, indicating how many years it will take to recoup the investment through NOI
- The cap rate multiple is a frequently used metric to compare properties and asset classes, given it is more simply expressed (spoken)

$$\text{Cap Rate Multiple (x)} = 1 / \text{Cap Rate}$$

- Lower multiples reflect higher income with potential for higher risk, whilst higher multiples suggest the contrary. For example, a property with a 4 cap (4% Cap Rate) has a 25 multiple (or "factor")



Gross Rent Multiplier (GRM)

- The Gross Rent Multiplier (GRM) is another financial metric used as an income multiple for valuing real estate
- It calculates how long it takes to recoup an investment on gross income, by dividing the current market value with the gross income:

$$\text{Gross Rent Multiplier (GRM)} = \text{Purchase Price (current value)} / \text{Gross Rental Income}$$

Conceptual Understanding of a Cap Rate

- A cap rate conceptually functions as an effective discount rate, representing the required return on an investment
- It reflects both the time value of money, and the risk associated with a property's cash flow, and is simplified using the Gordon growth formula

$$\text{Cap Rate (\%)} = \text{Discount rate (r)} - \text{Growth Rate (g)}$$

- Where the discount rate consists of:

$$\text{Discount rate (r)} = \text{Risk-free Rate} + \text{Inflation} + \text{Operations Premium} + \text{Liquidity Premium}$$

- And where the growth rate is derived from:

$$\text{Growth Rate (g)} = \text{NOI Expected Growth} + \text{Inflation}$$

Conceptual Understanding of a Cap Rate (pt. 2)

Long-term Risk Free Rate

The baseline return, typically represented by the yield on a 10-year U.S. Treasury bond, which reflects the return investors can earn with zero risk

Expected Economy wide Inflation

Accounts for expected economy-wide inflation to ensure that returns maintain purchasing power over time – nevertheless, this factor is cancelled out through the growth rate

Operational Risk Premium

Reflects the specific risks tied to a property's NOI, such as tenant creditworthiness, market volatility, and capital expenditures challenges

Liquidity Premium

Adjusts for the illiquidity of real estate compared to highly liquid assets like stocks or bonds, compensating investors for the difficulty in quickly selling or converting the property into cash

Section II: Use in valuation

Cap Rates for Valuations

- Using industry cap rates to project onto singular properties is a good way to value them based on general market conditions
- Flipping around the previously used cap rate formula gives a formula for property value:

$$\text{Property Value} = \text{Net Operating Income (NOI)} / \text{Cap Rate (\%)}$$

1. Calculate the stabilised NOI of property being valued and characterise it by location, asset class and use



2. Find the industry cap rate of properties with similar characteristics to the one being valued



3. Apply the cap rate to the cap rate formula along with the NOI to get a property value estimation



4. Given property value is an estimation based on general condition and must be adjusted for specific conditions

Cap Rates in a DCF

- The Discounted Cash Flow Method is a method to value a commercial property by taking all future projected cash flows of the project and discounting them back to time zero (date of purchase) using a predetermined discount rate
- It is premised on two main concepts:
 1. Time value of money
 2. The source of value of a property is solely derived from its ability to generate cash flows

1. Choose an appropriate discount rate

- The first step is to determine the appropriate discount rate
- Conceptually, this can be understood as the opportunity cost of making this investment, hence is the expected stabilized return of other properties, as shown before

2. Forecast the future CFs and discount

- The second step is to forecast the future CFs (levered) that a property is expected to return, and to discount them back to PV using the discount rate

3. Terminal Cap rate

- Lastly, we determine the terminal value by using the forward stabilized NOI and dividing this by the terminal cap rate to determine the exit value. This is simplified using the Gordon growth method

From the discounted CFs (incl. terminal/exit), we can take the **sum of these cash flows** (PV) to determine the **equity value** of an investment

Simple Cap Rates vs. DCF to Value a Property



While both methods use NOI as proxy to estimate the value, simple cap rates only take into account Year 1 NOI but the DCF method takes into consideration all future cash flows for the entire hold period, including sale proceeds



Growth is implicit in the cap rate method and explicit in DCF



Terminal or exit cap rate is used to calculate the residual (resale) value of the property



Using the DCF method requires making many other assumptions including NOI growth rate and estimating the residual value

Note:

Investors estimate property value using the cap rate method but ultimately adjust the purchase price to meet their target return (IRR, multiple). In the DCF method, the discount rate represents the investor's target return, used to calculate present value. Both methods solve for the same objective through different approaches.

