

Investment by Design



A Primer in Real Estate Analysis

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Contents

	Preface	vii
1	Introduction to Real Estate Investment Analysis	
	Investment by Design	1
2	Real Estate Investors in Today's Economic Environment	
	Why Investors Invest	7
	U. K. Investors Seek Diversity	11
3	Real Estate Risks	
	Complexities of Real Estate Investment	17
4	Real Estate Economics	
	Price Elasticity of Demand	23
	Scarcity Benefits Investors	28
	Using Economic Rent Theory	33
	External Obsolescence	38

5	Real Estate Market Research	
	Case Study: Wilma and the FTZ	44
	Analyzing Housing Markets for the Elderly	49
6	Financial Feasibility Analysis	
	Profitable Apartment Construction	55
7	Assembling the Data	
	Conducting a Multi-Year Analysis	60
8	Evaluating the Data	
	How Present Value Works	72
	Using Present Value Analysis	78
	Calculating Mortgage Loans	84
	Estimating Value	89
	Direct Capitalization or Discounted Cash Flow Analysis?	95
9	Analyzing Risk and the Use of Debt	
	Debt Financing: Rewards and Risks	100
	Appraising in Difficult Markets	105
	Towards Evaluating Commercial Properties	110

10

Asset Management

Asset Management Essentials	114
San Felipe Court: A Successful Renovation	118
A Matter of Assumptions	123
Buy or Lease? The Commercial Property Decision	127
Distressed Property Decisions	132
The Disinvestment Decision	138
About the Authors	145

Preface

This volume is a collection of short articles that, with one exception, were previously published by the Real Estate Center. Most of them were written for publication in the “Instructor’s Notebook” series in *Tierra Grande*; several were co-authored with colleagues at the Real Estate Center or with other real estate professionals. Although initially they were not planned for publication in a single volume, they gradually accumulated until their compilation as a real estate investment analysis primer seems reasonable.

The articles are organized as they would be for an actual class. Introductory articles provide an overview of real estate investment and development. Only after developing an awareness of the unique nature of real estate are technical topics introduced. Even with these topics, however, the goal is to explain the basic analytical tools instead of offering “cook book solutions.” With a thorough understanding of these tools, a broad variety of real estate problems can be addressed.

“Investment by Design” sets forth the basic steps for real estate investment analysis: determine market support, test financial feasibility, determine the adequacy of the return to equity and compare property’s value to its cost. These four points are the cornerstones of the real estate development and investment courses offered at Texas A&M University.

“Why Investors Invest” and “U.K. Investors Seek Diversity” both reach the same general conclusion: real estate investors want quality properties that will provide income and appreciation over the anticipated holding period. To help understand the real estate risks these investors face, the major risks of income-producing real estate and the particular characteristics that accentuate its riskiness are examined in “Complexities of Real Estate Investment.”

The application of economic analysis to real estate markets is explored in “Price Elasticity of Demand,” “Scarcity Benefits

Investors,” “Using Economic Rent Theory” and “External Obsolescence.” Knowledge of these basic economic concepts can turn a series of real estate market observations into a solid understanding of their significance with the further potential of predicting where the market will go next.

“Wilma and the FTZ” and “Analyzing Housing Markets for the Elderly” lay out the process of real estate market research. Although each article deals with a specific real estate product, both demonstrate that the principles of real estate market research can be applied broadly.

“Profitable Apartment Construction” provides a definition and an illustration of financial feasibility analysis. Determining if a proposed development (or redevelopment) can generate sufficient rental income to cover operating expenses, support sufficient debt to finance the property and provide a satisfactory cash return to the owner is, perhaps, the most basic format for real estate financial analysis.

“Conducting a Multi-Year Analysis” sets out the basic process for estimating cash flow from operations and resales. Although not previously published by the Real Estate Center in this format, this volume could not be considered a real estate investment primer without its inclusion.

Present value techniques for evaluating the assembled data are examined in “How Present Value Works,” “Using Present Value Analysis” and “Calculating Mortgage Loans.” Then, building on the basic internal rate of return and net present value calculations, the concepts of direct capitalization and investment value are examined in “Estimating Value” and “Direct Capitalization or Discounted Cash Flow Analysis.”

The advantages and risks of using debt to finance income-producing real estate are examined in “Debt Financing: Rewards and Risks” and “Appraising in Difficult Markets.” Because debt introduces financial risk (see “Complexities of Real Estate Investment”), a property’s total risk can become excessive when too much debt is used. “Towards Evaluating Commercial Properties” presents an approach for controlling a property’s total risk.

Asset management has emerged as an important area of real estate investment. “Asset Management Essentials” and “San Felipe Court: A Successful Renovation” outline and illustrate the use of decision-making techniques for choosing a strategy to maximize the value of an income-producing property. “A Matter of Assumptions”

examines the importance of the assumptions made by asset managers when estimating a building's value on a tenant-by-tenant basis while "Leasing versus Buying" illustrates the decision-making process a commercial or industrial space user would apply in making that decision. "Distressed Property Decisions" explores an important area of asset management, while procedures for deciding to sell or hold a property are outlined in "The Disinvestment Decision."

Together, the articles provide basic information about a variety of real estate development and investment topics. Consequently, whether information is sought about a particular technique, such as income capitalization, or about the broad process of investing in income-producing real estate, this volume should be useful.

Because the articles were published over a period of several years, the particular market conditions analyzed or described at the time of their original publication may have changed. The principles illustrated, however, remain useful.

I wish to thank the co-authors for their contributions. They supplied ideas, data and text and also suggested analytical approaches, reviewed drafts and provided many helpful suggestions.

Also, I wish to thank the Real Estate Center staff for their help in preparing these articles for publication, especially Dr. Shirley E. Bovey for her careful and thoughtful editing. Without their efforts, this volume could not have been published.

Wayne E. Etter
January 1995

Introduction to Real Estate Investment Analysis 1



Investment by Design

October 1988

Wayne E. Etter

Evaluating the potential of a proposed real estate investment requires a carefully designed, analytical plan. By logically arranging a series of questions, a plan can be developed that minimizes the chance of overlooking an important fact about the property.

Questions are answered through a careful evaluation of the specific data assembled for the analysis. When there is a lack of data, no further consideration should be given to the proposed real estate investment until the data are available; the temptation to ignore the question must be resisted. Of course, prior to beginning the analysis, the investor must establish criteria for evaluation whether or not an answer to a question is satisfactory. Although there can be any number of questions, they can be considered under four broad categories.

Determine Market Support

The presence of sufficient market support is determined by analyzing the supply and demand for space within a defined market area. Factors that define market areas vary according to property type; a retail space market is defined differently than an office space

market. In no case are market areas defined simply by drawing circles having radii of one or two miles. Within a defined market area, the supply and demand for space for particular market segments is then identified.

What types of space are available in the market? How much space of each type is available in the market? What types of space users are in the market now? What types of space are in demand? What changes in the demand for space are foreseen? What is the underlying cause of the expected change in future demand? Is an expected increase in the demand for space related to the expansion of businesses within the market area that will require additional office space? Or, is an expected increase in the demand for retail shopping space related to an increased residential population in the market? When will there be a need for additional space?

By answering these questions, **the investor can determine if there is an unmet need for space** in the market area. If so, the research should conclude with an estimate of the number of square feet of space required and the price users are willing to pay for it.

Marketing research usually is thought of in connection with new developments. Developers, lenders and investors want to know if there will be sufficient demand for the to-be-built space. But marketing research can play an equally important role when an investor is considering changing a property's existing use or when an investor is considering investing in a property when the use will remain the same.

How does "choosing a good location" differ from marketing research? Good locations are important and are based on the needs of particular activities. For instance, certain commercial activities require minimum lot sizes along a major arterial street with particular kinds of ingress and egress. Additional requirements may include easy access to wholesalers, shippers, customers or market centers. Locating such a site does not automatically make it suitable for the activity, however. **There must be adequate demand for the space; a good location cannot assure demand.**

What are the benefits of good marketing research? Obviously, identification of an unmet need increases the probability of success. The late Professor James A. Graaskamp suggested the identification of an unmet need provides a competitive edge for the investor that can result in a fully leased property—perhaps at a premium rent. This competitive edge provides the best defense against future properties entering the market—satisfied tenants are less likely to move to a competing property. Because a property's

value is a function of its ability to generate rent, an increased rent results in an increased value. Ultimately, the investor will enjoy a greater rate of return from the identification of an unmet need.

In addition, marketing research can protect against the consequences of the competitive price cutting that takes place in overbuilt markets. Although reducing the rental rate in an overbuilt market may cause some additional space to be leased, the lower rate also may result in less total rent being collected. For example, decreasing the rental rate for retail space will bring some additional space users into the market, but it is unlikely to result in substantial numbers of entrepreneurs deciding to enter the retail business or encourage existing retailers to expand. These decisions will depend on factors other than the price of retail space.

Furthermore, because all other owners will likely decrease their rental rates as well, the rental income of all owners will decline if the average market rental rate declines sufficiently. Thus, price cutting by the owners of vacant retail space in such a market will neither significantly increase the demand for space nor provide the investor with a superior competitive position. Good marketing research can help an investor avoid overbuilt markets. If there are no strong indications that the investment under consideration will fill an unmet need, it should not be given further consideration.

Test Financial Feasibility

The investor, having established that a particular property will fill an unmet need, next tests the project's financial feasibility. **If the property can generate adequate net operating income to support sufficient debt to finance the property and provide a satisfactory cash return to the developer-investor, the project is financially feasible.** This is a test of the property's ability to generate adequate cash in the short run. Making this determination requires answers to questions such as: How much will the project cost? How much rent will the project produce? What are the expected operating expenses? How much net operating income will the project generate? Given current market conditions and lending requirements, how large a loan will the net operating income support? And, given the estimated cost of the project and the desired equity contribution of the developer-investor, can the project be financed? A project's financial feasibility is best explained as a balance among the:

- property's expected cost,
- property's expected operating performance,

- lender's requirements and mortgage market conditions and
- investor's required before-tax, cash-on-cash return.

If there is a proper balance among these factors, the property should generate enough rent to pay all the operating expenses, to repay the debt used to finance the property and meet the investor's expected cash return. Properties that do not meet this test have little promise even when there is a demand for the space. **And, when properties promise little in the short run, it is risky to assume that they will improve in the long run.** If, however, an investor determines there is both a demand for the space and the property is financially feasible, the analysis moves to long-term considerations.

Is After-Tax Return to Equity Sufficient?

The expected after-tax rate of return from a real estate investment is determined by the expected benefits of the investment—after-tax cash flow and appreciation—and the cash required to purchase the property. **The expected rate of return can then be compared with the minimum return the investor requires to undertake the investment.** The investor's required return is established by examining the returns available from other investments having a similar level of risk.

A proper calculation of the rate of return involves the use of present value techniques so that the rate will reflect both the amount and timing of the cash inflows and outflows. This rate is known as the internal rate of return.

Why must the project's after-tax internal rate of return be considered even if the project is financially feasible? The investor's required return, as used in the determination of financial feasibility, is based on a single year's before-tax income—it is a short-term measure and does not encompass the period during which the investment is expected to be held. As a consequence, the investor must consider the effect of taxes, financing and future events on the property; this is the essential contribution made by the after-tax internal rate of return calculation.

Real estate is particularly affected by future events because of its characteristics: large economic size, physical immobility and long economic life. In short, a property investment involves a relatively sizable dollar investment that cannot be moved and that must generate income during a long period. Thus, successful real estate investing involves making decisions about the future level of rents, operating expenses, appreciation rates and tax laws. These, in turn,

depend on the rate and direction of urban growth, price inflation, international events, political events and so forth.

As the information is gathered, the investor necessarily will be addressing questions about risk. Risk exists in all projects, but some are more risky than others. The degree of risk depends on the difference between expected and actual outcomes. If the expected outcome is guaranteed, then the risk is negligible; if there is substantial uncertainty about the expected outcome, then the risk is great. For a single project, the best way to reduce risk is to improve the analysis of the variables that produce the project's expected rate of return. In this way, the spread between expected and actual outcomes can be minimized.

As the scope of discounted cash flow analysis is examined, one of its prime benefits becomes clear. **In gathering the data required to make the analysis, much will be learned about the investment under consideration.** Estimating the rate of return may be secondary to the knowledge gained from gathering the information. Nevertheless, the prospective investment must promise a satisfactory rate of return or its consideration should be abandoned.

Compare Value to Cost

The investment value of any asset is equal to the present value of its future cash flows, discounted at the appropriate rate. A property's investment value is not the same as fair market value or loanable value. It is the value that an investor determines after establishing a set of investment requirements and expectations about the property; this value is compared to a property's offering price or cost to see if it exceeds the cost of the property.

The investor anticipates cash benefits in the form of after-tax cash flow and appreciation. The lender generally receives a mortgage payment in an amount agreed upon in advance but also may expect a share of other benefits such as rents, cash flow or appreciation. It usually is assumed that the amount loaned is equal to the present value of the lender's expected benefits discounted at the lender's required rate of return (generally the face interest rate of the loan). **A property's investment value is equal to the present value of all the cash benefits expected by the equity investor, discounted at the investor's required rate of return, plus the amount of the mortgage.**

The property's investment value is based on all the projections, assumptions and so forth that have been made by the equity investor and the lender. In addition, the required rate of return and

the specific tax rates are taken into account. Thus, the investment value is for a particular property and for a particular set of circumstances. Because it is not an estimate of fair market value, there is no reason to expect that the property can be purchased for the estimated investment value. Rather, this is the value of the property under a particular set of circumstances, and if unreasonable assumptions, projections and so forth are made, the investment value calculated for a particular investor may be different from the property's market price.

However, the terms of purchase, financing or a particular investor's tax situation can increase the property's investment value. **This may explain why one investor may be willing to pay more for a property than another: the assumptions used and the terms available produce a higher estimate of investment value.** Nevertheless, if the property's investment value does not equal or exceed its cost, the property should not be purchased.

Conclusion

As the investor progresses through the analysis, the property's suitability as an investment will be established. If the answer to any one of the questions is negative, the analysis should be abandoned. There is no logical reason to proceed to any of the remaining questions. Furthermore, positive answers to one or more of the questions should not induce the investor to disregard a negative answer to the next question. By adhering to a carefully designed analytical plan, an investor can maximize the probability of choosing real estate investments that will prove successful in the long run.

Real Estate Investors in Today's Economic Environment

2



Why Investors Invest

Summer 1994

Wayne E. Etter

Assembling real property investment portfolios and developing property requires money. Do investors supply funds for real estate investment and development because they like real estate? Or do they supply their money in exchange for an expected return appropriate for the level of risk? Or are they initially more concerned with the expected return than with risk?

As they did in the early 1980s, today's individual investors supply considerable money for real estate. Studying investors' apparent motivations during these two periods provides insight into a future capital-raising approach for the real estate industry.

Then: Tax Benefits Reign

Several key factors produced the surge of investor interest in income-producing real estate during the 1980s.

First, the Economic Recovery Tax Act of 1981 was a principal stimulant of this escalation as individual investors sought to take advantage of the expanded real estate tax benefits. Second, inflationary economic conditions also caused many investors to anticipate rapid appreciation of their real estate investment.

Third, many investments depended heavily on money borrowed from deregulated, federally insured financial institutions to magnify the benefits of tax shelter and expected appreciation for the individual investor. Investors could deduct interest and depreciation expense on the entire property and enjoy all the benefits of the property's appreciation even though their equity investment might be quite small.

Because of the emphasis on tax benefits, which appeared to be automatic, and similar expectations about property appreciation, individual investors and syndicators sometimes analyzed the actual property only superficially. Risk was of little obvious concern; data on the supply and demand for space, rents, vacancy rates, operating expenses and the actual rates of property appreciation for surrounding property often were ignored.

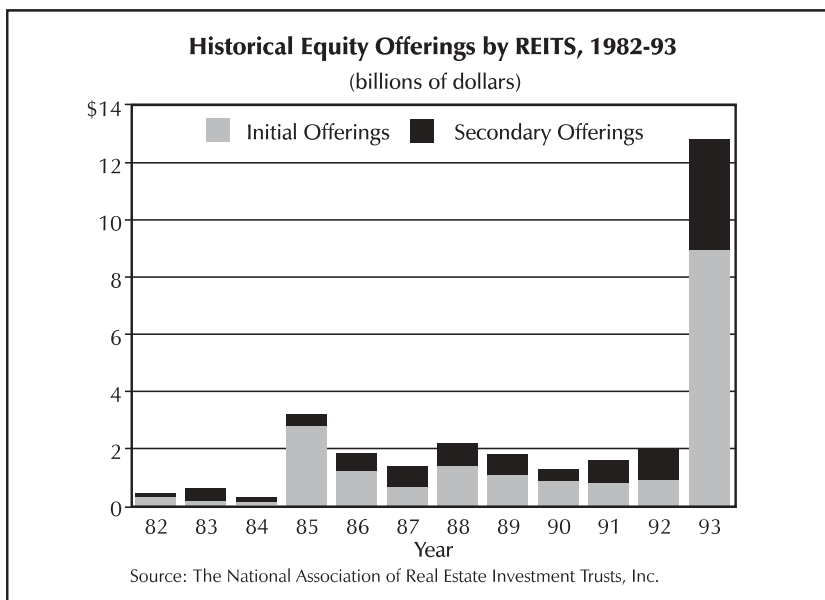
The circumstances of the early 1980s that fueled individual real estate investment expansion changed significantly by late 1986. Because of the extensive unneeded development that took place in some areas during the early 1980s, the prospect for property appreciation and sufficient cash flow to service debt was reduced. In addition, the 1986 Tax Reform Act significantly affected the status of real estate as a tax-sheltered investment; the tax benefits enjoyed in the past by real estate investors were no longer available. Consequently, commercial real estate values declined, and lenders were forced to foreclose on many properties.

These points are well known to anyone familiar with the history of commercial and multifamily real estate during the 1980s. Two points should be emphasized, however. First, investors expected high yields; syndications projecting internal rates of return in excess of 20 percent were common. Second, many investors seemed oblivious to the proposition that real estate is risky. As a consequence, the large expected returns caused money to pour into real estate, but when the commercial real estate market collapsed, many investors were disillusioned.

Now: Attractive Cash Yields

According to the National Association of Real Estate Investment Trusts, the total value of real estate investment trust (REIT) shares offered during 1993 was about \$12.8 billion. The graph shows annual equity offerings were less than \$2 billion in nine of the preceding 11 years.

