

**Graduate Program in Urban Planning
School of Architecture and Urban Design
University of Kansas**

UBPL 764
Real Estate Development Planning I
Fall, 2006

Kirk McClure
317 Marvin Hall

(785) 864-3888

**UBPL 764
Real Estate Development Planning
Course Workbook**

**Graduate Program in Urban Planning
School of Architecture and Urban Design
University of Kansas**

UBPL 764
Real Estate Development Planning I
Fall, 2006

Kirk McClure
317 Marvin Hall
(785) 864-3888

COURSE MATERIALS

TABLE OF CONTENTS

TABLE OF CONTENTS	1
COURSE SYLLABUS	2
COURSE ASSIGNMENTS	12
Assignment One: Present Value and Loan Calculations	13
Assignment Two: Amortization and Variable Rate Mortgages	15
Assignment Three: Return on Investment Calculations	17
Assignment Four: Dynamic Cash Flow Analysis Before Taxes	20
Assignment Five: Dynamic Cash Flow Analysis After Taxes	24
Assignment Six: Historic Rehabilitation Tax Credits	27
Assignment Seven: Low Income Housing Tax Credits	30
SUPPLEMENTARY MATERIALS	32
Basic Discounting Formulas	33
Preparation of Amortization Tables	34
Examples Using Internal Rates of Return	36
Sample Pro Forma with market rate financing	39
Sample of Historic Rehabilitation Tax Credit Analysis	41
Sample of Low-Income Housing Tax Credit Analysis	44
Appraisal of Market Value of Single-family Homes	46

**Graduate Program in Urban Planning
School of Architecture and Urban Design
University of Kansas**

UBPL 764
Real Estate Development Planning I
Fall, 2006

Kirk McClure
317 Marvin Hall
Voice: (785) 864-3888
E-mail: mcclure@ukans.edu

Line Number: 22156
3 Credits

11:00-12:15 Tuesday, Thursday
308 Marvin

COURSE SYLLABUS

Introduction and Objectives

This course is designed to provide a working knowledge of the techniques of real estate investment analysis. As a planning course, the emphasis is placed upon the process as performed by the practicing planner working with the public sector. This means that the course covers much of the same material that is normally included in a real estate development course in a business school. However, this material is augmented with the study of techniques used to achieve public sector goals. Among the topics covered in the course are: the calculation of return on investment in real estate; the financing of real estate development; the various forms of property ownership; the implications of tax laws upon the rehabilitation of historic properties; and the provision of low-income housing.

Format

The course has been developed around a problem-solving format. The best way to learn how real estate investments are structured is to solve problems that confront real estate investment analysts and planners when they review development proposals. As such, there will be several assignments that require the student to resolve investment problems. Given the extensive use of personal computers and spreadsheet software for this type of work, the assignments must be completed using these tools. To accommodate this type of work, the course format will be divided between three components: (1) Lectures on various topics of investment analysis; (2) Discussion of the problem sets; and (3) Lectures and demonstrations on the use of personal computers and spreadsheet software.

Course Assignments

A series of seven assignments must be completed during the semester. The seven assignments involve the practical application of investment analysis techniques to situations that are typical of those confronting planners. These assignments become increasingly complex as the course progresses and are cumulative in nature. The assignments cover:

1. Calculation of present value and loan payment amount.
2. Calculation of amortization tables and variable rate mortgages.
3. Calculation of internal rates of return and other forms of return on investment.
4. Dynamic cash flow models to analyze project feasibility before taxes.
5. Dynamic cash flow models to analyze project feasibility after taxes.
6. Use and valuation of Historic Rehabilitation Tax Credits.
7. Use and valuation of Low-Income Housing Tax Credits.

The first three assignments involve only the numerical analysis of an investment problem. The last four assignments involve the numerical analysis of case problems plus the preparation of concise memoranda summarizing the results of the analysis.

A comprehensive final examination will be given.

Requirements and Grading

The following weights will be used in the determination of a final grade in the course:

Assignment One:	5 %
Assignment Two:	5 %
Assignment Three:	5 %
Assignment Four:	15 %
Assignment Five:	10 %
Assignment Six:	20 %
Assignment Seven:	20 %
Final Examination:	20 %

In order to keep current in the course, assignments will be discussed as soon as they are due. Work completed after class discussion of the assignment's solution is inappropriate for grade evaluation. As such, assignments will not be accepted late. While students are encouraged to work together in the preparation for this course, the completed assignments must be the product of the individual student. Students are expected to submit work of high quality suitable to a professional degree program at the graduate level. Students should be aware of the University rules regarding academic misconduct. These are summarized in the Student Handbook.

Students who do not complete the work required in the course will be given a grade of "I" only where, for good reason, some part of the work has not been done while the remainder of the work has been satisfactorily completed.

Disabled Students

Any student who, due to disability, may not be able to complete the requirements for the course should contact the instructor as soon as possible so that appropriate accommodations can be made.

Schedule Conflicts

If any scheduled assignment or examination conflicts with a mandated religious observation, the student should immediately contact the instructor to arrange a make-up assignment or examination on a mutually acceptable date.

Disclaimer

This syllabus is to serve as a guide only. The course is subject to change due to extenuating circumstances.

Required Texts

One text is required for the course. This book has been ordered through the Kansas Union Bookstore. It is:

Mike E. Miles, Gayle Berens and Marc A. Weiss, *Real Estate Development: Principles and Process*, 2000, Third Edition, Urban Land Institute.

It is recommended that students, who are not already familiar with the use of the Excel or other comparable spreadsheet program, should acquire a book on the use of one of these software packages. The book should provide both instructions for the new user to facilitate learning the program and reference information for the experienced user so that questions can be answered easily while using the program. As many such books are readily available in bookstores and as many of these books adequately meet the needs of this course, no single book has been ordered. The student should look over several of these books and purchase the one which seems to be the book best suited to the student's style and level of experience.

The assignments, plus various other materials needed for the course, have been compiled into a course workbook. This workbook is available on the course website in PDF format. Each student should have a copy of the workbook available during each class session.

A topic outline is attached that provides a schedule to course lectures. Due dates of assignments are listed on the outline. These dates are subject to change as the course progresses. Readings are listed on the outline as well. Where the reading refers to a chapter number, this reading is from the textbook. Other readings are cited by the author's name and can be found in the supplemental reader. These supplemental readings have also been digitized and are available through Watson Library's electronic reserve system.

Topic Outline and Readings**Lecture 1.: Introduction to Course**

Topics: *Why planners need to understand real estate development*
Format and requirements of the course

Dowall, David E., "Applying Real Estate Financial Analysis to Planning and Development Control," *Journal of the American Planning Association*, Vol. 51, No. 1, Winter, 1985, pp. 84-94.

<Applying Real Est. to Planning.pdf>

Dowall, David E., "The Public Real Estate Development Process," *Journal of the American Planning Association*, Vol. 56, No. 4, Autumn, 1990, pp. 504-512.

<Public Real Estate Development Process.pdf>

Lecture 2.: The Real Estate Development Process

Topic: *Stages of the Development Process I*

Miles, Berens and Weiss: Chapter 1. Introduction to the Real Estate Development Process

Lecture 3.: The Real Estate Development Process

Topic: *Stages of the Development Process I*

Miles, Berens and Weiss: Chapter 2. The Raw Material: Land and Demographics in the United States, and Chapter 3. Developers and Their Partners

Lecture 4.: Real Estate as an Investment

Topic: *Real Estate as Investment*

Miles, Berens and Weiss: Chapter 4.: Real Estate Finance: The Institutional Setting

Lecture 5.: Discounting: The Value Today of Future Streams of Income

Topic: *How to investors and lenders decide how much to invest?*

Miles, Berens and Weiss: Chapter 5.: Financial Theory: The Logic behind Real Estate Financing Decisions

Lecture 6.: Discounting: Present Value and Loan Types

Topic: *How to determine the present value of future payment(s).*

Workbook.

Lecture 7.: Loan Calculations

Topics: *How to determine the payment on loan*
How to determine the loan value of a stream of payments

Workbook.

Miles, Berens and Weiss: Chapter 6: Innovations in Real Estate Finance.

Lecture 8.: Amortization Tables and Variable Rate Loans

Topic: *How to prepare a loan amortization table*
How to calculate payments on variable interest rate loans

Workbook.

Lecture 9.: Return on Investment: Internal Rate of Return and Net Present Value

Topic: *How to calculate the return on investment of a variable stream of payments*

Kharabe, Prakash and Andrew Rimbach, "MRR, IRR, and NPV as Project Ranking Measures," *Real Estate Review*, Vol. 19, No. 2, Summer, 1989, pp. 74-80.
<MRR, IRR, and NPV as Project-Ranking Measures.pdf>

Lecture 10.: Critiques of IRR

Topic: *Does the IRR mislead investors or do investors misuse the IRR?*

Lewis, Barbara J., "Real Estate Investment Analysts Should Not Rely on Standard Financial Measures," *Real Estate Review*, Vol. 20, No. 1, Spring, 1990, pp. 90-92.
<Real Estate Analysts Shouldn't Rely On.pdf>

Roulac, Stephen E., "The Demise of the IRR?," *Real Estate Finance*, Vol. 9, No. 4, Winter, 1993, pp. 11-18.
<The Demise of the IRR.pdf>

Lecture 11.: Preparation of a Pro Forma: Operation

Topic: *Application of discounting theory to a real estate development; the pro forma*

Miles, Berens and Weiss: Chapter 16. Stage Three: The Feasibility Study.

Etter, Wayne E., "Financial Feasibility Analysis for Real Estate Development," *The Journal of Real Estate Development*, Vol. 4, No. 1, Summer, 1988, pp. 44-55.
<Financial Feasibility Analysis for Real Estate Development.pdf>

Lecture 12.: Preparation of a Pro Forma: Reversion

Topic: *The pro forma for sale of property*

Workbook

Lecture 13.: Evaluation of a Pro Forma

Topic: *How does a planner or investor know a good the pro forma from a bad one?*

Martin, Vernon, III, "Nine Abuses Common in Pro Forma Cash Flow Projections," *Real Estate Review*, Vol. 18, No. 3, Fall, 1988, pp. 20-25.

<9 Abuses Common in Pro Forma Cash Flow Projections.pdf>

Tebow, Brad, "In Defense of DCF Analysis," *Real Estate Review*, Vol. 24, No. 3, Fall, 1994, pp. 43-49.