Mark-to-market Cap Rates

- Mark to market is an accounting practice that involves adjusting the value of an asset to reflect its value as determined by current market conditions
- In real estate, information on cap rates is typically distributed by broker reports, and are hence outdated and inapplicable for all assets



By having data on adjacent properties, Megafunds can determine mark-to-market cap rates

Mark-to-market cap rates give a more realistic picture of the property's value by aligning it with current market trends and conditions

Benchmarking returns:

- Comparing a property's current income and value against market cap rates allows investors to assess whether their target return metrics (e.g., IRR or equity multiple) are achievable

Risk/Return assessment:

- If a property's in-place cap rate is significantly different from the mark-to-market rate, it may indicate potential risks (e.g., overpriced asset or misaligned rents) or opportunities (e.g., potential to increase rents to market levels)

Cap Rates and Net Asset Value (NAV)

- Net Asset Value (NAV) is a valuation method used to determine the value of a real estate portfolio or company by focusing on the assets and liabilities

1. Divide NOI by a portfolio cap rate (lower, due to law of large numbers) or use detailed valuations if NOIs and cap rates vary



2. Add ancillary income, management fees, and JV income by dividing each by a relevant cap rate



3. Subtract future capital expenditures and corporate overhead, valued using a cap rate



4. Include cash, construction in progress, and other assets, valued at book or adjusted values



5. Deduct all debt and obligations, using book or market values as appropriate



6. Resulting NAV represents equity value, which can be compared to market cap or share price

Section III: Conceptual meaning of Cap Rates

What drives Cap Rates

- The single largest determinant, driving cap rates in commercial real estate, is the flow of funds
- For instance, imagine that more investors are allocating more capital to real estate. In this situation, more capital is bidding on each property, causing prices to rise and cap rates to fall
- Besides portfolio choice allocation, several economic indicators impact the flow of funds:

Interest Rates

Rising interest rates increase the cost of capital, so fluctuations in the interest rate environment can contribute to rising cap rates

Inflation expectations

Higher inflation may lead to rising cap rates as it erodes the real value of future cash flows - On the flip side, inflation can also boost rents, partially offsetting the upward pressure on cap rates

Capital Markets

Easier access to capital (e.g. through CMBS) tends to compress cap rates due to increased competition among investors

Expected returns of other assets

As the return for other asset classes rises (e.g. equities, bonds), the risk-appetite of investors to invest into real estate (with much lower liquidity) falls, leading to higher cap rates

Cap Rates and Risk

Higher Cap Rates (↑)

- Properties with higher cap rates typically carry greater risk but offer higher return potential
- Cap rates reflect expected return and indicate the level of risk, linking risk and return
- Higher cap rates inversely correlate with property values, implying reduced prices with increased risk
- Properties with higher cap rates are often priced lower, reflecting a discount on the sale price
- Rising NOI can increase cap rates, while declining NOI tends to lower them

Lower Cap Rates (↓)

- Properties with lower cap rates are generally seen as less risky, though exceptions exist
- Investors often target properties undervalued relative to their income generation potential
- Low cap rates can result from adverse market conditions or economic downturns
- Such properties are safer due to desirable locations in high-demand, modern areas
- Lower cap rates indicate reduced returns and are often associated with higher prices

Cap Rates for Different Asset Classes

Hospitality:

Highest Cap Rates

- Highly volatile cash flows due to seasonal demand and short-term leases
- Significant exposure to economic cycles and external shocks
- High operating costs and capital expenditure requirements

