JAMES A. GRAASKAMP COLLECTION OF TEACHING MATERIALS
II. CLASSES AT THE UNIVERSITY OF WISCONSIN--MADISON
    E.   Business 550/705: The Real Estate Process
         6.   Computer Model: MR CAP

Preliminary Risk Analysis

Risk

Risk is the variance between the realizations and the expectations about the execution of a program.

A. Test validity of assumptions concerning growth
    #40 Net Income - Market Value Ratio

$$\text{Yr. } 3 = \frac{58114}{992750} = .0585$$

For the purpose of this course you will not be concerned with the magnitude of the value, i.e. is .0585 too small??

The concern will be centered on the ratio's magnitude of <u>change</u> and <u>direction</u>, i.e. is the ratio getting larger or smaller and how much has it changed over the holding period?

The total acceptable change is ± 1.0% over the holding period.

Analysis

$$\text{Yr. } 1 = .0541$$
$$\text{Yr. } 2 = .0563$$
$$\text{Yr. } 3 = .0585$$
$$\text{Yr.} 10 = .0766$$

Note that the ratio is increasing over time. This indicates that one of two conditions exists:

1. The Net Income is growing too fast.
2. The Market Value is growing too slowly.

Why is Net Income too big?

1. Income is growing too fast.
2. Expenses growing too slowly.
3. Real Estate Taxes growing too slowly.
4. Vacancy rate is under stated.

Why is Market Value too low?

Rate of Project Value Growth is too low.
This is controlled by the data packet.

The analyst must determine how to bring the ratio into proper scale.

B. Test cash breakeven point
    #42 DEFAULT RATIO

$$\frac{\text{R.E.Tax + Expenses + Debt Pmt + Working Capital Loan}}{\text{Gross Income}}$$

Yr. 3

$$.9329 = \frac{10404 + 63654 + 47002 + 6998 + 3544}{140608}$$

Analysis of Default Ratio

```
 .9329 = Default Ratio
+.0600 = Vacancy Rate
 .9929 = Effective Cash Drain

1.0000 = Gross Income
-.9929 = Effective Cash Drain
 .0071 = B/4 Tax Income
```

140,608 * .0071 = 998.31

How Much Risk?

```
998.31 ÷ 140,608 = .00709 Gross Inc. Down
998.31 ÷   8,436 = .11834 Vac. Up
998.31 ÷  10,404 = .09595 R.E. Tax Up
998.31 ÷  63.654 = .01568 Exp. Up
998.31 ÷  47.002 = .02124 Int. Up
998.31 ÷   6,998 = .14266 Princ. Up
998.31 ÷   3,544 = .28170 WCL Up
```

C. Test Duration of Equity Exposure
    #33 B/4 Tax Orig. Equity Payback
    #38 AFR Tax Orig. Equity Payback

$$\#33 = \frac{\text{Cumulative Cash Throw-Off}}{\text{Original Equity}}$$

$$\#38 = \frac{\text{Cumulative Spendable Cash After Taxes}}{\text{Original Equity}}$$

	1	2	3
	15400	12841	10238
Cum.	15400	28241	38479

$$\text{Yr. 3} = \frac{38479}{350,000} = \underline{.1099}$$

CASH FLOW DEMO PROBLEM

Basic Assumptions

1.	Gross Rent	=	130,000 @ 4%/yr (5,200)
2.	Expenses	=	60,000 @ 3%/yr (1,800)
3.	R.E. Taxes	=	10,000 @ 2%/yr (200)
4.	Vacancy	=	6% of Gross Rent
5.	Project Growth Rate	=	1.5%/yr (14,250)
6.	Working Capital Loan	=	14%
7.	Income Tax Rate	=	50%
8.	Equity Discount	=	12%
9.	Project Cost	=	$950,000
	Land	=	$250,000
	Improvements	=	$700,000 (Life = 40 yrs)
10.	Depreciation	=	200% Declining Balance
11.	Mortgage		
	Amount	=	600,000
	Interest	=	8%
	Payment-Yearly	=	54,000