Why are REITs suddenly so popular? Because they invest in real estate? Not really. They are popular with investors because their



current cash yield is attractive. In some cases, falling interest rates have made REIT shares attractive relative to certificates of deposit. Rather than replace maturing higher yield CDs with lower yield CDs, some investors buy REIT shares.

REITs are similar to stock mutual funds; individual investors purchase shares that represent an undivided interest in the properties owned by the REIT. REITs do not pay corporate taxes if they pass through 95 percent of their portfolio income to their shareholders. REIT shares are traded on the stock exchange; thus, they are a highly liquid, particularly when compared to the real estate limited partnership interests owned by many investors in the 1980s.

During the past few months, a number of institutions have sold foreclosed properties from their portfolios at reported prices of as much as 50 percent less than their original valuation. Many of these distressed properties were purchased by REITs. When investors buy the REIT shares, money is provided to pay for the purchased properties plus the organizers' and underwriters' fees and profit.

Developers that need cash to pay debts on already developed properties are taking advantage of the demand for REIT shares by organizing REITs. REITs are popular with developers because they provide capital for development when few sources are available. The REIT sells shares to investors and buys the developers' properties.

Wall Street firms like REITs because they provide activity for underwriting departments and merchandise to sell. And the demand for REIT shares is credited with firming or increasing prices in the commercial property market.

What about the risk of owning REIT shares? As with the real estate investors of the 1980s, it is not clear that today's REIT investors are thinking about risk.

Notably, some high-quality REITs are offered. Today, most REITs are issuing stock to finance the purchase of completed properties. This is in sharp contrast to their activities in the early 1970s when they used short-term funds to make high interest rate development and construction loans.

Nevertheless, a portfolio of distressed properties does not automatically become a portfolio of sound properties, even if they are purchased by an REIT for 50 percent of their original value. The quality of each property in the portfolio depends on the usual set of local market factors. If the portfolio's income does not materialize, the value of the REIT's shares will decrease.

Lessons Learned

Three lessons can be gleaned from this historical comparison. First, these two groups of investors sought real estate investments for yield. Real estate is just another investment.

Second, the two investors' groups had different expectations. The first group consisted of high-income investors who sought high yields through tax benefits and appreciation. Some of today's investors want only to do better than the current yield on certificates of deposit; interest-rate-sensitive investors could sell their shares if CD yields increase. Although packaged quite differently, real estate investments can fulfill different expectations.

Third, the first group left the real estate market after their losses. Initially, they paid little attention to risk, and they paid a price for their inattention. The second group likely will leave too if their expectations are not realized. What will happen to the value of REIT shares remains to be seen, but if significant numbers of REIT portfolios are too risky or if interest rates increase sufficiently, investors are likely to lose again.

The large expected returns of the 1980s were achieved by introducing significant business and financial risk, whereas most REITs today are making nonleveraged property purchases at prices below replacement cost. Thus, they avoid some of the problems that the limited partnerships of the 1980s had—too much debt combined

with inflated purchase prices necessary to magnify the value of tax shelter benefits. However, foreclosed properties may suffer from inadequate demand in their specific markets even though no debt financing is involved and even though they were purchased at low prices.

Defining the Opportunity

The two periods offer the real estate industry an opportunity to study investors' motives and develop an appropriate product to take advantage of these motives. Investors will supply equity funds to the real estate industry in return for a satisfactory expected yield with little apparent concern for risk. However, they exit the market when their expectations are not realized.

If the real estate industry develops a nonspeculative product with limited risk and a satisfactory return, the industry might be rewarded with a steady source of equity funding. As the current demand for REIT shares by ordinary investors illustrates, the product need not provide unusually high expected returns. This is important because historically real estate returns have not been unusually high.

The challenge to those who seek capital in the real estate industry is not to develop a complex financial product; rather, it is to limit the issuance of securities to those backed by quality properties. Such a practice will produce a high quality security that will find a ready market. Because these securities will have a reasonable risk, their yield can be competitive with that of other securities of similar risk. To achieve this, however, will require that real industry participants develop a discipline rarely seen during the last decade.



U. K. Investors Seek Diversity

April 1991

**Wayne E. Etter
Andrew E. Baum**

Although many Americans believe the purchase of U.S. real estate by foreign investors is not desirable, others disagree. In particular, many Texas real estate brokers are interested in foreign real estate investors because they anticipate sizable purchases in the Texas market.

This article examines a major group of United Kingdom (U.K.) property market investors and their present motivation to

invest in the U.S. real estate market. According to the *Survey of Current Business*, U.K. investors have the largest foreign direct investment in U.S. real property. These investors are dominated by two types of institutional investors: pension funds and insurance companies.

U.K. pension funds and insurance companies purchase existing properties and finance the development of new properties that are added to their portfolios upon completion. They also may form partnerships to fund pooled property vehicles managed by merchant banks or life insurance companies. Each property in a pension fund portfolio is owned for the fund's sole benefit and is purchased for the particular fund in an all-equity transaction.

Properties owned by life insurance companies may be general company investments or held for the benefit of a particular pension fund managed by the insurance company or as one of several investments included in a unit scheme. From time to time, the pension funds and life insurance companies sell properties to adjust their portfolios; trading activity increased greatly during the 1980s.

As of December 1988, about 8.5 percent of U.K. pension funds' net assets were invested in property. Although the proportion of assets invested in property is about the same as it was in December 1985, property investment increased about £5 billion during the three-year period. About 15.3 percent of U.K. insurance companies' net assets were invested in property as of December 1988, an increase of almost 1 percent since December 1985. In absolute terms, insurance companies held about £14.6 billion more property investments at the end of 1988 than at the end of 1985.

Why Do They Invest in Real Estate? Although there are many reasons why U.K. pension funds and insurance companies hold real estate, the following three are important. First, real estate is expected to produce a reasonable return for a reasonably low risk. Furthermore, real estate returns are believed to have little or no correlation with returns from their other principal investments (common stocks, bonds and mortgages for the most part). Thus, the effects on portfolio yields and values caused by adverse common stock, credit market conditions or both will not be accentuated by simultaneously adverse changes in the real estate market.

Second, real estate is held by pension funds and insurance companies because their competitors hold real estate. In one survey, pension fund managers indicated their most important comparative performance standard is the performance of other property funds.

Therefore, they imitate their competitors' investment strategies, attempting to do at least as well. Third, real estate is considered a hedge against inflation. Because payments to beneficiaries often are linked to the inflation rates, pension funds and insurance companies invest in real estate expecting to offset inflationary effects.

Why Do They Invest Abroad? Many U.K. investors seek geographic portfolio diversification of both their security and property portfolios. Because the U.K. property market is small relative to the funds available for investment, opportunities to use funds in the U.K. market are limited. Therefore, these investors must diversify through foreign real estate markets. Foreign markets also may offer high returns and low correlation with U.K. real estate. Keen competition for suitable investment properties in the U.K. property market drives down U.K. property yields. Many U.K. investors are seeking larger investment returns than they believe are available in the U.K. market.

What Are Their Investment Requirements? When investing abroad, U.K. investors seek top quality buildings with strong market positions. These properties have little business risk and are expected to produce regular income and to increase in value over time. Returns from foreign properties must compare favorably with property returns currently available in the United Kingdom.

Generally, property portfolios are expected to have a higher total yield than equity, bond and mortgage portfolios. To be considered for acquisition, properties should have an expected internal rate of return (also known in the United Kingdom as the *total return*) of 15 to 20 percent. Presently, the expected return on U.K. equities is about the same as for property, while the return on government bonds and mortgages is about 12 percent and 14 percent, respectively. Currently, the U.K. overall capitalization rate (known there as the *initial yield*) is about 6 percent for retail properties, 7 percent for office properties and 10 percent for industrial properties.

Short-term vs. Long-term Performance. A recent study of U.K. property pension fund investors indicates that real estate is generally considered a long-term investment by them, but the comments of some interviewed managers indicate that in recent years there is more pressure for short-term investment performance. Short-term is defined by a majority of these managers as one year or less; likewise, a majority consider the long-term to be five to ten years or more. The most important investment objective for the majority of the interviewed managers short-term and long-term is to provide good performance.

Measuring Current Performance. In the United Kingdom, a property's current performance usually is measured by its annual *total return*:

$$(1) \text{ Total return} = \text{Income return} + \text{Capital return}$$

The components of total return are defined as follows:

$$(2) \text{ Income return} = \frac{\text{Annual income}}{\text{Current value}}$$

The tenant ordinarily bears all operating expenses of the property; the owner generally considers the rental income as the property's annual income. Thus, the income return is the same as the overall capitalization rate used by U.S. real estate investors. This return is equivalent to a current after-tax return for a U.K. pension fund—they are tax exempt and typically make 100 percent equity purchases. Although life insurance companies also make 100 percent equity purchases, they are only partially tax exempt.

$$(3) \text{ Capital return} = \frac{\text{Current value} - \text{Previous period value}}{\text{Previous period value}}$$

The capital return is simply the percentage change in a property's current value from its previous period value. This measure of the return is dependent on periodic appraisals of the property and is subject to error.

While U.K. institutional investors are concerned with a proposed investment's expected internal rate of return over the anticipated holding period, expectations about both current income and appreciation must regularly be achieved. Only properties offering this potential are of interest to these investors.

Where Are Their Investment Opportunities? U.K. pension funds and insurance companies invest in real properties, both in the United Kingdom and overseas. Americans are aware of the activities of foreign real estate investors in the United States and might assume the U.S. property market dominates the attention of foreign investors. In addition to providing opportunities for geographic diversification and reasonable returns, the United States possesses political and economic stability—on a relative scale, the United States continues to be a haven for those concerned with investment safety.

Currently, however, real estate investment opportunities in Western and Eastern Europe are emerging that will compete with U.S. properties for the attention of U.K. (and other foreign) investors. Why is this?

First, the dramatic changes in Eastern Europe are encouraging many investors to supply funds needed by these emerging market economies for real estate development.

However, current developments in Western Europe are even more significant. The 12 European countries (including the United Kingdom) of the European Union (E.U.) became a single market on December 31, 1992; soon three additional European countries will join the E.U. Their land area is about one fourth that of the United States, but their 1986 population was about one-third greater. Although such comparisons are difficult, the 12 E.U. countries' 1987 gross national product nearly equalled that of the United States.

Becoming a single market means there is free movement of goods, labor, services and capital among E.U. countries. Furthermore, there will be a "harmonization" of laws, indirect taxation, agricultural policies and so forth. Eventually, they hope to achieve monetary union; if they do, it will be possible for E.U. investors and businesses to shift funds among E.U. countries without foreign exchange risk. Thus, the E.U. is about to emerge as an important market area—one that is much stronger economically than were the 12 independent countries with trade barriers, conflicting laws and tax policies and 12 monetary systems.

These changes are expected to produce increased economic activity with significant real estate investment opportunities. This accounts for the present intensity of interest in European real estate by many institutional property market investors.

What about Texas Real Estate? Texas properties will be competing with many other markets now for U.S. and foreign investors. Attracting U.K. investors is particularly worthwhile because they usually make 100 percent equity purchases; mortgage financing (that is difficult to arrange in Texas) is not required to facilitate U.K. purchases.

Texas properties are low-cost by international standards and institutional investors such as pension funds still desire broad geographic diversification. To interest U.K. investors, however, Texas brokers must offer sound properties in areas with high demand and supply constraints. Interested Texas real estate brokers must realize that U.K. investors want only properties that will produce regular current income and appreciation during the anticipated holding period.

Texas real estate brokers with properties to present to U.K. investors may wish to contact one of the following firms.

Baring, Houston & Saunders
Property Consultants
104-106 Leadenhall Street
London EC3A 4AA

Debenham Tewson
& Chinnocks
3 - 5 Swallow Place
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Hanover Square
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77 Grosvenor Street
London W1A 2BT

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Real Estate Risks

3



Complexities of Real Estate Investment

July 1991

Wayne E. Etter

Real estate investments generate cash flows from three principal sources: operations, appreciation and equity build-up.

- Cash flow from operations represents the cash benefit the property provides after operating expenses, debt service and income tax are paid from the rental income. These benefits are expected throughout the investment's economic life.
- Appreciation represents an important source of real estate returns. Over time, well-located and well-maintained properties are expected to generate increased income that will be reflected in higher property value.
- Equity build-up results from the periodic reduction in the mortgage. These benefits can be obtained only if the property is refinanced, or it is sold at a sufficiently high price.

As investors estimate the present value of these future cash benefits, they are necessarily concerned with risk exposure because the value of any asset is equal to the present value of its future cash flows. If an investor is certain the actual cash flows will be the same in amount and timing as those expected when the investment is

made, the investor will not consider it risky. If, however, the probability of variation between expected and actual cash flows is high, the investment will be considered risky. Because investors expect a higher return from undertaking a risky investment, they apply higher discount rates when they estimate the present value of an investment. The result? A stream of risky cash flows is worth less than a stream of more certain cash flows.

Real Estate Investment Characteristics

The risks of an income property's future cash flows cannot be evaluated without understanding how they are related to real estate characteristics. Although real estate investments have many characteristics, three are particularly important.

First, real estate investments are physically immobile—they cannot be moved. Second, they have a long economic life—they must produce cash returns over a long period if their cost is to be recovered. Economic life is the time required for the property's cost to be recovered from operations; it differs from the investor's expected holding period. Even when an investor anticipates a five- or ten-year holding period, the future buyer of the property anticipates a satisfactory cash flow during a future holding period and so on.

Third, they have a large economic size—a single property requires a large dollar investment compared to the minimum purchase of common stock, for instance. Although it is difficult to relate these three characteristics to each of the seven risks, the characteristics accentuate real estate's risk exposure.

Relationship of Characteristics to Risks

Business Risk. Real estate's physical immobility and long economic life are strongly associated with business risk—the risk of failing to generate sufficient income. This failure can result from attracting too few tenants, lower than anticipated rental rates caused by high vacancies in competing properties, declining business conditions in the market area and so on.

Consider the plight of a shopping center owner when demographic changes adversely affect the center's market area. The center's tenants can follow their customers to other neighborhoods and markets, but the shopping center cannot be moved. Its owner must suffer the consequences of reduced cash flow from operations and lowered expectations of cash flow from appreciation and equity build-up. And because the shopping center has a long economic life, it must sustain its operational cash flow for a long period.

A property may appear to be ideally located when it is constructed; the adverse demographic changes may take place some years after its construction. Because of the property's long economic life, the center's cost may not be recovered even after generating sufficient cash flow for several years.

Management Risk. Real estate's physical immobility and long economic life also are strongly associated with management risk—the risk of failing to respond properly to changing business conditions to maintain the efficiency and profitability of the property. Because real estate cannot be moved and must sustain its cash flow during its economic life, the probability of changing business conditions is high during the property's economic life.

Considering the shopping center example, one might ask what a good manager could have done to predict the demographic changes and react to minimize their impact on the property's cash flow. Some investment managers may perceive such changes in business conditions and act rapidly to forestall their effect, while others may take no action or act improperly.

Financial Risk. Because real estate investments traditionally are financed with debt, financial risk is significant; furthermore, real estate's physical immobility, long economic life and large economic size accentuate the financial risk. Because the debt is unlikely to be repaid in a short time, the property must generate adequate cash flow throughout its long economic life.

As with business risk, many changes can occur during this time that adversely affect the property's income stream. Because the property cannot be moved, the probability of changes adversely affecting the owner's ability to meet the mortgage payment is increased. Real estate's large economic size often requires investments to be financed with high loan-to-value ratio turns into an equal disadvantage when the property's income declines.

Financial leverage is truly a "two-edged sword." This is a particularly significant risk when the terms of financing are arranged during periods of high interest rates.

Political Risk. Because real estate is located permanently within a particular political jurisdiction, it is subject to the community's attitude toward property. Accordingly, it is subject to zoning, land-use regulations and building codes imposed by that jurisdiction. Because of its long economic life, such regulation might become more severe during the economic life. But increased regulation can prevent competition, thus enhancing the value of existing

properties. Finally, large projects may be reviewed more strenuously by regulators at all levels.

Of course, the long economic life also subjects the investor to tax law changes. For instance, the 1986 Tax Reform Act altered real estate's status as a tax sheltered investment. Prior to the act, many investors expected tax benefits to be a significant portion of total cash flow; when this portion of the investment's cash benefits was eliminated, the value of their investment declined. The act also increased the capital gains tax liability generated by the sale of real estate. Many investors anticipated a lower rate of capital gains taxation when they invested. Thus, they not only must anticipate a larger tax on the sale, they also may expect a future buyer to offer less for the property because for that buyer the expected flow of cash benefits has been reduced.

Inflation Risk. Because real estate investments have a long economic life, investors must correctly anticipate the inflation rate for the long term. When future cash flows are reinvested, they will buy less than expected if the inflation rate is greater than expected; furthermore, future cash flows may be less than expected as a result of inflation—operating expenses may exceed expectations, for example.

Although inflationary gains should not be confused with appreciation, real estate values generally have performed well during periods of moderate inflation. However, higher than expected inflation rates may induce others to purchase and develop real estate to hedge against inflation. If, as a result, the supply of rentable space exceeds the demand for rentable space, rental rates and property values will fall. Finally, inaccurate inflation forecasts result in choosing inaccurate discount rates that can have an important effect on the present value of future benefits.

Liquidity Risk. Real estate's physical immobility and large economic size make it particularly subject to liquidity risk. Its physical immobility makes it unique—a severe hindrance to selling it quickly without loss. The liquidity of real estate investments also is hampered because of their large economic size—the buyer of the property must invest more cash than required for many other investments.

Interest Rate Risk. Real estate investment's long economic life and large economic size increase the exposure to interest rate risk. Because many investors value properties by capitalizing their net operating income, i.e., net rental income less the property's

operating expenses, the capitalization rate is an important determinant of value. Although there are two basic approaches to developing this rate, both approaches produce a result that is highly correlated with interest rates.

Some investors use discounted cash flow analysis to value properties, but their discount rates also are related positively to interest rates. Because of real estate's long economic life, fluctuations in market interest rates during that period are virtually certain.

As interest rates rise, property values will fall and vice versa. An investor wanting to sell a property may find that a prospective buyer reduces the offering price because of rising interest rates. The large economic size requires many real estate investments to be financed largely with debt, thereby making such investments even more interest sensitive. Although fixed-income securities are the usual example for this type of risk, income properties clearly are not immune.

The lesson for today's real estate investor is clear. As recent events have shown, **real estate is not a riskless investment**. Failure to recognize the threat of the combined effect of business risk and financial risk seems particularly important.