Retail:

Highest Cap Rates

- Impacted by e-commerce growth and declining demand for brick-and-mortar stores
- Income risk due to turnover and reliance on anchor tenants
- Sensitive to consumer spending and economic downturns

Office (CBD):

Middle Cap Rates

- Long-term leases provide stability but trends like remote work add risk
- High capital costs for tenant improvements and maintenance
- Demand tied to economic conditions and business activity

Residential:

Lowest Cap Rates

- Stable demand and necessity-based occupancy reduce risk
- Easier to lease with short vacancy periods and large tenant pools
- Lower operating costs and less volatility during downturns

Cap Rates Variations - Examples

- Cap rates vary vastly across types of properties due to differing stability of income, growth potential, vacancy rates and type of tenants occupying the properties
- They also vary across classes as A-Quality properties lower risk due to better location as well as higher demand and quality of tenants, leading to lower risk and rates: the opposite is true for C-quality properties, whilst B-class fall somewhere in between

C-Quality Shopping Centres	Low quality shopping centres attract lower quality of tenants, more vacancies due to low demand and could require more maintenance costs	High cap rate  Low cap rate
Poorly-located Warehouse	Poor location contributes to a relatively high cap rate, however stable demand for warehouses and long-term leases are among the things working to keep rates down	
A-Quality Shopping Centres	As opposed to the C-quality centers these centers are in good shape, in high demand from tenants and located in prime locations, all leading to lower risk and lower rates	
Prime Location Urban Apartments	Urban apartments in prime location carry a very low risk as they attract wealthy clients, are in high demand and are rare which may lead to capital appreciation	

Cap Rate Compression, Expansion and Disconnect in pricing

- Cap rate compression is defined as, decrease in cap rates over time, driven by the previously mentioned reasons



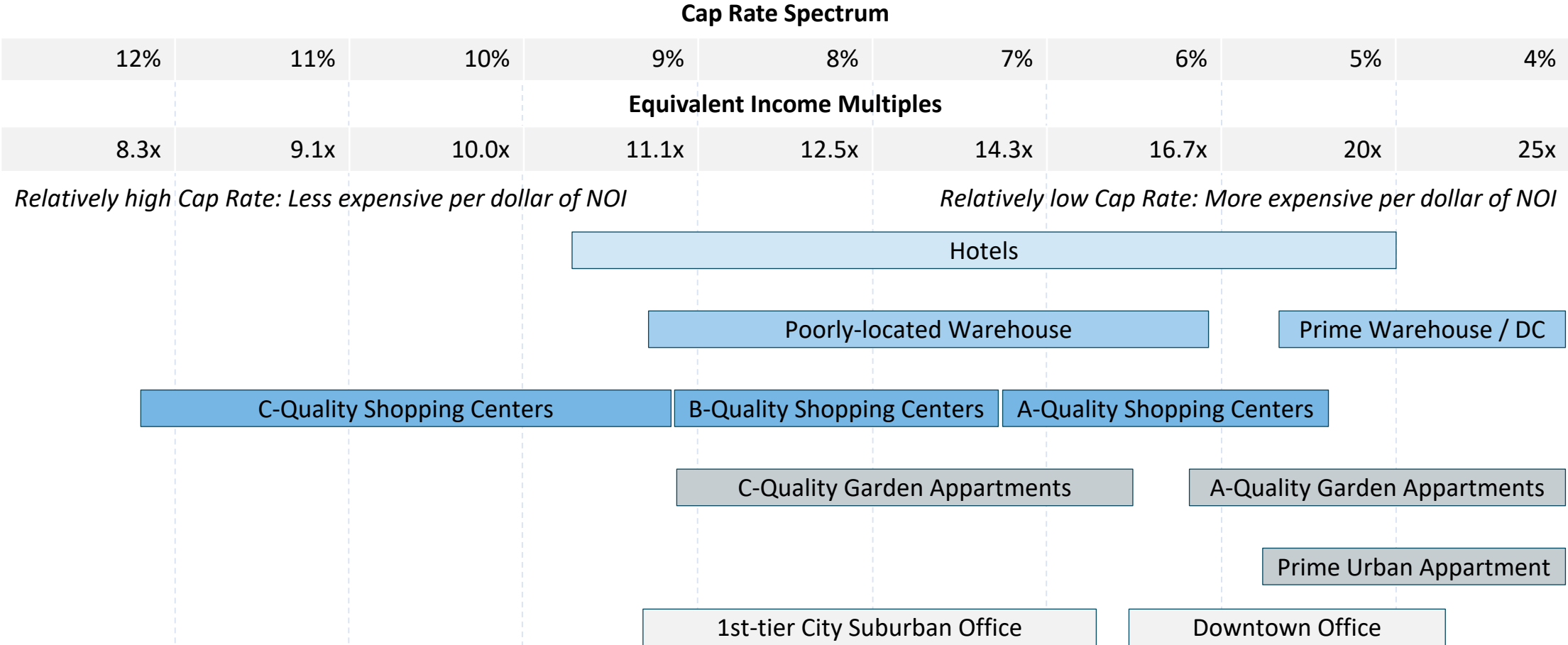
Concurrently, cap rate compression usually reduces the cap rate spread: the mathematical difference between the lowest cap rates (prime properties – highest price) and the highest cap rates (least competitive properties – lowest price) for an asset class