1. **550 DEMO PROBLEM   Orvil P. Anderson**
   Project Title   User Name

10. **1979** . **O** . **O** . **1.0** . **10** . **480**
   Starting Year | Data Sets | Classification | % Owned Yr. 1 | Holding Period | Units/Year

40. **130000** . **.04** . ***** . ___ . ___
   Fixed Income | 2 | 3 | 4 | 5

60. **.06** . ***** . ___ . ___ . ___
   Vacancy Rate | 2 | 3 | 4 | 5

70. **10000** . **.02** . ***** . ___ . ___
   Real Estate Tax | 2 | 3 | 4 | 5

80. **60000** . **.03** . ***** . ___ . ___
   Fixed Expenses | 2 | 3 | 4 | 5

100. **.12** . **.50** . **.06**
   Discount Rate | Income Tax Rate | Reinvestment Rate

101. **O** . **.015** . **5**
   Extraordinary Exp. | Project Growth Rate | Project Growth Type

102. **.14** . **1** . **O** . **O**
   Working Capital Loan | Ownership | Resale Cost Rate | Charge New Capital

   COMPONENT ENTRIES

200. 1. **Land**
   Title(20 character maximum)

201. 1. **250000** . **.0** . **O**
   Original Cost | % Depreciable | Depreciation Method

202. 1. **1** . **O** . **O**
   Starting Year | Useful Life | Switching

200. 2. **Improvements**
   Title

201. 2. **700000** . **1.0** . **5**
   Original Cost | % Depreciable | Depreciation Method

202. 2. **1** . **40** . **O**
   Starting Year | Useful Life | Switching

200. 3. ___
   Title

201. 3. ___ . ___ . ___
   Original Cost | % Depreciable | Depreciation Method

202. 3. ___ . ___ . ___
   Starting Year | Useful Life | Switching

   MORTGAGE ENTRIES

300. 1. **Perminent Mortgage**
   Title(20 character maximum)

301. 1. **600000** . **.08** . **54000** . **O**
   Principal Amount | Annual Interest | Payment Period | Term

302. 1. **1** . **1** . **40** . **O**
   Payments/Year | Year Began | Year End | Refinanced by #

303. 1. ___ . ___ . ___ . ___
   Bonus Interest | Base Amount | Base Type | Mortgage Factor

300. 2. ___
   Title

301. 2. ___ . ___ . ___ . ___
   Principal Amount | Annual Interest | Payment Period | Term

302. 2. ___ . ___ . ___ . ___
   Payments/Year | Year Began | Year End | Refinanced by #

303. 2. ___ . ___ . ___ . ___
   Bonus Interest | Base Amount | Base Type | Mortgage Factor

400, **9** . ___ . ___ . ___ . ___ . ___ . ___ . ___ . ___ . ___
   1 . 2 . 3 . 4 . 5 . 6 . 7 . 8 . 9 . 10

403, **1** . **2** . **3** . **10** . ___ . ___ . ___ . ___ . ___ . ___

999, 99

20. _____ , _____ , _____ , _____ , _____ , _____
    Back-Door   Back-Door Loans   Investment Default   B/4 Tax   Beginning Year   End Year

= Back Door

   0 = Do Not process through Back Door
   1 = Derive value based on Default Ratio
   2 = Derive value based on Loan-to-Value Mortgage
   3 = Derive value based on Debt Coverage Ratio

30. _____ , _____ , _____ , _____ , _____ , _____
    Default Ratio   Cash-On-Cash   Year   % Change   Equity B/4 Tax   Reserve B/4 Tax

103. _____ , _____ , _____ , _____
    Reserves Witheld   Equity Reserves   Equity Reserve Rate   Reserve Maximum

                                            Field #5 = Depreciation Method

                                               0 = no depreciation
                                               1 = sum of the years digits
                                               2 = straight line
                                               3 = 125% declining balance
                                               4 = 150% declining balance
= Bonus Basis Type   5 = 200% declining balance
                                               6 = reverse sum of years digits
   1 = fixed income - base amount   9 = equity modification
   2 = gross rent - base amount   "-" = remove equity
   3 = effective gross rent - base amount   "+" = add equity
   4 = fixed income - fixed expense - base amount
   5 = net income - base amount
   6 = cash throw - base amount * bonus interest rate
   7 = market value - base amount * bonus interest rate
   8 = B/4 net worth - base amount * bonus interest rate
   9 = after tax net worth - base amount * bonus interest
       rate