Many speculative properties were financed with high debt-to-equity ratios—sometimes in excess of 90 percent. The mortgage payments on such properties were large because of the high debt-to-equity ratio and interest rate levels; in many cases, the investor needed a 95 percent occupancy rate to generate sufficient net operating income to service the debt. When the supply of space exceeded demand, rent concessions were made in an attempt to fill the properties with tenants. Although rent concessions may have attracted tenants in some cases, they were little help to the market as a whole.

The other risks of real estate were present, too. Many properties were developed by inexperienced developers and purchased as investments by inexperienced investors. Thus, the management expertise needed to avert disaster was not available. Too, many investors were affected by the tax law changes—the result of their exposure to political risk. Lost tax shelter benefits and the increased capital gains tax rate hit the investor hard—not only were the investor's expectations of cash flow and appreciation benefits reduced, buyers also had reduced expectations and offered less for the property as a result.

Many investors expected the inflation rates of the 1970s and early 1980s to continue and, therefore, they believed the price of real

properties would continue to increase. Many of these investments were dependent on price appreciation to provide a satisfactory return to the investor, but the inflation rate decline signaled an end to the expected rate of property appreciation. Because of the excess supply in some markets, rental rates and property values have decreased.

In such markets, real estate's liquidity risk also is significant—investment properties are not easy to sell today. Perhaps interest rate risk has had the least effect on investors in the recent past. Although capitalization rates and discount rates have risen, this probably reflects an adjustment for risk rather than changes in the interest rate.

Many investors have suffered because of their exposure to these risks. Furthermore, investors have suffered because they do not understand the relationship between real estate characteristics and the risks of ownership. Thus, a substantial number of properties and their owners fell victim to these risks and to the fundamental characteristics of real estate during the recent economic slump.

Real Estate Investment Risks

Real estate investments are subject to a number of risks, but they are usually considered under the following headings:

Type	Risk
Business	The property will fail to generate sufficient income.
Management	The property's managers will fail to respond properly to changes in the business environment and, therefore, fail to earn a satisfactory return.
Financial	The property will have inadequate income to meet debt service requirements.
Political	A government action adversely affects the property or the investor.
Inflation	Cash benefits received in the future will have less purchasing power than an equal cash benefit received today.
Liquidity	A property cannot be sold quickly without loss or large selling expense.
Interest	The property's value will decrease because of increased interest rates.

Real Estate Economics

4



Price Elasticity of Demand

October 1991

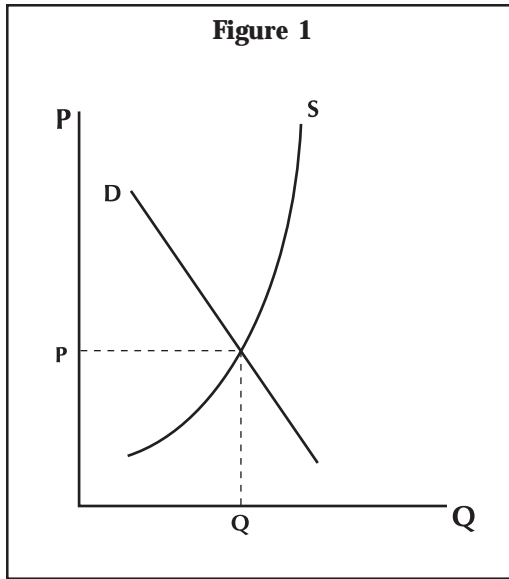
Wayne E. Etter
Ivan W. Schmedemann

Real estate prices and rents are established in the market through the interaction of supply and demand. Although most real estate brokers and investors acknowledge the importance of supply and demand, some have not considered the efficacy of this knowledge in analyzing real estate markets.

The determination of the market price of an acre of land is illustrated in Figure 1. The supply curve illustrates that the economic supply of a particular type of real estate is relatively fixed **in the short run**; the demand curve shows the **price elasticity of demand** for a particular type of real estate product. Discussions of this concept often involve consumer products such as butter and wheat; in this article the usefulness of the concept to real estate brokers and investors is explained and illustrated.

What Is Price Elasticity of Demand?

Price elasticity of demand is the percentage change in the quantity demanded that results from a percentage change in price and is useful in analyzing markets. If prices are increased (decreased)

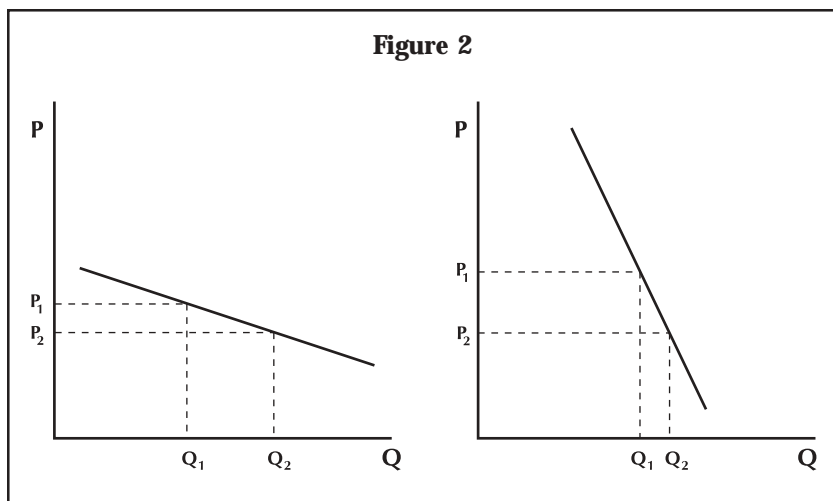


and quantity demanded decreases (increases) proportionally more than the price change, then demand is price elastic. Accordingly, as shown in Figure 2, the demand curve slopes down and to the right at an angle of more than 45 degrees. If the change in quantity demanded is less than proportional to the change in price, the demand is price inelastic, and the demand curve slopes down and to the right at an angle of less than 45 degrees.

What are the requirements for a product to be price elastic—that is, the change in quantity demanded is more than proportional to the change in price? A product's price elasticity of demand is relatively elastic if it has one or more of these characteristics:

- **Close substitutes.** If a product has many close substitutes, buyers turn to substitute products when prices increase; they purchase fewer substitutes when prices decrease.
- **Important percentage of buyers' budgets.** When a product is an important fraction of buyers' budgets, buyers tend to reduce expenditures for a product as its price increases; if the product is not an important fraction of buyers' budgets, price increases are tolerated.
- **Many uses.** Purchases of products with many uses decline in response to price increases; substitute products are purchased to

replace lower priority uses. Purchases of these products increase in response to price decreases as purchases for inferior uses are increased.



Analyzing Land Investments

The concept of price elasticity of demand may be used to analyze land investments. Assume an investor is considering purchasing and developing a 200-acre wooded, rolling tract in a rural cattle-producing area. The intention is to maximize the tracts resale value.

The tract could be cleared and planted with grass—making it ideal for cattle. Or, the woods could be retained, gullies converted to lakes rather than reshaped and grassed, existing wildlife habitat enhanced rather than destroyed and other amenities added—making it ideal for recreation. Assuming equivalent development costs, the investor’s dilemma is to choose the development plan that will maximize the property’s resale price.

How can the concept of price elasticity be applied here? **The investor should select the development plan that produces the product with the greatest price inelasticity.** Why? Because the price of such a product may be increased with the least negative effect on the quantity demanded. And which product will have the greatest price inelasticity? To answer this question, land is examined in terms of the requirements for price elasticity.

Do land parcels have close substitutes? Although each land parcel is unique, many land parcels are close substitutes for other land parcels. This is particularly true of agricultural land, but it also is true of much urban land. This characteristic makes the demand for land price elastic.

Does the purchase of land represent a large percentage of a buyer's budget? Most land purchases involve large dollar amounts; as a result, land purchases are an important part of the purchaser's budget. Small tracts generally command a higher per acre price because more buyers can afford small tracts. This makes the demand for small tracts somewhat more inelastic than for larger parcels with similar characteristics.

Do land parcels have many uses? Most land parcels have alternative uses. As the price of land increases, inferior uses will be given up; as the price of land decreases, it will return to inferior uses. This characteristic makes the demand for land with many uses price elastic.

There is little the investor can do to make a land purchase an unimportant part of the future buyer's budget or eliminate land's multiple use potential. But the investor can select the development plan that results in the product with the fewest substitutes.

One of the investor's tasks in making this choice is to analyze the local land market to determine the availability of close substitutes for each type of development. Of course, each parcel of land is unique, but there may be close substitutes in the vicinity.

If the investor clears the land and plants grass in an area where cattle raising is common, there will be other similar properties nearby; the potential for raising the price of the property is limited by the availability and price of close substitutes. Further, cattle prices and production costs will affect the market price of such land.

Because the site is in a cattle-raising area, recreational development of the property could result in a property with few close substitutes in that area; if so, the price elasticity of demand will be relatively inelastic for recreational use of the land. Given some level of demand for this type of property in the area, the property may command a greater resale price when developed for recreational purposes than when developed as a cattle ranch. Careful market research should clarify this dilemma.

Analyzing Changes in Apartment Rental Rates

Price elasticity of demand may be used to predict the outcome of price changes in the real estate market. For example, assume

an urban apartment market with 95 percent occupancy. Further, assume a particular quality or type of apartment unit. What happens if apartment owners increase rents (within limits) in response to increased demand? Apartments also can be examined in terms of the requirements for price elasticity.

Do apartments have close substitutes? In one sense, all types of housing are substitutes for other types—all are shelter. But are most tenants able to move from apartments to single-family houses if apartment rents increase? Many will be unable or unwilling to purchase a single-family home. (Of course, some single-family homes are rented and may compete with apartments.) If other types of housing are not affordable or not desired, they are not close substitutes for apartments. Thus, apartment rents can be increased without a loss in revenue because few substitutes are available. Therefore, the demand for apartments under these conditions is price inelastic.

Do apartment rents represent an important part of a buyer's budget? Yes, apartment renters are price conscious. This factor seems to make apartments less price inelastic. Prospective tenants may decrease their consumption of apartment space if rents are increased, although existing tenants are not likely to do so. Furthermore, apartments are lumpy goods; it is impossible to make small adjustments to the quantity consumed.

Do apartments have many uses? No, their use is normally limited to residential use. Therefore, other uses of the space will not be given up as rents are increased. On this point, the demand for apartments does not seem to be price elastic.

Because of the first and third reasons, the demand for apartments is considered to be relatively price inelastic within a limited price range. What does this suggest about raising apartment rents to increase income? Because market rents are established by supply and demand, an individual apartment owner cannot raise the rent for a standard apartment. But when market demand increases relative to supply, rental rates can be increased because the demand for apartments is price inelastic. There are few feasible substitutes within an area available to apartment dwellers, and it is difficult for them to economize on their space consumption even though their rent is increased.

Furthermore, because apartments do not have other uses, tenants using the space for inferior purposes will not give up units as rent increases. Thus, with sufficient demand, an increase in the

rental rate normally results in a less-than-proportional decrease in the quantity of space demanded.

Real Estate Market Research

Real estate market research should be used to avoid markets in which an investor must engage in competitive price cutting to sell or lease real estate. For example, assume investors overestimate the demand for apartment space and, therefore, increase the supply of apartment space beyond the amount required to satisfy the demand. Furthermore, what if apartment owners respond to their mistake by a competitive reduction of rental rates to attract tenants? Decreasing the rental rate will bring some tenants into the market, but it is unlikely to result in substantial numbers of persons in a given local market deciding to rent apartments or persons in other areas deciding to move to the market to take advantage of the reduced rental rates. These decisions depend on factors other than the rental rate. The best way to avoid this situation is to invest in apartments with few close substitutes and an effective demand.

Thus, to take advantage of the concept of price elasticity of demand, real estate brokers and investors should locate space or product shortage through market research. In such a market, a sustainable competitive edge can be achieved by supplying a differentiated real estate product for which there is a demand; tenants or buyers pay a full price for the product.



Scarcity Benefits Investors

October 1991

**Wayne E. Etter
Ivan W. Schmedemann**

The combination of a general oversupply of investment real estate in many areas of the United States and the 1986 Tax Reform Act has changed the thrust of real estate investment analysis. Prior to the 1986 Tax Reform Act, appreciation was assumed to be an automatic by-product of real estate and tax benefits flowed from owning it. Users' demand for space was ignored. Investors' interests appeared to be well served by a steady supply of newly developed properties.

Today, however, successful real estate investors must locate properties that are in short supply relative to user demand. Scarcity offers three primary benefits to income property investors. Scarcity

- enables investors to increase rents in response to increased demand,
- enables investors to avoid decreasing rents as a response to competition from similar properties and
- increases a property's market value.

Increasing Rent

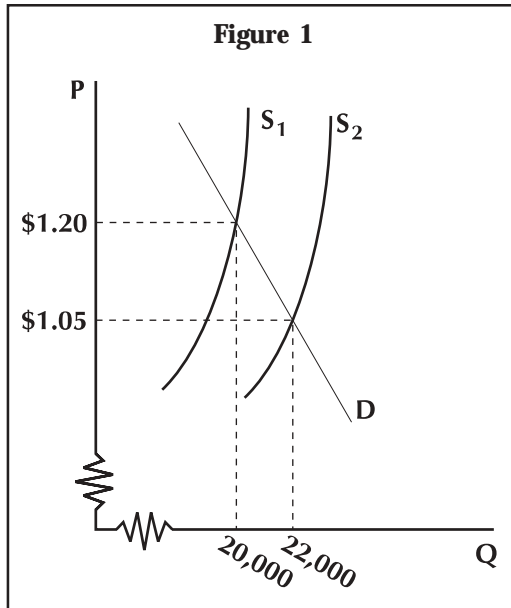
The concept of *price elasticity of demand* was considered in the previous section. Its principal lesson is that income properties have a relatively price inelastic demand because such space has few substitutes and few alternative uses. This means that if there is not an excess supply of a specific type of space relative to effective demand, investors can (within a limited range) raise rents in response to increased demand. This is because space consumers cannot shift to substitutes in the short run or discontinue inferior uses of the space when rental rates are increased.

Examination of this economic concept suggests that **real estate investors should seek differentiated real estate investments for which there is an effective demand.** Such properties are relatively scarce and their users tolerate price increases if demand is sufficient. Alternatively, investors should avoid markets with an abundant supply of an undifferentiated, homogeneous product.

Avoiding Price Competition

A second benefit of owning a property in short supply is avoiding the need for competitive pricing. For instance, assume the supply of *retail space* is increased (from S1 to S2) without a corresponding shift in the demand for retail space (see Figure 1). Decreasing the price per square foot may bring some retail space users into the market, but it is unlikely to result in substantial numbers of entrepreneurs entering retailing or to encourage existing retailers to expand. These decisions depend on factors other than the price of retail space.

The financial consequences of cutting price to attract retail tenants are illustrated by the supply and demand functions in Figure 1. At a price of \$1.20 per square foot per month, 20,000 square feet of space are leased, and the rental income is \$24,000 per month. At a price of \$1.05 per month, 22,000 square feet of space are leased, and the rental income is \$23,100 per month.



Similarly, cutting the office space or apartment rental rate when supply exceeds demand is unlikely to increase the short-run demand for space. How many businesses will lease additional office space because rental rates decrease if they do not need the additional space? How many apartment dwellers lease additional space because rental rates decrease if they do not need the additional space? In each case, changes other than the price are required to increase the quantity of space demanded for offices and apartments.

These considerations suggest a *diminishing marginal utility* for space—each square foot of additional space has less value to the user than did the preceding square foot. Because businesses and consumers have limited budgets, they normally will not lease space they cannot use, no matter how much the rental rate declines. Although some owners will decrease rental rates as a competitive tool to attract tenants, in time, no one will be better off. When other owners cut the rental rate first, however, it will be necessary to meet the competition. But this necessity can be avoided by investing in differentiated (unique) properties.

A property in short supply relative to demand commands a greater rent than those readily available. The greater rent per square foot results in more net operating income per square foot that is normally capitalized into increased value per square foot. For

example, assume two properties cost the same per square foot, but one’s locational advantage allows its owner to charge a greater rent. The effect on value is illustrated in Figure 2.

Figure 2		
	Property	
	1	2
Rent per sq. ft.	\$0.50	\$0.55
Operating expense per sq. ft.	0.15	0.15
Net operating income per sq. ft.	0.35	0.40
Capitalization rate	0.10	0.10
Capitalized value per sq. ft.	\$3.50	\$4.00

Locating Unmet Needs

Because of these benefits, **real estate investors should conduct market research to identify market segments where space is and will continue to be in short supply relative to effective demand.** By identifying markets with unmet needs and supplying those needs, real estate investors can achieve a sustainable competitive edge and reap the benefits of scarcity.

Many real estate investors disregard the benefits of market research. Some investors even view careful market research as an unnecessary impediment to the development and investment process. However, market research aids in reducing risk in the investment and development process.

Although scarcity may be defined as an absolute space shortage of one of the specific property types (for example, multifamily residential, office, industrial or retail space), there may be product gaps within any broadly defined property type. Because individual properties within each property type can be differentiated by factors such as quality, design, amenities, site layout and location, an unmet need may exist within one of the subgroups.

Within the multifamily residential category, for example, properties are located in small communities, medium-size cities and large cities. Each of these multifamily subgroups can have market subsets such as housing for low-income families, young professionals, retired persons and college students. Furthermore,

design, quality and site layout can distinguish a project from its competition. Finally, locational advantages that link the site and residents' jobs, schools and retail centers can minimize the cost of travel (in money, time and stress) and provide a comparative advantage for the investor.

Superior location alone can differentiate a property; however, its competitive edge can be sustained only if it is properly developed and managed. Thus, a skillful combination of location and management can be used to maintain the property's competitive position.

By systematically analyzing the supply and demand for space within these subgroups, the investor can locate investment opportunities. Thus, real estate market research is an important means of locating properties that provide the benefits of scarcity. Such research involves more than choosing among the various property types.

Lending Standards, Government Control

During the early 1980s, eager lenders financed the steady supply of income properties to investors. Now lenders have adopted more stringent real estate loan standards. This situation differs considerably from the early 1980s when many properties were financed even though demand appeared to be insufficient to justify the property.

Only properties with a strong market position can obtain financing. If the investor with an outstanding investment opportunity receives financing or presently owns a quality property, then the investor can be less concerned about competition from future development. Unless sufficient demand supports the new property, it will not receive financing. If new market entrants are limited to preleased properties, the potential for competitive price competition is reduced.

