

## Real Estate Investment Analysis Fall 2011

### Midterm Exam 1 – Version A – Solutions

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*TTh 11:00-12:15*

- 1) (50 points) Knight Holdings (KH) is considering an investment in an office property in Dallas. The building has 32,000 of rentable area, of which 12,000 square feet rent for \$35 per square foot, while the remaining 20,000 square feet rent for \$27 per square foot. The Dallas office market is currently experiencing a 15 percent vacancy rate (which is the allowance KH will use), and KH estimates an operating expense ratio for the property of 45 percent. KH can purchase this property for \$4.75 million.
- a) Derive the (stabilized) pro-forma operating statement for this property and calculate net operating income (NOI).

Potential gross income (12,000×35+20,000×27)	\$960,000
<u>– Vacancy &amp; collection (@ 15%)</u>	<u>144,000</u>
Effective gross income	816,000
<u>– Operating expenses (@ 45%)</u>	<u>367,200</u>
Net operating income	448,800

- b) What is KH's going-in cap rate for this investment?

$$R = \frac{NOI_1}{V_0} = \frac{448,800}{4,750,000} = 9.45\%$$

- c) If the current market cap rate for similar office properties is 10 percent, does this appear to be a good investment? Explain your answer. Also explain what factors might cause your initial answer to be incorrect.

No. The income this property will generate is higher than KH could get from a \$4.75 million investment in other similar office buildings. The low cap rate might be misleading, however, if this property has less risk than others in the market or if its income is expected to grow at a faster pace than others in the market.

- d) What is the (effective) gross income multiplier for this property? Name one advantage and one disadvantage of using a gross income multiplier to evaluate a real estate investment.

$$GIM = \frac{V_0}{EGI} = \frac{4,750,000}{816,000} = 5.82.$$

An advantage of the GIM is that it is easy to calculate. A disadvantage is that it does not take into account a property's operating expenses.

- e) Suppose that KH can find financing for 70 percent of the purchase price with an annual debt service of \$285,856. What is the breakeven ratio on this investment? If the lender's benchmark breakeven ratio is 75 percent, does this investment meet this guideline? Explain.

$$BER = \frac{OE + ADS}{EGI} = \frac{367,200 + 285,856}{816,000} = 80.0\%$$

No. The lender desires a low breakeven ratio so that there will be a large buffer between the income the property generates and the investor's obligations on the property.

- f) What is KH's cash-on-cash return from this investment?

$$COCR = \frac{NOI - ADS}{\text{Purchase Price} - \text{Loan Amount}} = \frac{448,800 - 285,856}{4,750,000 - 3,325,000} = 11.4\%$$

- g) Based on these multipliers and ratios, do you recommend that KH purchase this property? Explain your answer in detail.

Your answer may vary. Key is the reasoning you provide.

- h) If KH purchases this property, it expects to hold it for five years. Over this holding period (and through the end of year 6), the property's rents are expected to grow by 4 percent per year.

KH believes that a 13 percent discount rate is appropriate for evaluating an investment like this. Based on this information, calculate the property's expected reversion value ( $V_5$ ), its current market value ( $V_0$ ), and the NPV and IRR of this investment under each of the following terminal value assumptions:

- KH will sell the property at the end of year 5 based on a 9.0 percent terminal cap rate.

Based on the 4 percent growth rate in income, NOI over the next 5 years will be:

$$NOI_2 = 466,752$$

$$NOI_3 = 485,752$$

$$NOI_4 = 504,839$$

$$NOI_5 = 525,033$$

$$NOI_6 = 546,034$$

Thus,

$$V_5 = \frac{NOI_6}{R_T} = \frac{546,034}{0.09} = \$6,067,042.$$

Using the cash flow worksheet:

$$\begin{aligned} C01 &= 448,800 \\ C02 &= 466,752 \\ C03 &= 485,752 \\ C04 &= 504,839 \\ C05 &= 525,033 + 6,067,042 = 6,592,075 \end{aligned}$$

With  $CF_0 = -4,750,000$  and  $I = 13$ , solve for  $NPV = \$236,666$  and  $IRR = 14.3\%$ .

$$V_0 = NPV + CF_0 = 236,666 + 4,750,000 = \$4,986,666.$$

- KH will sell the property at the end of year 5 assuming that its NOI will grow by 4 percent per year for the indefinite future after year 6.

Because the terminal cap rate under this method is the same as it was under the last assumption ( $R_T = r - g = 0.13 - 0.04 = 0.09$ ), all of the answers are the same as they were before.

