

Problem Set 3
Due (end of lecture or beginning of recitation)

Note, the problems in this homework assignment are similar to Study Questions 19, 22, 23, & 24, at the end of Chapter 10, whose answers are provided on pp.856-858.

Note that you can use the standard MS Windows "Copy/Paste" procedure (select material, click "copy" or type ctrl-c, then click "paste" or type ctrl-v) to copy/paste figures from a MS Word document table into a MS Excel worksheet. If you download the MS Word file of this homework assignment from the course web site (web.mit.edu/cre), you can use this ability to quickly copy the data for problems 1 & 2 below into an Excel worksheet, which is probably the best way to do these problems.

1. The table below shows two 10-year cash flow projections (in \$ millions, including reversion) for the same property. The upper row is the projection that will be presented by the broker trying to sell the building, the bottom row is the realistic expectations. Suppose that it would be relatively easy for any potential buyers to ascertain that the most likely current market value for the property is about \$10 million. (a) What going-in IRR (blended rate) will equate the presented cash flow projection to the observable \$10 million present value (as of Year 0)? (b) What rate will equate the realistic projection to that same present value? (c) What is the most likely amount of "disappointment" in the ex post rate of return earned by an investor who buys this property believing the broker's cash flow projection (i.e., difference in presented vs realistic return)?

Year	1	2	3	4	5	6	7	8	9	10
Presented	\$1.0000	\$1.0250	\$1.0506	\$1.0769	\$1.1038	\$1.1314	\$1.1597	\$1.1887	\$1.2184	\$14.0497
Realistic	\$1.0000	\$1.0000	\$1.0000	\$1.0000	\$1.0000	\$1.0000	\$1.0000	\$1.0000	\$1.0000	\$11.0000

2. The projected cash flows (including reversion) are shown in the table below for Property A and Property B. (a) If both properties sell at cap rates (initial and terminal cash yields) of 9%, what is the expected total return on a 10-year investment in each property? (b) If the 9% cap rate represents a fair market value for each property, then which property is the more risky investment (and how do you know)? (c) What is the annual growth rate in operating cash flows for each building during the first nine years? (d) How is this growth rate related to the (constant) cap rate and the investor's expected total return (IRR) in each property?

Annual net cash flow projections for two properties (\$ millions)										
Year	1	2	3	4	5	6	7	8	9	10
A	\$1.0000	\$1.0050	\$1.0100	\$1.0151	\$1.0202	\$1.0253	\$1.0304	\$1.0355	\$1.0407	\$12.7252
B	\$1.0000	\$1.0200	\$1.0404	\$1.0612	\$1.0824	\$1.1041	\$1.1262	\$1.1487	\$1.1717	\$14.7395

3. In a certain market the typical lease is net to the landlord with a term of five years, and rents typically grow 2% per year, both within leases (due to built-in step-ups) and in the prevailing market rents charged on new leases. Properties typically have a single tenant, and are sold with a new lease just signed (i.e., five years of contractual cash flows). Tenants typically can borrow at 9%, and the going-in cap rate prevailing in the property market is 8% (initial cash yield). Assuming annual cash flows in arrears and no vacancy between leases, what is the implied inter-lease and reversion discount rate?

4. (This problem is based on the Ch.10 Appendix.) A 10-year property investment is characterized by the net cash flow stream indicated in the table below (including initial investment and reversion at the end of year 10). Compute the: (a) Overall total IRR; (b) Initial cash yield component; (c) Cash flow growth component; (d) Yield-change component; and (e) Interaction effect.

Yr	0	1	2	3	4	5	6	7	8	9	10	11
(1) Actual Oper.CF		\$1,000	\$1,030	\$900	\$1,061	\$1,093	\$1,126	\$850	\$1,159	\$1,194	\$1,230	\$1,267
(2) Actual Capital CF	-10,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$12,799	
(3) Actual Total CF (=1+2)	-10,000	\$1,000	\$1,030	\$900	\$1,061	\$1,093	\$1,126	\$850	\$1,159	\$1,194	\$14,029	