Investors with solid properties were made worse off in the past when weak projects were financed because their completion often resulted in competitive properties. Thus, the lack of current debt availability contributes to scarcity by limiting the development of competitive buildings and creates investor interest in renovating existing properties with good locations.

Investors also may focus on areas governed by strict planning and development controls. Local regulation of real estate development is a special means of achieving a sustainable monopoly position. Such control is limited in the United States, but other countries, such as the United Kingdom, regulate development extensively.

Many investors have viewed planning and development controls as obstacles to the free flow of desirable investment properties to the market. Of course, it can be argued that developers' interests are harmed by excessive regulation—developers generally focus on supplying space in response to demand. Furthermore, space consumers' interests also may be harmed by excessive regulation—they may pay premium rents because of scarcity. On the other hand, the cost of excess development is significant to investors, developers, financial institutions and taxpayers.

Although some might oppose such regulation, investors must consider the benefits of scarcity—in such an environment, their property becomes more valuable. Thus, their interests are served by regulation that restricts the supply of competitive properties. Accordingly, careful investors seek out markets with supply constraints.

Real estate investors must bear in mind the benefits of properties that are in short supply relative to tenant demand. The potential for loss is reduced while the potential for gain is enhanced. Accordingly, they should conduct market research to select suitable properties for investment. Rigorous lending standards and the regulation of real estate development also reduce the risk to current property market investors.



Using Economic Rent Theory

January 1991

Wayne E. Etter
Ivan W. Schmedemann

Analyzing real estate markets is an important task for real estate brokers and investors. Using appropriate economic theory yields a greater likelihood of correct and consistent results. Why? Because theories are *predictive devices*. In other words, economic theories help to make estimates about future events. If theories cannot do this, they still may be interesting, but they have little practical value.

Economic rent theory is useful for real estate market analysis. Although this may seem a rather obscure (or even impractical) topic to many (and some may never have heard of it), it can provide useful insights when one must form an opinion about the future course of a real estate market. This discussion illustrates how to use economic rent theory for analyzing the Texas apartment market.

Reviewing a number of apartment appraisals in several Texas cities results in two major observations about the state's apartment market.

- The final estimate of value often is less than the cost of constructing a new apartment building.
- The overall capitalization rates (net operating income/reported sales price) vary among the cities and markets.

For a real estate broker or an investor, a proper interpretation of these observations is important. As is well known, the early 1980s featured substantial overbuilding as anticipated tax benefits and appreciation appeared sufficient to provide satisfactory returns without any consideration of fundamental property economics. The question, "Are there sufficient tenants willing to pay sufficient rent to produce a positive cash flow?", often went unasked and unanswered.

The 1986 Tax Reform Act erased tax benefits and the oversupply of property stopped the expectation of immediate property appreciation. Today, income and long-term growth are valued, but the supply of and demand for apartment space has resulted in low rents and much slower growth expectations. Therefore, estimated market values often are less than the cost of constructing new apartments. Accordingly, there is little new apartment construction in most Texas cities.

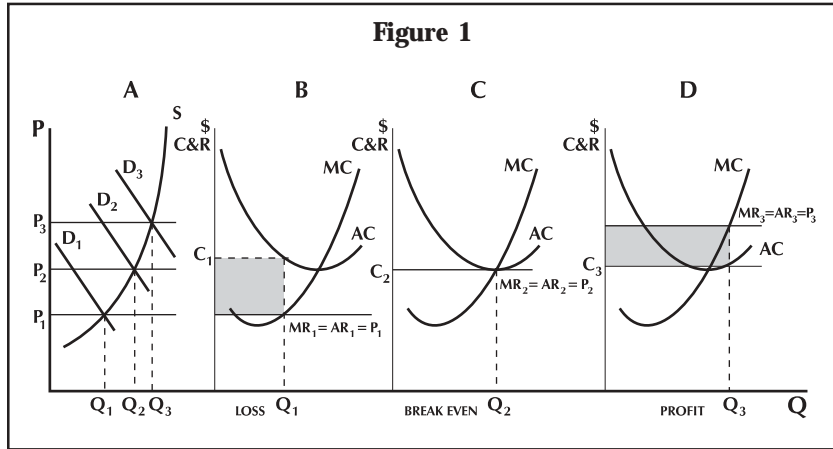
Turning to the second observation, one assumes areas with lower overall capitalization rates are markets in which apartment buyers are willing to pay a higher price for the income stream than in areas with higher overall capitalization rates. These buyers apparently believe the demand for apartment space, rents and, in time, apartment values will increase. Because buyers do not have equivalent expectations about other areas, they will pay less for the income streams there.

The real estate broker or investor interested in analyzing these observations and making predictions about a local apartment market can use economic analysis.

Market rents are set by supply and demand. **In the short run**, the supply of apartment space is fixed—additional apartment space may require a year to 18 months to be planned, built and offered to the market. Likewise, an oversupply of apartment space will not evaporate quickly.

The demand for apartment space results from a number of factors, but changes in population, employment, single-family housing costs and interest rates are important influences.

Figure 1A illustrates how supply and demand interact to establish the local market's apartment rental rate. Where demand D_1 , for example, equals supply, the market rental rate is P_1 with tenants using Q_1 units of apartment space.



Also in Figure 1A, the effect of an increase in demand is shown—the demand curve shifts to the right. Up to a point, the demand can be met by absorption of available space as shown by the demand curve shift from D_1 to D_2 . Rental rates have risen to P_2 with tenants using Q_2 units of space. If the demand curve shifts far enough to the right beyond D_3 , the rental rate rises, but in **the short run**, there is no additional space to lease. Therefore, the supply curve becomes vertical. Tenants are competing with one another for a limited supply of space.

Real estate brokers or investors who foresee, within a reasonable time, the shift in the demand curve from D_1 to D_2 or beyond might recommend or consider the purchase of the property even if the present overall capitalization rate is low. They might do so even if the property does not currently produce a positive before-tax cash flow. With rising rents and satisfactory management, the property should begin to produce a positive before-tax cash flow. Furthermore, because the present low capitalization rate is an indicator of expected higher future rents, the capitalization rate will rise when the higher rental rates are achieved, provided that continuing rental rate increases are not expected. If continuing rental rate increases are expected, however, the capitalization rate could remain low. This would result in the increased income stream being capitalized into a higher property value.

The apartment market can be analyzed further using economic rent theory. Economic rent theory is based on the principle that an owner of existing apartment space will continue supplying space if the marginal revenue (the revenue from supplying an additional apartment unit exceeds the marginal cost (the cost of supplying one more apartment unit). Thus, the supplier will stop supplying when the revenue from renting the apartment equals the cost of supplying the apartment. At that point, supplying an additional unit will make the owner worse off as marginal revenue (which equals average revenue per unit) equals marginal cost. This means the cost of achieving 100 percent occupancy through additional advertising, management expenses, reduced rent or all three may exceed the benefit of the additional rental income received. Thus, for a particular property, the optimum occupancy level may be less than 100 percent.

As illustrated in Figure 1A, the rental rate is dependent on the supply and demand for apartment space. **For any level of occupancy, total revenue is equal to the quantity of apartment units leased multiplied by the unit rental rate** (see Figures 1B, 1C, 1D).

Total cost includes all the factors of production—land, labor, capital and management. Normally, as the number of units rented by a single owner increases, the average unit cost first decreases because the fixed costs are spread over larger quantities of output. Likewise, the marginal cost declines. At some point, however, the marginal cost begins to rise because of inefficiencies that result in increased costs. This, in turn, causes the average unit cost of supplying an apartment unit to increase. At any level of output, total cost equals the quantity of apartment units leased multiplied by the average unit cost (see Figure 1B, 1C, 1D).

When demand is large relative to supply, the owner is able to charge a high rental rate. It may be that at this rental rate, total revenue exceeds total cost—when this is the case, the amount of revenue in excess of total cost is known as *economic rent* (or net return). Because total costs include all production factors (including management compensation), markets in which economic rent is being produced will attract competitors seeking abnormal profits. When competitors enter the market and demand is unchanged, the market rental rate will decline, and the abnormal profits or economic rent will disappear.

To illustrate, Figure 1 depicts the property at each of the three stages of demand. At demand D_1 , price P_1 is established and quantity Q_1 units of space are leased. At this price, total revenue

$(P_1 \times Q_1)$ is less than total cost $(C_1 \times Q_1)$ and a loss (negative economic rent) results.

Over time, demand improves to D_2 and the price increases to P_2 . The apartment owner supplies space equal to quantity Q_2 . At this price, total revenue $(P_2 \times Q_2)$ is equal to total cost $(C_2 \times Q_2)$. There is no economic rent, but all costs of production are covered at this price. Rental concessions have vanished.

When the demand curve shifts to D_3 , however, the price increases to P_3 , and the quantity of space supplied increases to Q_3 . At this rental rate, total revenue $(P_3 \times Q_3)$ is greater than total cost $(C_3 \times Q_3)$; economic rent exists. This means the rewards of owning apartments are such that others could be attracted to supply space with the expectation of earning above-average profits.

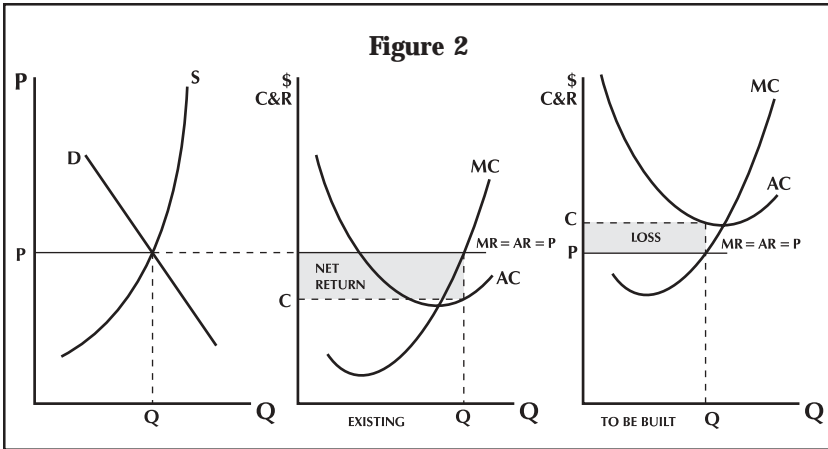
Assuming an owner's property is well managed and maintained, how should the owner view the prospect of competition from new construction? Today, many Texas apartment owners face this situation.

Economic rent theory can assist in analyzing this aspect of the Texas apartment market because it is based on the sound business principle that total costs must be covered before additional resources will be brought into production—in this case apartment space. Total costs include the cost of land, labor, capital and management. If expected apartment rents are sufficient to cover these costs and more, then new apartments will be built. Translated into investment terms, the expected rate of return is greater than the required return.

For this analysis, it is important to remember that today many apartment properties with 90 percent or greater occupancy rates at market rents have market values that are less than their replacement costs. It is, therefore, possible that an existing property purchased at a depressed price can produce economic rent (returns in excess of the cost of land, labor, capital and management). A new property, however, could not produce economic rent at current market rents.

Consider, for example, Figure 2. It begins at the last stage of Figure 1. The existing property produces economic rent as previously demonstrated, but, because of the cost of new construction, the new property has higher costs at all levels of output and, therefore, produces negative economic rent at current market rents. Of course, some rental premium may be possible because the property is new, but rents higher than the current market are required if the property

is to produce an economic rent. If the required increase is large, the owner of an existing property is protected (at least temporarily) from the competition of new properties.



External Obsolescence

October 1992

Wayne E. Etter
Ivan W. Schmedemann

The discussion of economic rent theory illustrates how an existing property purchased at a depressed price can produce an adequate return at current market rents, but a new property can not.

As illustrated in the figure, the higher costs of new construction cannot be covered by current market rents, and a loss results. But, until market rents increase, current owners are protected from the competition of new properties. In general, when this condition exists, appraisers conclude that a property has sustained external obsolescence. Although real estate appraisers spend a good deal of effort trying to measure external obsolescence precisely, many investors may not understand the importance of external obsolescence when making the investment decision.

External obsolescence, sometimes called *economic* or *environmental obsolescence*, is “the diminished utility of a structure because of negative influences from outside the site.” Normally,

external obsolescence is found when an existing property becomes subject to negative influences: e.g., a declining neighborhood causes an otherwise well-constructed and well-maintained building to command less rent than comparable buildings receive in other neighborhoods. Its reduced ability to generate adequate rent is attributed to external obsolescence.

Estimating External Obsolescence

Real estate appraisers normally use three approaches to estimate value: the cost approach, the sales comparison approach and the income capitalization approach. When the independent use of each approach produces three approximately equal value estimates, the logic of market participants is confirmed.

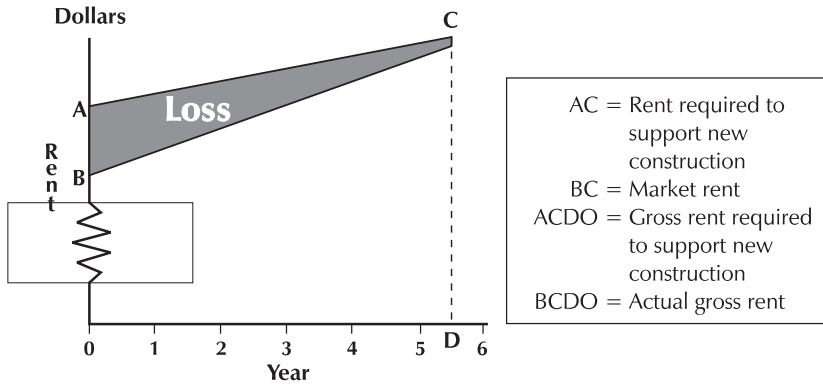
By comparing the actual sale prices for comparable properties and the cost of a new property, the belief that buyers will pay no more for an existing property than the cost of constructing a comparable property is asserted. Likewise, by comparing a property's capitalized income value with the prices buyers are paying for comparable properties and the cost of constructing a comparable property, the belief that the price buyers pay for a property is a function of its ability to produce income is asserted. Sometimes, however, the cost approach value estimate is considerably more than the value estimate of the other two approaches. When this occurs, the appraiser must discover if the cause of the difference is external obsolescence.

When expected rents decline and buyers pay less for properties because of the reduced income stream, the income capitalization approach and the sales comparison approach produce smaller market value estimates. Although land costs may decline, the other costs of constructing a new property probably will not decline. Therefore, external obsolescence is estimated and deducted from the subject property's depreciated replacement or reproduction cost so that in the final value indication, the cost approach estimate will be closer to those from the other two approaches.

Of course, estimating external obsolescence requires an appropriate methodology. If external obsolescence is improperly estimated, the cost approach cannot be used to confirm the other value estimates that take into account the market effects of the reduced rent.

Estimating the amount of external obsolescence is normally done by capitalizing the rent loss caused by the negative economic influence. The rent loss is estimated by comparing the subject's rent with that of comparable properties in other neighborhoods. External

Period of Protection from the Competition of New Construction



obsolescence is also estimated by examining the difference in sales prices of comparable properties within and outside the affected neighborhood.

With either approach, the calculated amount is allocated between land and improvements. Only the amount allocated to improvements is deducted from the depreciated reproduction or replacement cost of the improvements because the current market value of land is used in the cost approach. Any decline in land value resulting from negative influences from outside the site will be reflected in the land's current market value estimate.

At present, however, numerous properties have market values that are less than their depreciated replacement or reproduction cost plus land. This condition generally is attributable to an oversupply of the property type within these markets and/or a decline in general economic conditions rather than to the more limited causes of a declining neighborhood in the midst of other economically healthy neighborhoods. These properties' inability to generate sufficient rent to justify their construction also may be attributed to external obsolescence, but how is external obsolescence to be estimated using the usual methods if the entire city has suffered an economic decline and few properties are left unaffected? What will serve as the standard for comparison?

A suggested approach for estimating external obsolescence under such circumstances is to estimate the rental rate necessary to

support new construction and the time period that will elapse before actual market rents increase sufficiently to support new construction. The difference between the two rental rates is rent loss; the present value of the rent loss is used as the basis for estimating the property's external obsolescence.

Another suggested approach is to compare the property's cost with its investment value. The property's investment value is estimated using assumptions about expected rental rates, operating expenses, financing, required return and so forth.

Both suggested approaches are dependent on assumptions about the future. If the amount of external obsolescence is based on estimates of the future, it is difficult to evaluate the estimate's quality. If the appraiser's estimate of future rental rates and other important data is incorrect, the estimate of economic obsolescence is useless or misleading.

What might serve as a useful measure of economic obsolescence under such circumstances? If there are sufficient sales of comparable properties, another approach is to calculate the cost to replace or reproduce each of the comparable sales. The difference between their market price and their cost may be attributed to external obsolescence. If this calculation is made for several properties, a percentage reduction could be developed from sales data and applied to the subject property.

Why Is External Obsolescence Important to Investors?

When there is external obsolescence, the cost of constructing a comparable new property (including land cost) will exceed its market value and little, if any, new construction is expected to take place. Thus, the concept of external obsolescence is important to investors who are considering purchasing an existing property; the property's estimated economic obsolescence can serve as an indicator of the likelihood of competition from new buildings. In particular, a relatively large amount of economic obsolescence suggests higher market rents will be necessary before new construction is feasible.

For example, an investor may be considering the purchase of a 20,000 square-foot building with an estimated market value of \$300,000. The estimated cost (including land) of constructing a comparable property is \$600,000. If the property has no physical deterioration or functional obsolescence, the \$300,000 difference between the property's market value and the cost to construct a comparable property is attributable to external obsolescence.

**Table 1. Expected Cash-on-Cash Return
from Existing Property**

Expected purchase price	\$300,000
Estimated loan amount (10.5%, 25 years)	<u>210,000</u>
Required equity investment	\$ 90,000
Estimated potential gross income	\$ 68,400
Estimated vacancy and collection loss (20%)	<u>13,680</u>
Estimated effective gross income	\$ 54,720
Estimated operating expenses	<u>20,000</u>
Net operating income	\$ 34,720
Annual debt service	<u>24,030</u>
Before-tax cash flow	\$ 10,690
Cash-on-cash return = $\frac{\text{Before-tax cash flow}}{\text{Equity investment}}$	
	$11.9\% = \frac{10,690}{90,000}$

If the property's current rental rate is \$3.42 per square foot per year (28.5 cents per square foot per month) and the buyer of the property receives the financing assumed in Table 1, a cash-on-cash return of approximately 12 percent will be received.

The calculation of the rental rate necessary to support new construction is presented in Table 2. The difference between the current market rental rate (28.5 cents per square foot) and the rental rate required to support new construction (39 cents per square foot) is the investor's margin of safety.

