CONVERTING INCOME INTO VALUE:

A HANDBOOK
FOR REAL ESTATE INVESTORS

FIRST DRAFT

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PREFACE

August, 2013:

This first draft of Converting Income into Value: a Handbook for Real Estate Investors that will be tested and critiqued by the MSREI Class of 2014 in the Johns Hopkins Carey Business School Edward St. John Real Estate Program. These students will be using this Handbook as they take two, eight-week courses in real estate development.

With their help, the authors hope:

- To refine the text into full paragraphs;
- To find the mistakes that are hidden in the words and equations;
- To include explanatory footnotes and endnotes; and,
- To compile the necessary appendices, index, and bibliography.

We also realize the need for an understandable set of equations, variables, and abbreviations for a cogent text.

We appreciate your understanding and help as we attempt to make the confusing understandable and the oblique straightforward. Real estate investments and valuation is just not that difficult no matter how much our language gets in the way!

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Chapter I INTRODUCTION

A. Purpose of the Handbook

The purpose of the Handbook is to help real estate students, practitioners, and longtime experts better understand the conversion of future income into today's value. That is, real estate value is based on the conversion of expected future income into an estimate of today's worth. Probably the oldest and most commonly asked question in real estate is: "how much is it worth?" The second most commonly asked question is: "what is my return?" Of course, those questions are flipsides of each other. If you can estimate what it is worth, you can say what the return is and vice versa. This handbook will focus on the estimation of value as a starting point for understanding what the returns are.

In the world of real estate valuation and investments, there is proliferation of slang, jargon, and semi-technical terms which everyone uses and understands. Unfortunately, everyone uses and understands them differently. This causes a terrific amount of confusion.

For example: capitalization rates may be also referred to as overall returns, cash-on-cash returns, or equity dividend rates. Similarly, risk-adjusted the rates of discount may be called the internal rates of return, required rate of returns, or the equity yields.

Thus, another purpose of this Handbook is to help people understand, clarify and differentiate between these multiple terms that are used often interchangeably and usually incorrectly, in the process, convert expected future income into today's value.

B. A Little Theory

The title of this Handbook is *Converting Income to Value*. The value proposition is essentially that the value is equal to the present worth of future benefits. In real estate these future benefits are of two kinds:

a. First, there are annual benefits in the form of cash flows coming from collecting rent and paying expenses, and
b. Second, there is residual income which comes at the end of the holding period when the property is sold, the selling expenses are paid, and the remaining indebtedness is paid off.

Future income is by its nature uncertain. Economic conditions change; government regulations change; alternative investments change; and tastes and preferences change. Also the investor must wait for the future benefits that he/she expects and thereby forego current benefits from other capital investments. Therefore, the "conversion process" must account for the uncertainty or riskiness of the investment as well as the waiting period for the annual and residual incomes.

The conversion of the future income in real estate both annual and reversionary is most often used in the form of two valuation models:

a. The direct capitalization model, and
b. The discounted cash flow model.

C. Direct Capitalization Models vs. Discounted Cash Flow Models

The Direct Capitalization Model (DCM) in its most general form is defined as: the value (V) is equal to the income (I) divided by the capitalization rate (R):

[Equation 1]

$$V = I/R$$

where,

V = Value

I = Income

R = Capitalization Rate

The Capitalization Rate is defined as the annual risk-adjusted rate of discount (r) reduced by the annual expected rate of growth (g), so that:

[Equation 2]

$$R = r - g, \qquad r > g$$

where,

R = Capitalization Rate

r = risk-adjusted rate of discount

g = annual growth rate of the stream of income, (I), that is being valued

given that r > g (r is greater than g)

The Discounted Cash Flow Model is defined as: value (V) is equal to the sum of the present value of the annual income (AI) plus the present value of the reversionary income (RI) at the end of the holding period (n):

[Equation 3]

$$V = \left(\sum_{t=1}^{n} \frac{AI_t}{(1+r)^t} \right) + \frac{RI_n}{(1+r)^n}$$

where,

V = Value

AI = Annual Income

RI = Reversionary Income

r = Risk-adjusted Rate of Discount

n = number of years in the holding period

t = a specified year in the holding period

$\sum$ = summation of the present values for the Annual Incomes

The Risk-Adjusted Rate of Discount, (r), is defined as the sum of a risk-free rate, (rf), and a risk premium, (rp), which accounts for the uncertainty or riskiness of the future benefits.

[Equation 4]

$$r = rf + rp$$

where,

rf = a Risk-Free Rate (also called a safe rate)

rp = a Risk Premium that varies depending on the uncertainty of the future incomes

It should be noted that the above models are very general and need to be modified to reflect the stream of income being valued. For example, the Direct Capitalization Model (DCM) and the DCF Model (DCFM) would be modified differently if the total Property Value (PV) was being estimated or just the Loan Value (LV) or the Equity Value (EV) was being estimated.

By way of contrasting and comparing these two models, the following list of bullet points may be helpful:

- The DCM uses capitalization rates, whereas the DCFM uses risk-adjusted rates of discount to convert future benefits into a present value estimate.
- The DCM uses a "stabilized" annual income, whereas the DCFM uses year-specific incomes.
- In the DCM, the residual income is implicitly included in the capitalization rate; while in the DCFM, the residual Income is explicitly determined based on the income at the end of the holding period.
- The DCM assumes that the real estate is held to perpetuity while the DCFM assumes a specific time period for the valuation.
- The DCM uses very simple mathematical calculations that can be done with a pencil on "the back of an envelope." However, the DCFM uses more difficult calculations that are done with a calculator or computer.
- DCMs have many implicit assumptions, but the DCFMs have many explicit assumptions.
- DCMs are easy to calculate but hard to explain, but the DCFMs are difficult to calculate but easy to explain.

D. Capitalization Rates

Historically, capitalization rates have been described as being composed of two factors: a return "on" investment and a return "of" investment. The "return on" investment is fairly straight forward; the "return of" investment is less obvious because of the inflationary monetary environment in which we now live. Traditionally, real estate values were expected to decrease over the long run because of the physical deterioration of the improvements. Consequently, an investor would need a premium over the "return on" their investment as compensation for the declining value. However, in our inflationary environment, investors now expect their real estate to increase in value over time so investors are willing to accept a reduction in their "return on" because of the expected increase in the property value. That is to say, a risk adjusted rate of discount (r) was the return "on" while the expected annual rate of growth rate (g) was the return "of" since real estate was often expected to depreciate or decline in value over time.

Thus, a negative growth rate (-g) would reflect an expected declining income stream and property value. For example, if income stream was expected to decrease by 2% per year ($g = -2\%$), and the risk-adjusted rate of discount (r) was 8%, then the capitalization rate would be 10%. Algebraically, this is presented by:

[Equation 2]

$$R = r - g$$

$$R = 8\% - (-2\%) = 8\% + 2\% = 10\%$$

On the other hand, if the income stream was expected to increase by 2% per year ($g = 2\%$), and the risk adjusted rate of discount (r) was 8%, then the capitalization rate would be 6%. Algebraically, this is:

[Equation 2]

$$R = r - g$$

$$R = 8\% - 2\% = 6\%$$

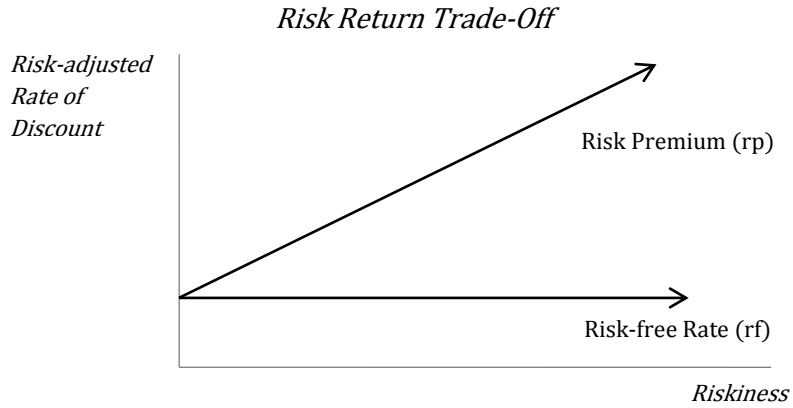
Capitalization rates that are used to estimate the total Property Value (PV) are called the Overall Capitalization Rate (OCR), and the capitalization rates that are used to estimate the Equity Value (EV) are called the Equity Dividend Rate (Re). These capitalization rates are also called the “unleveraged cash-on-cash return” and the “leveraged cash-on-cash return,” respectively.

The capitalization rates can be determined in two ways: 1) from actual market sales of comparable properties or 2) from active investors in real estate who articulate their expected capitalization rates. Comparable sales are the best way to determine the Overall Capitalization Rates (aka unlevered cash-on-cash return) while investor interviews are the best way to determine the Equity Dividend Rates (aka leveraged cash-on-cash return).

E. Risk-Adjusted Rates of Discount

Discounted Cash Flow Models (DCFM) use a risk-adjusted rate of d discount (r), which theoretically is the rate of return which is required to attract investment capital to the investment opportunity. As such, the risk-adjusted rate of discount can be considered as composing two parts: a risk-free rate (rf) and a risk premium (rp). See Example [4] in the previous section. The risk-adjusted rate of discount can also be shown graphically below:

[Figure 1] Risk Return Trade-off



The rate of return is "adjusted" or increased as the amount of uncertainty or "riskiness" increases regarding the actual realization of the expected benefits from the real estate. The difficult part is determining how to define, measure, or account for the riskiness of an investment. This debate continues today as scholars and investors try to define business risk, inflationary risk, environmental risk, systematic risk, or idiosyncratic risk. Rating companies like Standard and Poor's or Moody's try to measure the level of risk into classification groups (AAA, Baa, etc…), while statisticians measure risk using standard deviations of returns over time. A popular measure of risk is contained in the Capital Asset Pricing Model (CAPM), which looks like Equation 4 above, because it has a risk free rate that is adjusted by the covariance or the expected

individual asset's return to the returns on a portfolio of assets, usually leveraged equity securities.[3]

The risk-adjusted rate of discount used to estimate the Property Value (PV) is often called the Discount Rate (D) or the Required Internal Rate of Return on Total Capital (RIRRtc) while the risk-adjusted rate of discount to estimate Equity Value (EV) is called the Equity Yield Rate (y) or the Required Internal Rate of Return on Equity (RIRRe).

The risk-adjusted rate of discount for estimating the Property Value is also defined as the Weighted-Average Cost of Capital (WACC). The Weighted Average Cost of Capital of a real estate property considers the cost of debt capital [the Interest Rate (i)] and the required risk-adjusted rate of return for equity capital [the equity yield rate (y)] as well as the ratio of debt to equity, which is called the Loan-to-Value ratio (L/V). The loan-to-value ratio is defined as the amount of mortgage debt (L) compared to the total property value (V), and then by definition the amount of equity capital is defined as the compliment of the loan to value ratio or $(1 - L/V)$. Consequently, the Weighted Average Cost of Capital (WACC) for a real estate investment, which is also called the Discount Rate (D) or the Required Internal Rate of Return on Total Capital (RIRRtc), can be defined as:

[Equation 5]

$$WACC = D = \text{RIRRtc}$$

$$RIRRtc = [\, i \times (\text{L}/V)] + [y \times (1 - \text{L}/V)]$$

A market test for the correct risk-adjusted rate of discount is to compare the expected return on other assets relative to the real estate investment under consideration. In this way, the appropriate risk-adjusted rate of discount can be bracketed.

There are many, regularly published, real estate investor surveys in which active (usually institutional) investors are asked what their target (or Required) IRR's are. These are usually reported for unleveraged (RIRRtc) and leveraged (RIRRe) returns.

[3] The Capital Asset pricing Model is usually specified as… where…

F. Different Points of View: the Market Value and Investment Value

Real estate appraisers estimate the value of real estate from the overall market point of view. That is, they are reflecting the general consensus of the market participants' opinion or estimation of value. This is usually called the Market Value of the property, and there are numerous conditions or qualifications of a Market Value estimate. The Market Value represents an objective point of view from the perspective of a typical buyer and a typical seller, neither party of which is under duress and both parties of which have excellent information about future market conditions, competitive properties, and typical financing conditions. The transaction is expected to be all cash and subject to another dozen "limiting conditions and assumptions."

On the other hand, individual real estate investors are interested in their particular investment and market expectations, and they are interested in estimating the Investment Value of a property to them under all of the unique and unusual conditions of the sale. This is a very subjective estimate, and one that is unique to the individual investor. It considers the financial constraints and opportunities of the particular investor.

However, whether the point of view is objective and market-oriented or subjective and specific-investor oriented, the same techniques are used to convert future income into today's value.

G. Organization of the Handbook

Part II of the Handbook discusses the process of estimating the property value of real estate using Direct Capitalization Models (DCM). First, the estimate of a stabilized annual Net Operating Income (NOI') is determined and then the consideration of the reversionary income is discussed. Next, the determination of the appropriate Overall Capitalization Rate (OCR) is discussed in terms of market observations as well as investor derivations. Examples of the estimation process are then reviewed for an apartment, a retail center, a warehouse, and an office building.

Part III of the Handbook discusses the process of estimating the property value of real estate using a Discounted Cash Flow Model (DCFM). The estimation for Net Operating Income (NOI) for every year of the holding period is considered along with the estimation of the Net Sales Prices (NSP) at the end of the holding period. Next, the estimation of the appropriate risk-adjusted rate of discount is discussed. This is followed by the estimation of the Part II examples using DCFMs.

Part IV discusses the mathematics of amortized mortgages as well as the estimation of the value of mortgages using DCMs and DCFMs.

Part V demonstrates the estimation of the value of an equity investment using both OCMs and DCFMs.

Appendix A is a summary of equations and abbreviations.

Appendix B is a discussion of the Finley Form, which is a mortgage-equity approach to estimating property value using debt coverage ratios and leveraged cash-on-cash returns.

Appendix C discusses project feasibility using Overall Capitalization Rates.

Chapter II ESTIMATING PROPERTY VALUE (PV) USING DIRECT CAPITALIZATION MODELS (DCMs)

A. Introduction

The Property Value of a piece of real estate is estimated by dividing the "Stabilized" Net Operating Income (NOIs) by the Overall Capitalization Rate (OCR)

[Equation 6]

$$PV = \text{NOIs}/OCR$$

where,

PV = Property Value

NOI_s = stabilized Net Operating Income

OCR = Overall Capitalization Rate

[Equation 7]

$$\text{NOIs} = GI - VC - OE$$

where,

GI = Gross Income

VC = Vacancy and Collection Allowance

OE = Operating Expenses including Reserves for Wasting Parts

[Equation 8]

[8a] $$OCR = D - (\%Apr)$$

[8b] $$OCR = D + (\%Dpr)$$

where,

OCR = Overall Capitalization Rate

D = Discount Rate = WACC = RIRRtc

WACC = Weighted Average Cost of Capital

RIRRtc = Required Internal Rate of Return on Total Capital

%Apr = annual rate of property Appreciation

%Dpr = annual rate of property Depreciation

B. Gross Income (GI)

The Gross Income (GI) is the total possible income that can be generated from an income producing property over a 12-month period. Sources of income include rental income (RI), parking income (PI), and other miscellaneous income (OI) such as vending machines and billboards.

