

Direct Capitalization I

1. Overall rates (R_O) for direct capitalization
 - a. Can usually be extracted using the formula

$$IRV \left(\text{Rate} = \frac{\text{Income}}{\text{Value}} \right)$$

Sale price	=	\$150,000
I_O	=	\$12,000
R_O	=	0.08

See Practice Problem 7.1.

- b. Must be extracted from properties with similar characteristics
 - 1) Land-building ratios
 - 2) Risk
 - 3) Forecast income-growth rates
 - 4) Forecast investment-holding periods
 - c. May be difficult to obtain data. Appraiser may have to estimate *expected* net income of comparable sale
 - d. Difference between *GIMs* and R_O , or net income multipliers (*NIMs*) is that net operating income, rather than *GI*, is explicit in the model. Thus, the difference between them is captured in the operating expense ratio (*OER*).

Review symbols for basic capitalization

$$R_O = \frac{NIR}{GIM}$$

(If the formula $R_O = NIR/GIM$ is used, the income (I) in *NIR* and *GIM* must be consistent, either both potential or both effective. R_O can be extracted and applied with or without the consideration of a replacement allowance as long as both the extraction and application are consistent.)

$$NIR = 1.0 - OER \text{ (also, } NIR = \frac{I_o}{GI} \text{)}$$

$$GIM = \frac{SP}{GI} \text{ or } \frac{V_o}{GI}$$

Example: Expense ratio = 40%, $GIM = 5$, $R_o = 12\%$

Because $\frac{I_o}{V_o} = \frac{\frac{I_o}{GI}}{\frac{V_o}{GI}}$

And to divide fractions, invert and multiply, thus canceling GI :

$$\frac{I_o}{V_o} = \left(\frac{I_o}{GI}\right)\left(\frac{GI}{V_o}\right)$$

$$\frac{I_o}{V_o} = R_o$$

- e. The fact that differences in *OERs* are captured in net income means that comparables can differ (within reason) with respect to *OERs*

Note. It is important that net income ratio (*NIR*) and *GIM* are based on same income level (*PGI* or *EGI*).

- f. Return on and return of capital
- g. Rate selection techniques may vary according to
 - 1) Availability of data
 - 2) Kind of value sought
 - 3) Other
- h. Influence of other markets
 - 1) Mortgage
 - 2) Bond

3) Stock

2. Built-up and blended overall rates: Band of Investment

a. Fractionalization of property or cash flows

b. Key ideas are that weighted rates are equal to R_O , and sum of cash flows is equal to I_O .

1) Physical—land and building

$$V_O = \frac{I_O}{R_O} = \frac{\overbrace{I_L + I_B}^{I_O}}{\underbrace{R_L \text{ and } R_B}}$$

properly weighted = R_O

2) Financial—debt and equity

$$V_O = \frac{I_O}{R_O} = \frac{\overbrace{I_E + I_M}^{I_O}}{\underbrace{R_E \text{ and } R_M}}$$

properly weighted = R_O

3) Legal—leased fee and leasehold

$$V_O = \frac{I_O}{R_O} = \frac{\overbrace{I_{LF} + I_{LH}}^{I_O}}{\underbrace{R_{LF} \text{ and } R_{LH}}}$$

properly weighted = R_O

4) Economic—income and reversion

$$V_O = V_{I_O} + V_{REV}$$

c. Examples of band-of-investment techniques

- 1) Overall rate (R_O) using mortgage-equity ratios

See Practice Problem 7.2.

- 2) Extraction of equity capitalization rate (R_E) from sale

See Practice Problem 7.3.

- 3) Overall rate using land-building ratios

See Practice Problem 7.4.

- 4) Extraction of building cap rate (R_B) from sale

See Practice Problem 7.5.

3. Debt coverage ratio (DCR) (also called debt service coverage ratio)

- a. Lenders sometimes use the debt coverage ratio (DCR) as a constraining factor. This is the ratio of I_O to annual debt service (I_M). The debt service ratio is calculated as:

$$DCR = \frac{I_O}{I_M}$$

- b. Importance to lenders, investors, and appraisers increases as more of the value is expected to come from future increases in income and value.

- c. The formula to derive the overall capitalization rate is:

$$\begin{aligned} R_O &= (DCR)(M)(R_M) \\ &= \left(\frac{I_O}{I_M}\right)\left(\frac{V_M}{V_O}\right)\left(\frac{I_M}{V_M}\right) \end{aligned}$$

See Practice Problem 7.6.

4. Residual techniques

- a. All residual techniques require knowledge of the following:

- 1) Net operating income
 - 2) Capitalization rates of all components
 - 3) Values of all components except one
- b. Name depends on unknown component
- 1) Land residual if land value is unknown
 - 2) Building residual if building value is unknown
- c. Examples
- 1) Building residual
- See Practice Problem 7.7
- 2) Equity residual
- See Practice Problem 7.8.