Of course, the investor must estimate the time required for market rental rates to increase to the necessary level to make new construction feasible. The time required will depend on the supply and demand for space within the market area and the expected rate of increase in land and construction costs.

If the particular market has significant vacancies, rental rates will climb slowly unless a sharp upsurge in demand is expected. On the other hand, if the vacant space is not really suitable for satisfying future demand, rental rates may quickly increase sufficiently to support new construction even though some properties remain vacant. Nevertheless, investors who carefully pick among existing properties can gain some protection from the competition of new properties.

Table 2. Estimating the Required Rental Rate to Support New Construction

Estimated cost of land and improvements	\$600,000
Estimated loan amount	<u>420,000</u>
Estimated equity required	\$180,000
Required rental rate:	
Annual debt service (10.5%, 25 years)	48,060
Required cash-on-cash return (12%)	<u>21,600</u>
Required net operating income	69,660
Estimated operating expenses	<u>20,000</u>
Estimated required effective gross income	89,660
Estimated vacancy rate (5%)	<u>4,719</u>
Estimated potential gross income	94,379
Estimated monthly per square-foot rental rate	\$ 0.39

Real Estate Market Research

5



Case Study: Wilma and the FTZ

July 1992

Wayne E. Etter
John Y. Massey

The oversupply of developed commercial real estate in most Texas markets means little new commercial development activity in these markets in the near term. Those who hope to continue some level of development or redevelopment activity would do well to reflect on an important point made by the late Professor James A. Graaskamp of the University of Wisconsin at Madison. He says that developers cannot be successful if they supply a product that is already in the market. Instead, they must seek an unmet need; in supplying that unmet need, they must achieve a sustainable competitive edge that will allow them to reap the benefits of their monopoly position. These benefits were analyzed in “Scarcity Benefits Investors.”

Identifying an unmet need and designing a strategy to achieve a sustainable, competitive edge are not easy tasks. This section provides a case analysis of one real estate developer’s pursuit of these goals.

Wilma Southwest, Inc.

Wilma Southwest, Inc., of Houston is a subsidiary of Wilma International, a development firm headquartered in the Netherlands. Wilma undertakes property development projects on its own and with joint-venture partners. Because Wilma and its investors are conservative and because of the well-known difficulties of developing in the Houston market, speculative development is avoided.

In the early 1980s, Wilma owned 457 acres near Houston's Intercontinental Airport with good access to the city's freeway system and to rail transportation; Wilma executives wanted to develop the site to its maximum value. This property was marketed as Central Green Business Park.

Wilma's land could have been developed for a variety of users, but lenders and investors required developments to demonstrate financial feasibility. This meant that before construction began, Wilma needed to locate tenants willing to lease the completed space at rental rates sufficient to service the debt and provide an adequate return to Wilma's investors.

With other completed space in the market area remaining unleased, Wilma's site had to fill special needs if it were to be developed. Although near the airport, it was not the only site there. Likewise, it was not the only site with access to Houston's freeway system and to rail transportation. Thus, Wilma needed to devise a development strategy taking advantage of these attributes and permitting the site to fulfill an unmet need that competitive sites could not supply.

Finding the Unmet Need

Market segmentation means dividing a market into **distinct subsets of customers**. Many manufacturing and service firms use this approach to aid in product development and marketing; it also can be applied to real estate markets. In the case of real estate, the market is divided into tenant subsets with the goal of locating one or more subsets with unmet needs. Thus, it is a conceptual approach to isolating an unmet need.

The distinction between market segmentation and product differentiation is important. For real estate markets, product differentiation means supplying several product styles in hopes that various users will find at least one of the styles attractive or acceptable, e.g., office spaces varying in size and quality.

The distinction between market segmentation and market area also must be borne in mind. A market area has boundaries; it is

a defined geographical area. Distinct subsets of customers may exist within the defined geographical area. Thus, medical doctors desiring office space are a distinct subset of customers; they may desire to lease office space in particular market areas.

Development Strategy

Because Wilma Southwest was a subsidiary of a Dutch parent firm, developing sites for firms involved in international trade was not unknown to them. And because Houston is an important foreign trade hub with both an international airport and a major seaport, many importing and exporting firms are located in Houston. Therefore, Wilma began to seek a way to attract these firms to Central Green Business Park.

To assist in attracting these firms, Wilma Southwest sought a *foreign trade zone* (FTZ) designation from the Foreign Trade Zones Board (a U.S. government agency) in mid-1985. When a site is established as an FTZ, it is deemed to be outside the United States for duty and revenue purposes, even though it is physically located within the country's borders. This attracts firms engaged in importing and exporting for the following reasons.

- Normally, duty payments are made when imported goods arrive in the United States. If the goods are imported and warehoused in an FTZ, however, duty payments are delayed until the goods are shipped to a U.S. customer. Delaying the payment provides a time value of money benefit for the importer-exporter located in the FTZ.
- The duty payments made when goods are imported into the United States can be avoided by the importer-exporter located in an FTZ if goods are exported after storage, sorting, testing or repackaging. A business location outside the FTZ does not provide this advantage.
- Often the duty on parts is charged at a higher rate than the duty on the finished products. Because duty is not paid when parts are imported into the FTZ, finished products can be assembled within the FTZ and then sold to U.S. customers. Duty on the finished products will be charged at the lower rate. Assembling products outside the FTZ will not provide this advantage.
- Sometimes part of imported material becomes scrap during the assembly or manufacturing process. Because duty is not paid when parts are imported into the FTZ and assembled into finished products, duty on the scrap will be avoided when the

products are sold to U.S. customers. In addition, duty on the finished products may be charged at the lower rate. Assembling products outside the FTZ will not provide this advantage.

- Imported goods and goods stored for export are federally exempt from the annual personal property tax levied by local governments.

For these reasons, locating in an FTZ could prove attractive to an import-export firm, even though competing space located outside an FTZ might be otherwise competitive in design, price or location. In fact, an import-export firm considering leasing space within an FTZ could estimate the added value of the location. If, for example, the duty saved is \$50,000, a tenant occupying 36,000 square feet saves \$1.39 per square foot per year (a little less than 12 cents per square foot per month). Increased volume over time could further raise the location's value.

The FTZ also would provide Wilma with a sustainable competitive edge. Although other FTZs could be approved in the area, authorities would prefer the current one to be fully developed before approving others. And the application process for a new FTZ takes 12 months to two years. This gave Wilma adequate time to find sufficient tenants to test the quality of the idea.

Success of the Strategy

In late 1987, Wilma obtained an FTZ designation for approximately 13 acres of their total 457 acres at Central Green Business Park. After this designation, progress was slow. Eventually, Phase I—a 100,000 square-foot multi-tenant office-warehouse complex—was completed in January 1986 and totally leased. The complex was sold to an investor group in 1989.

Construction of Phase II, a second office-warehouse complex, was initiated in August 1990, the only project of this type constructed in the north Houston market during 1990. By year's end, 90 percent of this 104,000-square-foot facility was preleased at rates that supported the cost of the new construction. Phase II was completed in January 1991 and fully leased by January 1992.

As the business benefits of the FTZ became known, the increased interest by potential tenants caused Wilma to consider expanding their FTZ. An application to increase the FTZ from 13 acres to approximately 43 acres was submitted in November 1990. The request was granted in April 1991. A second increase, requested in June 1991 to expand the FTZ from 43 acres to 156 acres, was approved in December 1991.

Not all Phase I and II tenants were engaged in international commerce; about 43 percent of the Phase II tenants chose the project because it was located in the FTZ. Obviously, Central Green Business Park had a broad appeal. Among the tenants attracted to Wilma's Phase I and II developments in Central Green Business Park because of the FTZ were:

- two distributors of imported industrial valves;
- seven freight forwarding firms (assist other businesses in their export activities);
- three customhouse brokerage firms (assist other businesses in their import activities);
- several firms that crate exports for shipment;
- a specialist in handling dangerous goods; and
- an international parcel-package-letter express delivery service.

Wilma Southwest, Inc., recognized firms in the import-export business as a particular market segment. The increasing importance of foreign trade to the U.S. and Texas economies and the potential effects of the North American Free Trade Agreement on Texas-Mexican commerce suggest an increasing need for space in FTZs.

Because FTZs provide specific financial advantages to firms engaged in international commerce, there may be other development opportunities in the market. Knowledgeable real estate brokers may wish to discuss the advantages of FTZs with their clients when appropriate.

What Is the Lesson?

Real estate development can succeed in difficult markets. The key is to locate tenants who need something not currently available in the market and deliver that product to them. In addition, the developer must secure the strongest monopoly position possible by being the first to recognize an opportunity so that the competitive edge can be maintained.



Analyzing Housing Markets for the Elderly

April 1991

Wayne E. Etter
Steve H. Murdock

The U.S. population over 65 years old was estimated to be 30.9 million (12.5 percent of the total) in 1989. It is expected to grow to more than 59.7 million (20 percent of the total) by 2025. Most of the growth, however, is projected to occur after 2010. The elderly often are seen as a promising market for new housing, but **the identification of promising elderly housing markets is difficult.**

The elderly populations have a number of demographic, health and socioeconomic characteristics that must be considered to properly assess these markets. Some of the more important show the elderly population:

- will increase rapidly by 2025, with most growth occurring after 2010;
- comprises 40 to 50 percent of the elderly in the age groups over 75 in which health problems substantially limit independent living (this suggests that those 65-74, rather than older segments of the elderly, are the prime target group for independent forms of living);
- has a much higher proportion of women than the population as a whole, and these women are increasingly likely to live alone even at older ages;
- is much less likely to move than the nonelderly and generally wish to remain close to children who provide social and physical support;
- is a much higher proportion of the racial majority than of the minority population and will be slower to reflect the racial-ethnic changes occurring in the population as a whole;
- is likely to prefer housing options that allow independent living at moderate costs; and
- has limited resources or they are in homes that may be difficult to sell or which they may be hesitant to sell.

These factors suggest that those most likely to purchase elderly housing services will be among geographic populations with

growing concentrations in the youngest elderly age groups. These factors further suggest that such services may require the development of products intended to meet the needs of elderly women who are likely to live alone. Furthermore, the population using elderly housing and other real estate services is likely to be those elderly living near to the site where the services will be provided; the elderly are unlikely to migrate unless the destination is an area with unique natural beauty or other special features.

Because of the diverse characteristics of the elderly population and localized differences, **there is little doubt that detailed market research is essential prior to initiating a project intended for an elderly market.** To successfully market housing to the elderly requires the identification of a particular market segment with unmet demand within a particular market area that can be supplied profitably.

Elderly Housing Categories

Real estate market research is the analysis of supply and demand for a particular type of property within a particular market area. Housing especially designed for the elderly is typically separated into three categories. This means that a particular type of housing must be the focus of the analysis. A description of the three categories follows.

- **Independent Living Facilities** are characterized by communities for persons over a certain minimum age (about 50). These living facilities do not provide health care facilities, and residents are expected to care for themselves.
- **Congregate Care Facilities** include persons who cannot function independently; thus, they are usually older (typically 75 to 85) than those in independent living facilities. Although such facilities usually do not provide health care services, they do provide meals, maid service and various daily activities for the residents.
- **Assisted Living Facilities** provide assistance to residents in most areas of daily life, including personal (bathing and dressing) and medical care. Residents are usually older (85 years and older) than residents in the other two types of facilities.

Defining Market Area

Because the desire to remain within a community is an important consideration to the elderly, the market area for a particular project is small. Generally, therefore, only areas within the

immediate community or metropolitan area should be included as a part of a housing development's market.

Areas without significant numbers of elderly are poor choices for developing such housing unless the available amenities have an exceptional appeal.

Analyzing Supply by Product

An inventory of specially constructed housing for the elderly must be developed and should include certain information about each housing development within the defined market area. First, the market orientation of each development must be defined. Determine if existing developments provide independent living, congregate care or assisted living facilities. Next, collect information that differentiates projects within each of the three market orientations. For each development, determine the:

- product features,
- tenant amenities,
- availability of medical services,
- group activities and
- quality of management.

Finally, data that provide market information about each development is needed. This information includes:

- date sales or leasing began (or will begin),
- amount of space leased,
- amount of vacant space available for lease,
- amount of space per month leased during the past 12 months and
- current sales prices or rental rate and terms.

Although such data provide information about supply, they also are indicators of demand. When data are collected in sufficient detail, it may be possible to identify particular product types with high occupancy rates, those that have experienced large amounts of absorbed space in the past year or both. Although more research is required, these product types may represent areas of potential opportunity for the developer.

Analyzing Demand

Because of the demographic conclusions, a key question for the developer considering entering this market in a particular area is: "What is the *effective demand* for a particular type of housing especially designed for the elderly?" Effective demand is demand backed by the ability to purchase. Answering this question requires market research. Although a number of elderly might like to move to

specially designed housing (or even need to), how many of them can afford it?

Because of the importance of age and the type of housing selected, the elderly within a particular market area must be analyzed by age groups. For example, before building a particular number of independent living units, the developer's research must focus on potential space users 65 to 74 years old—the population group most likely to select such housing.

If the developer's project is to be successful, not only must there be a sufficient number of elderly within the proper age group, there also must be a sufficient number within the group with the income to afford the offered housing. Therefore, the demand must be estimated by income levels as well as by age.

Finally, there must be a sufficient number of the proper age who have sufficient income to afford the housing and who desire to move to a particular type of housing for the elderly. When the number of persons who both can afford and desire a particular type of housing currently unavailable within their market area is determined, the developer will know the extent of the unmet need within the market area. The number of elderly falling into this category may be much smaller than anticipated. Thus, this information is necessary to avoid making an incorrect decision and potential financial disaster.

Secondary Sources of Information

In most forms of marketing analysis, U.S. Census and other secondary data play a key role. Such data are likely to be particularly useful because of the 1990 Census. It is important to know the types and sources of available data.

A useful Census data source for isolating possible market areas for the development of housing for the elderly is the Public-Use Microdata Sampling Units (PUMS). This data series divides Texas into a number of sampling areas. For each area, substantial data are available. For example, assume a developer is interested in supplying high quality retirement housing to married couples 65 to 74 years old. Because these retirement units are high quality, the developer estimates annual household income must be \$40,000 or more.

The PUMS data illustrate how they can be used to assist in the analysis. Comparing the data for the two areas reveals the first area to have much more potential than the second. Area A has a large number of married householders in the relevant age group, a

large number of householders who rent (and are more likely to move than those who own) and a substantial number with household incomes of \$40,000 or more.

PUMS Data for Area A, 1980

	Age	
	65-69	70-74
Number of households	19,520	18,100
Number of married households	9,300	7,880
Number of rental housing	6,080	5,480
Number having income over \$40,000	1,900	1,300

Area B has less than 10 percent of the number of total households and married households in the relevant age groups. In addition, the number of households in rental housing and the number having incomes more than \$40,000 is small. Clearly, further analysis of Area A is warranted.

PUMS Data for Area B, 1980

	Age	
	65-69	70-74
Number of households	1,680	980
Number of married households	880	540
Number of rental housing	220	220
Number having income over \$40,000	120	0

Primary Data for Marketing Analyses

When a promising market area is identified, primary data are collected to estimate the proportion of the potential market that would actually move into the proposed development. Primary data obtained by personal interviews, telephone interviews, mail surveys and other means are used to make this estimate.

Although questionnaire and personal interview design are best left to those familiar with doing marketing research, the developer must review the questions to be asked to ensure that the market research will provide the desired information. If the developer is

intent on developing a particular type of housing for the elderly, then the market research must be addressed to an identified age group and household type—not the elderly population in general. On the other hand, a developer may be willing to supply any identified, unmet need. In this case, the market research is stratified by age group so that data about each age group are obtained, and the potential of various types of housing can be evaluated.

The developer needs information about the range of respondents' income to determine the development quality desired and that can be sustained in a specific market area. The questions also must establish the respondents' interest in leaving their present housing if housing with the desired features becomes available at an appropriate price.

With this information, the number of households that can be expected to move to the project within a reasonable time can be estimated. This is an estimate of the unmet need of a particular market segment in a specific market area. From this estimate, the project's definition will evolve in the following terms:

- orientation,
- size,
- quality and features and
- selling price and rental rates.

Project definition is a function of the number of elderly in the proper age group with the means to afford the housing and the desire to move to it. The project must appeal to the correct age group, have the number of units required by the market and have features the segment wants.

Despite expected growth of the elderly population, developers of housing for the elderly should proceed cautiously. The principal growth of the elderly population is expected after 2010. Moreover, the diverse characteristics of the present elderly population and their general desire to remain within a familiar community may limit the effective demand for a particular type of elderly housing product in the target market area. Although market research can assist in identifying promising market areas, it cannot eliminate the risk of developing housing for the elderly.

Financial Feasibility Analysis

6



Profitable Apartment Construction

January 1993

Wayne E. Etter

A previous section examined the importance of external obsolescence for real estate investors. When there is widespread external obsolescence in a market, current property owners are protected from the competition of new properties until market rents increase. This is a case analysis of the Bryan-College Station student housing market. It illustrates how current property owners are protected from the potential competition of new apartments in the market area.

Student Housing Market

At present, the Bryan-College Station student rental housing market occupancy rates are near 100 percent from September through May; summer occupancy rates and rental rates are rising. Students (and parents) often complain that rents are too high and that apartments are too hard to locate at the beginning of the fall semester. But several weeks after the fall semester begins, everyone seems to be settled.

For the past several years, Texas A&M University has implemented an enrollment management plan to limit the student

population on its main campus to 41,000. Previous efforts to control enrollment through raising admission standards did not affect total enrollment. At present, however, financial limitations related to the state's budget problems are likely to force Texas A&M to control enrollment. On the other hand, Texas A&M's enrollment is not likely to decline; more than 14,000 freshman applications were received for the fall 1992 semester, and only 6,100 were accepted. Thus, future demand for student housing appears steady.

Despite the expected level of student demand for housing, rising rental rates and the near-zero vacancy rate, little private sector housing has been added since 1984. Students wonder why additional rental units are not being constructed by the private sector.

The answer to private sector involvement requires an examination of the financial feasibility of constructing new apartments. The key to this analysis is the level of costs and rents, assuming that demand for the space exists. First, however, the role of the current low expectations of property appreciation and the current absence of any real estate tax shelter benefits in the lack of apartment development since 1984 is examined.