- KH will sell the property at the end of year 5 assuming that the property's value will grow by 3 percent per year over its purchase price.

$$V_5 = P_0 \times (1 + G)^T = 4,750,000 \times (1 + 0.03)^5 = \$5,506,552.$$

In the cash flow worksheet, change  $C05 = 236,666 + 5,506,552 = 6,031,854$  and solve for  $NPV = -\$67,545$  and  $IRR = 12.62\%$ .

$$V_0 = -\$67,545 + 4,750,000 = \$4,682,455.$$

- KH will sell the property at the end of year 5 assuming that the property's value will grow by 3 percent per year over its initial market value.

First solve for the multiplier:

$$M = \frac{1}{1 - \left(\frac{1+G}{1+r}\right)^T} = \frac{1}{1 - \left(\frac{1.03}{1.13}\right)^5} = 2.6969.$$

Next solve for  $PV(NOI)$  by changing  $C05 = 525,033$  in the cash flow worksheet and solving for  $NPV$  with  $CF_0 = 0$  and  $I = 13$  to get  $PV(NOI) = \$1,693,719$ .

Combining the two gives you  $V_0 = 1,693,719 \times 2.6969 = \$4,567,836$ .

$$V_5 = V_0 \times (1+G)^T = 4,567,836 \times 1.03^5 = \$5,295,373.$$

In the cash flow worksheet, reset  $C05 = 525,033 + 5,295,373 = 5,820,406$  and solve for  $NPV = -\$182,164$  and  $IRR = 11.95\%$ .

- i) Based on these calculations, should KH make this investment? Explain the reasoning behind your answer.

Note: Your answer here may vary. Key is the reasoning you provide for your conclusions.

- 2) (15 points) Sammy is considering two possible lease structures for a building he owns. This first is a net lease with steps. The base rent for this lease is \$18.00 per square foot (psf) in the first year, with steps of \$1.00 psf each year thereafter. The second is a gross lease with base rent of \$28 psf. Operating expenses are expected to be \$7 psf in the first year and increase by \$0.50 psf each year thereafter. Either of these leases will have a five-year term.

- a) Calculate the effective rent of the net lease with steps. Assume a discount rate of 12 percent.

The first lease will have the following rents:

<u>Year</u>	<u>Rent</u>
1	\$18.00
2	\$19.00
3	\$20.00
4	\$21.00
5	\$22.00

The present value of these cash flows at a 12 percent discount rate is \$71.28. Using the TVM keys of your calculator, you can then enter  $P/Y = 1$ ,  $N = 5$ ,  $I = 12$ ,  $PV = 71.28$ ,  $FV = 0 \Rightarrow PMT = 19.77$ . Thus, the effective rent under this lease is \$19.77 psf.

- b) Calculate the effective rent of the gross lease using the same discount rate.

The second lease will generate the following net rent for the landlord:

<u>Year</u>	<u>Gross Rent</u>	<u>Expenses</u>	<u>Net Rent</u>
1	\$28.00	\$7.00	\$21.00
2	\$28.00	\$7.50	\$20.50
3	\$28.00	\$8.00	\$20.00
4	\$28.00	\$8.50	\$19.50
5	\$28.00	\$9.00	\$19.00

The present value of these net rents is \$72.50. Entering  $P/Y = 1$ ,  $N = 5$ ,  $I = 12$ ,  $PV = 72.50$ ,  $FV = 0$ , you can solve for the effective rent of \$20.11 psf.

- c) Which of the two leases entails the most risk for the landlord? Explain.

The gross lease entails the most risk for the landlord, because any unexpected changes in operating expenses will be his responsibility.

- d) Based on your answers to parts (a) through (c) above, which lease option would you recommend Sammy choose? Explain your answer.

Either lease would be an acceptable answer, as long as you provide a reasonable explanation. The net lease has a lower effective rent, but it also has less risk. In contrast, the gross lease has more risk, but earns the landlord a higher expected rental stream over the life of the lease. Which you prefer depends on your tolerance for risk.

- 3) (10 points) Frank needs to lease 3,000 square feet of usable area, and is considering two different buildings. The first building has a gross leasable area of 22,000 square feet with 3,000 square feet of common areas. The landlord of this building is asking \$11.00 per square foot (psf) of rentable area. The second building has a gross leasable area of 30,000 square feet with 3,000 square feet of common areas; the asking rent for this building is \$12.00 psf of rentable area.

