1. Gross Income Multiplier Approach

\[ V = \text{EGI}(\text{GIM}) \]

where:

- \( V \) = Value
- \( I \) = Net operating income
- \( R \) = Overall capitalization rate

2. Direct Capitalization Approach

\[ \nu = \frac{I}{R} \]

where:

- \( V \) = Value
- \( I \) = Net operating income
- \( R \) = Overall capitalization rate

A. Market extracted capitalization rate method

\[ R = \frac{I}{SP} \]

where \( I \) is the net operating income and \( SP \) is the sale price of comparable properties.

B. Band-of-investment (weighted average capitalization rate) method

\[ R = \frac{L/V(MC) + E/V(EDR)}{V} \]

where:

- \( L/V \) = Loan-to-value ratio
- \( MC \) = Annual mortgage constant
- \( E/V \) = Equity-to-value ratio
- \( EDR \) = Equity dividend rate (BTCF/Equity)

C. Debt-Coverage Ratio Method
\[ V = \frac{I}{DCR(MC)} \]

when DCR = debt coverage ratio (NOI/DS).
Band-of-Investment Method

You are appraising an apartment project. From analysis of sales and interviews with lenders and investors, you determine that typical financing (debt and equity) for the subject property would be:

a. Debt financing: loan-to-value ratio of 75%
   interest rate = 9.5%
   monthly payments over 20 years

b. Equity financing: equity-to-value ratio of 25%
   EDR = 10.1%

The subject property has an NOI of $100,000 per year. What is the value of the property?

\[
R = L/V \text{ (mort. Constant)} + E/V \text{ (EDR)} \\
R = .75 (.1119) + .25 (.101) \\
R = .083925 + .02525 \\
R = .1091 \\
V = 100,000/.1091 = $916,569
\]

Proof:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>$916,569</td>
</tr>
<tr>
<td>Loan-to-value ratio</td>
<td>x .75</td>
</tr>
<tr>
<td>Mortgage amount</td>
<td>687,427</td>
</tr>
<tr>
<td>Mortgage constant</td>
<td>x .1119</td>
</tr>
<tr>
<td>Debt service</td>
<td>76,923</td>
</tr>
<tr>
<td>NOI</td>
<td>100,000</td>
</tr>
<tr>
<td>Debt Service</td>
<td>-76,923</td>
</tr>
<tr>
<td>BTCF</td>
<td>23,077</td>
</tr>
</tbody>
</table>

EDR = BTCF/Equity = 23,077/229,142 = .1007
Derivation of Debt-Coverage Ratio Method

Define:

1) \( DCR = \frac{NOI}{DS} \)
2) \( DS = (L/V) (V) (MC) \)

where:

- **DCR** = Debt-coverage ratio
- **NOI** = Net operating income (annual)
- **DS** = Debt service (annual)
- **L/V** = Loan-to-value ratio
- **MC** = Mortgage constant (annual)
- **V** = Value

Substitute equation (2) into (1)

3) \( DCF = NOI/(L/V) (V) (MC) \)

Solve equation (3) for \( V \),

\( (DCR) (L/V) (v) (MC) = NOI \)

4) \( V = NOI/(DCR) (L/V) (MC) \)

You are appraising an apartment project. From analysis of sales and interviews with lenders, you determine that typical long-term financing for the subject property would be:

- a. Loan-to-value ratio of 75%.
- b. Interest rate of 9.5% with monthly payments over 20 years.
- c. Debt coverage ratio of 1.30.

The subject property has an NOI of $100,000 per year. What is the value of the property?

\[
R = (L/V) (mort constant) (DCR)
\]
\[
R = .75 (.1119) (1.3)
\]
\[
R = .1091
\]
\[
V = 100,000/.1091 = $916,569
\]
Land Residual Approach

NOI subject property $40,000
Building value $300,000
Building cap rate, R_B 12%
Land cap rate, R_L 10%

a) Estimate the underlying land value and the total property value of the subject property.

b) What is the indicated overall cap rate, R_o?

SUGGESTED SOLUTION:

This problem demonstrates direct capitalization with the land residual technique. The suggested procedure is to 1) deduct the building income from the net operating income, 2) capitalize the residual income attributable to the land to obtain land value, and 3) add the building value to obtain the total property value.

\[
\text{NOI} \quad $40,000 \\
\text{Less income to building} \\
\quad ($300,000 \times .12) \quad $36,000 \\
\text{Income attributable to land} \\
\quad $4,000 \\
\text{Capitalize land income} \\
\quad ($4,000/.1) = 40,000 = V_L \\
\text{Add back building value, V_B} \\
\quad 300,000 \\
\text{R_o} = $40,000/$340,000 - .118, or 11.8\%
\]

COMMENT

The suggested solution to this problem demonstrates a popular format for simple applications of the land residual technique. In this case, the property being appraised includes a building of known value and the total net operating income is known. The same procedure is also applicable to the valuation of unimproved land using hypothetical improvements and estimated earning power.

The land residual technique is useful in studying highest and best use and in valuing unimproved land when market data of comparable unimproved land are scarce or nonexistent. The technique is vulnerable, however, when used to value land on the basis of hypothetical improvements. In practical appraisal work it is preferable to estimate the value of unimproved land via the sales comparison approach when possible.