Appreciation and Tax Shelter Benefits

A decade ago, most real estate investors expected their properties to appreciate rapidly. Perhaps these expectations were unwarranted, but it was not unusual for investors to use estimated annual property appreciation rates of 12 percent or more. The 1981 Economic Recovery Act created a huge demand by investors for residential and commercial real estate because paper losses generated by rapid depreciation could be used to offset investors' other taxable income. Often the combination of expected appreciation and tax shelter benefits could offset the fact that a property's rent was insufficient to cover operating expenses and debt service. The investor still believed that a satisfactory return would be had when the property was sold after a five-to-seven-year holding period.

With the passage of the 1986 Tax Reform Act, tax shelter benefits were eliminated, and, therefore, the after-tax cash benefits of owning real estate were sharply reduced. The reduction in cash benefits from the tax law changes was accentuated by the onset of recession in Texas. A fall in the market value of many multifamily residential properties followed. Many properties went into default as investors considered it unwise to continue making mortgage payments on loans that exceeded the property's market value.

Purchasers of these defaulted properties bought them for less than their replacement cost and were able to obtain a positive cash flow from the property despite the low market rents then prevailing.

Construction Costs

Today, investors have only modest expectations of property appreciation and tax shelter benefits are not available. As a result, a multifamily property investor must anticipate that rents will cover all operating costs and debt service as well as provide a 10 to 11 percent current cash return on the equity invested. Under these circumstances, the following question arises: Are rental rates sufficient to justify new apartment construction? A large gap between the current and the required rental rate means it will be some time before new construction will occur.

If a proposed apartment complex can generate adequate rental income to cover operating expenses, support sufficient debt to finance the property and provide a satisfactory cash return to the owner, it is financially feasible to develop the property. The first step in making this determination is to estimate the property's cost.

Current market information suggests that two-bedroom, two-bathroom apartments and three-bedroom, two-bathroom apartments have the highest demand in the Bryan-College Station student housing market. Students have a high preference for these apartments because they can share the kitchen and living area while having their own bedroom, thereby reducing the per student cost while maximizing their privacy. Thus, for the purposes of this analysis, the cost of constructing a 925-square-foot two-bedroom, two-bathroom apartment and an 1,100-square-foot three-bedroom, two-bathroom apartment was estimated.

To estimate land costs, construction of 20 units per acre is assumed, although the maximum apartment density in the city of College Station is 24 units per acre. Apartment developers prefer to purchase land that costs no more than \$1.75 to \$2 per square foot or about \$75,000 to \$85,000 an acre. A price of \$80,000 per acre is used in the analysis; therefore, the unit land cost is \$4,000.

Because no apartment construction has occurred in the Bryan-College Station market area for several years, the base construction cost is taken from the Marshall Valuation Service and adjusted for time and the local economy. The cost of built-ins, parking lot, recreation facilities and landscaping is based on Marshall Valuation Service and local estimates. A 12 percent

entrepreneurial profit is considered reasonable. As reported in Table 1, the apartment units' respective estimated costs are \$48,051 and \$54,110.

Table 1. Estimated Apartment Construction Costs

	Two-bedroom two-bath	Three-bedroom two-bath
Construction cost (sq. ft.)	\$35.63	\$34.88
Unit size	925	1,100
Unit construction cost	\$32,958	\$38,368
Built-ins	1,200	1,200
Other unit costs		
Landscaping and pool	1,765	1,765
Parking	2,280	2,280
Office and laundry	700	700
Land	4,000	4,000
Entrepreneurial profit	5,148	5,797
Total estimated cost	\$48,051	\$54,110

Required Rental Rates

To estimate the rent required to support the construction of these apartments, the following operating and financing assumptions were used.

- Amount of financing: 80 percent of total cost
- Terms of financing: 10 percent, 30 years
- Required cash-on-cash return: 11 percent
- Vacancy and bad debt loss: 5 percent
- Operating expense ratio: 30 percent

The monthly unit rent and rent per square foot required to support the apartment construction are presented in Table 2. These required rental rates are higher than the spring 1992 average high rental rates reported by Branson Research Associates for Bryan-College Station student housing market.

The difference between the nine-month lease rate and the one-year lease rate is important. Although the market is moving in the direction of one-year leases, the average high rental rates for spring 1992 are an unknown mixture of lease arrangements. To compete for tenants, the owners of a new apartment complex will not be able to demand that tenants sign one-year leases, but charging the required nine-month rental rate would put them at a serious competitive disadvantage relative to owners of existing apartments.

Table 2. Estimated Rental Rate Required to Support Construction

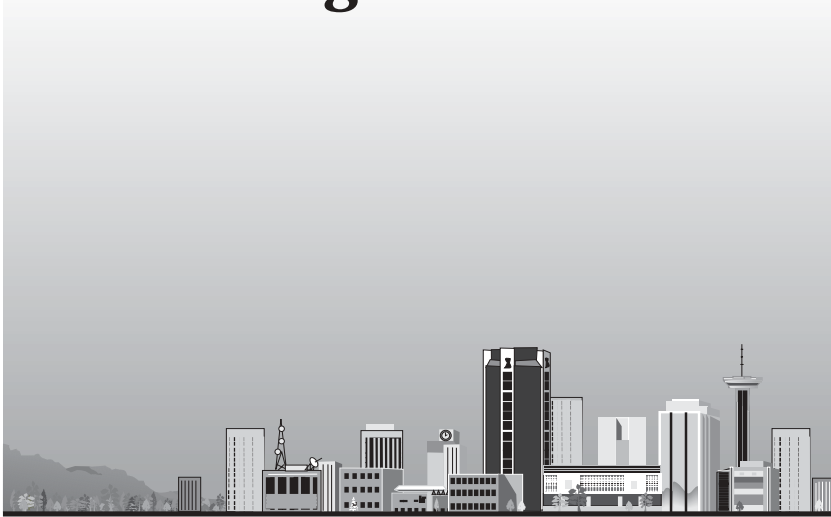
	Two-bedroom two-bath	Three-bedroom two-bath
Construction cost	\$48,051	\$54,110
Mortgage loan (80% of cost)	<u>38,441</u>	<u>43,288</u>
Equity investment	\$9,610	\$10,822
Required before-tax cash flow for 11% return on equity	1,057	1,190
Mortgage payment (10%, 30 years)	<u>4,078</u>	<u>4,592</u>
Required net operating income	\$5,135	\$5,782
Operating expenses	<u>2,370</u>	<u>2,669</u>
Required effective gross income	\$7,505	\$8,451
Vacancy and collection loss	<u>395</u>	<u>445</u>
Required gross possible income	\$7,900	\$8,896
Estimated required monthly rent per unit		
One-year lease	\$658	\$741
Nine-month lease	878	988
*Average high market rent (an unknown mixture of lease terms)		
Spring 1992	\$509	\$715

*Source: Branson Research Associates, Bryan, Texas

Thus, market rental rates must increase by a considerable amount to encourage new construction. And, the cost of new construction is likely to continue rising.

But such an increase is not likely in the short-run because market rents are established by supply and demand; an individual apartment owner cannot raise the rent for a typical apartment to the level required to support new construction. However, owners of properly maintained, well-located properties purchased for prices based on past or current market rents will be able to gradually increase their rental rates while maintaining their occupancy. Rental rates can be increased gradually because few alternatives exist in the local student housing market, and students will find it difficult to economize on their space needs, i.e., the demand for apartments is price inelastic.

On the other hand, an increase large enough to justify new construction is unlikely because current apartment owners do not need such rates for profitable operation. If demand remains steady, current property owners will be protected from the competition of new properties for several years.



Conducting a Multi-Year Analysis

January 1995

Wayne E. Etter

The expected rate of return from a real estate investment is determined by the expected benefits of the investment—cash flow and appreciation—and the cash required to purchase the property. Although there are a number of popular nondiscounted measures of the rate of return, a proper calculation uses present value techniques so that the rate will reflect the timing of the cash inflows and outflows.

Equally important, however, is the need for good data. Expected rate of return means nothing if the projected costs and benefits used in the calculation are incorrect.

Real estate is particularly affected by future events because of three important characteristics: physical immobility, long economic life and large economic size. In short, a property investment involves a relatively large dollar investment that cannot be moved and that must generate income for a long period. Thus, successful real estate investing involves decisions about the future level of rents, operating expenses, appreciation rates and tax laws. These, in turn, depend on the rate and direction of urban growth, price inflation, international events, political events and so forth.

As the information is gathered, the investor necessarily will be addressing questions about risk. Risk exists in all projects, but

some are more risky than others. The degree of risk depends on the difference between expected and actual outcomes. If the expected outcome is guaranteed, then the risk is negligible; if the expected outcome is uncertain, then the risk is large. For a single project, the best way to reduce risk is to improve the analysis of the variables that produce the project's expected rate of return. In this way, the spread between expected and actual outcomes can be minimized.

As the scope of the analysis is examined, one of its prime benefits becomes clear: in gathering the data required to make the analysis, much will be learned about the investment under consideration. Estimating the rate of return may be secondary to the knowledge gained from gathering the information. Nevertheless, the prospective investment must promise a satisfactory rate of return or be abandoned.

Most real estate investment decisions and market valuations are made using either net operating income or before-tax cash flow from operations and resale. For some individual real estate investment decisions, however, estimating after-tax cash flow from operations and resales is desirable. The calculations are illustrated in the appendix.

Analyzing income-producing real estate requires all expected cash flows to be specified. These flows can be categorized as those associated with the project's

- origination,
- operation and
- termination.

Project Origination

To estimate the cash investment required for an existing property, the amount of mortgage financing is netted against total purchase price. To estimate the cash investment required for a to-be-developed property, the amount of mortgage financing is netted against estimated total project cost.

Assume these basic facts of a project origination:

Cost of land	\$130,680
Cost of building	<u>612,080</u>
Total cost	\$742,760
Mortgage (12%, 25 years)	<u>-557,070</u>
Initial equity	\$185,690

Project Operation

Before-tax cash flow from operations for each year is estimated from the project's expected rent, vacancy rate, operating expenses and mortgage payment.

Estimating net operating income

With the cost estimated, additional market information is needed to prepare *pro forma* or projected operating statements. Specifically, estimates of rental rates, vacancy rates and operating expenses are needed for the property. These data can be obtained from the feasibility analysis if one is available.

Square feet of net leasable space	20,000
Rent per square foot per year (0.55 x 12)	<u>\$6.60</u>
Potential gross income	\$132,000
Miscellaneous income	0
Less vacancy and collection loss (5%)	<u>-6,600</u>
Effective gross income	\$125,400
Less operating expense	<u>-36,000</u>
Net operating income	\$89,400

Before-tax cash flow from operations

Before-tax cash flow from operations is estimated by subtracting the expected mortgage loan payment from net operating income (NOI). For example:

Net operating income	\$89,400
Mortgage payment	<u>-71,026</u>
Before-tax cash flow	\$18,374

Calculating the amount of the mortgage loan payment requires the loan amount and the mortgage constant. For the example property, the annual payment is calculated as follows:

$$\begin{aligned} \text{Loan amount} \times \text{mortgage constant} &= \text{annual payment} \\ \$557,070 \times .1275 &= \$71,026 \end{aligned}$$

Preparing multi-year projections

In addition, the following data will be needed to complete the specification of before-tax cash flow from operations for the holding period:

- estimated holding period,

- estimated rental growth rate,
- estimated operating expense growth rate,
- estimated vacancy rates and
- annual mortgage payment for remaining years of estimated holding period.

Using an estimated holding period of five years, an estimated rental growth rate and operating expense growth rate of 3 percent, NOI and before-tax cash flow from operations can be estimated for the example property. These estimates are presented in Table 1.

Table 1. Before-Tax Cash Flow to Equity from Operations

	Year 1	Year 2	Year 3	Year 4	Year 5
Gross possible income	\$132,000	\$135,960	\$140,039	\$144,240	\$148,567
Less vacancy and collection loss	-6,600	-6,798	-7,002	-7,212	-7,428
Effective gross income	\$125,400	\$129,162	\$133,037	\$137,028	\$141,139
Less operating expense	-36,000	-37,080	-38,192	-39,338	-40,518
Net operating income	\$89,400	\$92,082	\$94,844	\$97,690	\$100,620
Less mortgage payment	-71,026	-71,026	-71,026	-71,026	-71,026
Before-tax cash flow from operations	\$18,374	\$21,056	\$23,818	\$26,663	\$29,594

Project Termination

The net resale price and the before-tax cash flow from the resale are estimated from the expected resale price, expected selling expenses and the unpaid mortgage balance.

Estimating the expected resale price

The project's expected resale price is of particular concern because significant appreciation is often required to produce a satisfactory rate of return. By carefully examining the project's current value and its expected resale price, the investor can estimate the appreciation potential of the property and the contribution of this component to the project's rate of return.

Evaluating the property's current value. There is a relationship between a property's NOI and its value. When the following calculation is made using the subject property's data, the result is known as the *overall capitalization rate*.

$$\frac{\text{NOI}}{\text{Value}}$$

Using the property's total cost or purchase price and its estimated NOI for the first "normal" year—the year in which expected occupancy will be obtained—the overall capitalization rate can be calculated. By comparing the **property's overall capitalization rate** with the **market capitalization rate for similar properties**, the reasonableness of the price that the investor is paying for the property can be evaluated. For instance, if the property under consideration is offered for sale at an overall capitalization rate of 8.5 percent but similar properties are selling for 10 percent market capitalization rates, the investor should seek the reason(s) for the price difference. If the original purchase price is too great, the investor must expect a smaller increase in the project's value because a future buyer cannot be expected to pay too much for the property.

Estimating the expected resale price. The expected resale price at the end of the holding period is estimated by using the expected market capitalization rate to capitalize the **NOI projected for the year following the sale**. The NOI for the year following the sale is used because the buyer at the end of year five will purchase the property's future NOI rather than its past NOI. For example, to estimate the resale price at the end of a five-year holding period:

$$\text{Expected resale price} = \frac{\text{NOI (year 6)}}{\text{Market capitalization rate}}$$

$$\$1,036,391 = \frac{\$103,639}{.10}$$

The expected resale price should appear reasonable when compared to expected changes in the NOI and the market. For example, if no rent increase is projected, this approach will make it difficult to justify an increase in the property's value over time. Of course, annually increasing rents are a common assumption. Furthermore, a property that has operated successfully for several years may be considered less risky than a newer property. In this case, a lower capitalization rate may be used to estimate the resale price than was used in evaluating the purchase price.

A second approach to evaluating the expected resale price is to calculate the annual compound rate of growth necessary for the property to appreciate to the expected resale price. Does this rate of growth seem reasonable when compared to recent growth rates of similar properties in the area? And, is it reasonable to assume that

this rate of appreciation will continue in the market? Local real estate brokers are a good source for obtaining this information.

Net resale price and before-tax cash flow from resale

With the expected resale price estimated, expected selling expenses are deducted to arrive at the net resale price. When the unpaid mortgage balance is deducted from the net resale price, the result is called before-tax cash flow from resale. For example:

Expected resale price	\$1,036,391
Less selling expenses	-41,456
Net resale price	\$ 994,935
Less unpaid mortgage balance	-530,528
Before-tax cash flow from resale	\$ 464,408

The procedure for calculating the unpaid mortgage balance is presented in “Calculating Mortgage Loans.”

Summary

The final result of the preceding calculations is the summary of all before-tax cash flows to equity—both from operations and the expected proceeds from the resale of the property. A summary of these projected cash flows for the example property is presented in Table 2.

Table 2. Before-Tax Cash Flow to Equity

	Year 1	Year 2	Year 3	Year 4	Year 5
Before-tax cash flow from operations	\$18,374	\$21,056	\$23,818	\$26,663	\$ 29,594
Before-tax cash flow from resale	_____	_____	_____	_____	<u>464,408</u>
Before-tax cash flow to equity	\$18,374	\$21,056	\$23,818	\$26,663	\$494,002

Appendix

After-tax cash flow from operations

After-tax cash flow from operations is estimated by subtracting estimated income tax liability from before-tax cash flow from operations. The project’s taxable income must be estimated first. Taxable income is calculated as:

Potential gross income	\$132,000
Miscellaneous income	0
Less allowance for vacancy and collection loss (5%)	<u>-6,600</u>
Effective gross income	\$125,400
Less operating expenses	<u>-36,000</u>
Net operating income	\$ 89,400
Less: Depreciation	-21,331
Interest	-66,848
Amortized financing costs	<u>-0</u>
Taxable income	\$ 1,221

Thus, it is necessary to calculate the annual depreciation and the annual amortized financing costs and to separate the mortgage payment into its principal and interest components.

Depreciation. The modified accelerated cost recovery system (MACRS) is used to depreciate income-producing real estate placed in service after 1986. This depreciation system is not related to the property's physical depreciation or useful life. Furthermore, current law permits the depreciation of income-producing real estate even when it appreciates.

Current tax law requires income-producing real estate to be depreciated according to the tables shown in Table 3. Note that Table 3.A is to be used for the depreciation of residential property; Table 3.B is for the depreciation of nonresidential property. Assuming a residential property is placed in service in January, the first year's depreciation is calculated as follows:

$$\begin{array}{rcl} \text{Depreciable value} & \times & \text{recovery percentage} & = & \text{depreciation} \\ \$612,080 & \times & .03485 & = & \$21,331 \end{array}$$

Interest. For the example property, the first year's interest payment is calculated:

$$\begin{array}{rcl} \text{Loan amount} & \times & \text{interest rate} & = & \text{interest payment} \\ \$557,070 & \times & .12 & = & \$66,848 \end{array}$$

Permanent Financing Costs. Permanent financing costs are amortized for the term of the mortgage loan using the straight-line method. Had the mortgage lender charged a 2 percent fee for the example loan, an additional cost of \$11,141 would be incurred. Amortizing this amount for the 25-year life of the mortgage results in an annual amortization of \$445.

Table 3. Depreciation Rates

Table 3.A

Residential Rental Property (27.5-year)

Year	Use the column for the month of taxable year placed in service											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3.485%	3.182%	2.879%	2.576%	2.273%	1.970%	1.667%	1.364%	1.061%	0.758%	0.455%	0.152%
2-9	3.636%	3.636%	3.636%	3.636%	3.636%	3.636%	3.636%	3.636%	3.636%	3.636%	3.636%	3.636%

Table 3.B

Nonresidential Real Property (39-year)

Year	Use the column for the month of taxable year placed in service											
	1	2	3	4	5	6	7	8	9	10	11	12
1	2.461%	2.247%	2.033%	1.819%	1.605%	1.391%	1.177%	0.963%	0.749%	0.535%	0.321%	0.107%
2-39	2.564%	2.564%	2.564%	2.564%	2.564%	2.564%	2.564%	2.564%	2.564%	2.564%	2.564%	2.564%

Note: Depreciation rates may change as new tax laws go into effect. These tables are current as of January 1995. Future users may wish to contact the IRS or a tax consultant to verify depreciation rates in effect at that time.