<In Defense of DCF Analysis.pdf>

Pollack, Bruce, "Breakeven Analysis: The Third Leg of the Underwriting Stool," *Real Estate Review*, Vol. 25, No. 2, Summer, 1995, pp. 43-46.

<Breakeven Analysis-The 3rd Leg of the Underwriting Stool.pdf>

Lecture 14.: Taxation of Real Estate

Topic: *Is real estate taxed differently from other types of investment?*

Follain, James R., Patric H. Hendershott, and David C. Ling, "Understanding the Real Estate Provisions of Tax Reform: Motivation and Impact," *National Tax Journal*, Vol. XL, No. 3, pp. 363-372.

<Understanding the Real Estate Provisions of Tax Reform-Motiv.pdf>

Lecture 15.: Taxation of Real Estate: Operation

Topic: *How are earnings from operation of real estate taxed?*

Workbook.

Lecture 16.: Taxation of Real Estate: Reversion

Topic: *How are earnings from the sale of real estate taxed?*

Workbook.

Lecture 17.: Pro forma: Optimal Holding Periods

Topic: *How does an investor know the best time to sell a property?*

Mittelbach, Frank G., and Russell Thompson, "Uncovering the Biases in Real Estate Projections," *Real Estate Review*, Vol. 18, No. 1, Spring, 1988, pp. 38-42.

<Uncovering the Biases in Real Estate Projections.pdf>

Lecture 18: **Project Concept**

Topic: *How do developers know what to build and where to build it?*

Miles, Berens and Weiss: Chapter 10. Stage One: Inception of an Idea and Chapter 11. Market Research: A Tool for Generating Ideas.

Papke, Gary, and Cheryl Inghram, "Detecting the Flaws in Market Analysis," *Planning*, Vol. 56, No. 6, June, 1990, pp. 18-22.

<Detecting the Flaws in Market Analysis.pdf>

Rabianski, Joseph, "Market Analyses and Appraisals: Problems Persist," *Real Estate Review*, Vol. 24, No. 4, 1995, pp. 45-49.

<Market Analyses and Appraisals-Problems Persist.pdf>

Lecture 19: **Market Analysis: General**

Topic: *How can planners detect flaws in poorly prepared market analyses?*

Miles, Berens and Weiss: Chapter 12. Stage Two: Refinement of the Idea.

Redfearn, Christian L. and Larry A. Rosenthal, "The Case for Monitoring Real Estate Prices: Data and Methods for Informing the Planning Process," in *Land Market Monitoring for Smart Urban Growth*, Gerrit J. Knaap, editor, Cambridge, Massachusetts: The Lincoln Institute of Land Policy, 2001, pp 287-305.

<The Case for Monitoring Real Estate Prices_1.pdf>

<The Case for Monitoring Real Estate Prices_2.pdf>

Lecture 20: **Market Analysis: Retail Markets**

Topic: *How can planners detect flaws in poorly prepared market analyses?*

Miles, Berens and Weiss: Chapter 17. Market Data and Chapter 18. Data Sources Supporting Market Studies

McClure, Kirk, "Monitoring Industrial and Commercial Land Market Activity," in Land Market Monitoring for Smart Urban Growth, Gerrit J. Knaap, editor, Cambridge, Massachusetts: The Lincoln Institute of Land Policy, 2001, pp 263-286.

<Monitoring Industrial and Commercial Land Market Activity_1.pdf>

<Monitoring Industrial and Commercial Land Market Activity_1.pdf>

Lecture 21: **Historic Rehabilitation Tax Credits**

Topic: *How do Historic Rehabilitation Tax Credits work?*

Alperin, Kenneth, "Differences between the Historic Rehabilitation Tax Credit and the Low-Income Housing Tax Credit," Boston: Nixon Peabody LLP.

<Differences Between the Housing Rehabilitation Tax Credit.pdf>

Miles, Berens and Weiss: Chapter 13. The Roles of the Public Sector and Chapter 14. Meshing Public and Private Roles in the Development Process

Lecture 22: Historic Rehabilitation Tax Credits

Topic: *What is the optimal holding period with Historic Rehabilitation Tax Credits?*
Workbook.

Lecture 23: Low-Income Housing

Topic: *How do Low-Income Housing Tax Credits work?*

The Washington State Housing Finance Commission. 2004.
Excerpts from LIHTC Introductory Guide: Introduction. As found at
<http://www.wshfc.org/tax-credits/intro.htm>, posted June 11, 2004.
<LIHTC WSCFC.dbf>

Lecture 24: Low-Income Housing

Topic: *How much are tax credits worth?*

McClure, Kirk, "Low and Moderate Income Housing Tax Credits: Calculating their Value,"
Journal of the American Planning Association, Vol. 56, No. 3, Summer, 1990, pp. 363-369.
<Low and Moderate Income Housing Tax Credits.pdf>

Lecture 25: Low-Income Housing

Topic: *How does the pro forma for a Low-Income Housing Tax Credit development work?*

Workbook.

Lecture 26: Low-Income Housing

Topic: *How does the pro forma for a Low-Income Housing Tax Credit development work?*

Workbook.

Lecture 27: Appraisal

Topic: *What are the three approaches to the appraisal of property value?*

Jacobs, Eric K., "Appraising the Appraisal: A Developer's Guide to Appraisal Techniques,"
The Journal of Real Estate Development, Vol. 4, No. 4, Spring, 1989, pp. 37-44.
<Appraising the Appraisal-A Developers Guide to Appraisal Tec.pdf>

Fiedler, Lawrence E., "The Problem with Commercial Property Appraisals Today," *Real Estate Review*, Vol. 25, No. 4, Winter, 1996, pp. 33-36.
<The Problem is Commercial Property Appraisals Today.pdf>

Lecture 28.: Appraisal

Topic: *What are the critiques of the appraisal process?*

Owens, Robert W., "An Appraiser Examines Four Types of Return Rates," Real Estate Review, Vol. 25, No. 4, Winter, 1996, pp. 37-41.

<An Appraiser Examines 4 Types of Return Rates.pdf>

Jud, Donald G. and Daniel T. Winkler, "The Capitalization Rate of Commercial Properties and Market Returns," The Journal of Real Estate Research, Vol. 10, No. 5, 1995, pp. 509-518.

<The Capitalization Rate of Commercial Properties and Market .pdf>

Liteplo, Donald N., "Cap Rate Valuation Must Yield to Intensive Multi-Factor Analysis," Real Estate Review, Vol.24, No. 3, Fall, 1994, pp. 36-42.

<Cap Rate Valuation Must Yield.pdf>

Lecture 29: **Guest Speaker**

Topic: *Application of Real Estate Investment Analysis by Program Graduate.*

Lecture 30.: **Review and Summation**

Topic: *What has been learned and what is next?*

Topic Outline and Assignments for the Class

Week	Date	Meeting	Topic	Text	Supplemental Reading	Assign
1	17-Aug	1	Introduction to Course		Dowall (85); Dowall (90)	
2	22-Aug	2	Development Process I	1		
	24-Aug	3	Development Process II	2,3		
3	29-Aug	4	Real Estate as Investment	4		
	31-Aug	5	Discounting	5		
4	5-Sep	6	Present Value			
	7-Sep	7	Loan Calculations	6		
5	12-Sep	8	Amortization Tables			
	14-Sep	9	NPV and IRR		Kharabe	1
6	19-Sep	10	Critiques of IRR		Lewis; Roulac	
	21-Sep	11	Pro forma: Operation	16	Etter	2
7	26-Sep	12	Pro forma: Reversion			
	28-Sep	13	Pro forma: Evaluation		Martin; Tebow; Pollack	3
8	3-Oct	14	Taxation: Introduction		Follain	
	5-Oct	15	Taxation: Operation			
9	10-Oct	16	Taxation: Reversion			4
	12-Oct		No Class, Fall Break			
10	17-Oct	17	Pro forma: Optimal Holding		Mittelbach	
	19-Oct	18	Project concept	10, 11	Papke; Rabianski	
11	24-Oct	19	Market Analysis: General	12	Redfearn	5
	26-Oct		Market Analysis: Retail	17, 18	McClure	
12	31-Oct	20	Historic Rehab Credits	13,14	Alperin,	
	2-Nov	21	Historic Rehab Credits			
13	7-Nov	22	Low-Income Housing	15	WSHFC	
	9-Nov	23	No Class, ACSP Conference			
14	14-Nov	24	Low-Income Housing		McClure	6
	16-Nov	25	Low-Income Housing			
15	21-Nov	26	Low-Income Housing			
	23-Nov		No class, Thanksgiving holiday			
16	28-Nov	27	Appraisal		Jacobs; Fielder	
	30-Nov	28	Appraisal		Owens; Jud; Liteplo	7
17	5-Dec	29	Guest Speaker			
	7-Dec	30	Review			
18	8-Dec		Stop Day			
	14-Dec		Final Exam 1:30 - 4:30 am			

UBPL 764: Real Estate Development Planning I

Fall, 2006

Assignments

UBPL 764: Real Estate Development Planning
 Assignment One: Present Value and Loan Calculations

Fall, 2006

Name _____

ASSIGNMENT

Part A: What is the present value of \$1,750 to be received in a single payment three years from now, discounted at 9.0% APR ?

$$PV = FV * [1/(1 + i)^n]$$

Present value: _____

Part B: What is the present value of \$1,750 to be received in a single payment three years from now, discounted at 12% APR ?

$$PV = FV * [1/(1 + i)^n]$$

Present value: _____

Part C: If you agree to pay \$150 per month at 8% APR compounded monthly for a period of three years, what will be the:

1. Interest rate: _____

2. Number of payments: _____

3. The future value: _____

$$FV = PMT * \{[(1+i)^n - 1]/i\}$$

4. The present value: _____

$$PV = PMT * \{(1 - [1/(1+i)^n])/i\}$$

Part D: The following questions deal with the financing of a development with a total development cost of \$1,500,000 and a lender willing to loan up to a maximum loan to value ratio of 75% for a loan term of 20 years compounded monthly with level payments at an interest rate of 8.5% APR.

