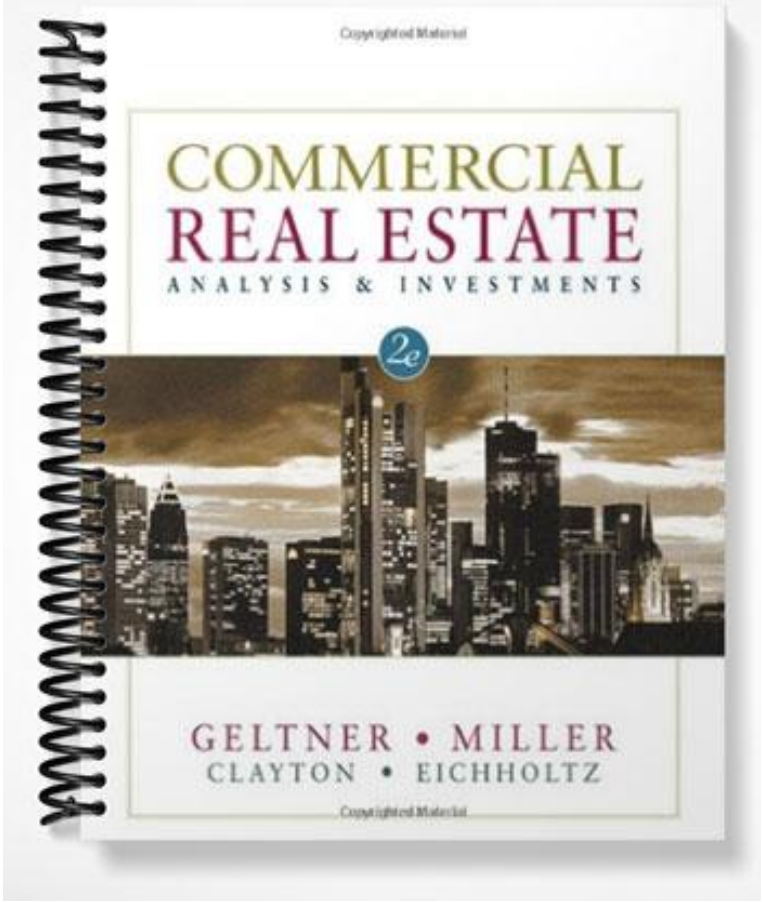
TEST BANK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There are five parts to this exam, plus an extra-credit question. The entire exam is designed to be finished in 2 hours, but you may take up to 3 hours. No open books or notes are permitted, but some possibly useful formulas are given at the end.

Your name:_____ ID#_____

Part I: Multiple Choice (36 points, 3 points each). Select the *single best* alternative answer, based on what was taught in the course. Clearly indicate your selection by circling the letter. *Read the question carefully before answering*.

1. An investor believes that a certain property is worth $10,000,000. The seller refuses to sell it for that amount, but has offered to provide a 5-year interest-only loan for $5,000,000 at 4% interest (annual payments at the ends of the years, first payment due in one year). Market interest rates on such a loan are currently 6.5%. How much should the investor be willing to pay for the property from an investment value perspective (taking the loan deal) if the investor faces a 30% marginal income tax rate? (Ch15)
   a) $10,000,000
   b) $10,383,588
   c) $10,403,023
   d) $10,519,460
   e) Insufficient information to answer the question.

2. A property has a McDonald's restaurant on it, which can earn $50,000 per year. In any other use (including another brand of restaurant), the most it can earn is $40,000 per year. Assuming a discount rate of 10% and constant cash flow in perpetuity, what is the "investment value" of this property to McDonalds, and what is its "market value"?
   a) Both investment value and market value are $400,000.
   b) Both investment value and market value are $500,000.
   c) Investment value is $400,000 and market value is $500,000.
   d) Investment value is $500,000 and market value is $400,000.

3. Suppose the riskfree rate of return is 7%, and the expected total return on the property free & clear is 11%, and you have a target total expected return of 15%. Assuming you can borrow at the riskfree rate, what Loan/Value ratio must you obtain for this real estate investment to meet your target expected return?
   a) 0%
   b) 25%
   c) 50%
   d) 75%
   e) 80%

4. Suppose a property has a cap rate of 10% and you can borrow at a mortgage constant of 11%. If you borrow 75% of the property price, what will be your equity yield?
   a) 7.00%
   b) 8.25%
   c) 10.00%
   d) 11.00%
   e) Cannot be determined from the information given.