A complete residential rental property depreciation table may be found in *Depreciation*, Department of the Treasury, Internal Revenue Service, Publication 534 (Rev. Dec. 1987), pp. 30-31.

Source: *1994 Instructions for Form 4562*, Department of the Treasury, Internal Revenue Service, p. 7.

Income Tax Liability. The estimated income tax payment is calculated by applying the appropriate income tax rate to the estimated taxable income. For the purposes of illustration, the marginal tax rate of 28 percent is assumed. Thus:

Net operating income	\$89,400
Less: Depreciation	-21,331
Interest	-66,848
Amortized financing costs	<u>-0</u>
Taxable income	\$ 1,221
Tax rate	<u>.28</u>
Income tax	\$ 342

If taxable income is negative, the loss is carried forward. Losses carried forward accumulate until they are offset by positive taxable income or the property is sold.¹ For example:

<u>Year</u>	<u>Taxable income</u>	<u>Loss carried forward</u>	<u>Net carried forward</u>	<u>Net taxable income</u>	<u>Tax due</u>
1	\$ (43,920)	\$43,920	\$43,920	\$ 0	\$ 0
2	(22,685)	22,685	66,605	0	0
3	4,678	0	61,926	0	0
4	34,348	0	27,578	0	0
5	66,519	0	0	38,940	10,903

It is possible that no income tax will be paid while the property is held; the accumulated losses are used to offset the capital gain when the property is sold.

There are two exceptions to the foregoing for **some** investors. First, rental real estate annual operating losses of as much as \$25,000 can be used to offset active trade or business income and portfolio income for investors with adjusted gross incomes of as much as \$100,000. The offset is reduced 50 cents for each \$1 more than \$100,000 of adjusted gross income; thus, for investors with adjusted gross incomes of \$150,000 or more, there is no allowable offset. Investors who use this exception must be actively engaged in the management of the rental real estate; they may not be limited partners and must own at least a 10 percent interest in the rental real estate.

Second, investors may deduct unlimited real estate losses if (a) more than half of all personal services they perform during the year are for real property trades or (real estate related) businesses in which they materially participate and (b) they perform more than 750 hours of service per year in those real estate activities. Material

participation requirements are met if the investor is involved in real estate operations on a regular, continuous and substantial basis. This provision may be especially useful for real estate professionals.²

After-tax cash flow from operations. The final step required to estimate after-tax cash flow from operations is to subtract the estimated income tax payment from estimated before-tax cash flow from operations. Thus:

Before-tax cash flow from operations	\$18,374
Less income tax liability	<u>-342</u>
After-tax cash flow from operations	\$18,032

Using the data from Table 1, after-tax cash flow from operations can be estimated for the example property. These estimates are presented in Table 4.

Table 4. After-Tax Cash Flow to Equity from Operations

	Year 1	Year 2	Year 3	Year 4	Year 5
Net operating income	\$89,400	\$92,082	\$94,844	\$97,690	\$100,620
Depreciation	21,331	22,255	22,255	22,255	22,255
Interest	<u>66,848</u>	<u>66,347</u>	<u>65,786</u>	<u>65,157</u>	<u>64,452</u>
Taxable Income	\$ 1,221	\$ 3,480	\$ 6,804	\$10,278	\$ 13,913
Before-tax cash flow					
from operations	\$18,374	\$21,056	\$23,818	\$26,663	\$ 29,594
Income tax liability	<u>342</u>	<u>974</u>	<u>1,905</u>	<u>2,878</u>	<u>3,896</u>
After-tax cash flow					
from operations	\$18,032	\$20,081	\$21,913	\$23,786	\$ 25,698

After-tax cash flow from resale. The after-tax cash flow from resale is determined by subtracting any capital gains tax from the before-tax cash flow from resale. Thus:

Expected resale price	\$1,036,391
Less selling expenses	<u>-41,456</u>
Net resale price	\$ 994,935
Less unpaid mortgage balance	<u>-530,528</u>
Before-tax cash flow from resale	\$ 464,408
Less capital gains tax	<u>-101,508</u>
After-tax cash flow from resale	\$ 362,900

Determining the capital gain tax. The capital gain tax is calculated as follows:

Step 1	
Cost of land	\$130,680
Cost of improvements	612,080
Total cost	<u>\$742,760</u>
Less accumulated depreciation	-110,352
Adjusted basis	<u>\$632,408</u>

Step 2	
Resale price	\$1,036,391
Less selling expense	<u>-41,456</u>
Net resale price	\$ 994,935
Less adjusted basis	<u>-632,408</u>
Capital gain	<u>\$ 362,527</u>

Step 3	
Capital gain	\$ 362,527
Less accumulated loss carry forward	<u>-0</u>
Net taxable gain	\$ 362,527
Tax rate	<u>x .28</u>
Capital gain tax	<u>\$ 101,508</u>

For the purposes of illustration, the maximum capital gain tax rate of 28 percent is assumed.

Summary

The final result of the preceding calculations is the summary of all after-tax cash flows to equity—both from operations and the expected proceeds from the resale of the property. A summary of these estimated cash flows for the example property is presented in Table 5.

Table 5. After-Tax Cash Flow to Equity

	Year 1	Year 2	Year 3	Year 4	Year 5
After-tax cash flow from operations	\$18,032	\$20,081	\$21,913	\$23,786	\$ 25,698
After-tax cash flow from resale					362,900
After-tax cash flow to equity	<u>\$18,032</u>	<u>\$20,081</u>	<u>\$21,913</u>	<u>\$23,786</u>	<u>\$388,598</u>

Notes

¹Income is segregated into active trade or business income, passive investment income and portfolio income. All real estate income from operations or gains is classified as passive investment income. If the property produces an operating tax loss after the deduction of interest and depreciation, the loss can be used only to offset positive income from other passive investments. If the real estate investor has no other passive investments that produce positive income, the loss can be carried forward and used to offset positive passive income in the future, or it can be written off when the property is sold. Thus, the project may not produce any taxable income for a number of years but neither will it produce tax shelter. **Unless an investor has properties that are producing taxable income, investing in a property that produces losses will have little attraction. Prior to the 1986 Tax Reform Act, the opposite was true.**

²Jerrold J. Stern, "Passive Loss Rules Eased for Real Estate Professionals," *Tierra Grande* (Spring 1994), pp. 17-18.

Evaluating the Data

8



How Present Value Works

January 1990

Wayne E. Etter

Present value analysis is one of the fundamental tools of financial analysis. Although making a proper and thorough financial analysis involves present value analysis, it is not the most important step in financial analysis.

Present value is simply a way of dealing with expected cash outlays and benefits to be paid out and received over time. **When the analyst is satisfied with the quality of the financial data**, present value analysis is used to calculate a proposed investment's expected net present value or internal rate of return so that each project under consideration can be measured against the investor's required return. Present value analysis also is used by real estate appraisers.

Today, many people are proficient at using financial calculators and personal computer software programs for making present value calculations. However, many people also have difficulty with present value calculations when they confront a problem not covered by the examples in the calculator manual—knowing a series of keystrokes or how to input data does not demonstrate a knowledge of present value.

Present value analysis is based on the idea that more is better than less and that sooner is better than later; both the magnitude and the timing of the cash flows are considered. Having more benefits from the investment sooner means that they can be reinvested sooner; given that the reinvestment takes place at a positive rate of interest, present value analysis allows a present sum of money to be compared with a larger sum to be received in the future.

Present value analysis helps to decide if the future benefits are sufficient, given their cost. Although present value analysis is a fundamental tool of all investment decision making, it is particularly important in real estate investment analysis because income-producing properties usually have rather long recovery periods.

Real estate investments, like all other investments, involve the expenditure of funds to obtain the right to receive a set of uncertain, future cash flows. Thus, there are three essential elements to the investment: a cash outlay, expected cash flows (or benefits), and an interval between the time of making the investment and receiving its benefits.

Because present value analysis is an important communication system, the following conventions are used when analyzing income-producing properties. First, it is usually assumed that cash outlays are made at the beginning of the period of analysis, sometimes called *time zero*. Second, it is usually assumed that positive or negative cash flows occur at the end of the period. Third, the period is usually one year.

Problems involving leases, compound interest or compound growth rates may be calculated for periods other than a year. When lease agreements are being analyzed, the payments may be paid at the beginning of the period, and the length of the period must be specified (month, quarter, year). Compound interest and compound growth rate problems require the specification of the time of payment and the length of the period.

Present value analysis is based on the concept of compound interest—how much must be invested today at a given rate to accumulate to \$1 over a specified number of years (or other period)? Thus, the amount that must be invested now is dependent on the rate of compound interest and the length of time the investment is left to accumulate. The compound sum of \$1 table, for example, includes the following information:

Number of years (periods)	10%
1	1.100
2	1.210
3	1.331

These entries are calculated with the formula $(1 + i)^n$ with i being the interest rate and n being the number of years (periods). For example, $(1 + 0.10)^3 = 1.331$. The entry “1.331” shows that if \$1 is invested now and left to compound at the rate of 10 percent for three years, the investment’s accumulated value will be \$1.331:

\$1.00	Initial investment
+ .10	Interest for year 1
<u>\$1.10</u>	Balance at the end of year 1
+ .11	Interest for year 2
<u>\$1.21</u>	Balance at the end of year 2
+ .121	Interest for year 3
<u>\$1.331</u>	Final value

How does a present value table differ from a compound interest table? The present value of \$1 table, for example, includes the following information:

Number of years (periods)	10%
1	0.909
2	0.826
3	0.751

These entries are calculated with the formula $1 / (1 + i)^n$ with i being the interest rate and n being the number of years (periods). For example, $1 / (1 + 0.10)^3 = 0.751$. The entry “0.751” says that if 75.1 cents are invested now and left to compound at the rate of 10 percent for three years, the investment’s terminal value will be \$1:

\$0.7510	Initial investment
+ .0751	Interest for year 1
<u>\$0.8261</u>	Balance at the end of year 1
+ .08261	Interest for year 2
<u>\$0.90871</u>	Balance at the end of year 2
+ .090871	Interest for year 3
<u>\$0.999571</u>	(= \$1) Final value

Thus, the difference between the compound interest table and the present value table is that the compound interest table is used to calculate the amount \$1 will become if invested for a certain number of periods at a particular interest rate. The present value table is used to calculate the number of cents that must be invested for a certain number of periods at a particular interest rate to become \$1.

Compound interest tables and present value tables are available widely. They are found in many real estate textbooks and are published in special books of financial tables.

Suppose an investor wishes to value a series of annual cash benefits. Present value analysis is applied to this problem by multiplying the expected benefits by the proper present value factor. If the expected cash benefits are \$1,000 at the end of years 1, 2 and 3, and the required return is 10 percent, the problem is solved as follows.

Year	Annual Cash Benefit		10% Present Value Factor	=	Present Value
1	\$1,000	x	.909	=	\$909
2	1,000	x	.826	=	826
3	1,000	x	.751	=	751
Present value of benefits					\$2,486

The calculated present value of the three annual cash benefits is \$2,486. What does this mean? It means that if the investor is satisfied that a 10 percent return is appropriate for this investment, then a maximum price of \$2,486 can be paid for the right to these future cash flows. The present value of each year's cash benefit, if left to compound at 10 percent for the respective number of years, will have a terminal value of \$1,000 as previously demonstrated.

If the investor believes that a 15 percent return is more appropriate, the maximum price that can be paid for the benefits is \$2,284:

Year	Annual Cash Benefit		15% Present Value Factor	=	Present Value
1	\$1,000	x	.870	=	\$870
2	1,000	x	.756	=	756
3	1,000	x	.658	=	658
Present value of benefits					\$2,284

Why does the lower rate generate a higher present value? This result is logical if the annual \$1,000 payments are considered the fixed benefits of the investment. Less will be paid for the benefits if they are to provide a 15 percent return on investment instead of a 10 percent return. Thus, for investments with a fixed income stream, their rate of return and value vary inversely. As required return rises, investment value declines.

Although some believe that inflation is the reason that future dollars are brought to their present value, present value analysis has nothing directly to do with inflation. Future dollars are worth less because they are not available now; if they were, they could be reinvested. Future dollars also may be worth less because of their expected lower buying power but, in that case, a higher reinvestment rate will equalize the expected rate of inflation. This process is identical to that of investors demanding higher interest rates during periods when higher rates of inflation are expected.

An annuity is a finite stream of equal periodic cash benefits. When calculating the present value or the rate of return of an annuity, the present value of \$1 received annually for N years table may be used to reduce the computations required. For example, the present value of a three-year annual annuity of \$1,000 per year is calculated as follows:

$$\begin{array}{r} \$1,000 \text{ annual payment} \\ \times 2.283 \text{ factor for three years, 15 percent} \\ \hline \$2,283 \text{ present value of the annuity} \end{array}$$

Such benefit streams are encountered in real estate analysis when lease payments, mortgages and other financial instruments are being analyzed, but they are encountered rarely otherwise.

The analysis of income-producing properties usually involves cash flows that vary from year to year and may be negative in some years. These cash flow patterns can be handled as easily as equal annual payments using present value analysis.

Year	Annual Cash Benefit		10% Present Value Factor	=	Present Value
1	\$2,400	x	.909	=	\$2,182
2	2,000	x	.826	=	1,652
3	-1,000	x	.751	=	-751
4	400	x	.683	=	273
5	-1,000	x	.621	=	<u>-621</u>
					Present value of benefits \$2,735

In an earlier example, the present value of receiving \$1,000 annually for three years was determined to be \$2,486 at a 10 percent discount rate. What is the effect of speeding up the rate of the cash benefits while holding the total constant? For example, what is the present value of the stream if \$2,000 is received the first year and \$500 in years two and three?

Year	Annual Cash Benefit		10% Present Value Factor		Present Value
0	\$2,000	x	.909	=	\$1,818
1	500	x	.826	=	413
2	500	x	.751	=	375
Present value of benefits					\$2,606

The result is an increase in the present value of the income stream; the stream is more valuable because the extra \$1,000 is received sooner and can be invested for two years. This will more than offset the effect of the smaller cash benefits in years two and three.

Just as present value results in an investment having a higher value if cash flows are received sooner, present value results in higher values when cash outlays are delayed. Thus, investment analysis must take the timing of cash outlays into account. For instance, a total cash outlay of \$1 million, when spread over three years, has the following present value:

Year	Annual Cash Benefit		10% Present Value Factor		Present Value
0	\$200,000	x	1.000	=	\$200,000
1	400,000	x	.909	=	363,600
2	400,000	x	.826	=	330,400
Present value of benefits					\$894,000

With a basic understanding of how present value works, the technique can be applied to investment decision making. Using present value to calculate an investment's internal rate of return and net present value will be considered next.



Using Present Value Analysis

April 1990

Wayne E. Etter

The basic idea of present value reveals the attributes that cause present value analysis to be used for analyzing investments.

- All cash flows during the life of the investment are considered. This includes the investment outlay, both positive and negative operating cash flows and appreciation.
- The timing of all cash flows is considered. Present value analysis makes those projects with delayed investment outlays or those producing cash flows sooner more attractive than those projects with immediate investment outlays or those producing delayed cash flows.
- Present value analysis considers an investor's desire to reinvest the cash benefits derived from the investment.

Present value analysis is used to determine a project's acceptance or rejection by calculating a proposed investment's net present value and internal rate of return. This discussion focuses on the investor's required rate of return and these two present value techniques.

An investor uses different required rates of return for different investments because the risk of all investments is not the same; normally, as the level of risk increases, the required rate of return is increased. Although risk considerations are beyond the scope of this article, it is necessary to understand only that an investor establishes a required rate of return for all investments being considered. The level of risk inherent in each investment is reflected in the required rate of return.

Net Present Value. Using the investor's required return to calculate the present value of the future benefits and subtracting the investment's cost from the present value of the future benefits gives the investment's net present value. For example, an investor with a required rate of return of 15 percent is considering an investment that costs \$2,284 and promises \$1,000 annual cash benefits for three years. What is the net present value?

Year	Annual Cash Benefit		15% Present Value Factor		Present Value
1	\$1,000	x	.870	=	\$ 870
2	1,000	x	.756	=	756
3	1,000	x	.658	=	658
			Present value of benefits		\$2,284
			Cash outlay		<u>2,284</u>
			Net present value		\$ 0

If the net present value is zero (the present value of the future benefits is equal to their cost), the investment's return will be equal to the investor's required rate of return. A better understanding of how a net present value of zero provides the required rate of return can be had by considering the following example:

Year	Cash Flow	15% Return	Investment Recovery	Outstanding Investment
0	-\$2,284			\$2,284.00
1	1,000	\$342.60	\$657.40	1,626.60
2	1,000	243.99	756.01	870.59
3	1,000	130.59	869.41	\$ 1.18

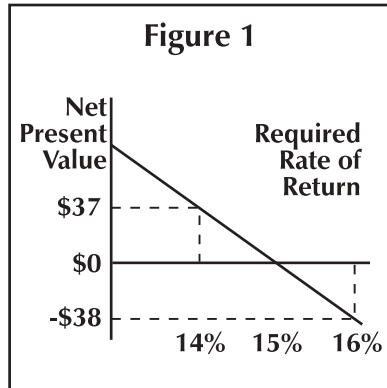
As shown, the first year's cash flow of \$1,000 provides the investor with a 15 percent return on the \$2,284 invested for the first year and reduces the amount of unrecovered investment by \$657.40. By the end of the third year, the amount invested has been recovered—the small remainder results from rounding—and the investor has earned 15 percent each year on the amount of the unrecovered investment. Thus, the rate of return accounts for both the return on and the return of the investment.

The present value of an income stream discounted at the required rate of return is the price that must be paid for the future benefits if the required rate of return is to be earned. When the present value of the benefits exceed their cost, the net present value is positive, and the investor receives a return in excess of the required return. If the net present value is negative, the investment's return will be less than the investors required return. For any given set of cash benefits and cash outlay, an increase in the required rate

of return decreases the investment's net present value. If the required return becomes too great, the net present value becomes negative.

When two or more projects are being compared, they can be ranked according to their net present value. All other things being equal, the project with the largest net present value will be selected because it will maximize the investor's wealth.