                          Report Field Identifiers

   Field #   Report Title   Field #   Report Title
   1.   Summary of Income & Expense   6.   After Tax Ratios
   2.   Component Summary   7.   Modified Internal Rate of Return
   3.   Cash Flow   8.   Mortgage Amortization
   4.   Market Value   9.   Depreciation Schedules
   5.   Before Tax Ratios   10.   Partnership Report

                    * = Position #1 of Card 400

                    5 = Auto 1, 2, 3, 4, 5, 6, 7, 10

                    9 = Auto All

                    3 = Select Specific Line #'s (10 maximum)
   PRINT YEARS (Enter any year number 1-25, in any order)

403 ____ , ____ , ____ , ____ , ____ , ____ , ____ , ____ , ____ , ____

        99 = first entry line 403 means 10 year wide carriage output option.

```
1,550 DEMO PROBLEM,ORVIL P.-ANDERSON
10,1979,0,0,1.0,10,480
40,130000,.04,*
60,.06,*
70,10000,.02,*
80,60000,.03,*
100,.12,.50,.06
101,0,.015,5
102,.14,1,.0,0
200,1,LAND
201,1,250000,.0,0
202,1,1,0,0
200,2,IMPROVEMENTS
201,2,700000,1.0,5
202,2,1,40,0
300,1,PERMINENT MORTGAGE
301,1,600000,.08,54000,0
302,1,1,1,40,0
400,9
403,1,2,3,10
999,99
#NU
#T
#P 30
      1=1,550 DEMO PROBLEM,ORVIL P. ANDERSON
      2=10,1979,0,0,1.0,10,480
      3=40,130000,.04,*
      4=60,.06,*
      5=70,10000,.02,*
      6=80,60000,.03,*
      7=100,.12,.50,.06
      8=101,0,.015,5
      9=102,.14,1,.0,0
     10=200,1,LAND
     11=201,1,250000,.0,0
     12=202,1,1,0,0
     13=200,2,IMPROVEMENTS
     14=201,2,700000,1.0,5
     15=202,2,1,40,0
     16=300,1,PERMINENT MORTGAGE
     17=301,1,600000,.08,54000,0
     18=302,1,1,1,40,0
     19=400,9
     20=403,1,2,3,10
     21=999,99
#LOG
 21 lines

Ready
```

DEPRECIATION SCHEDULE FOR IMPROVEMENTS

INITIAL COST   700000.
DEPRECIATION METHOD   5   PERCENT DEPRECIABLE 1.000
USEFUL LIFE   40.   BEGINNING YEAR   1

| | ANNUAL | CUMULATIVE | CUMULATIVE | |
YR	DEP.	STR. LINE	ACCELERATED	EXCESS
1	35000.	17500.	35000.	17500.
2	33250.	35000.	68250.	33250.
3	31588.	52500.	99838.	47338.
4	30008.	70000.	129846.	59846.
5	28508.	87500.	158353.	70853.
6	27082.	105000.	185436.	80436.
7	25728.	122500.	211164.	88664.
8	24442.	140000.	235606.	95606.
9	23220.	157500.	258825.	101325.
10	22059.	175000.	280884.	105884.

MORTGAGE AMORTIZATION SCHEDULE FOR PERMINENT MORTGAGE

MORTGAGE AMOUNT   600000.   TERM   28
INTEREST RATE   0.0800   MORTGAGE FACTOR   0.09000000
PERIOD PAYMENT   54000.00   PAYMENTS PER YEAR   1
BONUS INTEREST   0.0000   TYPE 0 GREATER THAN   0.

| | ANNUAL | INTEREST | PRINCIPAL | | BONUS INT |
YR	PAYMENT	PAYMENT	PAYMENT	BALANCE	PAYMENT
1	54000.	48000.	6000.	594000.	0.
2	54000.	47520.	6480.	587520.	0.
3	54000.	47002.	6998.	580522.	0.
4	54000.	46442.	7558.	572963.	0.
5	54000.	45837.	8163.	564800.	0.
6	54000.	45184.	8816.	555985.	0.
7	54000.	44479.	9521.	546463.	0.
8	54000.	43717.	10283.	536180.	0.
9	54000.	42894.	11106.	525075.	0.
10	54000.	42006.	11994.	513081.	0.