[Equation 9]

$$GI = RI + PI + OI$$

where,

GI = Gross Income

RI = Rental Income

PI = Parking Income

OI = Other Miscellaneous Income

C. Effective Gross Income (EGI) and Vacancy and Collection Allowance (VC)

The Effective Gross Income (EGI) is the actual or expected income that will be collected over a twelve-month period. The difference between the Gross Income and the Effective Gross Income is called the Vacancy and Collection Allowance (VC). The Vacancy and Collection Allowance is due to actual vacant space or rental units as well as bad debts or uncollectable rent.

[Equation 10]

$$EGI = GI - VC$$

where,
EGI = Effective Gross Income
GI = Gross Income
VC = Vacancy and Collection Loss

The Vacancy and Collection Allowance reflects the robustness of the real estate markets. A very strong market will have a low vacancy rate while a soft or sluggish market will have a high vacancy rate.

D. Operating Expense (OE)

Operating Expenses (OE) are those expenses that relate directly to the operation of the real estate property. They do not include financing expenses, personal expenses, or income tax expenses. Operating Expenses (OE) are divided into two groups: annual cash expenses and annualized non-cash reserve allowances. Operating expenses do not include financing costs such as interest and amortization payments and do not include income tax payments. Operating expenses are related to the operation of property and compliance with the lease provisions and are not dependent on specific financing or individual owners. The operating expenses may include some or all of the following:

- Management Expenses
- Legal and Accounting Expenses
- Repairs and Maintenance
  - Labor
  - Supplies
- Leasing Commissions
- Landscaping and Lawn Maintenance
- Snow Plowing and Ice Removal
- Real Estate Taxes
- Property Insurance
- Advertising
- Decorating
- Cleaning and Janitorial Expenses

The second type of expenses is allowance for wasting parts. These allowances can be used to annualize certain costs which are not annual in nature, but are predictable and do occur regularly. Examples of these expenses are:

- Major Appliance Replacements
- Carpet Replacements
- Tenant Improvements
- Painting
- Asphalt Parking Lot Replacements
- Roof Replacements

Often the Operating Expenses (OE) are lumped together and expressed as a percentage of Effective Gross Income (EGI). This is called the Operating Expense Ratio (OER).

[Equation 11]

$$OER = OE/EGI$$

where,
OER = Operating Expense Ratio
OE = Operating Expenses
EGI = Effective Gross Income

E. Net Operating Income (NOI)

The Net Operating Income (NOI) is calculated by deducting the Operating Expenses (OE) from the Effective Gross Income (EGI). The calculation is as follows:

	Gross Income (GI)
less	Vacancy and Collection (VC)
equal	Effective Gross Income (EGI)
less	Operating Expenses (OE)
equal	Net Operating Income (NOI)

[Equation 7]

$$NOI = GI - VC - OE$$

The Net Operating Income (NOI) used in Direct Capitalization Models (DCMs) is said to be "stabilized", and it is abbreviated as NOIs ("NOI" with a lowercase "s"). The NOIs is stabilized because it uses an average Vacancy and Collection Allowance and an average Operating Expense amount. Clearly, this is one of the limitations of the DCMs since a "stabilized" year may not be representative of the property's future performance. If the future income is highly variable, the "riskiness" would be reflected in the Overall Capitalization Rate. On the other hand, sometimes the DCM is just not an appropriate method to estimate a property's value.

F. Estimating Reversionary Income

In DCMs the expected reversionary income from the eventual sale of the property is not directly estimated. Rather, the expected reversionary income is reflected in the Overall Capitalization Rate as an annual rate of appreciation or depreciation. The annual rate of property appreciation is subtracted from the Discount Rate, or the annual rate of property depreciation is added to the Discount Rate to determine the Overall Capitalization Rate.

G. Overall Capitalization Rate (OCR)

The Net Operating Income (NOI) is subject to all of the business risks of real estate. The NOI is an unleveraged income stream, that is, no finance payments are included. Consequently, no financial risks are involved.

The Overall Capitalization Rate (OCR) is composed of the sum of 1) the Discount Rate (D) and 2) the annual Appreciation Rate of the property (%Apr) or the annual Depreciation Rate of the property (%Dpr).

[Equation 8]

[8a] $\mathrm{OCR} = \mathrm{D} - (\%\mathrm{Apr})$

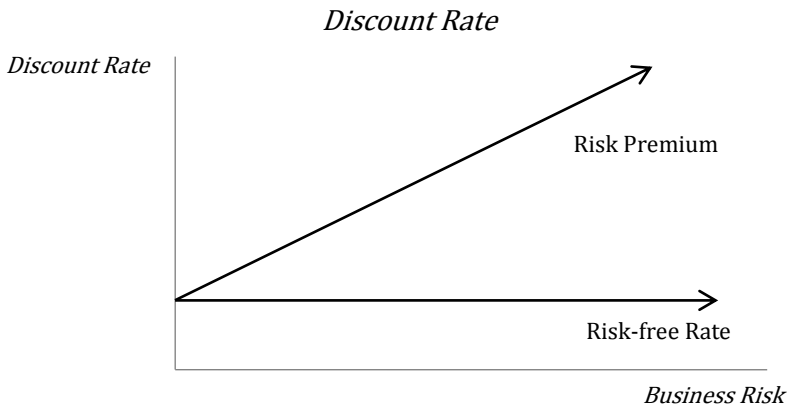
[8b] $OCR = D + (\%Dpr)$

where,
OCR = Overall Capitalization Rate
D = WACC = RIRRtc,
%Apr = annual rate of property Appreciation
%Dpr = annual rate of property Depreciation

The Discount Rate (D) is the risk-adjusted "return on" the investment. As such, it is the risk-free rate plus a risk premium.

Graphically, this is show as follows:

[Figure 2] Discount Rate



The Discount Rate (D) is also referred to as the Weighted-Average Cost of Capital (WACC) because it reflects the cost of debt capital or interest (i) and the cost of equity capital or equity yield rate (y) weighted by their relative share of the total capital structure. For example:

[Equation 5]

$$WACC = D$$

$$WACC = [i \times (L/V)] + [y \times (1 - L/V)]$$

The Discount Rate is also the same as the Required Internal Rate of Return on Total Capital (RIRRtc).

The Overall Capitalization Rate is sometimes referred to as a "Free and clear" return because it does not include any financing costs such as interest, loan amortization, or financing fees.

H. Example: Apartment Building

Assumptions: Income

- Four (4) one-bedroom (1BR) apartments at $600 per month
- Four (4) two-bedroom (2BR) apartments at $800 per month

Calculations:

One-bedroom Rent	$4 \times \$600 \times 12 = 28{,}800$
Two-bedroom Rent	$4 \times \$800 \times 12 = 38{,}400$
Gross Income (GI)	$ 67,200

Assumptions: Vacancy and Collection Loss

- Vacancy and collection allowance is estimated to be 10% of Gross Income

Calculations:

Gross Income (GI)	$ 67,200
Vacancy & Collection Loss (VC) @ 10% of GI	$ 6,720
Effective Gross Income (EGI)	$ 60,480

Assumptions: Operating Expense

- Operating Expense Ratio is 30%

Calculations:

Effective Gross Income (EGI)	$ 60,480
Operating Expenses (OE) @ 30% of EGI	$ 18,144
Net Operating Income (NOI_s)	$ 42,336

Assumptions: Financing

- Equity Yield Rate is 15%
- Interest Rate is 6% for thirty (30) years with annual payments
- Loan to Value Ratio is 75%
- Annual Rate of Property Appreciation is 1%

Calculations:

Stabilized Net Operating Income (NOI_s) $ 42,336

Discount Rate (D)

$$(0.75 \times 0.15) + (0.25 \times 0.06) = 8.25\%$$

Overall Capitalization Rate (OCR)

$$0.0825 - 0.01 = 7.25\%$$

Property Value (PV) $\$42{,}336 \div 0.0725 = \$\ 583{,}945$

I. Example: Strip Shopping Center

Assumptions: Income

- Net Leasable Area (NLA) is 8,000 square feet
- Retail rental rate is $8.00 per square foot (psf) per year

Calculations:

Gross Income (GI)	$8{,}000 \times \$8.00 = \$\ 64{,}000$

Assumptions: Vacancy

- Annual Vacancy and Collection Allowance (VC) is estimated to be 5% of Gross Income

Calculations:

Gross Income (GI)	$ 64,000
Vacancy and Collection Loss (VC) @ 5% of GI	$ 3,200
Effective Gross Income (EGI)	$ 60,800

Assumptions: Operating Expense

- Real Estate Taxes are $0.39 psf per year
- Common Area Maintenance (CAM) charges are $2.00 psf per year
- Management and Leasing fees are 5% of collected rents per year (EGI)
- Accounting, Legal, and Other Professional Expenses average $2,000 per year
- Carpet is replaced every five (5) years and costs $27.00 per square yard installed
- Asphalt Roof Built-up costs $20,000 and lasts twenty (20) years
- Four (4) HVAC Units cost $2,000 per unit and lasts ten (10) years

Calculations:

Effective Gross Income (EGI)		$ 60,800
Operating Expenses (OE)		
Real Estate Taxes	$0.39 × 8,000 =	$ 3,120
CAM	$2 × 8,000 =	$ 16,000
Management (% of EGI)	0.05 × $60,800 =	$ 3,040
Accounting, Legal, Other		$ 2,000
Carpet Allowance	($27 ÷ 9 ÷ 5) × 8,000 =	$ 4,800
Roof Allowance	$20,000 ÷ 20 =	$ 1,000
HVAC Allowance	($2,000 ÷ 10) × 4 =	$ 800
TOTAL EXPENSES		$ 30,760
Stabilized Net Operating Income (NOIs)		$ 30,040

Assumptions: Financing

- Mortgage Interest Rate is 6%, amortized over thirty (30) years with annual payments
- Loan-to-Value Ratio is 75%
- The Property is expected to increase annually at 1.5%
- Equity Yield Rate (y) is 15%

Calculations:

Stabilized Net Operating Income (NOIs) $ 30,040

Discount Rate (D)

$$(0.75 \times 0.06) + (0.25 \times 0.15) = 8.25\%$$

Overall Capitalization Rate (OCR)

$$0.0825 - 0.015 = 6.75\%$$

Property Value $\$30{,}040 \div 0.0675 = \$\ 445{,}037$

J. Example: Industrial Building

Assumptions: Income

- 50,000 Square feet of Net Leasable Area (NLA)
- Leased for 20 years to a single-user for an office/manufacturing complex on a triple net basis (NNN)[4]
- Rental rate is $2.25 per net leasable foot

Calculations:

Gross Income (GI)	$\$2.25 \times 50{,}000 = \$\ 112{,}500$

Assumptions: Vacancy

- The tenant has an AAA credit rating and intends to be in the building for the duration of the lease (20 years)
- The estimated vacancy and collection allowance is estimated to be 0% of Gross Income

Calculations:

Gross Income (GI)	$ 112,500
Vacancy and Collection Loss (VC) @ 0% of GI	$ 0
Effective Gross Income (EGI)	$ 112,500

[4] A triple net lease (NNN) means a tenant, typically in retail, pays the Common Area Maintenance (CAM), insurance, and taxes.

Assumptions: Operating Expense

- Management fees are 1% of Effective Gross Income
- Legal and Accounting fees are $2,000 per year
- Single membrane rubber roof costs $2.50 per square foot and has a 10-year remaining life

Calculations:

Effective Gross Income (EGI)		$ 112,500
Operating Expenses (OE)		
Real Estate Taxes (Net)		0
CAM (Net)		0
Management (% of EGI)	$0.01 \times \$112{,}500 = 1{,}125$	
Accounting, Legal, Other		$ 2,000
Roof Allowance	$\$2.5 \times 50{,}000 \div 10 = 12{,}500$	
TOTAL EXPENSES		$ 15,625
Stabilized Net Operating Income (NOIs)		$ 96,875

Assumptions: Financing

- Mortgage Loan has an interest rate of 5.5%, a 30-year amortization term with annual payments, and a Loan-to-Value Ratio of 90%
- The typical investor requires an equity yield of 15%
- Property annual depreciation rate is 1%

Calculations:

Net Operating Income (NOIs) $ 96,875

Discount Rate (D)

$$(0.9 \times 0.055) + (0.1 \times 0.15) = 6.45\%$$

Overall Capitalization Rate (OCR)

$$0.0645 + 0.01 = 7.45\%$$

Property Value (PV) $\$96{,}875 \div 0.0745 = \$\ 1{,}300{,}336$

K. Example: Office Building

Assumptions: Income

- Ten-story office building
- Gross Building Area is 110,000 square feet
- Net Leasable Area (NLA) is 100,000 square feet
- Rental Rate is $30.00 per square foot of NLA
- Parking Income is $5,000 per month

Calculations:

Rental Income (RI)	$30 \times \$100{,}000 = \$\ 3{,}000{,}000$
Parking Income (PI)	$\$5{,}000 \times 12 = \$\ 60{,}000$
Gross Income (GI)	$\$\ 3{,}060{,}000$

Assumptions: Vacancy

- Vacancy and collection allowance is estimated to be 10% of Gross Income

Calculations:

Gross Income (GI)	$\$\ 3{,}060{,}000$
Vacancy and Collection Loss (VC) @ 10% of GI	$\$\ 306{,}000$
Effective Gross Income (EGI)	$\$\ 2{,}754{,}000$

Assumptions: Operating Expense

- Operating Expenses are $10.00 psf per year
- Reserve for wasting parts is $50,000 annually

Calculations:

Effective Gross Income (EGI)	$ 2,754,000
Operating Expenses	$10 \times 100{,}000 = \$\ 1{,}000{,}000$
Reserve	$ 50,000
Total Expenses and Reserve (OE)	$ 1,050,000
Stabilized Net Operating Income (NOIs)	$ 1,704,000

Assumptions: Financing

- Mortgage of 30 years, 7% interest, and L/V of 70%
- The typical investor requires an equity yield of 18%
- The property's annual appreciation rate is 2%

Calculations:

Stabilized Net Operating Income (NOIs)	$ 1,704,000
Discount Rate	$(0.7 \times 0.07) + (0.3 \times\ 0.18) = 10.30\%$
Overall Capitalization Rate	$0.1030 - 0.02 = 8.30\%$
Property Value	$\$1{,}704{,}000 \div 0.083 = \$\ 20{,}530{,}120$

Chapter III ESTIMATING PROPERTY VALUE USING DISCOUNTED CASH FLOW MODELS (DCFMs)

A. Introduction

- DCFM's use more complicated math than Direct Capitalization Models (DCM's), but the math is intrinsically simple.
- DCFM's allow the analyst to recognize specific features of the investment on an annual basis. By contrast, DCM's use a stabilized Net Operating Income for the duration of the investment.
- DCFMs allow and require the analyst to think it through the real estate investment.
- DCM's are good to screen potential investment opportunities, while DCFM's must be used to understand how value is created and realized in the investment.
- DCFM's can be used in pre-programmed or "canned" models or they can be developed by the analyst. Financial institutions prefer to use pre-programmed models like ARGUS, while individual investors can build their own models on electronic spreadsheets like Excel.
- DCFMs allow the analyst to recognize the sage advice for investors: "if you can't model a project on paper, then you can't build it in real life."

