Chapter 10 Homework Solutions

INTRODUCTION

The homework problems in this chapter provide practice in application of all three of the appraisal approaches. The required solution procedure follows the examples in the text. However, the problems purposely do *not* indicate *exactly* which approach to use. Students should learn to determine which approach is appropriate given the information available, which is, of course, the way it works in practice.

Problem 10-1
Part (a)
(1) The goal is to find the present value of NOI from year 1-7 and
(2) the present value of the reversion value, or selling price, at the end of year 7.

Present Value of NOI in years 1-7 is as follows:

End of Year	NOI	PV at 12%
1	1,000,000	892,857
2	1,000,000	797,194
3	1,000,000	711,780
4	1,200,000	762,622
5	1,250,000	709,283
6	1,300,000	658,620
7	1,339,000	605,696

(3) The reversion value at the end of year 7 is determined by NOI in year (8) or 1,379,170 ÷ .09 (which is the term NAI cap rate or 12% - 3%). This produces an expected sale price of $15,324,111. However, this must be discounted at 12% for 7 years to present value or $6,931,850. We add the PV of NOI ($5,138,052) + PV of REV ($6,931,850) and get a property value of $12,069,902.

Part (b) The terminal cap rate is .09 or (12% - 3%).

Part (c) The going in cap rate is NOI_1 of $1,000,000 ÷ $12,069,902 or .082851, .083 rounded.

Part (d) The difference between the "going in" cap rate of .083 and "going out" or terminal cap rate .09 is attributable to the fact that the property will be 7 years older, and holding all else constant, will trade at a discount much like properties that are 7 years older than the subject property would trade today.

Problem 10-2

(a) The property value is $22,222,222

Solution:

Property Value = NOI Next Year / (Discount Rate - Growth Rate)

$22,222,222 = $2,000,000 / (0.13 - 0.04)

(b) If we survey recent sales, the cap rates indicated from recently sold properties that are comparable to the subject property should be 0.09, otherwise (1) market conditions have changed. If other properties have sold with cap rates lower than .09, property values have declined. If they have sold for higher cap rates, then property values have increased.

Solution:

"Going in" Cap Rate = NOI Year 1 / Property Value

.09 = $2,000,000 / $22,222,222

(c) If r = 12%, the property value would be $25,000,000

Solution:

Property Value = NOI Next Year / (Discount Rate - Growth Rate)

$20,000,000 = $2,000,000 / (0.12 - 0.04)

(d) Market cap rates should be falling and property values should be increasing.

Problem 10-3

Office is the highest and best use of this site.

The analysis for the Baker Tract is as follows:

	Office	Retail
Rent	2,400,000	2,400,000
Expenses	(960,000)	(1,200,000)
Cash Flow	1,440,000	1,200,000
Cap Rate	.10	.11
Property Value	14,400,000	10,909,090
Cost	(10,000,000)	(8,000,000)
Residual	4,400,000	2,909,090

Problem 10-4

Step 1, Calculate the NOI for the Office Building

Solution:

Rents	$6,000,000
PGI or EGI	6,000,000
less: Operating Expenses	2,400,000
NOI	$3,600,000

Step 2, Calculate the Building Value at Cost:

Solution:

300,000 sq. ft. x $100 per sq. ft. = $30,000,000

(a) Land Value would be $10,000,000.

Solution:

Property Value = NOI Next Year / (Discount Rate - Growth Rate)

$40,000,000 = $3,600,000 / (0.12 - 0.03)

Land Value = Property Value - Building Value at Cost

$10,000,000 = $40,000,000 - $30,000,000

(b) Land Value would be $15,000,000

Solution:

Property Value = NOI Next Year / (Discount Rate - Growth Rate)

$45,000,000 = $3,600,000 / (0.12 - 0.04)

Land Value = Property Value - Building Value at Cost
$15,000,000 = $45,000,000 - $30,000,000

Percentage Change in Land Value would be a 50% increase

Solution:

Percentage Change = (New Land Value - Old Land Value) / Old Land Value
0.50 = (15,000,000 - 10,000,000) / 10,000,000

(c) The Land Value would be $2,727,273

Solution:

Property Value = NOI Next Year / (Discount Rate - Growth Rate)
$32,727,273 = $3,600,000 / (0.12 - 0.01)

Land Value = Property Value - Building Value at Cost
$2,727,273 = $32,727,273 - $30,000,000

Percentage Change in Land Value would be a 72.73% decrease

Solution:

Percentage Change = (New Land Value - Old Land Value) / Old Land Value
-0.7273 = (2,727,273 - 10,000,000) / 10,000,000

(d) If the land owner is asking $12,000,000 for the land, the project would not be feasible (under the assumptions in (a)) because it is more than the estimated land value of $10,000,000.