P R O   F O R M A

INVESTMENT ANALYSIS OF

550 DEMO PROBLEM

FOR

ORVIL P. ANDERSON

```
* GROSS RENT        $ 156079.   * RATE OF GROWTH OF GROSS RENT  0.0400
* EXPENSES          $  68783.   * RATE OF GROWTH OF EXPENSES    0.0300
* R E TAXES         $  10950.   * RATE OF GROWTH OF R E TAXES   0.0200
  INCOME TAX RATE     0.5000      PROJECT VALUE GROWTH OF        5.0000
* VACANCY RATE        0.0600      WORKING CAPITAL LOAN RATE      0.1400
  EQUITY DISCOUNT     0.1200      EXTRAORDINARY EXPENSES      $     0.
  RESALE COST         0.0000      REINVESTMENT RATE              0.0600
  WKG CAPITAL RS $       0.       CAPITAL RESER INTEREST RATE    0.0000
  INITIAL COST $    950000.       INITIAL EQUITY REQUIRED     $ 350000.
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ALL '*' VALUES ARE AVERAGE AMOUNTS FOR HOLDING PERIOD. OF 10 YRS.

P R O   F O R M A

INVESTMENT ANALYSIS OF

550 DEMO PROBLEM

FOR

ORVIL P. ANDERSON

C O M P O N E N T   S U M M A R Y

TITLE	PCT. DEPR	BEGIN USE	USEFUL LIFE	DEPR METHOD		COST	SCH
LAND	0.00	1	0.	0	$	250000.	0
IMPROVEMENTS	1.00	1	40.	5	$	700000.	0

M O R T G A G E   S U M M A R Y

TITLE	INTR RATE	BEGIN YR.	END YR.	TERM		ORIG BALC	PCT VALUE
PERMINENT MORTGAGE	0.0800	1	40	28	$	600000.	0.632

PRO FORMA

INVESTMENT ANALYSIS OF

550 DEMO PROBLEM

FOR

ORVIL P. ANDERSON

CASH FLOW ANALYSIS
==================   1979   1980   1981   1988
 1 GROSS RENT   130000.   135200.   140608.   185031.
 2   LESS VACANCY   7800.   8112.   8436.   11102.
 3   LESS REAL ESTATE TAXES   10000.   10200.   10404.   11951.
 4   LESS EXPENSES   60000.   61800.   63654.   78286.
 5 NET INCOME   52200.   55088.   58114.   83691.
 6   LESS DEPRECIATION   35000.   33250.   31588.   22059.
 7   LESS INTEREST   48000.   47520.   47002.   42006.
 8 TAXABLE INCOME   -30800.   -25682.   -20476.   19627.
 9   PLUS DEPRECIATION   35000.   33250.   31588.   22059.
10   LESS PRINCIPAL PAYMENTS   6000.   6480.   6998.   11994.
11 CASH THROW-OFF   -1800.   1088.   4114.   29691.
12   LESS TAXES   1125.   863.   613.   9813.
13   LESS RESERVES AT   0.000   0.   0.   0.   0.
14 CASH FROM OPERATIONS   -2925.   225.   3500.   19878.
15 WORKING CAPITAL LOAN(CUM B)   2925.   3109.   44.   0.
16 DISTRIBUTABLE CASH AFR TAX   0.   0.   0.   19878.
17 TAX SAVING ON OTHER INCOME   15400.   12841.   10238.   0.
18 SPENDABLE CASH AFTER TAXES   15400.   12841.   10238.   19878.

P R O   F O R M A

INVESTMENT ANALYSIS OF

550 DEMO PROBLEM

FOR

ORVIL P. ANDERSON

CASH FLOW ANALYSIS
==================   1979   1980   1981   1988
MARKET VALUE