1. What is the loan amount? _____

2. What is the equity amount? _____

3. What is the monthly interest rate? _____

UBPL 764: Real Estate Development Planning
 Assignment One: Present Value and Loan Calculations

Fall, 2006

4. What is the number of payments? _____

5. What is S (the amount of \$1 at compound interest) ?

$S = (1 + i)^n$ _____

6. What is Sn (the ordinary annuity factor) ?

$S_n = \{[(1+i)^n]-1\}/i$ _____

7. What is the payment constant?

$CONSTANT = S / S_n$ _____

8. What is the monthly payment?

$PMT = LOAN * CONSTANT$ _____

9. What are the total dollars paid in a year? _____

Part E: For this part, the cost and financing terms are the same with one exception, the interest rate is compounded annually with a single payment at the end of each year.

1. What is S (the amount of \$1 at compound interest) ?

$S = (1 + i)^n$ _____

2. What is Sn (the ordinary annuity factor) ?

$S_n = \{[(1+i)^n]-1\}/i$ _____

3. What is the payment constant?

$CONSTANT = S / S_n$ _____

4. What is the annual payment?

$PMT = LOAN * CONSTANT$ _____

5. Why is this payment higher?

UBPL 764: Real Estate Development Planning
 Assignment Two: Amortization and Variable Rate Mortgages

Fall, 2006
 Name: _____

ASSIGNMENT

Part A: AMORTIZATION TABLE

For a project costing \$1,200,000, with a loan-to-value ratio of 75%, calculate the amortization table for the first year of the loan assuming a 25 year term, 8.5% APR interest compounded monthly.

TDC: 1200000
 LVR: 75.00%
 TERM: 25 Years with level monthly payments
 INTEREST 8.50% APR

Month	Balance Beginning of the Month	Paymnt	Interest Paid	Principle Paid	Balance End of the Month
1	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____
6	_____	_____	_____	_____	_____
7	_____	_____	_____	_____	_____
8	_____	_____	_____	_____	_____
9	_____	_____	_____	_____	_____
10	_____	_____	_____	_____	_____
11	_____	_____	_____	_____	_____
12	_____	_____	_____	_____	_____
Totals for the Year:		_____	_____	_____	

UBPL 764: Real Estate Development Planning
 Assignment Two: Amortization and Variable Rate Mortgages

Fall, 2006

Part B: VARIABLE RATE MORTGAGES

Assume that a household is attempting to buy a home priced at \$100,000. The bank will loan the family 90 % of the purchase price. All loans are calculated with monthly payments and are self-amortizing.

1. If the household arranges for a 90 % loan on the purchase price, with an interest rate of 9.0 % fixed APR and a 30 year term, what would be the:

Present value of loan: _____
 Interest rate of loan: _____
 Number of payments: _____
 Monthly payments: _____

2. To qualify for the loan, the household must have an income such that the payments of principle and interest do not exceed 28 % of their income. What is the minimum income needed?

Minimum Annual Income: _____

3. If the loan could be arranged as a Variable Rate Mortgage loan, the interest rate could be lowered to 7.5 % APR. What would be the monthly payment and minimum income initially required?

Present Value of Loan: _____
 Interest rate of loan: _____
 Number of payments: _____
 Monthly payments: _____
 Payments in year 1: _____
 Minimum Annual Income: _____

4. If after 2 years, the interest rate goes up by 75 basis points, what would be the new payments and what percent of household income is spent on principle and interest if the household has the minimum income calculated in question 3?

Number of payments remaining: _____
 Interest rate of VRM loan initially: _____
 Initial monthly payments: _____
 Present value of the loan after two years: _____
 New interest rate: _____
 New monthly payments: _____
 New minimum annual income: _____

UBPL 764: Real Estate Development Planning
 Assignment Three: Return on Investment

Fall, 2006

ASSIGNMENT

Part A: What is the present worth of an annuity of six annual payments of \$1,500 each, received at the end of each year for six years, if they are discounted at 10 % ?

$$PWA = PMT * (\{ 1 - [1/(1+i)^n] \} / i)$$

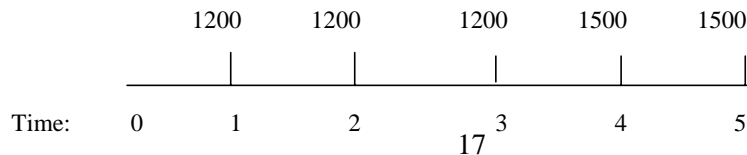
PWA: _____

Part B: If the above \$1,500 payments made at the end of each year for six years were paid for by a single equity payment of \$6,000, to the nearest whole percent, what percent interest would have been paid on the transaction? Estimate your answer through iterative solutions. The result is between 3% and 8%.

Payment: \$ 1,200 Number: 6 Equity: \$ 6,000

Interest Rate Tested	PWA at the Tested Rate	Initial Equity Payment	Difference PWA and Initial PMT	Diff is Positive or Negative	Estimate is too High or too Low
8%	_____	6000.00	_____	_____	_____
3%	_____	6000.00	_____	_____	_____
7%	_____	6000.00	_____	_____	_____
6%	_____	6000.00	_____	_____	_____
5%	_____	6000.00	_____	_____	_____
5.47%	_____	6000.00	_____	_____	_____

Part C: Assume you receive three payments of \$1,200 each at the end of years one, two and three of a transaction and payments of \$1,500 at the end of years four and five of the transaction. The payment stream looks like:



UBPL 764: Real Estate Development Planning

Fall, 2006

Assignment Three: Return on Investment

Part C: Continued

If the discount rate is 9 % APR:

1. What is the PWA of the three payments of \$1,200 ?

2. What is the PWA of the two payments of \$1,500 at the beginning of year four?

3. What is the present value of the amount in number 2 above, discounted at 9 % APR to the beginning of year one?

4. What is the total present value of all five payments discounted at 9 % APR ?

Part D: Assume that you had paid \$5,000 for the stream of payments in Part C above. Is the internal rate of return (IRR) on this transaction higher or lower than the 9% discount factor?

Assume that you had paid \$5,500 for this stream of payments. Is the IRR on the transaction higher or lower than the 9% discount factor?

UBPL 764: Real Estate Development Planning
 Assignment Three: Return on Investment

Fall, 2006

Part E. Using a spreadsheet program and its IRR function, determine the IRR for the following streams of payments.

The form of the Excel IRR function is =IRR(colrow:colrow,x) where the "x" is the expected IRR value and "colrow:colrow" is the range of cells containing the data.

The expected value is entered as a proportion, such as, an expected IRR of 20% is entered as .2 in the function. The range of data should identify the column and row at the beginning and at the end of the data. The first cell should contain the equity expressed as a negative number. The rest of the range should contain the stream of payments with income expressed as positive numbers and losses expressed as negative numbers. For example, if the equity is located in cell B2 and the stream of payments are in cells c2 through g2, then the data range would read B2:G2 in the function.

Equity	EOY 1	EOY 2	EOY 3	EOY 4	EOY 5	IRR
-35000	8000	8000	8000	8000	8000	_____
-35000	0	0	15000	15000	15000	_____
-35000	-10000	0	20000	20000	10000	_____
-35000	10000	20000	20000	0	-10000	_____
-35000	35000	0	0	0	0	_____
-35000	0	0	0	0	35000	_____
-35000	6789	7643	8230	9023	8540	_____

UBPL 764: Real Estate Development Planning
 Assignment Four: Dynamic Cash Flow Analysis

Fall, 2006

ASSIGNMENT FOUR

The following is to be used as input for the preparation of an eight year cash flow analysis describing the financial operation and return on investment performance of a 50 unit residential property. Determine the before tax cash flow from the operation of the property and the internal rate of return before taxes assuming the property is sold after operating for eight years.

Determine if the property will generate a cash on equity return that is positive within the first three years and reaches at least a five percent before tax return on equity by the end of year eight.

If sold at the end of its eighth year of operation, what will be the before tax internal rate of return on the equity invested in this property? Does this investment provide sufficient return to attract an investor who requires a conventional IRR before taxes of greater than 12%? Re-examine this development assuming that BMIR financing is available. What is the impact of lower interest rates upon the return on investment? If 5 of the units are set aside for low income occupancy (rents at \$350 initially) in return for the BMIR financing, would the project generate the necessary return? Prepare a memorandum outlining your results.

The following data provide the necessary information to complete the eight year proforma.

Item:	Data:	Market	Low-Income
Residential units:	50	45	5
Residential rents per month for year one:	825	825	350
Resid. rent inflation per year:	3.00%		
Residential vacancy loss for each year:	5.00%		
Operating expenses for year one:	4,300		
Operating expense inflation per year:	4.50%		
Total development costs:	4,625,000		
Land value:	693,750		
New Construction costs:	3,931,250		
Loan to value ratio:	75.00%		
Market interest APR compounded monthly:	6.50%		
Loan term in years:	30		
BMIR interest APR compounded monthly:	4.50%		
Appreciation of property value per year:	3.00%		
Selling costs as percent of value:	4.50%		

UBPL 764: Real Estate Development Planning
 Assignment Four: Dynamic Cash Flow Analysis

Fall, 2006

PROFORMA: MARKET RATE FINANCING AND ALL MARKET RATE UNITS

OPERATIONS:	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
INCOME Residential	_____	_____	_____	_____	_____	_____	_____	_____
Vacancy loss	_____	_____	_____	_____	_____	_____	_____	_____
EFFECTIVE GROSS INCOME	_____	_____	_____	_____	_____	_____	_____	_____
Operating Expenses	_____	_____	_____	_____	_____	_____	_____	_____
Net Operating Income	_____	_____	_____	_____	_____	_____	_____	_____
Debt Service Payments	_____	_____	_____	_____	_____	_____	_____	_____
BEFORE TAX CASH FL	_____	_____	_____	_____	_____	_____	_____	_____
BEFORE TAX RETURN ON EQUITY	_____	_____	_____	_____	_____	_____	_____	_____
REVERSION:								
MARKET VALUE:	_____	_____	_____	_____	_____	_____	_____	_____
SELLING COSTS:								_____
LOAN BALANCE:								_____
NET SALE PROCEEDS:								_____
BEFORE TAX CASH FLOW WITH REVERSION:	_____	_____	_____	_____	_____	_____	_____	_____
BEFORE TAX IRR WITH REVERSION:								_____

UBPL 764: Real Estate Development Planning
 Assignment Four: Dynamic Cash Flow Analysis