- The Discounted Cash Flow Model to estimate Property Value:

[Equation 12]

$$PV = \sum_{t=1}^{n} \frac{GI_t - VC_t - OE_t - CE_t}{(1+D)^t} + \frac{SP_n - SE_n}{(1+D)^n}$$

where,

PV = Property Value

GI = Gross Income

VC = Vacancy and Collection Allowance

OE = Operating Expenses

CE = Capital Expenditure

SP = Selling Price

SE = Selling Expenses

D = Discount Rate, aka the weighted average cost of capital (WACC), aka the required internal rate of return on total capital (RIRRtc)

B. Estimating Gross Income (GI)

- DCFMs allow analysts to recognize annual changes in rental income
    - Stepped up leases
    - Percentage leases
    - Lease renewal rates
    - Lease rollovers to market rent levels
    - Free-rent periods
- DCFM's allow analysts to recognize different types of leases for different types of users with different rent provisions, especially in mixed-use projects
    - Retail leases
    - Office leases
    - Apartment leases
    - Out-parcel ground leases
- Rent from other sources can be recognized in DCFM's
    - Parking income
    - Concession income like laundry income
    - Special events leases

C. Estimated Vacancy and Collection Losses (VC)

- DCFM's allow analysts to recognize different types of users and lessees with different kind of vacancy expectations
- DCFM's allow analysts to recognize different leases with different expiration dates and different renewal provisions
    - Probability of renewal
    - Remarketing time if not renewed

D. Estimating Operating Expenses (OE):

- Analysts can recognize normal cash operating expenses
    - Same operating expense as DCM's but now the analyst can recognize expense that vary over time
    - Customary reserves for regularly occurring expenses may be used as a yearly expense or the expected expense may be tied to specific leases or specific expenses
- Large reserves for wasting assets do not need to be set up annually unless the cash is actually put into a separate reserve account and not available for distribution to investors
- Large capital expenditures should not be included in a DCFM model as "operating expenses"
- Expense reimbursements can be modeled to recognize different expenses that are passed through to tenants or are subject to a "cap" over which tenants are charged for reimbursements
- Expense related to financing should not be included as operating expense (e.g. interest, amortization, origination, fees, or participating loan features)
- Non-cash expense should not be included as operating expenses such as building or equipment amortization
- Income tax expenses should not be included as operating expenses
- Personal expenses such as entertainment, travel, or clothing should not be included as operating expenses
- Typical operating expenses are included in:
    - Office buildings
    - Apartments
    - Warehouses
    - Retail

E. Estimating Annual Capital Expenditures (CE)

- While the DCMs use an annual allowance for capital expenditures, DCFMs recognize capital expenditures in the year that they actually occur
- Capital expenditures are basically any expenditure that would be depreciated for accounting or tax purposes
- Capital expenditures could include the following:
    - Major tenant improvements
    - Major leasing commissions
    - Roof replacements
    - Major appliances (washers, dryers, stoves, refrigerators, etc)
    - Parking lot replacement
    - Heating, ventilation, and air conditioning (HVAC) systems
    - Landscaping
    - Tenant signs and building signage
- The exception to these capital expenditure is when actual annual cash contributions are made to a specific reserve account and are not available for distribution

F. Estimating the Holding Period (n)

- DCFMs assume a “typical” holding period for the projections
- The convention is 10 years, but this was based on the accountsants’ ability to display 10 years on an 8.5 by 11 inch page using a “landscape” orientation, 10-pitch, and a matrix printer. Clearly, this is no longer a condition.
- Also, five years was used as a typical holding period because accountants could place five-year projections on an 8.5 by 11 inch page using a “portrait” orientation.
- The appropriate holding period depends on the investor’s objective and property’s business plan
- Analysts can determine that holding period that maximizes the property value by using a “sensitivity” analysis, which involves varying the holding period to see when the highest property value is reached

G. Estimating the Selling Price (SP) of the Property at the end of the Holding Period (n)

- The estimated selling price at the end of the holding period is usually based on the projected future income of the property
- Typically the selling price is estimated using a direct Capitalization Model (DCM), example:

[Equation 13]

$$SP_n = NOI_{n+1}/OCR$$

where,

SP_n = Selling Price in year n

NOI_{n+1} = Net Operating Income in year n+1

OCR = Overall Capitalization Rate

- The sale of the property is expected to occur on the last day of the holding period (n)
- Consequently, the selling price (SP) for the holding period (n) is based on the estimated stabilized Net Operating Income (NOI) for the next year—one year beyond the holding period (n+1)
- The Overall Capitalization Rate (OCR) used to estimate the future sales price of the property is problematic. Most of the time, analysts use the current OCR and assume that the capital market conditions will not change much over the holding period. This is a heroic assumption, but one that is usually made.

H. Estimating the Selling Expenses (SE) Incurred in the property's Sale at end of the Holding Period (n)

- Real estate sales have high transaction costs relative to other asset sales
- Typical transaction costs may include:
    - Brokerage commissions
    - Deed recording and mortgage costs at the county (or city) courthouse
    - Environmental reports
    - Title reports and title insurance
    - Survey costs
    - Loan prepayment or payoff fees
    - Property inspection reports
    - Marketing and advertising expenses
- While many of these costs are pro-rated or negotiated between the buyer and seller, it is reasonable to assume that there will be substantial closing costs
- The closing costs typically range between 5 to 10 percent of the sale price
- The Net Sales Price (NSP) is usually defined as the Sales Price (SP) minus the Selling Expenses (SE)

I. Estimating the Discount Rate (D), aka the Required Internal Rate of Return on Total Capital (RIRRtc), aka the Weighted Average Cost of Capital (WACC)

- The Discount Rate (D) is a risk-adjusted rate of discount
- It is equal to the "safe rate" plus a "risk premium" that is based on all of the "business risks" involved with owning real estate assets
- The Discount Rate (D) is also called the Required Internal Rate of Return on Total Capital (RIRRtc). It is the rate of return that is required to attract capital to the real estate investment. It is influenced by the rates of return that are available from alternative investments (stocks and bonds) or other real estate investments adjusted for the level of risk
- The WACC is based on the required Equity Yield (y) for leveraged real estate Investments as well as the Interest Rate (i), both of which are weighted" or adjusted for their relative portion of the total capital stack
- The WACC is usually defined as

[Equation 5]

$$WACC = D = RIRRtc$$

$$RIRRtc = i \times (L/V) + y \times (1 - \mathrm{L}/V)$$

- The Discount Rate (WACC or RIRRtc) is used to discount the stream of cash income that is associated with the ownership of the real estate, before financing costs, and non-cash accounting adjustments but after capital expenditures

J. Estimating the Property Value (PV)

- If the variable input values are based on "typical" investor expectations, then the PV would be the "Market Value" of the property
- If the variable input values are based on a particular investor's expectation then the PV would be the "Investment Value" of the property
- The buyer's Investment Value is defined as the most the buyer can pay for a property and still achieve his/her investment objectives
- The seller's Investment Value is defined as the lowest that a seller can sell the property for and still achieve his/her investment objectives
- The Transaction Price is the negotiated price between the buyer and the seller when the buyer's Investment Value is less than or equal to the seller's Investment Value

Buyer's Investment Value ≥ Transaction Price ≥ Seller's Investment Value

K. Example: Apartment Building

Assumptions: Income and Expense Escalation

- Annual rent escalation of 1.00%
- Operating Expense is 30% of Effective Gross Income
- Sale expense of 5%

PROPERTY VALUE -- DISCOUNTED CASH FLOW									
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Income	1.00%	escal						
Gross Income			67,200	67,872	68,551	69,236	69,929	70,628
Vacancy & Collection Loss	10.00%	of GI	6,720	6,787	6,855	6,924	6,993	7,063
Effective Gross Income			60,480	61,085	61,696	62,313	62,936	63,565
Operating Expenses	30.00%	of EGI	18,144	18,325	18,509	18,694	18,881	19,070
Net Operating Income			**42,336**	**42,759**	**43,187**	**43,619**	**44,055**	**44,496**
Property Sale								
Sale Price	7.25%	OCR					613,732	
Sale Expense	5.00%	of SP					30,687	
Net Sale Price							583,045	
Total CF before Debt Service			**42,336**	**42,759**	**43,187**	**43,619**	**627,100**	
Property Value								
Discount Rate	8.25%		92.38%	85.34%	78.83%	72.83%	67.28%	
Property Value	**$ 563,300**		**39,109**	**36,490**	**34,046**	**31,766**	**421,888**	

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L. Example: Strip Shopping Center

Assumptions: Income and Expense Escalation

- Annual rent escalation of 1.50%
- Annual expense escalation of 1.50%
- Sale expense of 5%

PROPERTY VALUE -- DISCOUNTED CASH FLOW									
				Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Income	1.50%	escal							
Gross Income			64,000	64,960	65,934	66,923	67,927	68,946
Vacancy & Collection Loss	5.00%	of GI	3,200	3,248	3,297	3,346	3,396	3,447
Effective Gross Income			60,800	61,712	62,638	63,577	64,531	65,499
Operating Expenses	1.50%	escal						
Real Estate Taxes	$ 0.39	psf/yr	3,120	3,167	3,214	3,263	3,311	3,361
CAM	$ 2.00	psf/yr	16,000	16,240	16,484	16,731	16,982	17,237
Management	5%	of EGI	3,040	3,086	3,132	3,179	3,227	3,275
Accounting, Legal, Other	$ 2,000	/yr	2,000	2,030	2,060	2,091	2,123	2,155
Total Expenses			24,160	24,522	24,890	25,264	25,643	26,027
Net Operating Income			**36,640**	**37,190**	**37,747**	**38,314**	**38,888**	**39,472**
Property Sale								
Sale Price	6.75%	OCR					584,766	
Sale Expense	5.00%	of SP					29,238	
Net Sale Price							555,527	
Total CF before Debt Service			**36,640**	**37,190**	**37,747**	**38,314**	**594,416**	
Property Value								
Discount Rate	8.25%		92.38%	85.34%	78.83%	72.83%	67.28%	
Property Value	**$ 523,144**		**33,848**	**31,737**	**29,758**	**27,902**	**399,899**	

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M. Example: Industrial Building

Assumptions: Income and Expense Escalation

- Annual rent escalation of 0.00%
- Annual expense escalation of 1.00%
- Sale expense of 10%

PROPERTY VALUE -- DISCOUNTED CASH FLOW			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Income	0.00%	escal						
Gross Income			112,500	112,500	112,500	112,500	112,500	112,500
Vacancy & Collection Loss	0%	of GI	-	-	-	-	-	-
Effective Gross Income			112,500	112,500	112,500	112,500	112,500	112,500
Operating Expenses	1.00%	escal						
Real Estate Taxes (Net)			-	-	-	-	-	-
CAM (Net)			-	-	-	-	-	-
Management	1%	of EGI	1,125	1,125	1,125	1,125	1,125	1,125
Accounting, Legal, Other	$ 2,000	/yr	2,000	2,020	2,040	2,061	2,081	2,102
Total Expenses			3,125	3,145	3,165	3,186	3,206	3,227
Net Operating Income			**109,375**	**109,355**	**109,335**	**109,314**	**109,294**	**109,273**
Property Sale								
Sale Price	7.45%	OCR					1,466,751	
Sale Expense	10.00%	of SP					146,675	
Net Sale Price							1,320,076	
Total CF before Debt Service			**109,375**	**109,355**	**109,335**	**109,314**	**1,429,370**	
Property Value								
Discount Rate	6.45%		93.94%	88.25%	82.90%	77.88%	73.16%	
Property Value	**$ 1,420,747**		**102,748**	**96,504**	**90,640**	**85,132**	**1,045,722**	

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N. Example: Office Building

Assumptions: Income and Expense Escalation

- Annual rent escalation of 2.00%
- Annual expense escalation of 2.00%
- Sale expense of 5%

PROPERTY VALUE -- DISCOUNTED CASH FLOW									
				Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Income	2.00%	escal							
Gross Income				3,060,000	3,121,200	3,183,624	3,247,296	3,312,242	3,378,487
Vacancy & Collection Loss	10%	of GI		306,000	312,120	318,362	324,730	331,224	337,849
Effective Gross Income				2,754,000	2,809,080	2,865,262	2,922,567	2,981,018	3,040,639
Operating Expenses	2.00%	escal							
Operating Expenses	$ 10.00	psf/yr		1,000,000	1,020,000	1,040,400	1,061,208	1,082,432	1,104,081
Reserve	$ 50,000	per yr		50,000	51,000	52,020	53,060	54,122	55,204
Total Expenses & Reserve				1,050,000	1,071,000	1,092,420	1,114,268	1,136,554	1,159,285
Net Operating Income				**1,704,000**	**1,738,080**	**1,772,842**	**1,808,298**	**1,844,464**	**1,881,354**
Property Sale									
Sale Price	8.30%	OCR						22,666,912	
Sale Expense	5.00%	of SP						1,133,346	
Net Sale Price								21,533,566	
Total CF before Debt Service				**1,704,000**	**1,738,080**	**1,772,842**	**1,808,298**	**23,378,031**	
Property Value									
Discount Rate	10.30%			90.66%	82.20%	74.52%	67.56%	61.25%	
Property Value	**$ 19,835,920**			**1,544,878**	**1,428,627**	**1,321,123**	**1,221,710**	**14,319,583**	

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Chapter IV ESTIMATING MORTGAGE LOAN VALUE (LV) USING DIRECT CAPITALIZATION MODELS (DCMs)

A. Introduction

- The property value (PV) or total value of a parcel of real estate can be divided into the types of capital that is used to acquire it: debt capital (LV) and equity capital (EV)
    - Debt capital is usually called a mortgage or a loan and is usually represented as (L). Debt capital is usually secured by a lien on the property and has a preferred claim on the Net Operating Income (NOI) relative to equity capital.
    - Equity capital (E) is subordinate to the Debt Capital and consequently has a higher risk profile. The equity capital is usually considered the ownership of the property.
- The Loan Value (LV) can be estimated using either a Direct Capitalization Model (DCM) or at Discounted Cash Flow Model (DCFM)
- The DCM is very simple mathematically, but several assumptions are imbedded in the calculations. It is very difficult to value complex financing structure using DCM
- The DCFM is more complicated mathematically; however it is much easier to explain the financial arrangement that is under consideration
- The Debt Payment (DP) used in both models includes both the interest payment and the amortization payment. Usually the DP used in the models is an annualized amount. However, the annual DP can vary depending on the number of debt payments that are made each year. Debt payments can be monthly (12 per year), bi-monthly (6 per year), quarterly (4 per year), semi-annually (2 per year), or annually (1 per year).
- To calculate the annual DP, the periodic debt payment must be calculated and then multiplied by the number of payments per year
- The periodic interest rate is the annual interest rate divided by the number of payments. For example, an annual rate of 6% would have a monthly rate of .5% $(0.06/12)$, a quarterly rate of 1.5% $(0.06/4)$, or a semi-annual rate of 3% $(0.06/2)$.
- The total periodic payments must be representative of the payments per year. For example, a mortgage loan with a 10-year amortization period would have total monthly payments of

120 (10×12), total quarterly payments of 40 (10×4) or total semi-annual payments of 20 (10×2).