- Conversely, cap rate expansion is when cap rates as whole, increases, leading to lower property values

Disconnect in real estate prices

- Occurs when property **prices deviate** from their income-generating potential, i.e. **fundamentals**
- This disconnect frequently occurs due to the **illiquid nature of RE** (this is now decreasing, through MBS and CMBS)
- Can also result from market **sentiment, speculation**, or misaligned fundamentals
- **Overpricing** often arises during **cap rate compression** fueled by investor demand
- **Underpricing** may occur in high-risk markets despite **stable long-term fundamentals**
- Economic uncertainty or misinformation can amplify **pricing disconnects**
- Identifying **mispricing creates opportunities** for value-driven investors

Cap Rates across Asset Classes



Note: The following cap rates are an estimation from research, however, large discrepancies exist in the real world and for each market

Section IV: Essential Interview Knowledge

Development Cap Rates

- Given development's speculative nature, cap rates are estimated prior to starting construction using an operating model that determines the stabilized forward NOI
- As such, there are two different cap rates in development:



Build to Cap Rate

Build to an X means that projected NOI for the property upon stabilization divided by the expected total development cost equals X%; so to build to a 10 means that your stabilized annual NOI return is 10% of the total development cost.



Sell to Cap Rate

To sell to an X means that stabilized NOI divided by your projected sales price is X%. Synonymous with the going-out cap rate.

Developers expect a 150-200 bp spread between the build to and sell to cap rate.

- Conceptually, the gross development profit margin is hence: (target, usually 25%)

$$\text{Gross Development Profit Margin (\%)} = (\text{exp. going-in cap rate} / \text{exp. going-out cap rate}) - 1$$

Alternatives – Gross and Net Yield

- There are two main alternative metrics to Cap Rates that are used very similarly: the gross yield and net yield
- Gross Rental Yield measures the annual rental income (before operating expense) generated by a property as a percentage of the property's purchase price:

$$\text{Gross Rental Yield (\%)} = \text{Annual Rental Income} / \text{Purchase Price}$$

- Alternatively, the Net Yield is the equivalent to the Cap Rate:

$$\text{Net Yield (\%)} = \text{Net Operating Income (NOI)} / \text{Purchase Price}$$

- When an interviewer refers to “yield,” he will usually mean the gross yield, however, if unclear, don’t be afraid to ask
- Nevertheless, understanding these metrics and the difference in calculation (and corresponding difference in result) is imperative for succeeding in technical interviews