19 BY METHOD - 5 - AT 0.0150   964250.   978500.   992750. 1092500.
20 LESS RESALE COST   0.   0.   0.   0.
21 LESS LOAN BALANCES   596925.   590629.   580566.   513081.
22 PLUS CUM. CASH RESERVES   0.   0.   0.   0.

23 B/4 TAX NET WORTH   367325.   387871.   412185.   579419.

24 CAPITAL GAIN (IF SOLD)   31750.   63500.   95250.   338677.
25   CAPITAL GAINS TAX   7938.   15875.   23813.   84669.
26   TAX PREFERENCE TAX   2381.   4763.   7144.   24585.
27   INCOME TAX ON EXCESS DEP   8750.   16625.   23669.   42354.
28   TOTAL TAX ON SALE   19069.   37263.   54625.   151607.

29 AFTER TAX NET WORTH   348256.   350609.   357560.   427812.

PRO FORMA

INVESTMENT ANALYSIS OF

550 DEMO PROBLEM

FOR

ORVIL P. ANDERSON

YEAR OF ANALYSIS				
==================	1979	1980	1981	1988

BEFORE TAX RATIO ANALYSIS
=========================

		1979	1980	1981	1988
30	RETURN ON NET WORTH B/4 TAX	0.0495	0.0589	0.0733	0.1011
31	CHANGE IN NET WORTH B/4 TAX	17325.	20546.	24314.	26244.
32	CASH RTN ON ORIG CASH EQUIY	-0.0051	0.0031	0.0118	0.0848
33	PERCENT ORIG EQUITY PAYBACK	0.0000	0.0000	0.0000	0.2997
34	PRESENT VALUE OF PROJECT	926362.	908469.	895573.	841992.

YEAR OF ANALYSIS
==================   1979   1980   1981   1988

AFTER TAX RATIO ANALYSIS
========================
		1979	1980	1981	1988
35	RETURN ON NEW WORTH AFT TAX	0.0390	0.0436	0.0490	0.0874
36	CHANGE IN NET WORTH AFT TAX	638.	4734.	9332.	19295.
37	CASH RTN ON ORIG CASH EQUIY	0.0440	0.0367	0.0293	0.0568
38	PERCENT ORIG EQUITY PAYBACK	0.0440	0.0807	0.1099	0.4512
39	PRESENT VALUE OF PROJECT	924693.	903490.	885778.	823147.
40	NET INCOME-MARKET VALUE RTO	0.0541	0.0563	0.0585	0.0766
41	LENDER BONUS INTEREST RATE	0.0000	0.0000	0.0000	0.0000
42	DEFAULT RATIO	0.9538	0.9536	0.9329	0.7795

P R O   F O R M A

INVESTMENT ANALYSIS OF

550 DEMO PROBLEM

FOR

ORVIL P. ANDERSON

YEAR OF ANALYSIS
===================== '   1979   1980   1981   1988

MODIFIED INTERNAL RATE OF RETURN ANALYSIS
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RETURN ANALYSIS WITHOUT SALE
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		1979	1980	1981	1988
41	CUM. AFT TAX SPENDABLE CASH	15400.	29165.	41153.	203356.
44	MOD. I.R.R. ON ORIG EQUITY	-0.9560	-0.7113	-0.5101	-0.0528
45	MOD. I.R.R. ON CUM. EQUITY	-0.9560	-0.7113	-0.5101	-0.0528

RETURN ANALYSIS WITH SALE
=========================

		1979	1980	1981	1988
46	CUM. CASH LESS ORIG EQUITY	13656.	29774.	48712.	281168.
47	CUM. CASH LESS CUM. EQUITY	13656.	29774.	48712.	281168.
48	MOD I.R.R. ON ORIG EQUITY	0.0390	0.0417	0.0444	0.0607
49	MOD I.R.R. ON CUM. EQUITY	0.0390	0.0417	0.0444	0.0607