- Mortgage Constants (MC) are used to calculate the Mortgage Value in the DCM, and Mortgage Constants are used to calculate the periodic DP in the DCFM
- The Mortgage Constant is a capitalization rate and consequently it has a "return on" component, the interest (i), and a "return of"" component, Sinking Fund Factor (SFF), so that the:

[Equation 14]

$$MC = i + SFF$$

[Equation 15]

$$SFF = \frac{i}{(1+i)^n - 1}$$

where,

i = Periodic Interest Rate

n = total number of periods in the amortization term

- The annual Debt Payment (DP) is usually determined by the Debt Coverage Ratio (DCR), which measures the extent to which the Net Operating Income (NOI) exceed the annual Debt Payment

[Equation 16]

$$DCR = \text{NOI}/DP$$

where,

DCR = Debt Coverage Ratio

NOI = Net Operating Income

DP = Debt Payment

- The Debt Coverage Ratio is a measure of default risk used by lender so the higher the perceived lending risk, the higher the DCR

- The amount of the Loan Value is usually constrained by the Loan-to-Value Ratio (LTV), which is defined as the Loan Value (LV) divided by the Property Value (PV):

[Equation 17]

$$L/V = LV/PV$$

where,

L/V = Loan-to-Value Ratio

LV = Loan Value

PV = Property Value

- The Loan-to-Value is a measure of liquidity in the event of default on the loan so the greater the risk perceived by lenders, the lower the Loan-to-Value Ratio

B. Estimating Loan Value (LV) using Direct Capitalization Models (DCMs)

- The conceptual direct capitalization model (V=I/R) is modified to estimate the Loan Value (LV) so that annual Debt Payment (DP) is divided by the annualized Mortgage Constant (MC):

[Equation 18]

$$LV = DP/MC$$

[Equation 19]

$$DP = NOI \ / \ DCR$$

[Equation 14]

$$MC = i + SFF$$

where,
i = Annualized Interest Rate on the Loan

[Equation 15]

$$SFF = \frac{i}{(1+i)^n - 1}$$

where,
SFF = Annualized Sinking Fund Factor for the Amortization Period of the Loan

- The Debt Payment is assumed to be a constant amount over the amortization period

C. Example: Apartment Building

Calculations:

Loan Interest (i) @ known	6.00%
Loan Term @ known	30 years (annually)
Sinking Fund Factor (SFF)	

$$0.06 \div [(1 + 0.06)\text{^}30 - 1] = 1.26\%$$

Calculations:

Loan Interest (i)	6.00%
Sinking Fund Factor (SFF)	1.26%
Mortgage Constant (MC)	$0.06 + 0.0126 = 7.26\%$

Assumptions: Loan

- For this example, Debt Coverage Ratio (DCR) is 1.30

Calculations:

Stabilized Net Operating Income (NOIs)	$ 42,336
Debt Coverage Ratio (DCR)	1.30
Debt Payment (DP)	$42,336 ÷ 1.30 = $ 32,566

Calculations:

Debt Payment (DP)	$ 32,566
Mortgage Constant (MC)	7.26%
Loan Value	$32,566 ÷ 0.0726 = $ 448,268

D. Example: Strip Shopping Center

Calculations:

Loan Interest (i) @ known	6.00%
Loan Term @ known	30 years (annually)
Sinking Fund Factor (SFF)	

$$0.06 \div [(1 + 0.06)\text{^}30 - 1] = 1.26\%$$

Calculations:

Loan Interest (i)	6.00%
Sinking Fund Factor (SFF)	1.26%
Mortgage Constant (MC)	$0.06 + 0.0126 = 7.26\%$

Assumptions: Loan

- For this example, Debt Coverage Ratio (DCR) is 1.25

Calculations:

Stabilized Net Operating Income (NOIs)		$ 30,040
Debt Coverage Ratio (DCR)		1.25
Debt Payment (DP)	$30,040 ÷ 1.25 =	$ 24,032

Calculations:

Debt Payment (DP)		$ 24,032
Mortgage Constant (MC)		7.26%
Loan Value	$24,032 ÷ 0.1095 =	$ 330,796

E. Example: Industrial Building

Calculations:

Loan Interest (i) @ known	5.50%
Loan Term @ known	30 years (annually)
Sinking Fund Factor (SFF)	

$$0.055 \div [(1 + 0.055)^{\wedge}30 - 1] = 1.38\%$$

Calculations:

Loan Interest (i)	5.50%
Sinking Fund Factor (SFF)	1.38%
Mortgage Constant (MC)	$0.055 + 0.0138 = 6.88\%$

Assumptions: Loan

- For this example, Debt Coverage Ratio (DCR) is 1.10

Calculations:

Stabilized Net Operating Income (NOIs)	$ 96,875
Debt Coverage Ratio (DCR)	1.10
Debt Payment (DP)	$96,875 ÷ 1.10 = $ 88,068

Calculations:

Debt Payment (DP)	$ 88,068
Mortgage Constant (MC)	6.88%
Loan Value	$88,068 ÷ 0.0688 = $ 1,279,961

F. Example: Office Building

Calculations:

Loan Interest (i) @ known	7.00%
Loan Term @ known	30 years (annually)
Sinking Fund Factor (SFF)	

$$0.07 \div [(1 + 0.07)\text{^}30 - 1] = 1.06\%$$

Calculations:

Loan Interest (i)	7.00%
Sinking Fund Factor (SFF)	1.06%
Mortgage Constant (MC)	$0.07 + 0.0106 = 8.06\%$

Assumptions: Loan

- For this example, Debt Coverage Ratio (DCR) is 1.30

Calculations:

Stabilized Net Operating Income (NOIs)		$ 1,704,000
Debt Coverage Ratio (DCR)		1.30
Debt Payment (DP)	$1,704,000 ÷ 1.30 =	$ 1,310,769

Calculations:

Debt Payment (DP)		$ 1,310,769
Mortgage Constant (MC)		8.06%
Loan Value	$1,310,769 ÷ 0.0806 =	$ 16,265,389

Chapter V ESTIMATING THE LOAN VALUE (LV) USING DISCOUNTED CASH FLOW MODELS (DCFMs)

The basic discounted cash flow model is modified to estimate the value of the Loan as follows:

[Equation 20]

$$LV = \sum_{t=1}^{n} \frac{DP_t}{(1+i)^t} + \frac{UM_n}{(1+i)^n}$$

where,

LV = Loan Value

n = Loan Term, or number of periods of debt service

t = a specific time period

i = Interest Rate per period

DP_t = Debt Payment per period

UM_n = Unpaid Mortgage Balance in period n, after DP_n is paid

The annualized Debt Payment can also include other cash payments beside the required interest and amortization amount such as:

- Additional interest from cash flow participation periods
- Payments to renew or extend that loan during the holding period

The holding period, n, is the investor's best estimate and does not need to coincide with the loan amortization period or the term of the loan

At the end of the holding period, year n, the Unpaid Mortgage Balance (UM) paid off when the property is sold. This reversionary payment can also include:

- Prepayment penalties
- Accrued but unpaid interest
- Participation interest
- Yield maintenance provisions

The interest rate, i, which is used as the risk-adjusted rate of discount may or may not be the same as the interest rate that is used to calculate the Debt Payment. For example, if a mortgage assumed to have a below-market interest rate, the current market interest rate may be used if the analyst wants to determine the market value of the loan

If the analyst is determining the loan owner's (or mortgagee's) value, the correct interest rate would be the rate at which the mortgagee could invest the money in a mortgage with similar risk.

The risk premium for the interest rate must consider the three "C's" of credit:

- The Credit worthiness of the borrower
- The Capacity of the borrower to make the loan payments; and,
- The Character of the borrower

If the loan is not personally guaranteed by the borrower, a non-recourse loan, then the analyst must consider only the capacity of the real estate enterprise to make the required debt payments. The level of this default risk is usually reflected in the level of the Debt Coverage Ratio. The higher the default risk, the higher the Debt Coverage Ratio.

The risk premium must also reflect the risk of the lender not being able to recover all of its capital in the event that the borrower defaults on the loan and the lender must sell the property. This is the risk of capital loss—or the Liquidity Risk. The lower the loan-to-value ratio, the lower the liquidity risk.

Usually in DCFMs, the analyst constructs a mortgage amortization table that shows the periodic payment as well as the annual debt payments, which are broken down into interest payments and amortization amounts so that the outstanding loan balance is calculated at the beginning of the year as well as the end of the year.

A. Amortization Table

Assumptions: Loan Amortization

- Principal: $ 1,000,000 Borrowed
- Interest Rate: 6.00% as an Annual Rate
- Term 10 Years @ 1 Period per Year

Period	BoP	Payment	Interest	Amortization	EoP
0					1,000,000
1	1,000,000	135,868	60,000	75,868	924,132
2	924,132	135,868	55,448	80,420	843,712
3	843,712	135,868	50,623	85,245	758,467
4	758,467	135,868	45,508	90,360	668,107
5	668,107	135,868	40,086	95,782	572,325
6	572,325	135,868	34,340	101,528	470,797
7	470,797	135,868	28,248	107,620	363,177
8	363,177	135,868	21,791	114,077	249,099
9	249,099	135,868	14,946	120,922	128,177
10	128,177	135,868	7,691	128,177	0

Definitions of an Amortization Table

Period:	Payment Interval, which affects how often (and how much) interest accrues
BoP:	Loan balance at the Beginning of a Period
Payment:	Periodic payments. A payment in an amortizing loan includes payment towards both interest and principal, and is the same for each period. Payment can be calculated using Microsoft Excel (function "=PMT") or a financial calculator such as HP-12C when the total number of periods, interest per period, and principal owed are known.
Interest:	Interest portion of the payment. Interest can be found by multiplying the periodic interest rate by the balance at the beginning of a period.
Amortization:	Principal portion of the payment, which is the difference between the periodic payment and the interest paid for that period
EoP:	Remaining balance at the End of a Period, which should reach zero by the end of the term

B. Example: Apartment Building

Assumptions: Valuation Period

- Property sale at the end of fifth year

LOAN AMORTIZATION TABLE -- FOR LOAN VALUE CALCULATIONS					
Loan Value (Principal)	448,268				
Interest (Annual)	6.00%				
Term (Annual)	30				
Debt Payment (Periodi	32,566				
Period	**BoP**	**Payment**	**Amortization**	**Interest**	**EoP**
0					448,268
1	448,268	32,566	5,670	26,896	442,598
2	442,598	32,566	6,010	26,556	436,587
3	436,587	32,566	6,371	26,195	430,216
4	430,216	32,566	6,753	25,813	423,463
5	423,463	32,566	7,158	25,408	416,305
6	416,305	32,566	7,588	24,978	408,717
7	408,717	32,566	8,043	24,523	400,674
8	400,674	32,566	8,526	24,040	392,148
9	392,148	32,566	9,037	23,529	383,111
10	383,111	32,566	9,580	22,987	373,531
11	373,531	32,566	10,154	22,412	363,377
12	363,377	32,566	10,764	21,803	352,613
13	352,613	32,566	11,409	21,157	341,204
14	341,204	32,566	12,094	20,472	329,110
15	329,110	32,566	12,820	19,747	316,291
16	316,291	32,566	13,589	18,977	302,702
17	302,702	32,566	14,404	18,162	288,298
18	288,298	32,566	15,268	17,298	273,030
19	273,030	32,566	16,184	16,382	256,845
20	256,845	32,566	17,155	15,411	239,690
21	239,690	32,566	18,185	14,381	221,505
22	221,505	32,566	19,276	13,290	202,229
23	202,229	32,566	20,432	12,134	181,797
24	181,797	32,566	21,658	10,908	160,138
25	160,138	32,566	22,958	9,608	137,180
26	137,180	32,566	24,335	8,231	112,845
27	112,845	32,566	25,795	6,771	87,050
28	87,050	32,566	27,343	5,223	59,707
29	59,707	32,566	28,984	3,582	30,723
30	30,723	32,566	30,723	1,843	-

LOAN VALUE -- DISCOUNTED CASH FLOW								
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Debt Service (DS)						
Debt Payment	32,566	32,566	32,566	32,566	32,566	
Unpaid Mortgage					416,305	
Total Debt Service	32,566	32,566	32,566	32,566	448,871	
Loan Value						
Interest Rate	94.34%	89.00%	83.96%	79.21%	74.73%	
Loan Value	**$ 448,268**	**30,723**	**28,984**	**27,343**	**25,795**	**335,422**

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C. Example: Strip Shopping Center

Assumptions: Valuation Period

- Property sale at the end of fifth year

LOAN AMORTIZATION TABLE -- FOR LOAN VALUE CALCULATIONS					
Loan Value (Principal)		330,796			
Interest (Annual)		6.00%			
Term (Annual)		30			
Debt Payment (Periodi		24,032			
Period	**BoP**	**Payment**	**Amortization**	**Interest**	**EoP**
0					330,796
1	330,796	24,032	4,184	19,848	326,612
2	326,612	24,032	4,435	19,597	322,177
3	322,177	24,032	4,701	19,331	317,476
4	317,476	24,032	4,983	19,049	312,492
5	312,492	24,032	5,282	18,750	307,210
6	307,210	24,032	5,599	18,433	301,610
7	301,610	24,032	5,935	18,097	295,675
8	295,675	24,032	6,292	17,740	289,383
9	289,383	24,032	6,669	17,363	282,714
10	282,714	24,032	7,069	16,963	275,645
11	275,645	24,032	7,493	16,539	268,152
12	268,152	24,032	7,943	16,089	260,209
13	260,209	24,032	8,419	15,613	251,790
14	251,790	24,032	8,925	15,107	242,865
15	242,865	24,032	9,460	14,572	233,405
16	233,405	24,032	10,028	14,004	223,377
17	223,377	24,032	10,629	13,403	212,748
18	212,748	24,032	11,267	12,765	201,481
19	201,481	24,032	11,943	12,089	189,537
20	189,537	24,032	12,660	11,372	176,878
21	176,878	24,032	13,419	10,613	163,458
22	163,458	24,032	14,225	9,807	149,234
23	149,234	24,032	15,078	8,954	134,156
24	134,156	24,032	15,983	8,049	118,173
25	118,173	24,032	16,942	7,090	101,232
26	101,232	24,032	17,958	6,074	83,273
27	83,273	24,032	19,036	4,996	64,238
28	64,238	24,032	20,178	3,854	44,060
29	44,060	24,032	21,388	2,644	22,672
30	22,672	24,032	22,672	1,360	(0)

LOAN VALUE -- DISCOUNTED CASH FLOW								
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Debt Service (DS)						
Debt Payment	24,032	24,032	24,032	24,032	24,032	
Unpaid Mortgage					307,210	
Total Debt Service	24,032	24,032	24,032	24,032	331,242	
Loan Value						
Interest Rate 6.00%	94.76%	95.15%	95.51%	95.85%	96.16%	
Loan Value $ 330,796	**22,672**	**21,388**	**20,178**	**19,036**	**247,523**	

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D. Example: Industrial Building

