

**FINANCE 673**  
**REAL PROPERTY VALUATION**

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Homework Assignment 2

Direct Capitalization

Solutions

1. A net income multiplier of 12 is the same as what capitalization rate?

$$\frac{1}{12} = 0.0833$$

2. An office has 17,000 square feet of rentable space at \$14 per square foot per year. Fixed expenses are expected to be \$22,000, variable expenses 34% of EGI. The vacancy allowance is 9%. Debt service will be \$90,000, and the depreciation expense will be \$30,000.

- A. What is  $I_o$ ?

<i>PGI</i>		
17,000 sq. ft. × \$14/per sq. ft.		\$238,000
Less vacancy		<u>21,420</u>
<i>EGI</i>		\$216,580
Less operating expenses		
Fixed	\$22,000	
Variable	\$73,637	<u>95,637</u>
$I_o$		\$120,943

- B. What is the OER (based on EGI)?

$$OER = \frac{\$95,637}{\$216,580} = 0.44$$

3. *what is the equity cash flow (IE)?*

$$\begin{aligned} I_E &= I_o - I_M \\ &= \$120,943 - \$90,000 \\ &= \$30,943 \end{aligned}$$

4. **Below are data from three comparable sales.**

Sale	Vacancy	OER
1	0.08	0.41
2	0.09	0.43
3	0.07	0.43

- A. *Extract a vacancy allowance.*

An estimate of 8% seems reasonable.

- B. *Extract an operating expense ratio, based on EGI.*

An estimate of 42% seems reasonable.

5.a. *Estimate the value of the land.*

$I_O$			\$500,000
Less: $I_B$	=	$V_B \times R_B$	
	=	$(\$4,000,000 \times 0.11)$	<u>440,000</u>
$I_L$			<u>\$ 60,000</u>
$V_L = I_L/R_L = (\$60,000/0.09)$			<u>\$666,667</u>

5.b. *What is the implied land-to-value ratio (L)?*

$V_L$		\$ 666,667	
$V_B$		<u>+4,000,000</u>	
$V_O$		\$4,666,667	
$L$	=	\$666,667/\$4,666,667	
	=	14.30%	

5.c. *What is the implied  $R_O$ ?*

$R_O$		= \$500,000/\$4,666,667	
	=	10.71%	

6. *What is the value of the land?*

$V_O$		= $I_O/R_O$	
$V_O$	=	\$500,000/0.1075	= \$4,651,163
$V_L$	=	\$4,651,163 - \$4,000,000	= \$ 651,163

7. *What is the implied building capitalization rate?*

$$\begin{aligned} R_L &= I_L/V_L \\ R_L &= \$55,000/\$600,000 \\ &= 0.091667 \text{ or } 9.20\% \end{aligned}$$

$$\begin{aligned} V_O &= I_O/R_O \\ V_O &= \$300,000/0.10 \\ &= \$3,000,000 \end{aligned}$$

$$\begin{aligned} L &= V_L/V_O \\ L &= \$600,000/\$3,000,000 \\ &= 0.20 \end{aligned}$$

If

$$B(R_B) + L(R_L) = R_O$$

then

$$B(R_B) = R_O - L(R_L)$$

and

$$R_B = [R_O - L(R_L)]/B$$

$$\begin{aligned} R_B &= [R_O - L(R_L)]/B \\ &= [0.10 - 0.20(0.091667)]/0.80 \\ &= 0.102083 \\ &= 10.21\% \end{aligned}$$

Alternative solution:

$I_O$	\$ 300,000
Less $I_L$	<u>55,000</u>
$I_B$	\$ 245,000

$V_O$	\$3,000,000
Less $V_L$	<u>600,000</u>
$V_B$	\$2,400,000

$$\begin{aligned} R_B &= I_B/V_B \\ &= \$245,000/\$2,400,000 \\ &= 0.102083 \\ &= 10.21\% \end{aligned}$$

8. *What is the implied equity capitalization rate?*

If

$$R_O = (M \times R_M) + (1 - M) \times R_E$$

then

$$R_O - (M \times R_M) = (1 - M) \times R_E$$

and

$$\frac{R_O - (M \times R_M)}{(1 - M)} = R_E$$

$$(1 - M)$$

$$= [0.12 - 0.7(0.112)]/0.3$$

$$= 0.138667 \text{ or } 13.87\%$$

9. *What is the indicated property value?*

$V_L$		\$400,000
$I_O$	\$ 180,000	
Less $I_L = V_L \times R_L = (\$400,000 \times 0.08)$	<u>32,000</u>	
$I_B$	\$ 148,000	
$V_B = I_B/R_B = (\$148,000/0.12)$		<u>+\$1,233,333</u>
$V_O$		\$1,633,333

10. *What is the indicated property value?*

$V_M$		\$ 800,000
$I_O$	\$ 120,000	
Less: $I_M = V_M \times R_M = (\$800,000 \times 0.095)$	<u>76,000</u>	
$I_E$	\$ 44,000	
$V_E = I_E/R_E = (\$44,000/0.13)$		<u>+ 338,462</u>
$V_O$		\$1,138,462

11.a. *What is the implied overall capitalization rate?*

$$\begin{aligned} R_O &= DCR \times R_M \times M \\ &= 1.25 \times 0.10 \times 0.75 \\ &= 0.093750, \text{ or } 9.38\% \end{aligned}$$

11.b. *What is the implied equity capitalization rate?*

If

$$R_O = (M \times R_M) + (1 - M) \times R_E$$

then

$$R_O - (M \times R_M) =$$

and

$$\frac{R_O - (M \times R_M)}{(1 - M)} = R_E$$

$$\begin{aligned} R_E &= \frac{R_O - M(R_M)}{(1 - M)} \\ &= \frac{[0.093750 - 0.75(0.10)]}{0.25} \\ &= 0.0750, \text{ or } 7.50\% \end{aligned}$$

12.a. *What is the value of the property?*

$$\begin{aligned} R_O &= (L \times R_L) + (B \times R_B) \\ &= (0.25 \times 0.08) + (0.75 \times 0.10) \\ &= 0.095, \text{ or } 9.50\% \\ V_O &= I_O / R_O \\ &= 70,000 / 0.095 \\ &= \$736,842 \end{aligned}$$

12.b. *What is the implied land value?*

$$\begin{aligned} V_L &= L \times V_O \\ &= 0.25 \times \$736,842 \\ &= \$184,210.50 \end{aligned}$$