(e) To justify a $12 million land value, something has to give:

1. Expected Return on the Investment could to increase to 12.7% from 12%

   Solution:

   Property Value = Implied Land Value + Building Value at Cost
   $42,000,000 = $12,000,000 + $30,000,000

   Cap Rate (R) = NOI Year 1/ Property Value
   0.0857 = 3,600,000 / 42,000,000

   Expected Return (r) = Required Return (R) + Growth Rate
   0.1157 = 0.0857 + 0.03

2. Expected growth (g) in NOI would increase from 0.03 to 0.0343

   Solution:

   Property Value = Implied Land Value + Building Value at Cost
   $42,000,000 = $12,000,000 + $30,000,000

   Cap Rate (R) = NOI Year 1/ Property Value
   0.0857 = 3,600,000 / 42,000,000

   Expected Growth (g) = Expected Return (r) - Required Return (R)
   0.0343 = 0.12 - 0.0857

3. Building Costs would have to decrease by $2,000,000, or by $6.67 per sq. ft. and the investor will earn 12%.

   Solution:

   Max Building Costs = Expected Property Value - Amount Paid for Land
   $28,000,000 = $40,000,000 - $12,000,000
   $28,000,000 / 300,000 = $93.33 per square foot compared to $100 per square foot
   $100 - $93.33 = $6.67

Rents would have to increase from $6,000,000 to $6,300,000 or average rent per square foot from $20 to $21 and the investor would still earn 12%.

Solution:

Property Value	=	Implied Land Value	+	Building Value at Cost
$42,000,000	=	$12,000,000	+	$30,000,000

NOI	=	Property Value	x	Required Return (R)
$3,780,000	=	$42,000,000	x	0.09

Rents	=	NOI	/	0.6*
$6,300,000	=	$3,780,000	/	0.6*

*Operating Expenses are 40% of rents (1-0.4 = 0.6) and NOI is rent less operating expenses.

Problem 10-5

(a) The present value of the property would be $588,235.

Solution:

Property Value	=	NOI Next Year	/	(Discount Rate	-	Growth Rate)
$588,235	=	$100,000	/	(0.13	+	0.04)

(b) The new development would produce NOI of $200,000 and when a cap rate of .07 is applied a value of $2,857,142 is indicated. If the cost to redevelop (demolish/rebuild/release) is $1,000,000 the property could be acquired for $588,235 and a profit of $1,268,909 or (2,815,142-1,000,000-588,235) could be earned.

Problem 10-8

(a)

Comparable	Rent/unit	Price	Units	Price/unit	GRM*
#1	$550	$9,000,000	140	$64,286	117
#2	650	6,600,000	90	73,333	113

*Price/unit divided by rent/unit

Thus the GRM ranges from about 113 to 117. This implies a range in value for the subject property as follows:

Rent	x	Units	x	GRM	=	Est. value
$600	x	120	x	117	=	$8,424,000
600	x	120	x	113	=	8,136,000

Note: Because vacancy is the same for both comparables and the subject property, the vacancy can be ignored. That is, the potential gross rent multiplier can be used. If the vacancy was not the same, then using an *effective* gross rent multiplier would be preferred.

Because the rental income is provided for in this problem, use of a rent multiplier (either gross or effective gross) is the preferred solution. However, an alternative approach to the problem would be to estimate value based on using only the price per unit. That is, the price per unit ranges from $64,286 to $73,333. This implies a range in price for the 120 unit subject property from $7,714,320 to $8,799,960.

(b) Other information that might be considered includes differences between the subject property and the comparable properties in expense ratios, financing, expected trends in rents and property values, and risk.

Problem 10-10

(a)

Comparable #1	
Rent (350,000 s.f. x $3.90)	$1,365,000
Vacancy and expenses (50%)	682,500
NOI	$682,500
Price	$9,400,000
Overall rate (682,500 / 9,400,000)	7.26%

Comparable #2	
Rent (300,000 s.f. x $4.10)	$1,230,000
Vacancy and expenses (50%)	615,000
NOI	615,000
Price	$7,900,000
Overall rate (615,000 / 7,900,000)	7.79%

Comparables 1 and 2 imply an overall rate of about 7.53%.

Application to the subject:		
Rent (320,000 s.f. x $4.00)		$1,280,000
Vacancy and expenses (50%)		640,000
NOI		$640,000
Price	=	NOI / Overall rate
	=	640,000 / 0.0753
	=	$8,499,336

(b)

Examples of additional information that would be desirable about the comparable properties and the subject property include the trend in NOI, property values, financing , and risk.

Problem 10-11

Refer to table below, the highest land value is now $1,714,286 with a highest and best use of warehouse. The higher growth rate for warehouse was enough to change the highest and best use.

	(a)	(b)	(c)	(a/c = d)	(e)	(d) - (e)
Use	***Year 1 NOI***	***(r-g)***	***R***	***Implied Property Value***	***Building Costs***	***Implied Land Value***
Office	$500,000.00	.13-.03	0.10	$ 5,000,000.00	$ 4,000,000.00	1,000,000
Retail	$600,000.00	.12-.04	0.08	7,500,000	$ 6,000,000.00	1,500,000
Apartment	$400,000.00	.12-.03	0.09	4,444,444	$ 3,000,000.00	1,444,444
Warehouse	$400,000.00	.10-.03	0.07	5,714,286	$ 4,000,000.00	1,714,286