Assumptions: Valuation Period

- Property sale at the end of fifth year

LOAN AMORTIZATION TABLE -- FOR LOAN VALUE CALCULATIONS					
Loan Value (Principal)	1,279,961				
Interest (Annual)	5.50%				
Term (Annual)	30				
Debt Payment (Periodi	88,068				
Period	**BoP**	**Payment**	**Amortization**	**Interest**	**EoP**
0					1,279,961
1	1,279,961	88,068	17,670	70,398	1,262,290
2	1,262,290	88,068	18,642	69,426	1,243,648
3	1,243,648	88,068	19,668	68,401	1,223,980
4	1,223,980	88,068	20,749	67,319	1,203,231
5	1,203,231	88,068	21,890	66,178	1,181,341
6	1,181,341	88,068	23,094	64,974	1,158,246
7	1,158,246	88,068	24,365	63,704	1,133,882
8	1,133,882	88,068	25,705	62,363	1,108,177
9	1,108,177	88,068	27,118	60,950	1,081,058
10	1,081,058	88,068	28,610	59,458	1,052,448
11	1,052,448	88,068	30,184	57,885	1,022,265
12	1,022,265	88,068	31,844	56,225	990,421
13	990,421	88,068	33,595	54,473	956,826
14	956,826	88,068	35,443	52,625	921,384
15	921,384	88,068	37,392	50,676	883,992
16	883,992	88,068	39,449	48,620	844,543
17	844,543	88,068	41,618	46,450	802,925
18	802,925	88,068	43,907	44,161	759,017
19	759,017	88,068	46,322	41,746	712,695
20	712,695	88,068	48,870	39,198	663,825
21	663,825	88,068	51,558	36,510	612,267
22	612,267	88,068	54,393	33,675	557,874
23	557,874	88,068	57,385	30,683	500,489
24	500,489	88,068	60,541	27,527	439,947
25	439,947	88,068	63,871	24,197	376,076
26	376,076	88,068	67,384	20,684	308,692
27	308,692	88,068	71,090	16,978	237,602
28	237,602	88,068	75,000	13,068	162,602
29	162,602	88,068	79,125	8,943	83,477
30	83,477	88,068	83,477	4,591	(0)

LOAN VALUE -- DISCOUNTED CASH FLOW								
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Debt Service (DS)						
Debt Payment	88,068	88,068	88,068	88,068	88,068	
Unpaid Mortgage					1,181,341	
Total Debt Service	88,068	88,068	88,068	88,068	1,269,409	
Loan Value						
Interest Rate	94.79%	89.85%	85.16%	80.72%	76.51%	
Loan Value	**$ 1,279,961**	**83,477**	**79,125**	**75,000**	**71,090**	**971,268**	

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E. Example: Office Building

Assumptions: Valuation Period

- Property sale at the end of fifth year

LOAN AMORTIZATION TABLE -- FOR LOAN VALUE CALCULATIONS					
Loan Value (Principal)	16,265,389				
Interest (Annual)	7.00%				
Term (Annual)	30				
Debt Payment (Periodi	1,310,769				
Period	**BoP**	**Payment**	**Amortization**	**Interest**	**EoP**
0					16,265,389
1	16,265,389	1,310,769	172,192	1,138,577	16,093,197
2	16,093,197	1,310,769	184,245	1,126,524	15,908,952
3	15,908,952	1,310,769	197,143	1,113,627	15,711,809
4	15,711,809	1,310,769	210,943	1,099,827	15,500,867
5	15,500,867	1,310,769	225,709	1,085,061	15,275,158
6	15,275,158	1,310,769	241,508	1,069,261	15,033,650
7	15,033,650	1,310,769	258,414	1,052,356	14,775,236
8	14,775,236	1,310,769	276,503	1,034,267	14,498,734
9	14,498,734	1,310,769	295,858	1,014,911	14,202,876
10	14,202,876	1,310,769	316,568	994,201	13,886,308
11	13,886,308	1,310,769	338,728	972,042	13,547,580
12	13,547,580	1,310,769	362,439	948,331	13,185,142
13	13,185,142	1,310,769	387,809	922,960	12,797,332
14	12,797,332	1,310,769	414,956	895,813	12,382,376
15	12,382,376	1,310,769	444,003	866,766	11,938,373
16	11,938,373	1,310,769	475,083	835,686	11,463,290
17	11,463,290	1,310,769	508,339	802,430	10,954,951
18	10,954,951	1,310,769	543,923	766,847	10,411,029
19	10,411,029	1,310,769	581,997	728,772	9,829,032
20	9,829,032	1,310,769	622,737	688,032	9,206,295
21	9,206,295	1,310,769	666,329	644,441	8,539,966
22	8,539,966	1,310,769	712,972	597,798	7,826,994
23	7,826,994	1,310,769	762,880	547,890	7,064,115
24	7,064,115	1,310,769	816,281	494,488	6,247,834
25	6,247,834	1,310,769	873,421	437,348	5,374,413
26	5,374,413	1,310,769	934,560	376,209	4,439,852
27	4,439,852	1,310,769	999,980	310,790	3,439,873
28	3,439,873	1,310,769	1,069,978	240,791	2,369,895
29	2,369,895	1,310,769	1,144,877	165,893	1,225,018
30	1,225,018	1,310,769	1,225,018	85,751	-

LOAN VALUE -- DISCOUNTED CASH FLOW									
				Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Debt Service (DS)									
	Debt Payment			1,310,769	1,310,769	1,310,769	1,310,769	1,310,769	
	Unpaid Mortgage							15,275,158	
	Total Debt Service			1,310,769	1,310,769	1,310,769	1,310,769	16,585,927	
Loan Value									
	Interest Rate	7.00%		93.46%	87.34%	81.63%	76.29%	71.30%	
	Loan Value	**$ 16,265,389**		**1,225,018**	**1,144,877**	**1,069,978**	**999,980**	**11,825,537**	

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Chapter VI ESTIMATING EQUITY VALUE (EV) USING DIRECT CAPITALIZATION MODELS (DCMs)

A. Introduction

- Equity Value (EV) is the present worth of the future monetary benefits that accrue to the owner of the real estate during the expected holding period
- It is often called a “Reversion or Residual Value” based on what cash flow is left after the rents are collected, the operating expenses are paid, the necessary capital expenditures are made, and the required financial obligations are met
- The Equity Value can be estimated using either a Direct Capitalization Model (DCM) or a Discounted Cash Flow Model (DCFM)
- In both cases, the after-financing cash flow is used and income taxes are not considered
- Investors should understand the tax consequences of the real estate investment, but “tax savings” should never drive or justify any real estate investment
- The most common forms of real estate ownership are non-taxable conduits that have the income “flow through” to the owners of the entity. That is, no income tax is made at the entity level. These would include
    - Partnerships
    - Real Estate Investment Trusts (REIT’s)
    - Limited Liability Companies (LLC’s)
    - Pension funds, or
    - Non-profit companies
- Language surrounding the Equity Value is confusing, because several terms are used to describe the appropriate capitalization rate and the risk-adjusted rate of discount
- The appropriate capitalization rate is then sometimes called the “leveraged cash-on-cash return” by investors or the Equity Dividend Rate (Re) by appraisers. In any event, this capitalization rate has a “return on” components and a “return of” component.
- The “return on” component is the Required Internal Rate of Return on Equity (RIRRe), which is also called the Required Equity Yield Rate (y)

- The “return of” component is usually negative because the Equity Value is assumed to increase over time as the mortgage is amortized and therefore “building up” the equity
- Also, the Equity Value is expected to increase over time, because as the property value increases and the mortgage amount remains either fixed or declining so that all of the residual benefits go to the equity
- Both the appropriate capitalization and the risk-adjusted rate of discount are difficult to discern from recent property sales, because the exact amount and terms of property’s financing arrangements are not known
- Active real estate investors are often surveyed to determine their expected “leveraged cash-on-cash return” (a capitalization rate) or their “leveraged internal rate of return” (a risk-adjusted rate of discount)

B. Estimating Equity Value (EV) Using Direct Capitalization Models (DCMs)

- The Direct Capitalization Model to estimate the Equity Value (EV) is Cash Flow after financing (CF) divided by the Equity Dividend Rate (Re) or the Leveraged Cash-on-Cash Return (LCOC)

[Equation 21]

$$EV = CF/Re$$

where,
CF = Cash Flow after financing
Re = Equity Dividend Rate

- As a capitalization rate, the Equity Dividend Rate (Re) is the Equity Yield Rate (y), less the expected growth rate of the equity. The equity value will increase annually through the appreciation in the property value (%Apr) as well as by the decrease in the mortgage loan principal, because the debt is amortized by the Sinking Fund Factor (SFF). See Figure 3.
- To capture the effect of the property appreciation and the debt amortization, we need to start with the definition of the Overall Capitalization Rate (OCR). OCR is the weighted average of the Mortgage Constant (MC) and the Equity Dividend Rate (Re).

[Equation 22]

[22a] $OCR = MC \times (L/V) + Re \times (1 - L/V)$

re-arranging the terms, we have:

[22b]

$$Re = \frac{OCR - MC \times (L/V)}{(1 - L/V)}$$

Then, we substitute the below:

[Equation 8] $OCR = D - \%Apr$

[Equation 5] $D = [i \times (L/V)] + [y \times (1 - L/V)]$

[Equation 14] $MC = i + SFF$

and, re-arrange and cancel terms we have:

[Equation 23]

$$Re = y - \frac{\%Apr + (L/V) \times SFF}{1 - (L/V)}$$

where,

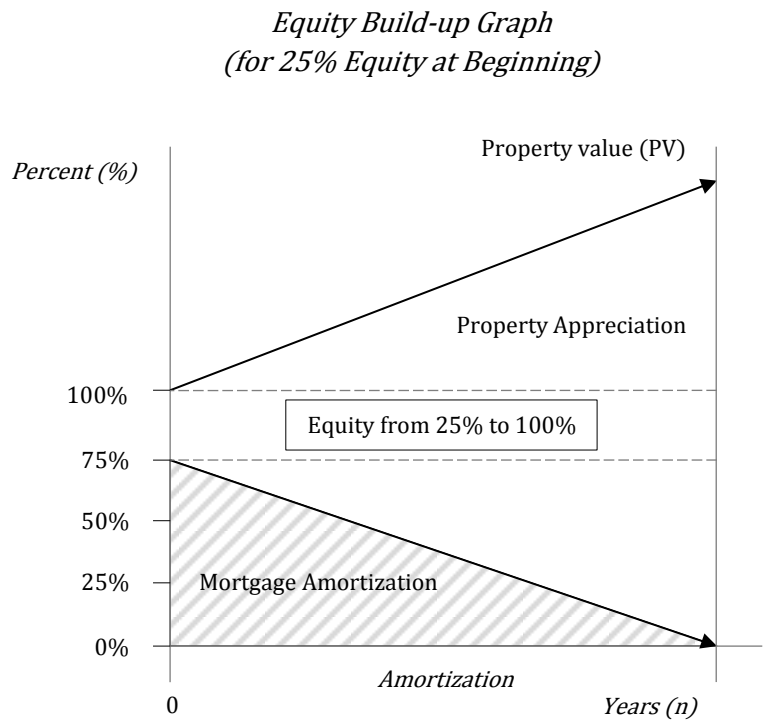
y = Equity Yield Rate

%Apr = annual property Appreciation rate

SFF = annual Sinking Fund Factor

L/V = Loan-to-Value Ratio (or Percent Debt)

[Figure 3] Equity Build-up Graph (for 25% Equity at Beginning)



- Again, the Direct Capitalization Model uses simple mathematics, but it has many assumptions embedded in it
- There have been many attempts to modify direct capitalization models to account for different financing conditions (Ellwood Models) and to account for increasing or decreasing income streams (J-factors)
- However, as with most DCM's, these are best used for "back of the envelope (BOTE)" analysis and as a way to screen or quickly evaluate a real estate investment's potential
- The Equity Dividend Rate (Re) can be derived as above for an analyst estimating the Investment Value of a property
- The Equity dividend Rate (Re) can also be derived from recent market sales if the financing terms of the sales are known. Equity Dividend Rates determined in this manner are used in the estimation of the Market Value of the property.

C. Example: Apartment Building

Calculations:

Stabilized Net Operating Income (NOIs)	$ 42,336
Cash Flow before Debt Service	$ 42,336
Debt Payment (DP) @ known	$ 32,566
CF after Debt Service	$\$42{,}336 - \$32{,}566 = \$\ 9{,}770$

Calculations:

Overall Capitalization Rate (OCR)	7.25%
Mortgage Constant (MC)	7.26%
Loan-to-Value Ratio	75%

Equity Dividend Rate (Re) / Leveraged Cash-on-Cash Return

$$\frac{0.0725 - 0.0726 \times 0.75}{1 - 0.75} = 7.21\%$$

Calculations:

Equity Yield Rate (y)	15.00%
Property Annual Growth	Apprec. @ 1%
Loan-to-Value Ratio	75%
Sinking Fund Factor (SFF)	1.26%

Equity Dividend Rate (Re) / Leveraged Cash-on-Cash Return

$$0.15 - \frac{(0.01 + 0.75 \times 0.0126)}{1 - 0.75} = 7.21\%$$

Calculations:

Cash flow after Debt Service	$ 9,770
Equity dividend Rate (Re)	7.21%
Equity Value (EV)	$ 9,770 ÷ $ 0.0721 = $ 135,592

D. Example: Strip Shopping Center

Calculations:

Stabilized Net Operating Income (NOIs)	$ 30,040
Cash Flow before Debt Service	$ 30,040
Debt Payment (DP) @ known	$ 24,032
CF after Debt Service	$\$30{,}040 - \$24{,}032 = \$\ 6{,}008$

Calculations:

Overall Capitalization Rate (OCR)	6.75%
Mortgage Constant (MC)	7.26%
Loan-to-Value Ratio	75%

Equity Dividend Rate (Re) / Leveraged Cash-on-Cash Return

$$\frac{0.0675 - 0.0726 \times 0.75}{1 - 0.75} = 5.21\%$$

Calculations:

Equity Yield Rate (y)	15.00%
Property Annual Growth	Apprec. @ 1.5%
Loan-to-Value Ratio	75%
Sinking Fund Factor (SFF)	1.26%

Equity Dividend Rate (Re) / Leveraged Cash-on-Cash Return

$$0.15 - \frac{(0.015 + 0.75 \times 0.0126)}{1 - 0.75} = 5.21\%$$

Calculations:

Cash flow after Debt Service	$ 6,008
Equity Dividend Rate (Re)	5.21%
Equity Value (EV)	$ 6,008 ÷ 0.0521 = $ 115,420

E. Example: Industrial Building

Calculations:

Stabilized Net Operating Income (NOIs)	$ 96,875
Cash Flow before Debt Service	$ 96,875
Debt Payment (DP) @ known	$ 88,068
CF after Debt Service	$96,875 − $88,068 = $ 8,807

Calculations:

Overall Capitalization Rate (OCR)	7.45%
Mortgage Constant (MC)	6.88%
Loan-to-Value Ratio	90%

Equity Dividend Rate (Re) / Leveraged Cash-on-Cash Return

$$\frac{0.0745 - 0.0688 \times 0.9}{1 - 0.9} = 12.58\%$$

Calculations:

Equity Yield Rate (y)	15.00%
Property Annual Growth	Deprec. @ -1.00%
Loan-to-Value Ratio	90%
Sinking Fund Factor (SFF)	1.38%

Equity Dividend Rate (Re) / Leveraged Cash-on-Cash Return

$$0.15 - \frac{-0.01 + 0.9 \times 0.0138}{1 - 0.75} = 12.58\%$$

Calculations:

Cash flow after Debt Service	$ 8,807
Equity dividend Rate (Re)	12.58%
Equity Value (EV)	$8,807 ÷ 0.1258 = $ 70,034

F. Example: Office Building

Calculations:

Stabilized Net Operating Income (NOIs)	$ 1,704,000
Cash Flow before Debt Service	$ 1,704,000
Debt Payment (DP) @ known	$ 1,310,769

Cash Flow after Debt Service

$$\$1{,}704{,}000 - \$1{,}310{,}769 = \$\ 393{,}231$$

Calculations:

Overall Capitalization Rate (OCR)	8.30%
Mortgage Constant (MC)	8.06%
Loan-to-Value Ratio	70%

Equity Dividend Rate (Re) / Leveraged Cash-on-Cash Return

$$\frac{0.083 - 0.0806 \times 0.7}{1 - 0.7} = 8.86\%$$

Calculations:

Equity Yield Rate (y)	15.00%
Property Annual Growth	Apprec. @ 2.00%
Loan-to-Value Ratio	70%
Sinking Fund Factor (SFF)	1.06%

Equity Dividend Rate (Re) / Leveraged Cash-on-Cash Return

$$0.18 - \frac{(0.02 + 0.7 \times 0.0106)}{1 - 0.7} = 8.86\%$$

Calculations:

Cash flow after Debt Service	$ 393,231
Equity dividend Rate (Re)	8.86%
Equity Value (EV)	$393,231 ÷ 0.0886 = $ 4,436,682

Chapter VII ESTIMATING EQUITY VALUE (EV) USING DISCOUNTED CASH FLOW MODELS (DCFMs)

The basic Discounted Cash Flow Model can be redefined to estimate the Equity Value (EV) as follows:

[Equation 24]

$$EV = \sum_{t=1}^{n} \frac{CF_t}{(1+y)^t} + \frac{ER_n}{(1+y)^n}$$

where,

n = Holding Period

CF_t = Cash Flow at period t

y = Equity Yield Rate

ER_n = Equity Reversion at the end of year n

The Cash Flow (CF) is defined as the annual Net Operating Income (NOI) less the annual Capital Expenditures (CE), then less the annual Debt Payment (DP):

[Equation 25]

$$CF = NOI - CE - DP$$

The Equity Reversion (ER) at the end of the holding period (n) is defined as the Sales Price (SP) less the Selling Expense—brokerage commission and closing costs (SE), then less the Unpaid Mortgage (UM):

[Equation 26]

$$ER_n = SP_n - \mathrm{SE}_n - UM_n$$

where,

SP_n = Sale Price in year n

SE_n = Selling Expenses in year n

UM_n = Unpaid Mortgage in year n

A. Example: Apartment Building

EQUITY VALUE -- DISCOUNTED CASH FLOW			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Net Operating Income			42,336	42,759	43,187	43,619	44,055	44,496
Capital Expenditure			-	-	-	-	-	
Operating Future CF before Debt Payment			42,336	42,759	43,187	43,619	44,055	
Debt Payment			32,566	32,566	32,566	32,566	32,566	
Operating Future CF after Debt Payment			**9,770**	**10,193**	**10,621**	**11,053**	**11,489**	
Property Reversion								
Sale Price	7.25%	OCR					613,732	
Sale Expense	5.00%	of SP					30,687	
Net Sale Price							**583,045**	
Unpaid Mortgage							416,305	
Net Sale after Principal Repay							**166,741**	
Total CF before Debt Service			42,336	42,759	43,187	43,619	627,100	
Total Debt Service			32,566	32,566	32,566	32,566	448,871	
Total CF after Debt Service			**9,770**	**10,193**	**10,621**	**11,053**	**178,229**	
Equity Value								
Equity Yield Rate	15.00%		86.96%	75.61%	65.75%	57.18%	49.72%	
PV of Operating CF after DS	$ 35,218	29.82%	8,496	7,708	6,983	6,319	5,712	
PV of Reversion CF after DS	$ 82,900	70.18%	-	-	-	-	82,900	
Equity Value	**$ 118,117**		**8,496**	**7,708**	**6,983**	**6,319**	**88,612**	

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B. Example: Strip Shopping Center

EQUITY VALUE -- DISCOUNTED CASH FLOW			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Net Operating Income			36,640	37,190	37,747	38,314	38,888	39,472
Capital Expenditure								
Capet	5	yrs	-	-	-	-	24,000	
Roof	20	yrs	-	-	-	-	-	
HVAC	10	yrs	-	-	-	-	-	
Total Capital Expenditure			-	-	-	-	24,000	
Operating CF before Debt Payment			36,640	37,190	37,747	38,314	14,888	
Debt Payment			24,032	24,032	24,032	24,032	24,032	
Operating CF after Debt Payment			**12,608**	**13,158**	**13,715**	**14,282**	**(9,144)**	
Property Reversion								
Sale Price	6.75%	OCR					584,766	
Sale Expense	5.00%	of SP					29,238	
Net Sale Price							**555,527**	
Unpaid Mortgage							307,210	
Net Sale after Debt							**248,318**	
Total CF before Debt Service			36,640	37,190	37,747	38,314	570,416	
Total Debt Service			24,032	24,032	24,032	24,032	331,242	
Total CF after Debt Service			**12,608**	**13,158**	**13,715**	**14,282**	**239,174**	
Equity Value								
Equity Yield Rate	15.00%		86.96%	75.61%	65.75%	57.18%	49.72%	
PV of Operating CF after DS	$ 33,550	21.37%	10,963	9,949	9,018	8,166	(4,546)	
PV of Reversion CF after DS	$ 123,458	78.63%	-	-	-	-	123,458	
Equity Value	**$ 157,008**		**10,963**	**9,949**	**9,018**	**8,166**	**118,912**	

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C. Example: Industrial Building

EQUITY VALUE -- DISCOUNTED CASH FLOW			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Net Operating Income			109,375	109,355	109,335	109,314	109,294	109,273
Capital Expenditure								
Roof	10 yrs		-	-	-	-	-	
Total Capital Expense			-	-	-	-	-	
Operating CF before Debt Payment			109,375	109,355	109,335	109,314	109,294	
Debt Payment			88,068	88,068	88,068	88,068	88,068	
Operating CF after Debt Payment			**21,307**	**21,287**	**21,267**	**21,246**	**21,226**	
Property Sale								
Sale Price	7.45%	OCR					1,466,751	
Sale Expense	10.00%	of SP					146,675	
Net Sale Price							**1,320,076**	
Unpaid Mortgage							1,181,341	
Net Sale after Debt							**138,736**	
Total CF before Debt Service			109,375	109,355	109,335	109,314	1,429,370	
Total Debt Service			88,068	88,068	88,068	88,068	1,269,409	
Total CF after Debt Service			**21,307**	**21,287**	**21,267**	**21,246**	**159,961**	
Equity Value								
Equity Yield Rate	15.00%		86.96%	75.61%	65.75%	57.18%	49.72%	
PV of Operating CF after DS	$ 71,307	50.83%	18,528	16,096	13,983	12,148	10,553	
PV of Reversion CF after DS	$ 68,976	49.17%	-	-	-	-	68,976	
Equity Value	**$ 140,283**		**18,528**	**16,096**	**13,983**	**12,148**	**79,529**	

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D. Example: Office Building

EQUITY VALUE -- DISCOUNTED CASH FLOW			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Net Operating Income			1,704,000	1,738,080	1,772,842	1,808,298	1,844,464	1,881,354
Capital Expenditure			-	-	-	-	-	
Operating CF before Debt Payment			1,704,000	1,738,080	1,772,842	1,808,298	1,844,464	
Debt Payment			1,310,769	1,310,769	1,310,769	1,310,769	1,310,769	
Operating CF after Debt Payment			**393,231**	**427,311**	**462,072**	**497,529**	**533,695**	
Property Sale								
Sale Price	8.30%	OCR					22,666,912	
Sale Expense	5.00%	of SP					1,133,346	
Net Sale Price							**21,533,566**	
Unpaid Mortgage							15,275,158	
Net Sale after Debt							**6,258,408**	
Total CF before Debt Service			1,704,000	1,738,080	1,772,842	1,808,298	23,378,031	
Total Debt Service			1,310,769	1,310,769	1,310,769	1,310,769	16,585,927	
Total CF after Debt Service			**393,231**	**427,311**	**462,072**	**497,529**	**6,792,103**	
Equity Value								
Equity Yield Rate	18.00%		84.75%	71.82%	60.86%	51.58%	43.71%	
PV of Operating CF after DS	$ 1,411,269	34.03%	333,246	306,888	281,232	256,620	233,283	
PV of Reversion CF after DS	$ 2,735,608	65.97%	-	-	-	-	2,735,608	
Equity Value	**$ 4,146,877**		**333,246**	**306,888**	**281,232**	**256,620**	**2,968,891**	

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APPENDICES

APPENDIX A EQUATIONS AND ABBREVIATIONS

Equation		Variable Abbreviation	Variable Definition
1	$V = I/R$		
		V	Value
		I	Income
		R	Capitalization Rate
2	$R = r - g$		
		R	Capitalization Rate
		r	Risk-Adjusted Rate of Discount
		g	annual growth rate of the stream of income
3	$V = \left(\sum_{t=1}^{n} \frac{AI_t}{(1+r)^t} \right) + \frac{RI_n}{(1+r)^n}$		
		V	Value
		∑	Summation
		n	number of years in the holding period
		t	a specific year in the holding period
		r	Risk-Adjusted Rate of Discount
		AI	Annual Income
		RI	Reversionary Income
4	$r = rf + rp$		
		r	Risk-Adjusted Rate of Discount
		rf	Risk-free or safe rate
		fp	Risk premium
5	$WACC = D = RIRRtc$ $RIRRtc = [\, i \times (\mathrm{L}/V)] + [y \times (1 - \mathrm{L}/V)$		
		WACC	Weighted Average Cost of Capital
		D	Discount Rate
		RIRRtc	Required Internal Rate of Return on total capital
		i	Interest rate
		y	Equity Yield Rate
		L/V	Loan-to-Value Ratio

6 $PV = \text{NOIs}/OCR$

PV	Property Value
NOIs	Stabilized Net Operating Income
OCR	Overall Capitalization Rate

7 $NOIs = GI - VC - OE$

NOIs	Stabilized Net Operating Income
GI	Gross Income
VC	Vacancy and Collection Allowance
OE	Operating Expenses including Reserves for Wasting Parts

8a $OCR = D - (\%Apr)$

8b $OCR = D + (\%Dpr)$

OCR	Overall Capitalization Rate
D	Discount Rate; WACC = RIRRtc
%Apr	Growth rate; annual rate of property Appreciation
%Dpr	Growth rate; annual rate of property Depreciation

9 $GI = RI + PI + OI$

GI	Gross Income
RI	Rental Income
PI	Parking Income
OI	Other Income

10 $EGI = GI - VC$

EGI	Effective Gross Income
GI	Gross Income
VC	Vacancy and Collection Allowance

11 $OER = OE/EGI$

OER	Operating Expense Ratio
OE	Operating Expenses
EGI	Effective Gross Income

12 $$PV = \sum_{t=1}^{n} \frac{GI_t - VC_t - OE_t - CE_t}{(1+D)^t} + \frac{SP_n - SE_n}{(1+D)^n}$$

PV	Property Value
$\sum$	Summation
n	number of years in the holding period
t	a specific year in the holding period
GI_t	Gross Income for period t
VC_t	Vacancy and Collection Allowance for period t
OE_t	Operating Expenses for period t
CE_t	Capital Expenditure for period t
SP_n	Selling Price after holding period n
SE_n	Selling Expenses after holding period n
D	Discount Rate; WACC; RIRRtc

13 $$SP_n = NOI_{n+1}/OCR$$

SP_n	Selling Price in year n
NOI_{n+1}	Net Operating Income in year n+1
OCR	Overall Capitalization Rate

14 $$MC = i + SFF$$

MC	Mortgage Constant
i	Periodic interest rate
SFF	Sinking Fund Factor

15 $$SFF = \frac{i}{(1+i)^n - 1}$$

SFF	Sinking Fund Factor
n	Total number of periods in the amortization term
i	Periodic interest rate

16 $$DCR = \mathrm{NOI}/DP$$

DCR	Debt Coverage Ratio
NOI	Net Operating Income
DP	Debt Payment

17 $L/V = LV/PV$

L/V	Loan-to-Value Ratio
LV	Loan Value
PV	Property Value

18 $LV = DP/MC$

LV	Loan Value
DP	Debt Payment
MC	Mortgage Constant

19 $DP = NOI \ / \ DCR$

DP	Debt Payment
NOI	Net Operating Income
DCR	Debt Coverage Ratio

20 $$LV = \sum_{t=1}^{n} \frac{DP_t}{(1+i)^t} + \frac{UM_n}{(1+i)^n}$$

LV	Loan Value
$\sum$	Summation
n	Loan Term, or number of periods of debt service
t	a specific time period
i	Interest Rate per period
DP_t	Debt Payment per period
UM_n	Unpaid Mortgage Balance after the loan term n

21 $EV = CF/Re$

EV	Equity Value
CF	Cash Flow after financing
Re	Equity Dividend Rate

22a $OCR = MC \times (L/V) + Re \times (1 - L/V)$

22b $$Re = \frac{OCR - MC \times (L/V)}{(1 - L/V)}$$

OCR	Overall Capitalization Rate
MC	Mortgage Constant
Re	Equity Dividend Rate
L/V	Loan-to-Value Ratio

23 $$Re = y - \frac{\%Apr + (L/V) \times SFF}{1 - (L/V)}$$

Re	Equity Dividend Rate
y	Equity Yield Rate
%Apr	annual rate of property Appreciation
SFF	annual Sinking Fund Factor
L/V	Loan-to-Value Ratio

24 $$EV = \sum_{t=1}^{n} \frac{CF_t}{(1+y)^t} + \frac{ER_n}{(1+y)^n}$$

EV	Equity Value
$\sum$	Summation
n	Holding Period
t	a specific time period
CF_t	Cash Flow at period t
y	Equity Yield Rate
ER_n	Equity Reversion at the end of holding period n

25 $$CF = NOI - CE - DP$$

CF	Cash Flow
NOI	Net Operating Income
CE	Capital Expenditures
DP	annual Debt Payment

26 $$ER_n = SP_n - \mathrm{SE}_n - UM_n$$

ER_n	Equity Reversion at the end of holding period n
SP_n	Sale Price in year n
SE_n	Selling Expenses in year n
UM_n	Unpaid Mortgage in year n

APPENDIX B THE FINLEY FORM

BACKGROUND

Wes Finley

In the mid 1970's my business partner in Oklahoma City was R. W. "Wes" Finley, a former saloon keeper turned real estate appraiser, broker, and developer. Wes did everything in a big way. His Branding Iron Saloon was the largest bar in Oklahoma; his Crossroads Mall was the largest shopping center in Oklahoma; and finally, Wes's United Founders Deal was the largest real estate transaction in Oklahoma. We were great friends and, as partners, we loved to look at properties and figure out real estate deals.