5. Two loans have the same interest rate and maturity. Loan A has a 15-year amortization rate. Loan B has a 30-year amortization rate. In comparing these two loans from a borrower's perspective:
   a) The advantage of Loan A is lower monthly payments and lower balloon payment at maturity.
   b) The advantage of Loan B is lower monthly payments and lower balloon payment at maturity.
   c) The advantage of Loan A is lower monthly payments but its disadvantage is a higher balloon at maturity.
   d) The advantage of Loan B is lower monthly payments but its disadvantage is a higher balloon at maturity.

6. Consider an 8.5% loan amortizing at a 25-year rate with monthly payments. What is the maximum amount that can be loaned on a property whose net operating income (NOI) is $500,000 per year, if the underwriting criteria specify a debt service coverage ratio (DCR) no less than 125%?
   a) $2,789,406
   b) $3,409,091
   c) $3,844,614
   d) $4,000,000
   e) $4,139,619. n=300, i=8.5, pmt = 500000 / 12 / 1.25 = 33333, fv = 0; ➔ PV = 4139619.

7. For the same property as above, suppose the underwriting criteria is a maximum loan/value ratio (LTV) of 75%, and we estimate property value by direct capitalization using a rate of 11% on the stated NOI. By this criterion what is the maximum loan amount?

a) $2,789,406
b) $3,409,091 = 0.75 * (500000 / 0.11).
c) $3,844,614
d) $4,000,000
e) $4,139,619

8. Suppose a construction project anticipates end-of-month draws of $400,000, $300,000, and $600,000 consecutively. What will be the balance owed at the end of the third month if the interest on the loan is 7% per annum (nominal annual rate, compounded monthly), and no payments of either principal or interest are required during the construction period?

a) $1,306,430.
b) $1,314,051.
c) $1,378,960.
d) Cannot be computed with the information given.

9. Consider the investment evaluation of a real estate development in which the property to be built is projected to reach stabilized occupancy at the end of Year 2 (two years from the time the investment decision must be made and construction will begin). The project is speculative in that there are no leases signed as of Time Zero (the present, when the investment decision must be made). The property level opportunity cost of capital is considered to be 9% for stabilized investments, and 10% for assets not yet stabilized (lease-up investments). Which of the following is true?

a) Property level before-tax cash flows beyond Year 2 should be discounted back to the end of Year 2 at 9%, and the projected stabilized asset value as of the end of Year 2 should be discounted two years to Time Zero at 10%.
b) Property level before-tax cash flows beyond Year 2 should be discounted back to the end of Year 2 at 10%, and the projected stabilized asset value as of the end of Year 2 should be discounted two years to Time Zero at 9%.
c) Property level before-tax cash flows beyond Year 2 should be discounted all the way back to Time Zero at the 10% rate.
d) Property level before-tax cash flows beyond Year 2 should be discounted all the way back to Time Zero at the 9% rate.

10. The opportunity cost of capital (discount rate) applicable on an unlevered basis to assets that are not yet leased up ("speculative built properties") is best described as:

a) Usually about 50 to 200 basis-points above the OCC for the same property with stabilized occupancy, based in part on analysis of the "interlease" discount rate implied in the property market.
b) Usually about 300 to 500 basis-points above the OCC for the same property with stabilized occupancy, based in part on analysis of the "interlease" discount rate implied in the property market.
c) Usually about 50 to 200 basis-points below the OCC for the same property with stabilized occupancy, based on the typical upward slope of the yield curve in the bond market, because lease-up is near term.
d) Usually about 300 to 500 basis-points below the OCC for the same property with stabilized occupancy, based on the typical upward slope of the yield curve in the bond market, because lease-up is near term.

11. All of the following are typical types of real options found in development projects or developable land ownership, except:

a) The wait option
b) The phasing option
c) The switch option
d) The refinance option

12. The replicating portfolio of a development option (land) consists of:

a) A long position in an asset like the stabilized building to be built and a short position (borrowing) in a riskless bond.
b) A short position in an asset like the stabilized building to be built and a long position (lending) in a riskless bond.
c) Long positions in both the stabilized building and a bond.
d) Short positions in both the stabilized building and a bond.

Part II: Definitions (12 points, 4 points each). Provide a complete definition of each term or phrase in the space below each. Answer in a single, clear sentence. (You may provide a single example or formula to clarify your answer if necessary.) Only define the subject term; do not add extraneous material in your answer. Write legibly; no credit will be given for writing we cannot decipher.

1. Phased risk regimes (in development projects):

This refers to the fact that development projects are more risky during the development phase than subsequently.

2. Back-door feasibility analysis:

This refers to a financial feasibility analysis of a development project in which wee start out with a known or presumed rent and end up with an implied maximum affordable price of the land (residual) or maximum combination of acquisition and construction cost for the project.