5. Symbols

- a. $V = \frac{I}{R}$
- b. R s are always used when directly capitalizing a single year's income
- c. Subscripts identify IRV for each way to divide the bundle of rights
- 1) An “ O ” subscript refers to whole property (V_O) or whole (overall) capitalization rate (R_O)
 - 2) Other subscripts are used to identify which component of value is being valued. Subscripts are generally abbreviations.
 - a) Mortgage and equity (M and $1 - M$, or E)
 - b) Land and building (L and B)
 - c) Leased fee and leasehold estates (LF and LH)

Figure 7.1.
Rates, Ratios, and Relationships

Property Interest	Net Income or Cash Flow	Forecast Reversion	Capitalization Rate	Yield Rate
Total property V_O	Net operating income — I_O (NOI)	Proceeds of resale (PR) (Property reversion)	Overall capitalization rate (R_O)	Risk rate Discount rate (Y_O)
Debt (Mortgage loan) V_M	Debt service (Monthly: DS) (Annual: ADS) I_M	Balance, Balloon, Book value (b)	Annual loan constant (R_M)	Yield rate to mortgage (Y_M)
Equity V_E	Pre-tax cash flow, Equity cash flow ($PTCF$) I_E	Pre-tax equity reversion (ER)	Equity capitalization rate (R_E)	Equity yield rate (Y_E)
Land, Site V_L	NOI to land (NOI_L) I_L	Land reversion (LR)	Land capitalization rate (R_L)	Risk rate (Y_O)
Building, Improvements V_B	NOI to building (NOI_B) I_B	Building reversion (BR)	Building capitalization rate (R_B)	Risk rate (Y_O)
Leased fee V_{LF}	NOI to lessor (NOI_{LF}) I_{LF}	Property reversion (PR) or Proceeds of resale	Leased fee capitalization rate (R_{LF})	Lease fee yield rate (Y_{LF})
Leasehold V_{LH}	NOI to lessee (NOI_{LH}) I_{LH}	None (0) or Proceeds of resale of leasehold estate	Leasehold capitalization rate (R_{LH})	Leasehold yield rate (Y_{LH})

Note. Figure 7.1 illustrates that there may be multiple terms to express the same concept.

7. Summary of options available for processing income and converting income to value using factors and rates in direct capitalization
 - a. Apply $PGIM$ to PGI to get V_O
 - b. Estimate vacancy and collection loss
 - c. Apply $EGIM$ to EGI to get V_O
 - d. Estimate expenses
 - 1) Fixed
 - 2) Variable
 - 3) Allowance for replacements
 - e. Apply R_O to I_O before deducting an allowance for replacements to get V_O .
 - f. Apply R_O to I_O after deducting an allowance for replacements to get V_O .
 - g. Estimate debt service
 - h. Apply R_E to I_E add V_M to get V_O

8. Note from summary list above that the move from $GIMs$ to band-of-investment models is from the top of the income statement to the bottom. This means that as we move down, the income being capitalized explicitly reflects an increasing amount of value-affecting factors. This leaves a decreasing number of factors that must be captured in the capitalization rate or multiplier.

Practice Problem 7.1.
Extraction of Rates

Calculate the GIM and the R_o for each comparable sale below.

Comparable Sale	Selling Price	Gross Income	I_o
1	\$1,000,000	\$165,000	\$110,000
2	\$1,250,000	\$200,000	\$135,000
3	\$ 970,000	\$165,000	\$ 88,000

Practice Problem 7.2.
Overall Rate by Band of Investment, Mortgage-Equity

Given:

Net operating income	\$100,000
Mortgage capitalization rate	0.0980
Equity capitalization rate	0.0700
Loan-to-value ratio	0.70

- A. *What is the overall rate?*
- B. *What is value?*
- C. *How would you prove that your answers are correct?*

Practice Problem 7.3. Extraction of Rates

Given:

Sale price	\$900,000
Net operating income	\$ 99,000
Down payment	\$200,000
Annual debt service	\$ 60,520

A. *What is R_O ?*

B. *What is R_M ?*

C. *What is M ?*

D. *What is R_E ?*

E. *If equity investors take more risk than lenders, why might R_M be higher than R_E ?*

Practice Problem 7.4.
Overall Rate by Band of Investment, Land-Building

The land capitalization rate is 0.0800, the building capitalization rate is 0.1100, and the ratio of building value to total value is 0.80.

What is the overall rate?

Practice Problem 7.5. Building Residual

Given:

Sale price	\$600,000
Net operating income	\$ 58,000
Land value	\$180,000
R_L	0.0900

A. *What is R_O ?*

B. *What is R_B ?*

Practice Problem 7.6.
Using DCR to Form an Opinion of Value

Lenders expect a minimum DCR of 1.7. Current terms require a mortgage capitalization rate (loan constant) of 0.1050 with a 75% loan-to-value ratio. Expected I_O is \$350,000.

A. *What is R_O ?*

B. *What is V_O ?*

Practice Problem 7.7. Building Residual

Given:

I_O	\$25,000
Land value	\$50,000
R_L	0.0900
R_B	0.1100

A. *What is the opinion of property value?*

B. *Why is $R_B > R_L$?*

Practice Problem 7.8. Equity Residual

Given:

I_O	\$ 55,000
Loan amount	\$380,000
R_M	0.1100
R_E	0.0800

What is property value?