Wes's Minor Eccentricity

One of Wes's minor eccentricities was his "to-do" lists which he kept on old envelopes carried in the vest pocket of his sport coat. Each morning Wes would open his mail and save all the envelopes for his day's notes and "to-dos."

Probabilistic, Discounted Cash Flow Analysis Versus the Sniff Test

My preferred form of investment analysis was a probabilistic, discounted cash flow technique which used Monte Carlo simulation, over 50 variables, and various IRR and present value calculations which included the probability of the return. This analysis was done using a remote terminal, a modem, the University of Oklahoma's main frame computer, and 15 pages of output.

When we "worked out" a deal, I would gather all of the relevant data, make preliminary calculations, and call up the main frame. Meanwhile as I was collecting the data, Wes would be writing furiously on the back of one of his envelopes. He would then announce whether the deal would work even before I could call up the computer and do the "real analysis."

Wes contended that the most important thing for a good real estate developer and investor was a good nose. "The deal's just got to smell right!" he insisted.

Wes and I were different in many other ways as well: he was 150 pounds heavier, a foot taller, and twenty-five years older. Wes was all Irish and street-smart while I was only part Irish and book-learned, as Wes would say. It was little wonder that we had totally different approaches to everything, but the real estate analysis is where we sparred most of the time.

It was my computer-based, discounted cash flow analysis (the explicit scientific approach) versus Wes's intuitive, back-of-the-envelope, "smells good" approach.

Insights on the Sabbath

One Sunday morning while Wes was at Mass, I was in the office working on the computer (to get good turnaround time on the main frame). During a coffee break, I absent-mindedly walked in to Wes's vacant office and noticed a stack of "used" envelopes on his desk. In the name of scientific inquiry, I picked up the stack of envelopes, and studied his calculations. Much to my surprise, Wes was doing a rather complex mortgage-equity analysis that was based on real estate market conditions, mortgage rates and constraints, and risk-return trade off's.

The Finley Form Goes High Tech

I put Wes's calculation on the original computer spreadsheet program, Visicalc, which worked on my 16K Apple II. When I showed Wes his back-of-the-envelope approach computer screen the next morning, he was a little chagrined that I had pirated his intellectual property onto a 5 ½ inch floppy disk. But when he saw the "The Finley Form", he embraced this new computer technology.

We included the Finley Form in our appraisals, feasibility studies, and investment proposals from then on. Not surprisingly, our clients and investors related much more to the Finley Form than my I5-page, probabilistic, discounted cash flow analysis.

WHAT IS THE FINLEY FORM?

Direct Capitalization Technique

The Finley Form is essentially a direct capitalization technique that uses the mortgage-equity approach. Specifically, it is an equity residual methodology since the real estate markets (rents, vacancies, and operating expenses) and the mortgage markets (interest rates, amortization terms, and underwriting ratios) determine the amount of annual income that is left-over for (or residual to) the equity capital.

Capital Assumptions

As a valuation technique, the Finley Form assumes that the real estate investment will be acquired with both debt capital (a mortgage loan) and equity capital (the investor's cash contribution). The total property value is therefore defined on the sum of the value of the debt capital and the value of the equity capital.

Debt Value

The value of the debt capital is determined using the property's net operating income, and the lender's debt coverage ratio, interest rate, and amortization period. Essentially, the debt service is determined using the net operating income and debt coverage ratio, and then it is capitalized (or converted to value) using the mortgage constant.

Equity Value

The equity value is determined by calculating the property's cash flow (after financing but before tax) and then capitalizing it using what appraisers call the equity divided into rate and what equity investors call the "cash-on-cash" return.

As a mortgage-equity appraisal, the Finley Form implicitly includes all of the financial and investment assumptions that are made in the famous Ellwood Technique and the discounted cash flow technique.

ADVANTAGES OF THE FINELY FORM

The three main advantages of the Finley Form are that it (1) employs simple calculations (2) uses readily available data, and (3) is easily communicated.

Simple Calculations

Even though rather complicated financial and investment assumptions are implicitly being made, the Finley Form requires only basic addition, subtraction, multiplication, and division.

The calculations can be made using a computer, a calculator, or a pencil and the back-of-an-envelope. Investors who are familiar with the Finley Form, often do the calculations in their heads during negotiations or while driving the car with a spouse and children.

Readily Available Data

The financial information used in the Finley Form is readily available from banks, insurance companies, pension funds, or sellers offering carryback financing. Equity investors in real estate are usually forthcoming when asked what expected cash-on-cash return is. The equity dividend rate is a term of art used exclusively by real estate appraisers which is the same as the cash-on-cash return. Also the dividend yield quoted for common stocks in the financial pages is a very similar rate.

In discounted cash flow analysis, the equity yield rate is used which is also the expected internal rate of return on equity. This rate is very appealing as a risk-adjusted rate of discount for equity returns, but it is very difficult to observe. Also equity investors who do quote internal rates also need to express a small volume of assumptions for the meaningful interpretation of their rate. Thus, the cash-on-cash return is usually the best expressed indication of equity investors' expectations.

Easily Communicated

The straight forward manner of the Finley Form appeals to equity investors, and the ease of calculation in the Finley Form saves time and quickly eliminates investment "opportunities" that just won't hunt (as in "this dog won't hunt", as Wes would say).

Probably the best case for the Finley Form is that it easily communicates the essence of the real estate investment. In this way, the Finley Form is an excellent test for reasonableness: "does this deal make sense?" No matter how complicated the analysis or how elaborate the financial structure, if it doesn't work on the Finley Form, it probably won't work.

A LINE-BY LINE-EXPLANATION OF THE FINLEY FORM

An example of the Finley Form appears in Exhibit 1. The following is a line-by-line explanation of the critical assumptions and calculation used in the form.

Line A. Proposed Purchase Price. This is the total purchase price which is expected to be paid for the property. It can be the price, an estimated market value, or a possible bid price. For example, $480,000.

Line B. Total Square Feet. This is the total net rentable square footage of the property. For example, 5,000 sq. ft.

Line C. Rent psf Per Year. This is the estimated rental rate of the property expressed as dollars per square foot per year. For example, $12 per year.

Line D. Vacancy Rate. This is the estimated annual allowance for vacancies and collections. For example, 10%.

Line E. Operating Expense Ratio. The operating expense ratio is the total amount of actual cash operating expense which anticipated during a normal year and reserves for wasting parts expressed as a percent of the effective gross income. For example, 30%.

Line F. Interest Rate. The annual interest rate is the rate which is expected to be charged for a new mortgage or by the seller if carry back financing is expected. For example, 9%.

Line G. Amortization Period in Years. The amortization period is the number of years over which the loan may be amortized. The loan may have a ten-year call, but it may be amortized over 30 years. In this case, it is important to use the amortization period. For example, 20 years.

Line H. Debt Coverage Ratio. The debt coverage ratio, usually determined by the lender, is the ratio which calculated by dividing the Net Operating Income by the Annual Debt Service. A debt coverage ratio of 1.25, for example, would indicate that the net operating income would be 25% higher than the expected mortgage payment. For example, 1.25.

Line I. Required Cash Return (%). The required cash return is also known as the equity dividend rate. It is the cash flow divided by the equity investment. For example, 8%.

Line J. Gross Income. The gross income is calculated by taking the total square feet (line B) times the rent per square foot (line C). For example, 5000 X 12 = $60,000.

Line K. Vacancy. The vacancy allowance is calculated by taking the expected vacancy rate (Line D) times the gross income (Line J). For example, 10% X 60,000= $6,000.

Line L. Effective Gross. The effective gross income is the amount of money expected to be actually collected during a year of operation. It is calculated subtracting the vacancy allowance (line K) from the gross income (line J). For example, 60,000 - 6,000 = $54,000.

Line M. Operating Expenses. The operating expenses are calculated by multiplying the operating expense ratio (line E) by the effective gross (line L). For example, 30% X 54,000 = $16,200.

Line N. Net Operating Income. The net operating income is calculated by subtracting the operating expenses (line M) from the effective gross income (line L). For example, 54,000 - 16,200= $37,800.

Line O. Debt Coverage Ratio. The debt coverage ratio is the same as line H. For example, 1.25.

Line P. Mortgage Payment. The mortgage payment is calculated by dividing the net operating income (line N) by the debt coverage ratio (line O). For example, 37,800 + 1.25 = $30,240.

Line Q. Mortgage Constant. The mortgage constant is the amount per year that is necessary to amortize one dollar at the specified interest rate (line F) over the amortization period in years (line K). The mortgage constant can be determined from financial tables, financial calculators, or calculated in the computer spreadsheet program. For example, Mortgage Constant= 108 for 9%, 20 years, monthly payment.

Line R. Mortgage Value. The mortgage value is determined by dividing the mortgage payment (line P) by the mortgage constant (line Q).

For example, 30,240 .108 = $280,000.

Line S.Net Operating Income. The net operating income is the same as line N.

For example, $37,800.

Line T. Mortgage Payment. The mortgage payment is the same as line P.

For example, $30,240.

Line U. Cash Flow (before taxes). The cash flow before taxes is calculated by subtracting the mortgage payment (line T) from the net operating income (line S).

For example, 37,800 - 30,240= $7,560.

Line V. Required Cash Return. The required cash return is the same as line 1.

For example, 8%.

Line W. Equity Value. The equity value is calculated by dividing the cash flow (line U) by the required cash return (line V). For example, 7,560 /8% = $94,500.

Line X. Mortgage Value. The mortgage value is the same as line R. For example, $280,000.

Line Y. Property Value. The property value is calculated by adding the equity value (line W) to the mortgage value (line X). For example, 94,500 + 280,000 = $374,500.

Line Z. Purchase Price. The purchase price is the same as line A. For example, $400,000.

Line AA. Mortgage Value. The mortgage value is the same as line X and line R. For example, $280,000.

Line BB. Required Equity. The required equity is calculated by subtracting the mortgage value (line AA) from the purchase price (line Z).

For example, 400,000 - 280,000 = $120,000.

Line CC. Cash Flow. The cash flow is the same as line U. For example, $7,560.

Line DD. Required Equity. The required equity is the same as line BB.

For example, $120,000.

Line EE. Cash-on-Cash Return. The cash-on-cash return is calculated by dividing the cash flow (line CC) by the required equity (line DD).

For example, 7,560 + 120,000 = 6.3%.

Line FF. Loan to Value Ratio. The loan to value ratio is calculated by dividing the Mortgage Value (line R) by the property value (line Y).

For example, 280,000 + 374,500 = 74.7%.

APPLICATIONS OF THE FINLEY FORM

The Finley Form can be used for market value estimation, investment analysis, new project feasibility, land value estimation, and sensitivity analysis by the real estate appraiser or investment analyst.

Market Value

The estimation of market value requires normative assumptions that reflect the typical behavior of market participants. Market supported rents, vacancies, and operating expenses are required. The financial terms should be those available to most equity investors, and the expected equity divided rate should reflect the consensus of the market.

Investment Value

The investment value can be estimated using the Finley Form with specific lease terms or contemplated lease terms. Also if the investor perceives itself to have superior management and marketing skills, then lower operating expenses or lower vacancy rates may be used. In investment analysis, buyer-specific or seller-specific financing terms are appropriate. Also, the individual investor's unique cash-on-cash requirements are used.

Project Feasibility

The Finley Form is very useful for evaluating proposed projects. The rents, expenses, financing terms, and cash-on-cash returns for the hypothetical project are used to determine the property value Then the property value is compared to the total project costs to determine the feasibility of the project.

Land Value

The land value can be estimated using the Finley Form by following the procedure for a hypothetical project to determine the property value and then deducting the cost of the

improvements to estimate the land value. This is a “land residual” technique using an “equity” residual approach.

Sensitivity Analysis

Sensitivity analysis is the process of asking:

“What if we’re wrong?”

“What if the future turns out to be different than our expectation?”

“What if the market is not our friend?”

The Finely Form can address all of these questions by changing the assumptions and evaluating the results. The ease of the calculation with the Finely Form makes the critical sensitivity analysis very quick and timely.

GOOD LUCK

The investment insights that I have learned from the Finely Form and from its originator, R.W. “Wes” Finely, have been an important part of my real estate life for the past 20 years. I recommend the Finely Form to you and wish you good luck. I know Wes does too!

THE FINLEY FORM

(Back-of-the-Envelope Method)

A Mortgage-Equity Residual Model

		CRITICAL ASSUMPTIONS			
A		Proposed Sales Price	$	400,000	*input*
B		Total Square Feet		5,000 sf	*input*
C		Rent Per SF Per Year		$12.00 sf/year	*input*
D		Vacancy Rate (%)		10.00%	*input*
E		Operating Expense Ratio (%)		30.00%	*input*
F		Interest Rate		9.00%	*input*
G		Amortization Period in Years		20	*input*
H		Debt Coverage Ratio		1.25	*input*
I		Required Cash Return (%)		8.00%	*input*
		CALCULATIONS			
J		Gross Income	$	60,000	
K	*less*	Vacancy	$	6,000	
L		Effective Gross Income	$	54,000	
M	*less*	Operating Expenses	$	16,200	
N		Net Operating Income	$	37,800	
O	*divided by*	Debt Coverage Ratio		1.25	
P		Mortgage Payment	$	30,240	
Q	*divided by*	Mortgage Constant		10.80%	
R		Mortgage Value	$	280,085	
S		Net Operating Income	$	37,800	
T	*less*	Mortgage Payment	$	30,240	
U		Cash Flow (Before Taxes)	$	7,560	
V	*divided by*	Required Cash Return		8.00%	
W		Equity Value	$	94,500	
X	*plus*	Mortgage Value	$	280,085	
Y		Property Value	$	374,585	
Z		Purchase Price	$	400,000	
AA	*less*	Mortgage Value	$	280,085	
BB		Required Equity	$	119,915	
CC		Cash Flow	$	7,560	
DD	*divided by*	Required Equity	$	119,915	
EE		Cash-On-Cash Return		6.30%	
FF		Loan to Value Ratio		74.77%	

THE FINELY FORM

(the back-of-the-envelope method)

	Gross Income
less	Vacancy
	Effective Gross Income
less	Operating Expenses
	Net Operating Income
divided by	Debt Coverage Ratio
	Mortgage Payment
divided by	Mortgage Constant
	Mortgage Value
	Net Operating Income
less	Mortgage Payment
	Cash Flow (Before Taxes)
divided by	Required Cash Return
	Equity Value
plus	Mortgage Value
	Property Value
	Purchase Price
less	Mortgage Value
	Required Equity
	Cash Flow
divided by	Required Equity
	Cash-On-Cash Return

APPENDIX C THE BUILDING DEVELOPER'S "BACK-OF-THE-ENVELOPE" (BOTE) ANALYSIS FOR PROJECT FEASIBILITY

The best way for a Building Developer to evaluate the feasibility of new project is to analyze a couple hundred possible projects, and best way to analyze a couple hundred project is to use a direct capitalization model that compares the developer's Return on Cost (NOI/ Total Development Costs) to the current Overall Capitalization Rates (NOI/ Sales Price) in the real estate marketplace.