Fall, 2006

PROFORMA: BELOW MARKET INTEREST RATE FINANCING AND ALL MARKET RATE UNITS

OPERATIONS:	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
INCOME Residential	_____	_____	_____	_____	_____	_____	_____	_____
Vacancy loss	_____	_____	_____	_____	_____	_____	_____	_____
EFFECTIVE GROSS INCOME	_____	_____	_____	_____	_____	_____	_____	_____
EXPENSES Operating Expenses	_____	_____	_____	_____	_____	_____	_____	_____
Debt Service Payments	_____	_____	_____	_____	_____	_____	_____	_____
BEFORE TAX CASH FL	_____	_____	_____	_____	_____	_____	_____	_____
BEFORE TAX RETURN ON EQUITY	_____	_____	_____	_____	_____	_____	_____	_____
REVERSION:								
MARKET VALUE:	_____	_____	_____	_____	_____	_____	_____	_____
SELLING COSTS:								_____
LOAN BALANCE:								_____
NET SALE PROCEEDS:								_____
BEFORE TAX CASH FLOW WITH REVERSION:	_____	_____	_____	_____	_____	_____	_____	_____
BEFORE TAX IRR WITH REVERSION:								_____

UBPL 764: Real Estate Development Planning
 Assignment Four: Dynamic Cash Flow Analysis

Fall, 2006

PROFORMA:	BELOW MARKET INTEREST RATE FINANCING WITH SET ASIDE OF LOW-INCOME UNITS							
OPERATIONS:	Year	Year	Year	Year	Year	Year	Year	Year
	1	2	3	4	5	6	7	8
INCOME Residential	_____	_____	_____	_____	_____	_____	_____	_____
Vacancy loss	_____	_____	_____	_____	_____	_____	_____	_____
EFFECTIVE GROSS INCOME	_____	_____	_____	_____	_____	_____	_____	_____
EXPENSES Operating Expenses	_____	_____	_____	_____	_____	_____	_____	_____
Debt Service Payments	_____	_____	_____	_____	_____	_____	_____	_____
BEFORE TAX CASH FL	_____	_____	_____	_____	_____	_____	_____	_____
BEFORE TAX RETURN ON EQUITY	_____	_____	_____	_____	_____	_____	_____	_____
REVERSION:								
MARKET VALUE:	_____	_____	_____	_____	_____	_____	_____	_____
SELLING COSTS:								_____
LOAN BALANCE:								_____
NET SALE PROCEEDS:								_____
BEFORE TAX CASH FLOW WITH REVERSION:	_____	_____	_____	_____	_____	_____	_____	_____
BEFORE TAX IRR WITH REVERSION:								_____

UBPL 764: Real Estate Development Planning
Assignment Five: Dynamic Cash Flow Analysis

Fall, 2006

ASSIGNMENT FIVE

Using the same development analyzed in assignment four, prepare an eight-year dynamic cash flow analysis describing the return on investment of the development both before and after taxes.

Determine if the development achieves a ten percent return on equity before taxes that is positive within the first three years. Also determine if the development achieves a five percent return on equity before the end of year eight.

Assume that the property is sold at the end of eight years of operation. Determine the after tax internal rate of return on investment with this property. Does this development provide sufficient after-tax return to attract an investor who requires an after-tax IRR of at least 10 percent? Run the analysis a second time using the BMIR financing. Does the reduced interest rate change the results? Can the developer be expected to set aside units for low-income households?

Assume that density bonuses are permitted in your community. If the developer sets aside units for low-income, then the total number of units may be increased on a two-for-one basis to a maximum of a 20 percent increase. Thus, setting aside 5 units for low-income will result in a total of 60 units. This revokes BMIR financing. Assume that the construction costs per unit stay the same, and land costs are constant. Is this alternative better?

The following data provide the necessary information to complete the eight year proforma.

Item:	Data:			
Residential units:	Total	50 Market-Rate	45 Low-Income	5
Residential rents per month for year one:			825	400
Resid. rent inflation per year:		3.00%		
Residential vacancy loss per year:		5.00%		
Operating expenses per unit for year one:		4,300		
Operating expenses inflation per year:		4.50%		
Total development costs:		4,625,000		
Land value:		693,750		
New Construction costs:		3,931,250		
Loan to value ratio:		75%		
Market interest APR compounded monthly:		6.25%		
Loan term in years:		30		
BMIR interest APR compounded monthly:		4.25%		
Appreciation of property value per year:		3.0%		
Selling costs as percent of value:		4.5%		
Income tax rate of the owner:		28.0%		
Capital gains tax rate of owner:		15.0%		
Recapture rate on Cumulative Depreciation		25.0%		

UBPL 764: Real Estate Development Planning
 Assignment Five: Dynamic Cash Flow Analysis

Fall, 2006

PROFORMA:		Eight Year Cash Flow Analysis:							
OPERATIONS:		Year	Year	Year	Year	Year	Year	Year	Year
		1	2	3	4	5	6	7	8
INCOME	Residential	_____	_____	_____	_____	_____	_____	_____	_____
	Vacancy loss	_____	_____	_____	_____	_____	_____	_____	_____
EFFECTIVE GROSS INCOME		_____	_____	_____	_____	_____	_____	_____	_____
EXPENSES	Operating Expenses	_____	_____	_____	_____	_____	_____	_____	_____
	Net Operation Income	_____	_____	_____	_____	_____	_____	_____	_____
	Debt Service Payments	_____	_____	_____	_____	_____	_____	_____	_____
BEFORE TAX CASH FLOW		_____	_____	_____	_____	_____	_____	_____	_____
BEFORE TAX RETURN ON EQUITY		_____	_____	_____	_____	_____	_____	_____	_____
TAX CALCULATIONS ON OPERATIONS:									
DEDUCTIONS AVAILABLE	Operating Expenses	_____	_____	_____	_____	_____	_____	_____	_____
	Interest Payments	_____	_____	_____	_____	_____	_____	_____	_____
	Depreciation Expenses	_____	_____	_____	_____	_____	_____	_____	_____
EFFECTIVE GROSS INCOME		_____	_____	_____	_____	_____	_____	_____	_____
DEDUCTIONS CLAIMED	Operating Expenses	_____	_____	_____	_____	_____	_____	_____	_____
	Income Remaining	_____	_____	_____	_____	_____	_____	_____	_____
	Current Interest Claimed	_____	_____	_____	_____	_____	_____	_____	_____
	Surplus Current Interest	_____	_____	_____	_____	_____	_____	_____	_____
	Income Remaining	_____	_____	_____	_____	_____	_____	_____	_____
	Banked Interest BOY	_____	_____	_____	_____	_____	_____	_____	_____
	Draw of Banked Interest	_____	_____	_____	_____	_____	_____	_____	_____
	Balance Banked Int EOY	_____	_____	_____	_____	_____	_____	_____	_____
	Income Remaining	_____	_____	_____	_____	_____	_____	_____	_____
	Current Deprec Claimed	_____	_____	_____	_____	_____	_____	_____	_____
	Surplus Current Deprec	_____	_____	_____	_____	_____	_____	_____	_____
	Income Remaining	_____	_____	_____	_____	_____	_____	_____	_____
	Banked Deprec BOY	_____	_____	_____	_____	_____	_____	_____	_____
	Draw Banked Deprec	_____	_____	_____	_____	_____	_____	_____	_____
	Balance Banked Deprec E	_____	_____	_____	_____	_____	_____	_____	_____
	Income Remaining	_____	_____	_____	_____	_____	_____	_____	_____
	Tax on Remain Income	_____	_____	_____	_____	_____	_____	_____	_____
AFTER TAX CASH FLOW:		_____	_____	_____	_____	_____	_____	_____	_____
AFTER TAX RETURN ON EQUITY:		_____	_____	_____	_____	_____	_____	_____	_____

UBPL 764: Real Estate Development Planning
 Assignment Five: Dynamic Cash Flow Analysis

Fall, 2006

REVERSION:

Sale of Property at the End of Eight Years of Operation:

	Year	Year	Year	Year	Year	Year	Year	Year	Year
	1	2	3	4	5	6	7	8	
Property Value	_____	_____	_____	_____	_____	_____	_____	_____	_____
Selling Costs									_____
Loan Balance									_____
Net Sale Proceeds									_____
Total Bef Tax Cash Flow	_____	_____	_____	_____	_____	_____	_____	_____	_____
Internal Rate of Return Before Tax									_____
Capital Gain									_____
Tax on Capital Gain									_____
Cummulative Depreciation									_____
Recapture of Cumm. Deprec.									_____
After Tax Cash Flow on Reversion									_____
Total Aft Tax Cash Flow	_____	_____	_____	_____	_____	_____	_____	_____	_____
Internal Rate of Return After Tax									_____

UBPL 764: Real Estate Development Planning
Assignment Six: Historic Rehabilitation Tax Credit

Fall, 2006

ASSIGNMENT

For this assignment, the same development analyzed in assignments four and five will be used again. However, in this case, the alternative development proposals will be compared to assess the costs and benefits of using Historic Rehabilitation Tax Credits.

Prepare eight year dynamic cash flow proformas for three alternatives. These alternatives are:

1. Demolition of the existing building on the site and development of 50 units, all new construction.
2. Rehabilitation of the existing structure for 42 units meeting the requires for Historic Rehabilitation Tax Credits.
3. Mixed new construction and rehabilitation. This alternative will have 46 units but will not qualify for use of the tax credits.