3. American option:

This refers to an option ("right without obligation") that can be exercised anytime prior to its maturity (or expiration).

Part III: Short Answer Questions (20 points, 10 points each question): Choose 2 out of the 3 questions below, and answer each question in the space provided below that question. Please be sure it is clear to us which question you DON'T want to be graded.

1. What are the major line items in the operating budget of a development project, and why does it usually make sense for such a budget to consider only a single year's operation of the building?

The major items are:

Potential gross income:	PGI
Vacancy	- v
Effective gross income:	EGI
Operating expenses:	-OE
Net operating income:	NOI

It makes sense to consider only one year because we typically don't have leases signed yet, so detailed future income projections by year are not very practical or accurate.

2. Why is it that construction loans are almost always used to finance all or most of the construction costs in a development investment, even when the investor has plenty of cash that could be used to pay for construction?

(i) One reason may be that construction lenders have construction expertise that enables them to certify that the work is being done.

(ii) Another reason is to get a "second opinion" or confirmation of sorts, from the construction lender, that the project seems financially sound.

(iii) Yet another reason would be for the financial leverage the loan brings.

3. Is it appropriate, and if so, why is it appropriate, to apply a riskless or nearly riskless OCC to construction cost cash flows in the typical development project?

Yes, it is appropriate, because construction costs either have little volatility or they are typically not much correlated with financial markets, giving them effectively little risk (that cannot be diversified away, hence, little risk that would be "priced" in the capital markets).

Yes, it is appropriate, because the opportunity cost of capital is an expected return, not the contract interest rate on the construction loan. Because of the possibility of loss under default of the construction loan, the construction lender actually faces an expected return on the loan that is substantially below the contract interest rate on the loan, which effectively makes the expected return only slightly above the riskfree rate.

Part IV: Longer Problems (20 points, 10 points each)

1. Based on the following information, develop a front door "Simple Financial Feasibility Analysis" (SFFA) for this project estimating the required minimum market gross rent per SF that will support development.

- 40,000 NRSF office building project.
- Acquisition & construction cost = $1,500,000;
- Estimated operating costs (to landlord) = $100,000/yr.
- Projected stabilized occupancy = 95%.
- Permanent loan available on completion @ 9% (interest-only loan) with 130% debt service coverage requirement on the net operating income, and 75% maximum loan-to-value ratio.

Show your work.

1500000 X .75 = 1125000 Max loan
1125000 X .09 = 101250/yr debt svc
101250 X 1.3 = 131625 Required NOI
131625 + 100000 = 231625 Required EGI
231625 / .95 = 243816 Required PGI
243816 / 40000 = $6.10 / SF Gross rent required.

Part IV (continued)

2. Consider a $5,000,000, 9%, 25-year mortgage with monthly payments. Compute the first three payments and the loan balance after the third payment for each of the following loan types: (a) Interest-only, (b) CAM, (c) CPM.

(a) Interest-Only:

	Rules 3&4:		*Rule 1:*	*Rule 2:*	*Rules 3&4:*
Month#:	*OLB(Beg):*	*PMT:*	*INT:*	*AMORT:*	*OLB(End):*
0					*$5,000,000.00*
1	*$5,000,000.00*	*$37,500.00*	*$37,500.00*	*$0.00*	*$5,000,000.00*
2	*$5,000,000.00*	*$37,500.00*	*$37,500.00*	*$0.00*	*$5,000,000.00*
3	*$5,000,000.00*	*$37,500.00*	*$37,500.00*	*$0.00*	*$5,000,000.00*

(b) CAM:

	Rules 3&4:	*Rule 2:*	*Rule 1:*		*Rules 3&4:*
Month#:	*OLB(Beg):*	*PMT:*	*INT:*	*AMORT:*	*OLB(End):*
0					*$5,000,000.00*
1	*$5,000,000.00*	*$54,166.67*	*$37,500.00*	*$16,666.67*	*$4,983,333.33*
2	*$4,983,333.33*	*$54,041.67*	*$37,375.00*	*$16,666.67*	*$4,966,666.67*
3	*$4,966,666.67*	*$53,916.67*	*$37,250.00*	*$16,666.67*	*$4,950,000.00*

(c) CPM:

	Rules 3&4:		*Rule 1:*	*Rule 2:*	*Rules 3&4:*
Month#:	*OLB(Beg):*	*PMT:*	*INT:*	*AMORT:*	*OLB(End):*
0					*$5,000,000.00*
1	*$5,000,000.00*	*$41,959.82*	*$37,500.00*	*$4,459.82*	*$4,995,540.18*
2	*$4,995,540.18*	*$41,959.82*	*$37,466.55*	*$4,493.27*	*$4,991,046.92*
3	*$4,991,046.92*	*$41,959.82*	*$37,432.85*	*$4,526.97*	*$4,986,519.95*

Part V: Required Problem (20 points):

1. In the following situation:

	Today (time 0)	Next Year (Yr.1)	
Probability	100%	50%	50%
Value of Developed Property	$1000	$700	$1300
Development Cost (exclu land)	$800	$800	$800

Suppose no further value after next year, construction is instantaneous, the riskfree interest rate is 4%, the expected return (OCC) on unlevered investments in developed property is 7.5%, what is the value today of the land? And should development be undertaken now or should you wait.