Going in vs. Terminal Cap Rates

- Cap rates are used to measure the expected return on a property at acquisition (going-in cap rate) and at sale (terminal cap rate)
- The going-in cap rate is the rate of return on a property investment based on the income the property is anticipated to generate once stabilised

$$\text{Going-in Cap Rate (\%)} = \text{Stabilised Net Operating Income (NOI)} / \text{Purchase Price}$$

- The terminal cap rate, calculated with the expected NOI at sale divided by the projected sale price, estimates the return at the property's exit (merely a forward estimate)

$$\text{Terminal Cap Rate (\%)} = \text{Exp. Net Operating Income (NOI) at Sale} / \text{Exp. Purchase Price}$$

Considerations

- The terminal cap rate is usually materially higher than the going in cap rate: as cap rate conceptually illustrates the risk of a property, as the property becomes older and hence less competitive with newer construction in the market, the cap rate rises
- While having a lower terminal cap rate (compression) is an easy value driver for investors, underwriting a property with the assumption of cap rate decreases is highly risky and often fails to materialize – the return often needs to be driven from alternative sources to pass an IC

Cap Rates as an IRR

- Internal Rate of Return (IRR) is the discount rate that makes the net present value (NPV) of an investment's cash flows zero. It represents the annualized rate of return at which the present value of the future cash inflows equals the initial investment (break-even)

$$\text{IRR (\%)} = (\text{Future Value of CF} / \text{Present Value of CF})^{(1/\text{Periods})} - 1$$

Interpretation of IRR

- IRR conceptually represents the break-even rate of return where the investment covers all costs without generating a net profit or loss

Interesting case (interview trick):

- Entry and exit prices are identical, so there is no capital appreciation or depreciation contributing to returns
- The entire return is generated from consistent annual NOI throughout the holding period
- Cap rate represents the income yield of the property
- IRR equals to the cap rate when cash flows are stable, with no timing or value changes affecting returns
- Assumes no significant shifts in market conditions or cap rates over the investment period

Section V: Practice Problems

Practice Problems

The following practice problems can be used as interview prep – all mental math (no calculator allowed)

1. A property generates \$120,000 in NOI annually and is valued at an 8 cap (8%). What's the purchase price?
2. A property generates \$120,000 in NOI annually and was purchased for \$2,000,000. What is the cap rate?
3. A property with \$500,000 NOI was valued at \$10,000,000 with a 5% cap rate. If cap rates rise to 6%, what is the new property value?
4. A property is purchased at a 5% entry cap rate with \$400,000 NOI and sold at a 4% terminal cap rate after NOI grows to \$450,000. What are the proceeds to equity (assume no debt)?
5. A property is purchased for \$5,000,000 at a 6% cap rate. NOI grows by 3% annually. What is the property value after 3 years if the cap rate remains constant?
6. A property generates \$200,000 NOI and was initially valued at a 6% cap rate. If cap rates compress to 5%, how much value is added?
7. A property is generating \$250,000 NOI and is priced at \$5,000,000. The market cap rate is 6%. Is the property overpriced or underpriced?
8. How much would a property with \$800,000 NOI increase in value if cap rates compress from 8% to 7%?
9. {Advanced} You have a property, with 80% LTV, valued at a 5 cap. How much cap rate expansion is needed for the equity portion to be underwater?
10. {Advanced} Your property is currently underwater at a 5% cap rate. How much cap rate compression is needed to restore 80% LTV? (Tip: assume debt = Property price initially)

Answers - Practice Problems (pt.1)

The following practice problems can be used as interview prep – all mental math (no calculator allowed)

1. A property generates \$120,000 in NOI annually and is valued at an 8 cap (8%). What's the purchase price?

$$\text{Purchase Price} = \text{NOI} / \text{Cap Rate} = 120,000 / 8\% = \$1,500,000$$

→ Trick is to remember that dividing by .08 is the same as multiplying by 100/8 which makes the mental math way easier

2. A property generates \$120,000 in NOI annually and was purchased for \$2,000,000. What is the cap rate?

$$\text{Cap Rate} = \text{NOI} / \text{Purchase Price} = 120,000 / 2,000,000 = 6\%$$