Item	Alternative:		
	New Cons.	His.Rehab	Mixed
Residential units:	50	42	46
Residential rents per month for year one:	825	875	850
Resid. rent inflation per year:	3.00%	3.00%	3.00%
Residential vacancy loss per year:	5.00%	5.00%	5.00%
Operating expenses per unit for year one:	4300	4800	4400
Operating expenses inflation per year:	4.50%	6.50%	5.00%
Total development costs:	4,625,000	4,620,000	4,600,000
Land value:	675,000	500,000	500,000
New Construction costs:	3,950,000	-	2,000,000
Rehabilitation costs:	-	4,120,000	2,100,000
Loan to value ratio:	75.00%	75.00%	75.00%
Market interest APR compounded monthly:	6.25%	6.50%	6.25%
Loan term in years:	30	30	30
Appreciation of property value per year:	3.00%	3.00%	3.00%
Selling costs as percent of value:	4.50%	4.50%	4.50%
Capital gains tax rate of owner:	15.00%	15.00%	15.00%
Recapture Rate on Depreciation:	25.00%	25.00%	25.00%
Income tax rate of owner:	28.00%	28.00%	28.00%
Syndication net proceeds:		90.00%	

UBPL 764: Real Estate Development Planning
 Assignment Six: Historic Rehabilitation Tax Credit

Fall, 2006

Operations	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Gross possible income:	_____	_____	_____	_____	_____	_____	_____	_____
Vacancy loss:	_____	_____	_____	_____	_____	_____	_____	_____
Effective gross income:	_____	_____	_____	_____	_____	_____	_____	_____
Operating expenses:	_____	_____	_____	_____	_____	_____	_____	_____
Net operating income:	_____	_____	_____	_____	_____	_____	_____	_____
Debt service:	_____	_____	_____	_____	_____	_____	_____	_____
Before tax cash flow:	_____	_____	_____	_____	_____	_____	_____	_____
Return on equity:	_____	_____	_____	_____	_____	_____	_____	_____
Tax calculations:	_____	_____	_____	_____	_____	_____	_____	_____
Deductions Available:	_____	_____	_____	_____	_____	_____	_____	_____
Operating expenses:	_____	_____	_____	_____	_____	_____	_____	_____
Interest expenses:	_____	_____	_____	_____	_____	_____	_____	_____
Depreciation expenses:	_____	_____	_____	_____	_____	_____	_____	_____
Effective gross income:	_____	_____	_____	_____	_____	_____	_____	_____
Deductions claimed:	_____	_____	_____	_____	_____	_____	_____	_____
OPEX claimed:	_____	_____	_____	_____	_____	_____	_____	_____
Income remaining:	_____	_____	_____	_____	_____	_____	_____	_____
Current interest claimed:	_____	_____	_____	_____	_____	_____	_____	_____
Surplus current interest:	_____	_____	_____	_____	_____	_____	_____	_____
Income remaining:	_____	_____	_____	_____	_____	_____	_____	_____
Banked interest BOY:	_____	_____	_____	_____	_____	_____	_____	_____
Draw on banked interest:	_____	_____	_____	_____	_____	_____	_____	_____
Bal banked interest EOY:	_____	_____	_____	_____	_____	_____	_____	_____
Income remaining:	_____	_____	_____	_____	_____	_____	_____	_____
Current deprec claimed:	_____	_____	_____	_____	_____	_____	_____	_____
Surplus deprec:	_____	_____	_____	_____	_____	_____	_____	_____
Income remaining:	_____	_____	_____	_____	_____	_____	_____	_____
Banked deprec BOY:	_____	_____	_____	_____	_____	_____	_____	_____
Draw banked deprec:	_____	_____	_____	_____	_____	_____	_____	_____
Bal banked deprec. EOY:	_____	_____	_____	_____	_____	_____	_____	_____
Income remaining:	_____	_____	_____	_____	_____	_____	_____	_____
Tax on remaining income:	_____	_____	_____	_____	_____	_____	_____	_____
After tax cash flow:	_____	_____	_____	_____	_____	_____	_____	_____
Return on equity:	_____	_____	_____	_____	_____	_____	_____	_____

UBPL 764: Real Estate Development Planning
 Assignment Six: Historic Rehabilitation Tax Credit

Fall, 2006

Reversion	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Property value:	_____	_____	_____	_____	_____	_____	_____	_____
Selling costs:	_____	_____	_____	_____	_____	_____	_____	_____
Loan balance:	_____	_____	_____	_____	_____	_____	_____	_____
Net sale proceeds:	_____	_____	_____	_____	_____	_____	_____	_____
Cash flow before tax:	_____	_____	_____	_____	_____	_____	_____	_____
IRR before taxes:	_____	_____	_____	_____	_____	_____	_____	_____
Capital gain:	_____	_____	_____	_____	_____	_____	_____	_____
Tax on capital gain:	_____	_____	_____	_____	_____	_____	_____	_____
Recapture of credit:	_____	_____	_____	_____	_____	_____	_____	_____
Cash flow after tax:	_____	_____	_____	_____	_____	_____	_____	_____
Total cash flow AT:	_____	_____	_____	_____	_____	_____	_____	_____
IRR after taxes:	_____	_____	_____	_____	_____	_____	_____	_____
Rehabilitation Tax Credit Calculations:								
Total Development Costs:	_____							
Land Costs:	_____							
Deprec. Basis before Credit:	_____							
Hist. Rehab. Costs:	_____							
Credit (20% of Costs):	_____							
Syndication Proceeds:	_____							
Deprec. Basis after Credit:	_____							
Sources of financing:								
Conventional loan:	_____							
Equity:	_____							
Syndication:	_____							
Developer's cash:	_____							

UBPL 764: Real Estate Development Planning
 Assignment Seven: Low-Income Housing Tax Credits

Fall, 2006

Assignment Seven: Use of Low-Income Housing Tax Credits

Using the same development analyzed in Assignment Four, prepare a fifteen year pro forma describing the return on investment of the development both before and after taxes. This time, assume that the city and the developer are negotiating over the inclusion of low-income housing units. The city wants some of the units set aside for low- and moderate-income households. Examine alternatives: 1.) all market rate units; 2.) all low-income units; and 3.) all moderate-income units. Examine additional alternatives that provide for BMIR financing, alternative rates of property appreciation, local grants/loans, local property tax abatements of up to 50% on property taxes that are 25% of operating expenses. Assume that the lender will lend no more than what the first-year NOI will support with a DCR of 1.1. What position should the City take? Examine many alternative and determine a negotiating position for the City. Note that return on reversion calculations need to be made only for sale at the end of year fifteen.

Alternative: Market Rate	100% market rate	0% mod-income	0% low-income	
Financing: BMIR Loan	No Grant	\$ -	Appreciation 1	0% Debt Coverage Ratio 1.1
		Units:		
		Number	Rent	Syndication and Tax Credit Calculations:
Residential units:	Low-Income	0	400	Total development costs: 4,500,000
	Moderate-Income	0	500	Land Costs: 675,000
	Market-Rate	50	850	Depreciable Basis: 3,825,000
	Total Units	50		
Rent inflation rate per year:		3.0%		Eligible Percentage: 0%
Vacancy rate:		5.0%		Credit Basis: 0
Operating expenses per unit year one:		4,300		Credit Percentage (8.3% or 3.5%): 8%
Operating expense inflation rate:		3.5%		Annual Credit Amount: 0
Total development costs:		4,500,000		Total Credit Amount: 0
Land value:		675,000		Percent Syndicated: 99%
Value of Existing Building:		-		Amount Syndicated: 0
New Construction costs:		3,825,000		Percent to Developer: 75%
BMIR Loans (Grants) from City		-		Syndication Proceeds: 0
Loan interest rate (APR):		7.5%		
Maximum Loan to value ratio:		75.0%		Sources of financing: Percent of TDC:
Loan term in years:		30		Loan Amount: 65% 2,919,943
Debt Coverage Ratio:		1.1		Syndication Proceeds: 0% -
Property value appreciation rate:		3.0%		Developer's Cash: 35% 1,580,057
Brokerage rate:		4.5%		Grants from the City: 0% -
Tax abatement on low- or mod-income units:		0%		Total Development: 100% 4,500,000
Property tax as a percent of op. expenses:		25%		
Percent of Credits Syndicated:		99%		Maximum Return on Equity: 8.8%
Syndication Proceeds as Percent of Credits:		75%		Average Return on Equity: 5.0%
Capital Gains Tax Rate:		15%		After Tax IRR at EOY 15: 8.8%
Depreciation Recapture Rate:		25%		LVR conventional loan: 64.9%
Income tax rate of investor:		28%		Capitalization Rate: 5.5%
Depreciable life:		27.5 years		

UBPL 764: Real Estate Development Planning
 Assignment Seven: Low-Income Housing Tax Credits

Fall, 2006

Alternative:

1

Proforma:	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Operations															
Gross possible income:															
Vacancy loss:															
Effective gross income:															
Operating expenses:															
Net operating income:															
Debt service:															
Before tax cash flow:															
Return on equity:															
Tax calculations:															
Deductions Available:															
Operating expenses:															
Interest expenses:															
Depreciation expenses:															
Effective gross income:															
Deductions claimed:															
OPEX claimed:															
Income remaining:															
Current interest claimed:															
Surplus current interest:															
Income remaining:															
Banked interest BOY:															
Draw on banked interest:															
Bal banked interest EOY:															
Income remaining:															
Current deprec claimed:															
Surplus deprec:															
Income remaining:															
Banked deprec BOY:															
Draw banked deprec:															
Bal banked deprec. EOY:															
Income remaining:															
Tax on remaining income:															
After tax cash flow:															
Return on equity:															
Reversion															
Property value:															
Selling costs:															
Loan balance:															
Net sale proceeds:															
Total CF before Taxes:															
IRR before Taxes:															
Capital gain:															
Tax on capital gain:															
Cummulative depreciation:															
Recapture on depreciation:															
CF Reversion after taxes:															
Total CF after Taxes:															
IRR after taxes:															
CF Reversion after taxes:															
Total CF after Taxes:															
IRR after taxes:															

UBPL 764: Real Estate Development Planning I

Fall, 2006

Supplementary Materials

BASIC DISCOUNTING FORMULAS

Number of Payments

Single Payment

Multiple Payments

Time Value of

Money at Time:

Present	$PV = FV * \{1 / [(1+i)^n]\}$	$PWA = PMT * \{[1 - (1/(1+i)^n)] / i\}$
Future	$FV = PV * (1+i)^n$	$SF = PMT * \{[(1+i)^n - 1] / i\}$

Payment Amount for
Borrowing at Time:

Present	$PMT = PV * (1+i)^n$	$PMT = PV * \{S / S_n\}$
Future	$PMT = FV * \{1 / [(1+i)^n]\}$	$PMT = FV * SFF$

Where: $S = \{(1+i)^n\}$	Compound Interest Factor or Amount \$1 at Compound Interest
$S_n = \{[(1+i)^n - 1] / i\}$	Ordinary Annuity Factor or Accumulation of \$1 per Period
S / S_n	Loan Constant or Installment to Amortize \$1
$SFF = \{i / [(1+i)^n - 1]\}$	Sinking Fund Factor

Terms:	i	Interest rate per period
	n	Number of periods
	PV	Present Value
	FV	Future Value
	PWA	Present Worth of an Annuity
	PMT	Payment
	SF	Sinking Fund

PREPARATION OF AMORTIZATION TABLES

Amortization tables list the payments made on a level payment, fully amortized loan. Within each payment, the amount that is payment of interest and the amount that is repayment of principal are listed separately. This is necessary in order to know the amount of interest paid in any one year as only the interest part of the payment is deductible for tax purposes. In addition, it is necessary to know the amount of principal repaid at any point in order to determine the amount of the loan which is outstanding in the event that the loan is prepaid upon sale of a property.