Basic values:
$E[V_1] = .5*1300 + .5*700 = \$1000$. As this = V_0 , ➔ $g_V = 0$; ➔ $1+y_V = (1+r_V)/(1+g_V) = (1+r_V) = 1.075$.
$V(0) = V_0/(1+y_V) = E[V_1]/(1+r_V) = 1000/(1.075) = \$930$.
Vu = $1300; Vd = $700.
Cu = MAX[(1300-800), 0] = $500; Cd = MAX[(700-800), 0] = 0.

Option to wait value :
N = (Cu-Cd)/(Vu-Vd) = (500-0)/(1300-700) = 500/600 = 5/6.
$B = (NVd-Cd)/(1+r_f) = [(5/6)700 – 0]/1.04 = 583/1.04 = \$561$.
C_0 (wait) = NV(0)-B = (5/6)930 – 561 = 775 – 561 = $214.

Alternatively:
C_0 (wait) = $CEQ_1/(1+r_f) = [E[C_1] – (Cu-Cd)(r_V-r_f)/(Vu/V(0) – Vd/V(0))] / (1+r_f)$
= [(.5*500+.5*0) – (500-0)(7.5%-4%)/(1300/930 – 700/930)] / 1.04
= [250 – 500(3.5%/(140%-75%))]/1.04 = (250 – 500(.05385))/1.04
= (250 – 27)/1.04 = $223/1.04 = $214.

Option to develop today:
$V_0 – K_0 = 1000 – 800 = \$200$.

Value of land = MAX[V_0-K_0 , C_0] = MAX[200, 214] = $214, and
You should wait, not develop today.

Part VI: Extra-credit question. Earn up to **5 points extra credit**. It can help you but not hurt you.

1. Describe the call option model of land value. What is the "underlying asset" in this model? What is the "exercise price"? What is the typical maturity of the land development option?

The call option model of land value views land as deriving its value from the "call option" that the landowner has for developing the land. A "call option" gives its owner the right without obligation to acquire an "underlying asset" (such as a share of stock in a specified company) upon payment of a "strike price" (or "exercise price"), on or prior to the "maturity" or expiration date of the option. In the case of land, the underlying asset is the to-be-built structure (or more completely, the developed property including the land), the exercise price is the construction cost (exclusive of land cost), and the maturity of the option is typically infinite (the ownership right is perpetual, hence, the option never expires).

Formulas that may (or may not) be useful in this exam . . .

$a + da + d^2a + \ldots + d^{n-1}a = a(1-d^n)/(1-d)$.

$PMT/(1+r) + PMT/(1+r)^2 + \ldots + PMT/(1+r)^n = (PMT/r)[1 - 1/(1+r)^n]$.

$CF + CF/(1+r) + CF/(1+r)^2 + \ldots + CF/(1+r)^{n-1} = (1+r)(CF/r)[1 - 1/(1+r)^n]$.

$CF/(1+r) + (1+g)CF/(1+r)^2 + (1+g)^2CF/(1+r)^3 + \ldots$ (forever) $= CF/(r-g)$.

$EAY = (1+CEY/2)^2-1$; $MEY=((1+EAY)^{(1/12)}-1)*12$.

$PMT = PV*(i/m)/(1 - 1/(1 + i/m)^N)$; i=IntRate/Yr, m=Pmts/Yr.

N=(Cu-Cd)/(Vu-Vd)

B=(NVd-Cd)/(1+r_f).

$$C_0 = \left(E_0[C_1] - \left(C_{up} - C_{down}\right)\frac{E[r_V]-r_f}{V_{up}\%-V_{down}\%}\right)\Big/\left(1+r_f\right)$$

$$E[r_C] = \left[\frac{\left(V_T - L_T\right)\left(1+E[r_V]\right)^T\left(1+E[r_D]\right)^T}{\left(1+E[r_D]\right)^T V_T - \left(1+E[r_V]\right)^T L_T}\right]^{(1/T)} - 1$$