Answers - Practice Problems (pt.2)

The following practice problems can be used as interview prep – all mental math (no calculator allowed)

3. A property with \$500,000 NOI was valued at \$10,000,000 with a 5% cap rate. If cap rates rise to 6%, what is the new property value?

$$\text{New Purchase Value} = \text{old NOI} / \text{Cap Rate} = 500,000 / 6\% = \$8,330,000$$

4. A property is purchased at a 5% entry cap rate with \$400,000 NOI and sold at a 4% terminal cap rate after NOI grows to \$450,000. What are the proceeds to equity (assume no debt)?

$$\text{Initial Purchase} = 400,000 / 5\% = \$8,000,000$$

$$\text{Exit} = 450,000 / 4\% = \$11,250,000$$

$$\text{Proceeds to Equity} = 11,250,000 - 8,000,000 = \$3,250,000$$

Answers - Practice Problems (pt.3)

The following practice problems can be used as interview prep – all mental math (no calculator allowed)

5. A property is purchased for \$5,000,000 at a 6% cap rate. NOI grows by 3% annually. What is the property value after 3 years if the cap rate remains constant?

$$\text{Year 1 NOI} = \text{Purchase Price} * \text{Cap Rate} = \$300,000$$

$$\text{Year 2 NOI} = 300,000 * 1,03 = \$309,000$$

$$\text{Year 3 NOI (estimated)} = 309,000 * 1,03 = \$318,000$$

$$\text{Property value} = 318,000 / 6\% = \$5,300,000$$

6. A property generates \$200,000 NOI and was initially valued at a 6% cap rate. If cap rates compress to 5%, how much value is added?

$$\text{Initial Price} = 200,000 / 6\% = 3,333,333$$

$$\text{New Price} = 200,000 / 5\% = 4,000,000$$

$$\text{Value added} = 4,000,000 - 3,333,333 = \$666,666$$

Answers - Practice Problems (pt.4)

The following practice problems can be used as interview prep – all mental math (no calculator allowed)

7. A property is generating \$250,000 NOI and is priced at \$5,000,000. The market cap rate is 6%. Is the property overpriced or underpriced?

$$\text{Property Cap Rate} = 250,000 / 5,000,000 = 5\%$$

Market cap rate > Property cap rate = Since the implied cap rate is lower than the market rate, the property is overpriced

8. How much would a property with \$800,000 NOI increase in value if cap rates compress from 8% to 7%?

$$\text{Price initially} = 800,000 / 8\% = 10,000,000$$

$$\text{Price after compression} = 800,000 / 7\% = 11,450,000$$

$$\text{Increase in value} = 11,450,000 - 10,000,000 = \$1,450,000$$

Answers - Practice Problems (pt.5)

The following practice problems can be used as interview prep – all mental math (no calculator allowed)

9. {Advanced} You have a property, with 80% LTV, valued at a 5 cap. How much cap rate expansion is needed for the equity portion to be underwater?

Initial formula: $\text{Debt} = 0.8 * \text{Value} = 0.8 * \text{NOI} / 5\%$

→ Solve for new cap rate: $\text{NOI} / \text{New Cap Rate} = \text{Debt} = 0.8 * \text{NOI} / 5\%$ {From earlier equation}

NOI is equal, so we can cancel it mathematically, determine new cap rate: $1 / \text{New Cap Rate} = 0.8 / 5\%$

Hence, $\text{New Cap rate} = 5\% / 0.8 = 6.25\%$

10. {Advanced} Your property is currently underwater at a 5% cap rate. How much cap rate compression is needed to restore 80% LTV? (Tip: assume debt = Property price initially)

Debt = same as current property value at 5% cap rate

Restore to 80% LTV: $\text{NOI} / \text{New Cap rate} = \text{Debt} / 0.8$

Rearrange for new cap rate = $0.8 * \text{Old cap rate} = 0.8 * 5\% = 4\%$



ESCP Alternative
Investment Society