The following is an example:

Total Development Costs:	\$1,000,000
Loan to Value Ratio:	75.0%
Loan Interest Rate:	11.0% APR Comp. Monthly
Term of Loan:	25 Yrs paid Monthly
Loan Amount:	\$750,000
Payment Periods:	300
Interest Rate per Period:	0.009167
Monthly Payment:	\$7,350.85

Columns within an Amortization Table:

Balance of Loan Outstanding at the Beginning of Period:

For the first period it is the face value of the loan, and for later periods it is the balance at the end of the prior period.

Payment of Principal and Interest:

This is the monthly payment calculated as the loan amount multiplied by the loan constant.

Payment of Interest:

The amount of the payment which goes to interest is the interest rate for the period times the principal outstanding at the beginning of the period.

Payment of Principal:

The amount of the payment which goes to principal is simply the total payment minus the amount which goes to interest.

Balance of Principal at the End of the Period:

The balance of the loan at the end of the period is the balance at the beginning of the period minus the amount of the payment made to principal.

AMORTIZATION TABLE FOR YEAR ONE OF THE LOAN

Payment Number	Balance Begin Month	Payment Amount	Interest Amount	Principal Amount	Balance End of Month
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5
	COL5 PRIOR MNTH	LOAN*CONST	COL1*INT	COL2-COL3	COL1-COL4
1	750000.00	7350.85	6875.00	475.85	749524.15
2	749524.15	7350.85	6870.64	480.21	749043.94
3	749043.94	7350.85	6866.24	484.61	748559.33
4	748559.33	7350.85	6861.79	489.05	748070.28
5	748070.28	7350.85	6857.31	493.54	747576.74
6	747576.74	7350.85	6852.79	498.06	747078.68
7	747078.68	7350.85	6848.22	502.63	746576.05
8	746576.05	7350.85	6843.61	507.23	746068.82
9	746068.82	7350.85	6838.96	511.88	745556.93
10	745556.93	7350.85	6834.27	516.58	745040.36
11	745040.36	7350.85	6829.54	521.31	744519.04
12	744519.04	7350.85	6824.76	526.09	743992.95

Totals: 88210.18 82203.13 6007.05

In some cases, it is necessary to know the total paid to interest and the outstanding loan amount without calculating the the entire amortization table.

At any given point during the life of a loan, the balance of the loan for the remaining periods is the present value of all the payments for the remaining term of the loan at the same interest rate. For example, the balance of the above loan after the first year is the present value of a loan of 288 payments (300 -12) at 11% APR compounded monthly with payments of \$7,350.85 per month. This amount is:

\$743,992.95 The formula is =PV(.11/12,300-12, 7350.85)

The loan outstanding at the end of the second year is:

\$737,290.78 The formula is =PV(.11/12,300-24, 7350.85)

The difference between these two figures is the total paid to principal during year 2 or \$6,702.77. The interest paid is the total payment of \$88,210.18 minus the amount paid to principal or \$81,507.41 (\$88,210.18 - \$6,702.77).

EXAMPLES USING INTERNAL RATES OF RETURN

Internal rate of return is an annual interest rate. It describes the yield on an investment held over a period of time with either regular or irregular cash flows. The yield is that interest rate which, when used to discount to the cash flows, will cause the sum of the discounted cash flows to equal the initial equity investment.

While the internal rate of return is the most popular measurement of yield on real estate investment, it does have complications. First, the IRR is not always a single unique number; multiple rates can satisfy the requirements of discounting the cash flows to equal the equity. This can lead to erroneous conclusions. Second, the IRR treats cash flows during operation as having the same value as the cash flow from reversion. This is rarely the case in real estate where the reversion funds are usually much larger than the cash flows from operation.

Several alternatives to the conventional IRR exist to correct these problems. Some of these are described below.

Examples of Multiple Solutions to IRR:

Time:	0	1	2	IRR 1:	IRR 2:
Amount:	-1600	10000	-10000	400%	25%
Amount:	-1000	1200	-100	-91%	11%

Note: With both examples, two IRR's are mathematically correct. Thus, non-unique solutions can occur including solutions of different signs.

Examples of Alternative Approaches to IRR Measurement:

Data used for Conventional IRR, Modified IRR, FMIRR, and ARR:

Time Period:	0	1	2	3	4
Payment of:	Equity:	Cash	Cash	Cash	Cash Flow
		Flow:	Flow:	Flow:	+ Reversion:
Amount:	-1000	-100	200	400	1400

Examples of Internal Rate of Return

1. CONVENTIONAL IRR

The conventional IRR treats all payments equally assuming that cash flows have the same value as reversion funds. It may have multiple solutions.

The conventional IRR is that interest rate that discounts all earnings back to the initial period such that the sum of the discounted earnings equals the equity.

Conventional IRR: 18.77%

2. MODIFIED IRR

The modified IRR discounts losses back to the initial period at a selected discount rate and all earnings forward to the reversion date at the same discount rate. The values are used to form a ratio of earnings over losses. The result is converted to an annual rate of return to determine the modified IRR. This approach eliminates the possibility of multiple solutions but is sensitive to the discount rate selected and can cause losses to be carried back past years that experienced earnings.

Discount all losses, including equity, to the initial period using a discount rate of 10%. Inflate all earnings forward to year 4 using a discount rate of 10%. Annualized the ratio of earnings to losses to find a modified IRR.

Discounted Losses: -1091 Inflated Earnings: 2082
 Earnings/Losses: $(2082/1091) = 1.908341$
 $MIRE: ((1.908341)^{(1/n)}) - 1$
 Modified IRR: 17.54%

3. FINANCIAL MANAGEMENT IRR

The financial management IRR makes the same type of adjustments as the modified IRR but uses separate discount rates for the losses and the earnings to reflect the different interest rates associated with borrowing to cover losses and investing to gain on deposits. Like the modified IRR it is sensitive to the interest rates selected and has the same problem of discounting losses back past years that experienced earnings.

Discount all losses to the initial period at a discount rate of 12%. Inflate all earnings to the end of year 4 at a discount rate of 8%.

Examples of Internal Rate of Return**3. FINANCIAL MANAGEMENT IRR (cntd.)**

Discounted Losses: -1089 Inflated Earnings: 2065
 Earnings/Losses: $(2065/1089) = 1.896235$
 FMIRR: $((1.896235)^{(1/4)})-1$

Financial Management IRR: 17.34%

4. ADJUSTED RATE OF RETURN

The adjusted rate of return method maintains a balance in an account holding the cash flows with different interest rates applied to negative balances and positive balances. This most closely approximates the actual use of funds in a development. The ending balance and the initial equity form a ratio which is converted to an annualized rate of return.

Balance earns 8% on positive amounts and pays 12% on Losses.

Time Period:	1	2	3	4
Cash flow amount:	-100	200	400	1400
Cash flow balance:	-100	88	495	1935

End Balance/Equity: $(1935/1000) = 1.935$

ARR: $((1.935)^{(1/4)})-1$

Adjusted Rate of Return: 17.94%

Sample development using market financing

The following data have been used to prepare the pro forma on the next page.

Sample Pro Forma

Input Data

Item:	Data:
	Total
Residential units:	40
Residential rents per month for year one:	900
Resid. rent inflation per year:	3.50%
Residential vacancy loss per year:	5.00%
Operating expenses per unit for year one:	3,500
Operating expenses inflation per year:	4.50%
Total development costs:	4,560,000
Land value:	684,000
New Construction:	3,876,000
Loan to value ratio:	75.00%
Market interest APR compounded monthly:	7.25%
Loan term in years:	30
Appreciation of property value per year:	3.00%
Selling costs as percent of value:	4.50%
Income tax rate of the owner:	28.00%
Capital gains tax rate of owner:	15.00%
Recapture rate on Cumulative Depreciation	25.00%

Pro Forma for Operations

		Year	Year	Year	Year	Year	Year	Year	Year
		1	2	3	4	5	6	7	8
OPERATIONS:									
INCOME	Residential	432,000	447,120	462,769	478,966	495,730	513,080	531,038	549,625
	Vacancy loss	21,600	22,356	23,138	23,948	24,786	25,654	26,552	27,481
EFFECTIVE GROSS INCOME		410,400	424,764	439,631	455,018	470,943	487,426	504,486	522,143
EXPENSES	Operating Expenses	140,000	146,300	152,884	159,763	166,953	174,465	182,316	190,521
	Net Operating Income	270,400	282,568	295,284	308,571	322,457	336,968	352,131	367,977
	Debt Service Payments	279,965	279,965	279,965	279,965	279,965	279,965	279,965	279,965
BEF TAX CASH FLOW	1140000	-9,565	-1,501	6,782	15,289	24,026	32,996	42,205	51,658
BEF TAX RETURN ON EQUITY		-0.84%	-0.13%	0.59%	1.34%	2.11%	2.89%	3.70%	4.53%

TAX CALCULATIONS ON OPERATIONS:

DEDUCTIONS	Operating Expenses	140,000	146,300	152,884	159,763	166,953	174,465	182,316	190,521
AVAILABLE	Interest Payments	246,864	244,383	241,716	238,849	235,767	232,454	228,893	225,064
	Depreciation Expenses	140,945	140,945	140,945	140,945	140,945	140,945	140,945	140,945
EFFECTIVE GROSS INCOME		410,400	424,764	439,631	455,018	470,943	487,426	504,486	522,143
DEDUCTIONS	Operating Expenses	140,000	146,300	152,884	159,763	166,953	174,465	182,316	190,521
CLAIMED	Income Remaining	270,400	278,464	286,747	295,255	303,991	312,961	322,170	331,623
	Current Interest Claimed	246,864	244,383	241,716	238,849	235,767	232,454	228,893	225,064
	Surplus Current Interest	0	0	0	0	0	0	0	0
	Income Remaining	23,536	34,081	45,031	56,406	68,224	80,507	93,277	106,558
	Banked Interest BOY	0	0	0	0	0	0	0	0
	Draw of Banked Interest	0	0	0	0	0	0	0	0
	Balance Banked Int EOY	0	0	0	0	0	0	0	0
	Income Remaining	23,536	34,081	45,031	56,406	68,224	80,507	93,277	106,558
	Current Deprec Claimed	23,536	34,081	45,031	56,406	68,224	80,507	93,277	106,558
	Surplus Current Deprec	117,410	106,865	95,914	84,540	72,722	60,438	47,668	34,387
	Income Remaining	0	0	0	0	0	0	0	0
	Banked Deprec BOY	0	117,410	224,275	320,189	404,729	477,451	537,889	585,557
	Draw Banked Deprec	0	0	0	0	0	0	0	0
	Balance Banked Deprec EOY	117,410	224,275	320,189	404,729	477,451	537,889	585,557	619,944
	Income Remaining	0	0	0	0	0	0	0	0
	Tax on Remain Income	0	0	0	0	0	0	0	0
AFTER TAX CASH FLOW:	1,140,000	-9,565	-1,501	6,782	15,289	24,026	32,996	42,205	51,658
AFTER TAX RETURN ON EQUITY:		-0.84%	-0.13%	0.59%	1.34%	2.11%	2.89%	3.70%	4.53%

Pro Forma for Reversion

Property Value	4,560,000	4,696,800	4,837,704	4,982,835	5,132,320	5,286,290	5,444,878	5,608,225	5,776,472
Selling Costs									259,941
Loan Balance									3,074,270
Net Sale Proceeds									2,442,261
Total Bef Tax Cash Flow	-1,140,000	-9,565	-1,501	6,782	15,289	24,026	32,996	42,205	2,493,918
Internal Rate of Return Before Tax									11.00%
Capital Gain									956,530
Tax on Capital Gain									143,480
Cummulative Depreciation									507,619
Recapture of Cumm. Deprec.									126,905
After Tax Cash Flow on Reversion									2,171,876
Total Aft Tax Cash Flow	-1,140,000	-9,565	-1,501	6,782	15,289	24,026	32,996	42,205	2,223,534

Return on Investment

Internal Rate of Return After Tax									9.48%
After Tax Return on Equity		-0.8%	-0.1%	0.6%	1.3%	2.1%	2.9%	3.7%	4.5%
Capitalization Rate		5.8%	5.8%	5.9%	6.0%	6.1%	6.2%	6.3%	6.4%

Sample Development Using the Historic Rehabilitation Tax Credit

HISTORIC REHABILITATION TAX CREDIT

Income earning properties listed as historic buildings are permitted special tax credits when they are rehabilitated. The credit:

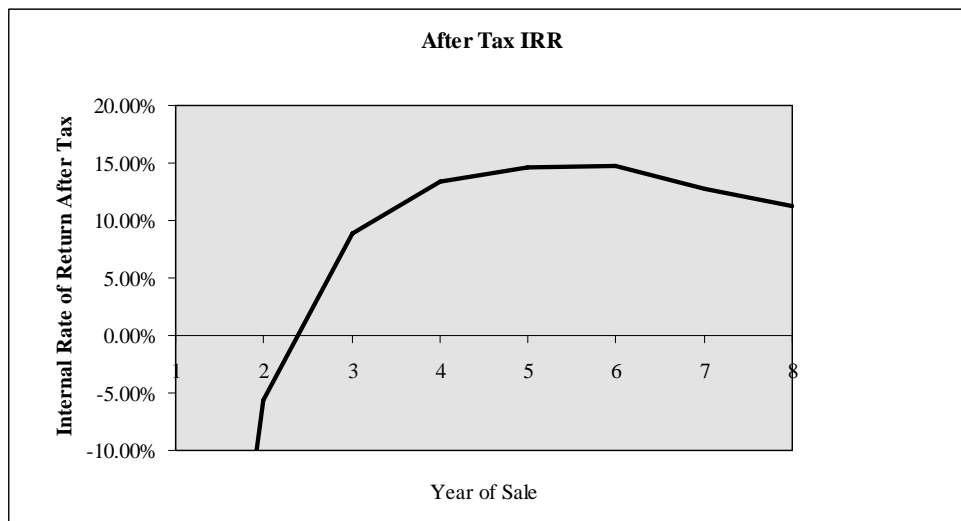
- is calculated as 20 percent of the cost of rehabilitation,
- must be claimed during the first year of operation following the rehabilitation work,
- causes the depreciable basis to be reduced by an amount equal to 100 percent of the amount of the credit,
- must be repaid if the property is sold during the first five years at the rate of 100% if sold in the first year, 80% if sold in the second year, and so on through year five.

If a development or its owner do not have sufficient income to make use of the tax credit, within certain restrictions, the credits may be sold to investors who can claim the credit against their own income. The investor will pay the owner some percentage of the value of the credit. The investor usually pays the owner prior to the time the credit is claimed. This payment serves to reduce the developer's equity requirement.

The following analysis has been prepared on a mixed historic rehabilitation and new construction rental housing development.

Item	His.Rehab
Residential units:	40
Residential rents per month for year one:	850
Resid. rent inflation per year:	3.0%
Residential vacancy loss per year:	5.0%
Operating expenses per unit for year one:	\$4,500
Operating expenses inflation per year:	4.5%
Total development costs:	4,800,000
Land value:	500,000
New Construction costs:	-
Rehabilitation costs:	4,300,000
Loan to value ratio:	75.0%
Market interest APR compounded monthly:	8.0%
Loan term in years:	30
Appreciation of property value per year:	2.5%
Selling costs as percent of value:	4.5%
Capital gains tax rate of owner:	15%
Recapture Rate on Depreciation:	25%
Income tax rate of owner:	28%
Syndication net proceeds:	90%

Proforma Operations	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Gross possible income:	408,000	420,240	432,847	445,833	459,208	472,984	487,173	501,789
Vacancy loss:	20,400	21,012	21,642	22,292	22,960	23,649	24,359	25,089
Effective gross income:	387,600	399,228	411,205	423,541	436,247	449,335	462,815	476,699
Operating expenses:	180,000	188,100	196,565	205,410	214,653	224,313	234,407	244,955
Net operating income:	207,600	211,128	214,640	218,131	221,594	225,022	228,408	231,744
Debt service:	316,986	316,986	316,986	316,986	316,986	316,986	316,986	316,986
Before tax cash flow:	-109,386	-105,858	-102,346	-98,855	-95,392	-91,964	-88,578	-85,242
Return on equity:	426,000	-25.7%	-24.8%	-24.0%	-23.2%	-22.4%	-21.6%	-20.8%
Tax calculations:								
Deductions Available:								
Operating expenses:	180,000	188,100	196,565	205,410	214,653	224,313	234,407	244,955
Interest expenses:	286,913	284,417	281,714	278,786	275,616	272,182	268,463	264,436
Depreciation expenses:	125,091	125,091	125,091	125,091	125,091	125,091	125,091	125,091
Effective gross income:	387,600	399,228	411,205	423,541	436,247	449,335	462,815	476,699
Deductions claimed:								
OPEX claimed:	180,000	188,100	196,565	205,410	214,653	224,313	234,407	244,955
Income remaining:	207,600	211,128	214,640	218,131	221,594	225,022	228,408	231,744
Current interest claimed:								
Surplus current interest:	79,313	73,289	67,074	60,655	54,022	47,160	40,055	32,692
Income remaining:	0	0	0	0	0	0	0	0
Banked interest BOY:	0	79,313	152,602	219,676	280,331	334,353	381,513	421,569
Draw on banked interest:	0	0	0	0	0	0	0	0
Bal banked interest EOY:	79,313	152,602	219,676	280,331	334,353	381,513	421,569	454,261
Income remaining:	0	0	0	0	0	0	0	0
Current deprec claimed:								
Surplus deprec:	125,091	125,091	125,091	125,091	125,091	125,091	125,091	125,091
Income remaining:	0	0	0	0	0	0	0	0
Banked deprec BOY:	0	125,091	250,182	375,273	500,364	625,455	750,545	875,636
Draw banked deprec:	0	0	0	0	0	0	0	0
Bal banked deprec. EOY:	125,091	250,182	375,273	500,364	625,455	750,545	875,636	1,000,727
Income remaining:	0	0	0	0	0	0	0	0
Tax on remaining income:	0	0	0	0	0	0	0	0
After tax cash flow:	-109,386	-105,858	-102,346	-98,855	-95,392	-91,964	-88,578	-85,242
Return on equity:		-25.7%	-24.8%	-24.0%	-23.2%	-22.4%	-21.6%	-20.8%



Reversion

Property value:	4,800,000	4,920,000	5,043,000	5,169,075	5,298,302	5,430,759	5,566,528	5,705,692	5,848,334
Selling costs:		221,400	226,935	232,608	238,424	244,384	250,494	256,756	263,175
Loan balance:		3,569,927	3,537,358	3,502,085	3,463,885	3,422,515	3,377,711	3,329,188	3,276,637
Net sale proceeds:		1,128,673	1,278,707	1,434,381	1,595,993	1,763,860	1,938,324	2,119,748	2,308,522
Cash flow before tax:	-426,000	1,019,287	1,172,849	1,332,035	1,497,138	1,668,468	1,846,360	2,031,170	2,223,279
IRR before taxes:		139.3%	53.6%	32.8%	23.8%	18.9%	15.8%	13.7%	12.3%
Capital gain:		-101,400	16,065	136,467	259,878	386,375	516,035	648,935	785,159
Tax on capital gain:		0	2,410	20,470	38,982	57,956	77,405	97,340	117,774
Cummulative Depreciation:		0	0	0	0	0	0	0	0
Recapture of Depreciation:		0	0	0	0	0	0	0	0
Recapture of credit:		860,000	688,000	516,000	344,000	172,000	0	0	0
Cash flow after tax:		268,673	588,298	897,911	1,213,011	1,533,904	1,860,919	2,022,408	2,190,748
Total cash flow AT:	-426,000	159,287	482,439	795,565	1,114,156	1,438,512	1,768,954	1,933,829	2,105,506
IRR after taxes:		-62.6%	-5.6%	8.9%	13.3%	14.6%	14.8%	12.7%	11.3%

Item

Rehabilitation Tax Credit Calculations:

Residential units:	40	Total Development Costs:	4800000
Residential rents per month for year one:	850	Land Costs:	500000
Resid. rent inflation per year:	3.0%	Deprec. Basis before Credit:	4300000
Residential vacancy loss per year:	5.0%	Hist. Rehab. Costs:	4300000
Operating expenses per unit for year one:	4500	Credit (20% of Costs):	860000
Operating expenses inflation per year:	4.5%	Syndication Proceeds	774000
Total development costs:	4800000	Deprec. Basis after Credit:	3440000
Land value:	500000	Sources of financing:	
New Construction costs:	0	Conventional loan:	3600000
Rehabilitation costs:	4300000	Equity:	
Loan to value ratio:	75.0%	Syndication:	774000
Market interest APR compounded monthly:	8.0%	Developer's cash:	426000
Loan term in years:	30		
Appreciation of property value per year:	2.5%		
Selling costs as percent of value:	4.5%		
Capital gains tax rate of owner:	15.0%		
Recapture Rate on Depreciation:	25.0%		
Income tax rate of owner:	28.0%		
Syndication net proceeds:	90.0%		

IRR TABLES

YRSOLD	BTIRR	EQUITY	CFY1	CFY2	CFY3	CFY4	CFY5	CFY6	CFY7	CFY8
8	12.27%	-426000	-109386	-105858	-102346	-98855	-95392	-91964	-88578	2223279
7	13.73%	-426000	-109386	-105858	-102346	-98855	-95392	-91964	2031170	
6	15.79%	-426000	-109386	-105858	-102346	-98855	-95392	1846360		
5	18.85%	-426000	-109386	-105858	-102346	-98855	1668468			
4	23.80%	-426000	-109386	-105858	-102346	1497138				
3	32.83%	-426000	-109386	-105858	1332035					
2	53.58%	-426000	-109386	1172849						
1	139.27%	-426000	1019287							

YR SOLD	ATIRR	EQUITY	CFY1	CFY2	CFY3	CFY4	CFY5	CFY6	CFY7	CFY8
8	11.29%	-426000	-109386	-105858	-102346	-98855	-95392	-91964	-88578	2105506
7	12.72%	-426000	-109386	-105858	-102346	-98855	-95392	-91964	1933829	
6	14.76%	-426000	-109386	-105858	-102346	-98855	-95392	1768954		
5	14.62%	-426000	-109386	-105858	-102346	-98855	1438512			
4	13.34%	-426000	-109386	-105858	-102346	1114156				
3	8.92%	-426000	-109386	-105858	795565					
2	-6%	-426000	-109386	482439						
1	-62.61%	-426000	159287							

EXAMPLE USING LOW-INCOME HOUSING TAX CREDITS

Proforma Operations	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	
Gross possible income:	846,000	871,380	897,521	924,447	952,180	980,746	1,010,168	1,040,473	1,071,687	1,103,838	1,136,953	1,171,062	1,206,194	1,242,380	1,279,651	
Vacancy loss:	42,300	43,569	44,876	46,222	47,609	49,037	50,508	52,024	53,584	55,192	56,848	58,553	60,310	62,119	63,983	
Effective gross income:	803,700	827,811	852,645	878,225	904,571	931,709	959,660	988,450	1,018,103	1,048,646	1,080,106	1,112,509	1,145,884	1,180,261	1,215,668	
Operating expenses:	400,000	418,000	436,810	456,466	477,007	498,473	520,904	544,345	568,840	594,438	621,188	649,141	678,353	708,878	740,778	
Net operating income:	403,700	409,811	415,835	421,758	427,564	433,236	438,756	444,105	449,263	454,208	459,918	465,368	470,531	475,382	479,890	
Debt service:	367,000	367,000	367,000	367,000	367,000	367,000	367,000	367,000	367,000	367,000	367,000	367,000	367,000	367,000	367,000	
Before tax cash flow:	36,700	42,811	48,835	54,758	60,564	66,236	71,756	77,105	82,263	87,208	91,918	96,368	100,531	104,382	107,890	
Return on equity:	1,961,827	1.87%	0	2.49%	2.79%	3.09%	3.38%	3.66%	3.93%	4.19%	4.45%	4.69%	4.91%	5.12%	5.32%	5.50%
Tax calculations:																
Deductions Available:																
Operating expenses:	400,000	418,000	436,810	456,466	477,007	498,473	520,904	544,345	568,840	594,438	621,188	649,141	678,353	708,878	740,778	
Interest expenses:	320,304	316,929	313,309	309,428	305,266	300,803	296,017	290,886	285,384	279,484	273,157	266,373	259,099	251,299	242,935	
Depreciation expenses:	306,818	306,818	306,818	306,818	306,818	306,818	306,818	306,818	306,818	306,818	306,818	306,818	306,818	306,818	306,818	
Effective gross income:	803,700	827,811	852,645	878,225	904,571	931,709	959,660	988,450	1,018,103	1,048,646	1,080,106	1,112,509	1,145,884	1,180,261	1,215,668	
Deductions claimed:																
OPEX claimed:	400,000	418,000	436,810	456,466	477,007	498,473	520,904	544,345	568,840	594,438	621,188	649,141	678,353	708,878	740,778	
Income remaining:	403,700	409,811	415,835	421,758	427,564	433,236	438,756	444,105	449,263	454,208	459,918	465,368	470,531	475,382	479,890	
Current interest claimed:																
Surplus current interest:	320,304	316,929	313,309	309,428	305,266	300,803	296,017	290,886	285,384	279,484	273,157	266,373	259,099	251,299	242,935	
Income remaining:	83,396	92,882	102,526	112,331	122,298	132,433	142,738	153,219	163,879	174,724	185,761	196,994	208,432	220,083	231,956	
Banked interest EOY:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Draw on banked interest:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bal banked interest EOY:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Income remaining:	83,396	92,882	102,526	112,331	122,298	132,433	142,738	153,219	163,879	174,724	185,761	196,994	208,432	220,083	231,956	
Current deprec claimed:																
Surplus deprec:	223,422	213,936	204,292	194,487	184,520	174,385	164,080	153,599	142,939	132,094	121,058	109,824	98,386	86,735	74,863	
Income remaining:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Banked deprec EOY:	0	223,422	437,358	641,650	836,137	1,020,657	1,195,042	1,359,122	1,512,721	1,655,661	1,787,754	1,908,812	2,018,636	2,117,022	2,203,756	
Draw banked deprec:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bal banked deprec EOY:	223,422	437,358	641,650	836,137	1,020,657	1,195,042	1,359,122	1,512,721	1,655,661	1,787,754	1,908,812	2,018,636	2,117,022	2,203,756	2,278,619	
Income remaining:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Tax on remaining income:																
After tax cash flow:	36,700	42,811	48,835	54,758	60,564	66,236	71,756	77,105	82,263	87,208	91,918	96,368	100,531	104,382	107,890	
Return on equity:	1,961,827	1.87%	0	2.49%	2.79%	3.09%	3.38%	3.66%	3.93%	4.19%	4.45%	4.69%	4.91%	5.12%	5.32%	5.50%
Reversion																
Property value:	9,000,000	9,180,000	9,363,600	9,550,872	9,741,889	9,936,727	10,135,462	10,338,171	10,544,934	10,755,833	10,970,950	11,190,369	11,414,176	11,642,460	11,875,309	12,112,815
Selling costs:																545,077
Loan balance:																3,402,578
Net sale proceeds:																8,165,160
Total CF before Taxes:	-1,961,827	36,700	42,811	48,835	54,758	60,564	66,236	71,756	77,105	82,263	87,208	91,918	96,368	100,531	104,382	8,273,051
IRR before Taxes:																11.9%
Capital gain:																2,567,738
Tax on capital gain:																385,161
Cummulative depreciation:																2,323,654
Recapture on depreciation:																580,913
CF Reversion after taxes:																7,199,086
Total CF after Taxes:	-1,961,827	36,700	42,811	48,835	54,758	60,564	66,236	71,756	77,105	82,263	87,208	91,918	96,368	100,531	104,382	7,306,977
IRR after taxes:																11.1%

USING REGRESSION FOR APPRAISAL

The following is an excerpt of a data set used to build a multiple regression model predicting the price of a standard single family dwelling. This is the market data approach that is standard practice in the appraisal profession.

DATA: Variable:

ID	MLSSALE	BDRMS	BATHS	SQFT	GARAGE	LOTSIZE	BSMNT	HOMEAGE	SUBSCHL	KCCITY	MONTH
1	52000	3	1.5	1154	1	7920	1	21	1	1	2
2	42800	3	1.5	1200	1	7150	1	21	1	1	3
.											
.											
57	67500	3	1.5	1054	2	15750	1	11	1	0	7
58	51500	2	2.0	955	1	12320	1	21	0	0	6
59	52500	3	1.0	1044	2	7425	1	11	1	1	6
60	52000	3	1.5	915	1	12980	1	22	1	0	5

REGRESSION MODEL:

Regression Output:

Constant	14911.00
Std Err of Y Est	5920.262
R Squared	0.727790
No. of Observations	50
Degrees of Freedom	39

	BEDROOMS	BATHS	SQFT	GARAGE	LOTSIZE	BASEMENT	HOMEAGE	SUBSCHL	KCCITY	MONTH
X Coefficient(s)	5765.10	-384.33	10.41	7468.39	0.60	4286.02	-138.44	-3485.70	-120.74	-759.81
Std Err of Coef.	1902.33	2597.25	4.85	1615.30	0.21	2722.81	141.23	3388.24	2247.05	731.69
t-Score	3.03	-0.15	2.14	4.62	2.89	1.57	-0.98	-1.03	-0.05	-1.04

PRICE PREDICTION FOR SUBJECT PROPERTY:

SUBJECT PROPERTY'S VALUES:

BEDROOMS	BATHS	SQFT	GARAGE	LOTSIZE	BASEMENT	HOMEAGE	SUBSCHL	KCCITY	MONTH
3	1.5	1000	1	7500	1	16	1	1	6

COMPONENT PRICE:

14911.00	17295.30	-576.50	10410.23	7468.39	4519.91	4286.02	-2215.07	-3485.70	-120.74	-4558.87
----------	----------	---------	----------	---------	---------	---------	----------	----------	---------	----------

PREDICTED PRICE:

\$47,934 CONFIDENCE INTERVAL AT 95%: \$36,330 TO \$59,538