- a) Calculate the load factor for the first building.

$$LF_1 = \text{Leasable Area} / \text{Usable Area} = 22,000 / 19,000 = 1.158$$

- b) Calculate the load factor for the second building.

$$LF_2 = 30,000 / 27,000 = 1.111$$

- c) Assuming that the space being rented is otherwise identical, which option should Frank choose? Explain your answer.

In either building, Frank will have 3,000 square feet for his exclusive use. The building with the lower rent per square foot of usable space is the one he should choose. This can be calculated by simply multiplying the base rent by each building's load factor:

$$\text{Building 1: } 11.00 \times 1.158 = \$12.74 \text{ psf usable area}$$

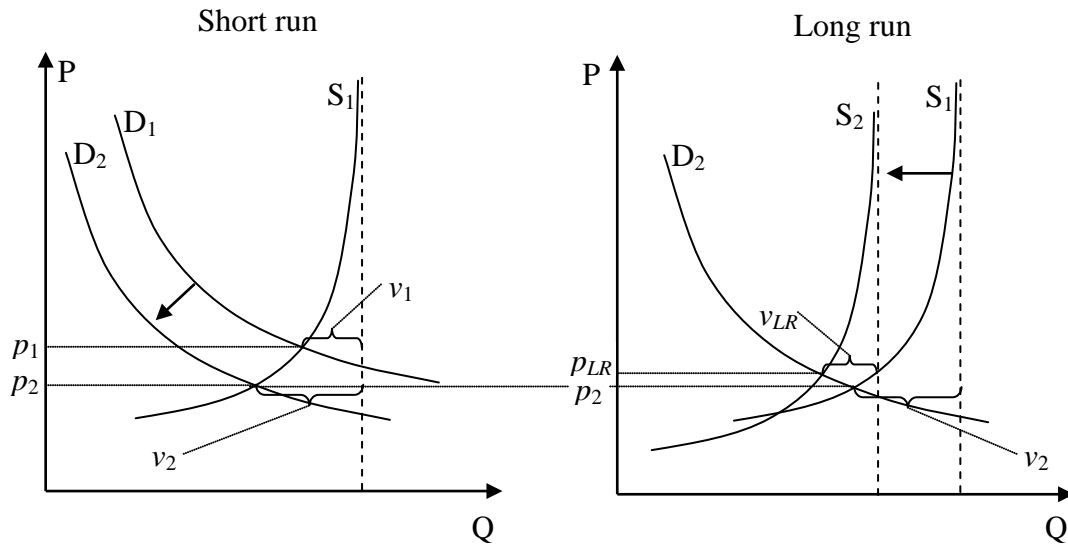
$$\text{Building 2: } 12.00 \times 1.111 = \$13.33 \text{ psf usable area}$$

Thus, even though building 1 has a higher load factor, it will still be less expensive for Frank because of its lower base rent.

- 4) (15 points) Explain briefly how rents and vacancies will respond to a sudden *decrease* in demand in a specific real estate market (e.g., downtown loft apartments). Make sure you discuss both short-run and long-run effects. Use a supply-demand graph to illustrate these effects.

A decrease in demand causes the demand curve to shift to the left. In the short run, rents will fall (from  $p_1$  to  $p_2$ ) and vacancies will increase (from  $v_1$  to  $v_2$ ).

In the long run, property owners will remove space from the market, perhaps converting it to other uses or demolishing obsolete units to redevelop the space at some future time. This will cause the supply curve to shift to the left, raising rents (to  $p_{LR}$ ) and decreasing vacancies (to  $v_{LR}$ ).



5) (10 points) Short answer questions:

a) If a building has a total load factor of 1.15, what is its efficiency percentage?

$$EP = 1 / LF = 1 / 1.15 = 87.0\%.$$

b) The most important characteristic of real estate is its \_\_\_\_\_ because all of the other economic and physical characteristics derive from this.

Fixed location. Note that simply saying “location” is not enough here. It is the fact that real estate cannot be moved (the *fixed* location) that drives all of the other economic and physical characteristics of real estate.

c) What is the natural breakpoint on a 2,000 square foot lease with base rent of \$15 per square foot and percentage rent of 4 percent of gross sales?

$$\text{Natural breakpoint} = 2,000 \times 15 / 0.04 = \$750,000.$$

d) In what two “markets” is real estate traded?

Space & asset

e) From a risk-return perspective, levered (equity) investments in real estate are

similar to \_\_\_\_\_, while unlevered real estate investments are

similar to \_\_\_\_\_.

Stock market investments; corporate bond investments.