The Building Developer must compare the "spread" or difference between the Return on Costs and the Overall Capitalization Rate to see if the risk of taking on such a project is justified. That is, is the new project sufficiently profitable to compensate the developer for taking the risk to build it?

The old joke is that an aging Irish-American immigrant, who was a very successful and wealthy real estate developer, was asked the secret to his success over the last 40 years. He modestly said that he only ever wanted to make a 2% profit. "I would build it for 10% and sell it for an 8%!"

Let's check the math: If he built a project for $1,000,000 that generated an NOI of 100,000 (or a 10% Return on Total Costs) and he sold the property for an 8% Overall Capitalization Rate (or $1,250,000), was making a $250,000 profit or 25%!

While we may not be a successful as the old Irish developer, we should always to try to achieve some spread between the Return on Total Costs and the Overall Capitalization Rate. How much the spread should be depends on the risks and uncertainty surrounding the project

The math in the methodology shown below is very simple, but the accuracy of the inputs is all important. For the Building Developer to be successful, he/she must know three things:

1. **Know Thy Self**. What are your strengths, weaknesses, keen skills, poor skills, risk tolerances, tastes and preferences, phobias and fatal attractions?

2. **Know Thy Market**. What are properties selling for, what is property renting for, who needs space, who's leaving town, who's your competitors, what's in the pipeline?

3. **Know Thy Costs.** What does it cost to construct a building, what does it cost to operate a building, how long does it take to make things happen, what are the interest rates, who's available to do the work?

A Little Nuance in the BOTE Feasibility Analysis

Construction costs are quoted in gross building square feet while rental rates are quoted in net rentable square feet. Therefor the construction costs need to be converted to costs per rentable square feel so that the analysis makes sense. Unfortunately, one of the most difficult and contentious challenge in real estate is measuring a building. The gross building area, the usable area, and the net rentable area can be very elusive concepts.

BOTE Examples

http://dankohlhepp.com/uploads/3/0/6/8/3068213/_airpark_bote.xls

Back of the Envelope Analysis												
AirPark West 176,400 sf Warehouse						Date	11-Oct-06		Time:	4:16 PM	
INCOME CALCULATIONS		per RSF	Annual	comments							
Gross Building Area			176,400								
Rentable Area Ratio per FAR			95.00%			**NET CAP RATE CALCULATIONS**					
Rentable Area			176400			Net Operating Income					$4.04
Rental Income per Rentable Square Foot		$4.25	749700			divided by: Total Development Costs					$45.13
Parking Income 0	0	$0.00	0			Return On Total Costs					8.95%
Gross Income		$4.25	749700			less: Required Spread					1.50%
times: Occupancy Rate		95.00%				Required Disposition Cap Rate					7.70%
Effective Gross Income			712215			less: Market Cap Rate					6.75%
less: Operating Expenses		$0.00	0			Net Cap Rate					**0.95%**
Net Operating Income		**$4.04**	712215			Indicated Decision					yes
DEVELOPMENT COST CALCULATIONS		per RSF	Total			**JUSTIFIED LAND PRICE CALCULATIONS**					
Expected Land Cost	$6.25					Market Cap Rate					6.75%
Infrastructure	$1.30					plus: Required Spread					1.50%
Total Land Cost		$7.55	1331820			Required Return on Costs					8.25%
Other Development Costs (ODC)						times: ODC					$37.58
Earthwork	$4.17					Income To ODC					$3.10
Storm Sewer	$0.00										
special Fees	$0.00					Net Operating Income					$4.04
Real Esate Taxes	$0.15					less: Income to ODC					$3.10
Building Construction	$23.25					Income To Land					$0.94
Parking Deck	$0.00					divided by: Required Return on Costs					8.25%
Contingency - Hard	$0.70					Justified Land Price					**$11.36**
Project Administration	$0.00										
Architect/Engineering	$0.75					**BREAK-EVEN GROSS RENT CALCULATIONS**					
Insurance	$0.10					Total Development Costs					$45.13
Testing/Inspection/Permits	$0.25					times: Required Return on Costs					8.25%
Landscape/Irrigation	$0.80					Required NOI					$3.72
Signage/Monumentation	$0.25					plus: Operating Expenses					$0.00
Special Features Share Cost	$0.00					Required Effective Gross					$3.72
Tenant Improvements	$4.00					divided by:Pro Forma Occupancy Rate					95.00%
Leasing Commissions	$1.13					Break-Even Gross Rent					**$3.92**
Closing/Title Fees	$0.09										
Legal	$0.25										
Financing	$0.17										
Interim interest	$0.41										
Advertising/Promotion	$0.02										
Leasing/Salary Expenses	$0.10										
Tenant Inducements	$0.00										
Contingency - Soft	$0.25										
Corporate Overhead (2.00%	$0.74										
Total ODC		$37.58	6628548								
Total Development Costs		**$45.13**	7960368								

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Back of the Envelope Analysis
International Plaza Four

INCOME CALCULATIONS		per RSF	Annual
Gross Building Area			260,000
Rentable Area Ratio per FAR			95.00%
Rentable Area			247,000
Rental Income per Rentable Square Foot		$31.00	7,657,000
Parking Income		$0.00	-
Gross Income		$31.00	7,657,000
times: Occupancy Rate		95.00%	
Effective Gross Income			7,274,150
less: Operating Expenses		$11.00	2,717,000
Net Operating Income		**$18.45**	4,557,150

DEVELOPMENT COST CALCULATIONS		per RSF	Total
Expected Land Cost	$22.00		
Infrastructure	$0.00		
Total Land Cost		$22.00	5,434,000
Other Development Costs (ODC)			
Earthwork	$0.04		
Storm Sewer	$0.00		
Special Fees	$4.29		
Real Esate Taxes	$0.20		
Building Construction	$100.33		
Other Construction	$1.62		
Parking Deck	$42.14		
Contingency - Hard	$2.69		
Project Administration	$0.24		
Architect/Engineering	$2.09		
Insurance	$2.75		
Testing/Inspection/Permits	$0.58		
Landscape/Irrigation	$1.61		
Signage/Monumentation	$0.17		
Special Features Share Cost	$0.20		
Tenant Improvements	$22.00		
Leasing Commissions	$7.81		
Closing/Title Fees	$0.12		
Legal	$0.32		
Financing	$0.99		
Interim interest	$3.63		
Advertising/Promotion	$0.22		
Leasing/Salary Expenses	$0.61		
Tenant Inducements	$3.00		
Contingency - Soft	$0.20		Excludes land cost
Corporate Overhead (3.50%	$6.92	$204.77	50,579,363
Total ODC		**$226.77**	56,013,363
Total Development Costs			

NET CAP RATE CALCULATIONS	
Net Operating Income	$18.45
divided by: Total Development Costs	$226.77
Return On Total Costs	8.14%
less: Required Spread	1.25%
Required Disposition Cap Rate	6.89%
less: Market Cap Rate	6.75%
Net Cap Rate	**0.14%**
Indicated Decision	yes

JUSTIFIED LAND PRICE CALCULATIONS	
Market Cap Rate	6.75%
plus: Required Spread	1.25%
Required Return on Costs	8.00%
times: ODC	$204.77
Income To ODC	$16.38
Net Operating Income	$18.45
less: Income to ODC	$16.38
Income To Land	$2.07
divided by: Required Return on Costs	8.00%
Justified Land Price	**$25.85**

BREAK-EVEN GROSS RENT CALCULATIONS	
Total Development Costs	$226.77
times: Required Return on Costs	8.00%
Required NOI	$18.14
plus: Operating Expenses	$11.00
Required Effective Gross	$29.14
divided by:Pro Forma Occupancy Rate	95.00%
Break-Even Gross Rent	**$30.68**

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Back of the Envelope Analysis

Phipps Plaza

Date: Time:

INCOME CALCULATIONS			per RSF	Annual	comments
Gross Building Area				500,000	
Rentable Area Ratio per FAR				95.33%	
Rentable Area				476,650	
Rental Income per Rentable Square Foot			$31.50	15,014,475	
Parking Income (non-	1018	90	$2.31	1,099,440	
Reserved Parking	113	125	$0.36	169,500	
Gross Income			$33.81	16,113,915	
times: Occupancy Rate			95.00%		
Effective Gross Income				15,308,219	
less: Operating Expenses			$10.50	5,004,825	
Net Operating Income			**$21.62**	10,303,394	

DEVELOPMENT COST CALCULATIONS		per RSF	Total	
Expected Land Cost	$24.00		At Market	
Infrastructure	$0.00			
Total Land Cost		$24.00	11439600	
Other Development Costs (ODC)				
site work	$9.24			
Storm Sewer				
special Fees	$1.00			
Real Esate Taxes	$1.50			
Building Construction	$110.85		reduce curtain (fins,crash bars)	
Building Lighting	$1.00			
Spire	$0.00			
Parking deck screening	$0.45			
Elevators 7'to 8'	$0.12			
16 Elevator Lobby's	$0.92			
8 z-corridors	$0.50			
Parking Deck	$39.50		reduced parking by 119	
Parking Deck Security	$0.87			
Parking Deck Equipment	$0.21			
Contingency - Hard	$3.20			
Project Administration	$0.30			
Architect/Engineering	$7.10			
Insurance	$0.10			
Testing/Inspection/Permits	$0.35			
Landscape/Irrigation	$0.00			
Signage/Monumentation	$0.50			
General Conditions	$0.00			
Tenant Improvements	$35.00			
Leasing Commissions	$15.00			
Closing/Title Fees	$0.19			
Legal	$0.50			
Financing	$0.88			
Interim interest	$16.00			
Advertising/Promotion	$1.00			
Leasing/Salary Expenses	$0.30			
Tenant Inducements (Restauran	$1.00			
Contingency - Soft	$0.30			
Corporate Overhead (2.00%	$4.96		Excludes land cost	
Total ODC		$252.84	120,515,042	
Total Development Costs		**$276.84**	131,954,642	

NET CAP RATE CALCULATIONS	
Net Operating Income	$21.62
divided by: Total Development Costs	$276.84
Return On Total Costs	7.81%
less: Required Spread	1.50%
Required Disposition Cap Rate	6.31%
less: Market Cap Rate	6.50%
Net Cap Rate	**-0.19%**
Indicated Decision	no

JUSTIFIED LAND PRICE CALCULATIONS	
Market Cap Rate	6.50%
plus: Required Spread	1.50%
Required Return on Costs	8.00%
times: ODC	$252.84
Income To ODC	$20.23
Net Operating Income	$21.62
less: Income to ODC	$20.23
Income To Land	$1.39
divided by: Required Return on Costs	8.00%
Justified Land Price	**$17.37**

BREAK-EVEN GROSS RENT CALCULATIONS	
Total Development Costs	$276.84
times: Required Return on Costs	8.00%
Required NOI	$22.15
plus: Operating Expenses	$10.50
Required Effective Gross	$32.65
divided by:Pro Forma Occupancy Rate	95.00%
Break-Even Gross Rent	**$34.37**

APPENDIX D THE REAL ESTATE INVESTMENT PROCESS

The Real Estate Investment Process: A Practitioner's Perspective

Presented by Daniel b. Kohlhepp, Ph.D., MAI

Kohlhepp Corporation

The purpose of the presentation is to describe the real estate investment process from a practitioner's point of view. First, the nature of the process is discussed, and secondly, each step of the eight-step process is described.

Successful real estate investments can be achieved consistently when decisions concerning those investments are made in the context of the entire investment process. This is a labor-intensive, satisfying process in which reasonableness is the most important decision criteria in an uncertain and dynamic environment. The process requires both a to-down and bottom-up analysis; the process is circular in nature.

The objective of real estate investment decisions is to satisfy a series of constraints determined by governments, financial institutions, market conditions, and individual buyers and sellers. Consequently, the real goal is to simply satisfy all limiting conditions while reducing risks and raising returns to acceptable levels.

Every step in the investment process requires a myriad of human interactions. "real estate is a body contact sport," said Trammell Crow, the legendary developer. Selecting the right people throughout the real estate investment process is the most important decision. The right people can make a marginal piece of real estate into a successful investment, but the wrong people can turn the best located, highest quality real estate into an unbelievable disaster.

Successful investments require highly quantitative, computer-based algorithms of modern financial theory to be tempered and conditioned with the experiential-based intuitive decision calculus. Technically rigorous and complex decision models may obscure the essential problems and most significant risks. The decision-maker must ask the questions: is it reasonable to accept

these risks; is it reasonable to expect these returns; and is it reasonable to make these assumptions?

There are eight steps in the real estate investment process. Each step is essential and ignoring or skipping steps will lead to unsuccessful investments in the long run. The steps are:

1. Establish Investment Objectives, Policies, and Guidelines. What does a good real estate investment look like? A good investment must meet the guidelines for real estate investments which must be compatible with the strategy of the investment portfolio which must help achieve the mission of the organization.
2. Seek Out and Screen Possible Investment Opportunities. Who controls the kinds of investment opportunities that meet the requirements of the real estate portfolio? Appropriate screens are important because the amount of opportunities will always exceed the amount of capital.
3. Evaluate the Investment. Is this opportunity acceptable for the real estate portfolio? The property, the market, the people, and the risks and returns must meet or satisfy the investment of portfolio guidelines.
4. Structure the Real Estate Investment. Does the investment structure match the real estate enterprise while generating returns and reducing risks to acceptable levels? The investment structure must be clean, simple and fair. Over-structuring an investment is worse than over-improving the site.
5. Complete the Due diligence Pr ocess. Is it reasonable to expect that this real estate investment with all of its complexities, nuances, risks, and uncertain returns will achieve the long-term investment objectives? An effective due diligence review helps avoid over-due diligence and “doo-doo” diligence and maintains the integrity of the investment process.
6. Control, Close and Fund the Investment. The time between the execution of commitment letter or purchase contract and the closing and funding can be months or years. Consequently, contracts must be managed, the final documents negotiated, and the appropriate fundings made.
7. Manage the Real Estate Investment. The real estate investment must be managed against a budget, a pro forma, or a peer group at three levels: the property, the investment, and the portfolio. Timely and accurate reports are essential in this step.
8. Sell, Refinance, or Securitize the Investment. Sell or disposition decisions ask two questions. First, does the investment comply with the portfolio strategy and guidelines? If not, can a more compatible real estate investment be found? Refinance or securitization decision asks the questions: Are the additional returns generated by refinancing or securitizing adequate compensation for the additional risks incurred?

Throughout the real estate investment process there is a constant need for accurate, timely, and usable information. All of the participants in the process need to understand the overall process and have access to information developed in each step of the process. Information must flow up and down. (Currently, several software companies are developing decision

support systems which encompass the entire investment process and provide access to common and extensive information banks.) Individuals and organizations that understand and undertake the complete investment process will experience consistently successful real estate investments.

In conclusion, the changing investment climate is important to the development of TopSight as well. There is recognition that effective, real estate management requires timely, accurate process and operations information, as well as accounting-based information. There is a necessity to develop models that will evaluate real estate risks in similar manner as other investments.