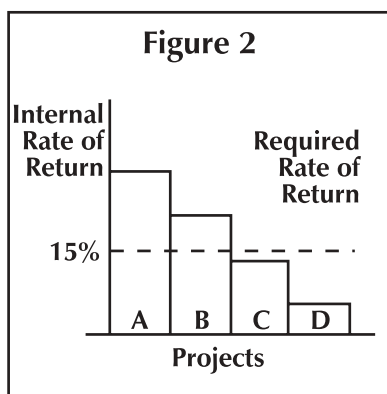
Internal Rate of Return. An investment's expected rate of return can be compared directly with the investor's required return. In the discussion of net present value, it was observed that there is a particular rate of discount that will make the net present value equal to zero. This rate is known as the *internal rate of return*. To find this rate, trial discount rates are chosen until the rate that results in a net present value of zero is found. As Figure 1 shows, a positive net present value of \$37 is obtained with a discount rate of 14 percent. Because a net present value of zero is desired, a higher rate, say 16 percent, is tried. This rate yields a negative \$38 net present value. Finally, a discount rate of 15 percent is used and a net present value of zero results.



Financial calculators and electronic spreadsheet programs make this calculation in a similar fashion—electronic spreadsheet programs, for instance, require a “guess” rate to begin the calculation of the internal rate of return.

As with the net present value method, the internal rate of return is used to compare alternatives. When two or more projects are being compared, the projects can be ranked according to their internal rate of return; each also is compared with the investor's required rate of return. This comparison is shown in Figure 2.

Projects A and B have internal rates of return in excess of the investor's required rate of return and are acceptable; projects C and D have internal rates of return less than the investor's required rate of return and are not acceptable. If only one project can be funded, the project with the largest internal rate of return ordinarily will be selected because choosing it will maximize the investor's wealth (assuming that all alternatives are equal in risk).



To use present value analysis, one must have a clear understanding of net present value and the internal rate of return methods. Many investors calculate both the net present value and the internal rate of return for each investment. Others prefer to use only the internal rate of return because they understand the general concept of rate of return. Therefore, they rely on it to determine if an investment's return is adequate relative to the required rate of return and for ranking alternative investments.

Is the use of the internal rate of return instead of net present value in real estate investment analysis a problem? Ordinarily, this is not a problem because both usually result in the same ranking of alternative investments. However, this question arises because it is **possible** for an investor choosing between two mutually exclusive alternatives (choosing between financing proposals, for example) to discover that one alternative generates the largest net present value and the other generates the largest internal rate of return. Although the circumstances that result in such conflicts are not common in the analysis of income properties, exploring this question provides additional insight into these two approaches to measuring an investment's expected return.

Although investors have many goals, their ultimate investment goal is assumed to be wealth maximization. Using this as a guide, the example of an investment costing \$2,284 and providing \$1,000 annual cash benefits for three years will be re-examined. It was shown that this investment provides the investor with a 15 percent internal rate of return.

Year	Annual Cash Benefit	15% Present Value Factor			Present Value
1	\$1,000	x	.870	=	\$ 870
2	1,000	x	.756	=	756
3	1,000	x	.658	=	<u>658</u>
Present value of benefits					\$2,284
Cash outlay					<u>2,284</u>
Net present value					\$ 0
Internal rate of return					15%

However, if \$2,284 is invested in an alternative investment at a 15 percent compound rate for three years, it will become \$3,474. Why would an investor not prefer this investment to one that produces three annual cash flows of \$1,000? Because a basic assumption of present value analysis is that cash flows are reinvested. If each of the \$1,000 cash flows is reinvested at 15 percent when it is received, the future value of these cash flows is \$3,474:

Year	Accumulation from Previous Year	Cash Flow Reinvested at End of Year	Interest at 15%	Total
1	\$ 0	\$1,000		\$1,000
2	1,000	1,000	\$150	2,150
3	2,150	1,000	324	3,474

Thus, because of the reinvestment of the cash flows at 15 percent, both investments will accumulate to the same future value. If the reinvestment of the annual \$1,000 cash flows is not possible or if reinvestment will take place at a rate less than 15 percent, the alternative investment providing \$3,474 in three years would be preferred. Accordingly, it can be seen that when an internal rate of

return is being calculated, it is assumed that the cash flows will be reinvested at the internal rate of return. But when a large internal rate of return is calculated, it may not be possible to find other investments with equally large expected returns in which to reinvest the cash flows.

On the other hand, in the calculation of the net present value, the required rate of return is the reinvestment rate. The required rate of return should reflect realizable returns in the market for a given level of risk; furthermore, it is assumed that an investor will not invest at a rate less than the required rate of return; if this happens, the required rate of return has been improperly established.

The net present value method is used to choose between alternatives when there is a ranking conflict between the net present value and the internal rate of return. Why? **With the net present value method, reinvestment of the cash flows takes place at the investor's required rate of return, but with the internal rate of return method, reinvestment of the cash flows must take place at the internal rate of return.** The internal rate of return can vary from project to project; this, in turn, results in a varying reinvestment rate assumption from project to project. However, the reinvestment rate assumption is constant from project to project when the net present value method is used. Furthermore, when the cash flows are reinvested at the required rate of return, the project with the largest net present value will maximize the investor's wealth.

Calculating the net present value also is superior to calculating the internal rate of return if the annual cash flows change from positive to negative to positive during the holding period. Under these circumstances, calculating the internal rate of return can result in multiple internal rates of return. No such possibility exists when calculating net present value.

Once the proper interpretation of the net present value method is firmly grasped, another advantage appears—it is easier to calculate than the internal rate of return. Only a present value table and a simple calculator are required whereas a financial calculator or a computer is necessary to quickly calculate the internal rate of return for a real estate investment having uneven cash flows over a long holding period.



Calculating Mortgage Loans

April 1992

Wayne E. Etter

Mortgage loan calculations are based on present value concepts. Although they usually are made with a calculator or a computer, learning how present value basics can be used to calculate the payment provides the understanding needed to solve practical mortgage calculation problems.

Present Value Basics

A borrower obtains a \$100,000, 10 percent, 25-year loan. Repayment of this loan requires 25 annual payments of \$11,017. Because the annual payments are equal, they are an annuity, and its present value can be calculated. Using a discount rate of 10 percent (and ignoring rounding error), the present value of the annuity is equal to the amount of the loan.

$$\begin{aligned} \text{Annual payment} \times \text{Annuity factor} &= \text{Present value} \\ (10\%, 25 \text{ years}) \quad \text{of payments} & \\ \$11,017 \times 9.077 &= \$100,000 \end{aligned}$$

The annuity factor can be calculated by solving for the present value of a \$1-per-year payment, discounted at 10 percent for 25 years or obtained from a present value table.

These terms can be rearranged to calculate the loan payment:

$$\begin{aligned} \text{Loan amount} \times \frac{1}{\text{Annuity factor}} &= \text{Annual payment} \\ \$100,000 \times \frac{1}{9.077} &= \$11,017 \end{aligned}$$

Usually, however, the appropriate mortgage constant is used to calculate the payment. Mortgage constant tables are found in many real estate textbooks and are published in special books of financial tables. The mortgage constant can be calculated by solving for the payment of a \$1 loan using the appropriate interest rate and repayment term.

$$\begin{aligned} \text{Loan amount} \times \text{Mortgage constant} &= \text{Annual payment} \\ &\text{(10\%, 25 years)} \\ \$100,000 \times .11017 &= \$11,017 \end{aligned}$$

Examination of these two methods indicates that the annuity factor and the mortgage constant are reciprocals:

$$\frac{1}{\text{Annuity factor}} = \text{Mortgage constant}$$

When monthly mortgage payments are required, monthly mortgage constants rather than annual mortgage constants are used. Although most mortgage loans are repaid monthly, annual mortgage loan payments normally are used for illustration.

If the borrower actually receives \$100,000 from the lender and then pays the \$11,017 annually to the lender, the lender earns and the borrower pays a true rate of 10 percent on the loan. In fact, 10 percent is the *internal rate of return* because 10 percent is the rate of discount that makes the present value of the loan payments equal to the loan amount. If less than \$100,000 is received by the borrower but payments of \$11,017 are still made, then the true rate is greater than 10 percent. This situation occurs when points or other financing costs are paid by the borrower to the lender.

Figure 1. Illustration of a Declining-Balance Mortgage Loan

Loan amount: \$100,000
 Interest rate: 11%
 Term: 10 years
 Mortgage constant: 0.1698014
 Payment: \$16,980.14

Year	Payment	Interest	Principal	Balance
1	\$16,980.14	\$11,000.00	\$5,980.14	\$94,019.86
2	16,980.14	10,342.18	6,637.96	87,381.90
3	16,980.14	9,612.01	7,368.13	80,013.77
4	16,980.14	8,801.52	8,178.62	71,835.15
5	16,980.14	7,901.87	9,078.27	62,756.88
6	16,980.14	6,903.26	10,076.88	52,679.99
7	16,980.14	5,794.80	11,185.34	41,494.65
8	16,980.14	4,564.41	12,415.73	29,078.92
9	16,980.14	3,198.68	13,781.46	15,297.46
10	16,980.14	1,682.72	15,297.42	0.05

The calculated mortgage payment is sufficient to repay the principal amount borrowed during the term of the loan. In addition, the lender receives and the borrower pays the stated rate of interest on the outstanding balance of the loan. Figure 1 illustrates how the principal is repaid during the term of the loan. Note that a small balance remains after the last payment. This will almost always be true because all payments are rounded to the nearest cent.

Sometimes there is a need to estimate a mortgage's unpaid balance as of a certain date. For example, assume a \$50,000 loan was made for 25 years at an 8 percent rate. The appropriate mortgage constant is 0.0937 and the annual payment is \$4,685.

$$\begin{aligned} \text{Loan amount} \times \text{Mortgage constant} &= \text{Annual payment} \\ \$50,000 \times .0937 &= \$4,685 \end{aligned}$$

What is the unpaid balance of the loan after seven payments have been made? Consider that the loan is still an annuity but has only 18 remaining annual payments. To find the unpaid balance, the present value of the annuity is calculated using the annuity factor for 8 percent and 18 years.

$$\begin{aligned} \text{Annual payment} \times \text{Annuity factor} &= \text{Unpaid balance} \\ \$4,685 \times 9.372 &= \$43,907.82 \end{aligned}$$

What if the owner desires to sell the mortgage after receiving the seventh payment? Assume the current mortgage rate for this type of loan is 12 percent. Again, the mortgage is an annuity with 18 remaining payments of \$4,685. To determine the current market price of the mortgage, the payments are discounted using the annuity factor for 12 percent and 18 years.

$$\begin{aligned} \text{Annual payment} \times \text{Annuity factor} &= \text{Market value} \\ \$4,685 \times 7.250 &= \$33,966.25 \end{aligned}$$

The decreased value of the mortgage results from the fact that the fixed payments must provide a higher rate of return to the owner of the mortgage than is provided in the mortgage, i.e., 12 percent versus 8 percent. Note that the rate of return and value vary inversely for a security that provides a fixed income stream.

Mortgage Constant

From the perspective just presented, mortgage constants are simply numbers from a table used to calculate mortgage loan

payments. Although this is true, mortgage constants also indicate the cash cost of borrowing money in much the same way as the interest rate for other types of loans. For example, on a \$100,000, 12 percent, interest-only loan, the borrower expects to pay \$12,000 annual interest.

$$\frac{\text{Annual interest}}{\text{Loan amount}} = \text{Interest rate}$$

$$\frac{\$12,000}{\$100,000} = 12 \text{ percent}$$

Because the mortgage loan payment includes principal and interest, the annual payment must be larger than the amount sufficient to pay the annual interest. If a 12 percent, \$100,000 mortgage loan is to be repaid in 25 years, the annual payment is \$12,750.

$$\begin{aligned} \text{Mortgage constant} \times \text{Loan amount} &= \text{Loan payment} \\ .1275 \times \$100,000 &= \$12,750 \end{aligned}$$

Rearranging terms:

$$\frac{\text{Loan payment (principal + interest)}}{\text{Loan amount}} = \text{Mortgage constant}$$

$$\frac{\$12,750}{\$100,000} = .1275 \text{ percent}$$

Thus, the mortgage constant, like the interest rate, expresses the cash cost of borrowing money. Because of this, the mortgage constant is often quoted as an indicator of borrowing costs in a manner similar to the interest rate. When this is done, the mortgage constant is expressed in percentage terms, not as a decimal fraction—12.75 percent, not 0.1275.

The mortgage constant at a particular interest rate always exceeds that interest rate because it includes the amount necessary to repay the loan over the life of the loan and pay the interest on the loan. Therefore, extending the maturity of the loan reduces the payment because the principal repayment is spread over more years. Thus, the mortgage constant is a function of the interest rate and the maturity. A review of a mortgage constant table reveals that as the loan maturity is increased, the mortgage constant decreases from one plus the interest rate to a value almost equal to the interest rate (the interest rate is the mathematical limit of the function).

For example, mortgage payments were calculated at four different interest rates and for increasing maturities. These comparisons are presented in Figure 2. The mortgage constant and, therefore, the annual cost of borrowing decreases as the maturity of the loan increases. Note, however, that **the percentage decrease is largest when the loan term is increased from 15 to 20 years and the decrease is least when the loan term is increased from 25 to 30 years**. Further note that at higher interest rates there is less to be gained in the way of mortgage payment reduction from extending the loan's maturity than there is at lower interest rates.

The ready availability of calculators and computers allows most mortgage loan calculations to be made quickly and easily. Sometimes, however, solving a problem requires more than knowledge of the proper calculator keystrokes. In such cases, basic present value concepts such as annuities and mortgage constants can be used to assist in problem solving. Knowledge of these concepts provides greater understanding of the usefulness of the result.

Figure 2. Reduction in Annual Payments Required to Amortize a \$1,000 Loan at Selected Rates and Maturities

Interest Rate (%)	Annual payment		Decrease from 15-year payment (%)
	15 years	20 years	
6	\$102.96	\$ 87.19	15.32
8	116.83	101.85	12.82
10	131.47	117.46	10.66
12	146.83	133.88	8.82

Interest Rate (%)	Annual payment		Decrease from 20-year payment (%)
	20 years	25 years	
6	\$ 87.19	\$ 78.23	10.27
8	101.85	93.68	8.02
10	117.46	110.17	6.21
12	133.88	127.50	4.76

Interest Rate (%)	Annual payment		Decrease from 25-year payment (%)
	25 years	30 years	
6	\$ 78.23	\$ 72.65	7.13
8	93.68	88.83	5.18
10	110.17	106.08	3.71
12	127.50	124.14	2.63



Estimating Value

July 1990

Wayne E. Etter

Now that the basics of present value have been presented, the use of present value techniques to estimate the value of income-producing real estate will be examined. Although some investment considerations are introduced, the main focus of this series continues to be explaining the mechanics of present value techniques.

As demonstrated in this section, the present value of all the expected cash benefits, discounted at the appropriate discount rate is the maximum price that can be paid for the expected cash benefits if the required return is to be obtained. **This maximum price may be called the *property's investment value*.** Investors should seek properties with investment values in excess of their cost.

The real estate investor anticipates cash benefits in the form of after-tax cash flow from operations and resale. When debt is used, the mortgage lender generally receives periodic mortgage payments of a predetermined amount but also may expect a share of other benefits such as rents, cash flow or appreciation. **Thus, an income producing property's investment value is equal to the present value of all cash benefits expected by the equity investor, discounted at the investor's required rate of return, plus the cash benefits expected by the lender, discounted at the lender's required rate of return.**

Estimating a property's investment value is important. The present value approach reflects all variables that contribute to a property's investment value and that an investor considers in making the investment decision. If the property's investment value does not equal or exceed its purchase price or cost to develop, the property should not be considered further.

The property's cash benefits are based on projections and assumptions about expected rental rates, vacancy rates and operating expenses, financing terms and loan amount, tax rates and the projected holding period made by the equity investor and the lender. Because these projections and assumptions result in estimating the after-tax cash flow from operations and resale (the equity investor's benefits) and the property's estimated debt service (the lender's

benefits), the property's investment value is affected by any changes in any of these variables.

In Figure 1, for example, estimates of after-tax cash flows from operations and resale are presented. Except for the vacancy rate assumption, both estimates of cash benefits are calculated using identical inputs. The 10 percent vacancy rate assumption, versus the 5 percent vacancy assumption, resulted in reduced after-tax cash flows from operations each year; furthermore, because the greater vacancy reduced the property's expected net operating income, the property's estimated resale price and after-tax cash flow from resale was less at the end of the holding period. This vacancy assumption results in a reduced investment value and demonstrates the sensitivity of the calculation to changes in the assumptions.

As noted previously, the required rate of return is used in calculating investment value. Because capital is usually contributed by equity investors and lenders, each can have a different required rate of return.

The required return on equity is the minimum after-tax rate of return that an investor must earn on the equity-financed portion of the investment. It is used to calculate the present value of the estimated after-tax cash flow from operations and resale that accrues to the equity investor. If the investor pays more for the expected benefits than their present value, the investor's wealth will decline because the investor will have paid more for the expected income stream than it is perceived to be worth.

Figure 1

Year	5% Vacancy		10% Vacancy	
	ATCF/OP	PV at 15%	ATCF/OP	PV at 15%
1	\$ 7,695	\$ 6,691	\$ 5,286	\$ 4,597
2	8,574	6,443	6,366	4,814
3	9,374	6,164	7,315	4,810
4	10,191	5,827	7,831	4,477
5	11,026	<u>5,482</u>	<u>8,595</u>	<u>4,273</u>
	Total	\$ 30,647		\$ 22,971
	ATCF/SALE			
5	\$161,453	\$ 80,271	\$137,414	\$ 68,319
PV of Equity		110,918		91,290
PV of Debt		<u>240,898</u>		<u>240,898</u>
Investment value		<u>\$351,816</u>		<u>\$332,188</u>

The lending rate is the lender's required rate of return, but it is not necessary to discount the lender's expected benefits to find the present value of the lender's portion: the loan amount is equal to the present value of the lender's expected benefits (mortgage receipts, plus expected participation, if any) discounted at the lender's required rate of return (the lending rate). **Thus, as shown in Figure 1, investment value may be calculated by adding the loan amount to the present value of the equity benefits.**

The property's perceived risk, the terms of purchase, its financing or a particular investor's tax situation can affect the property's investment value for a particular investor. Thus, one investor is willing to pay more for a particular property than another investor. For example, the effect of using a 25 percent required rate of return instead of 15 percent in calculating investment value is shown in Figure 2. The difference in the two investment values results entirely from the difference in the investor's required rate of return, which reflects a difference in the investor's perception of the property's risk. The degree of risk depends on the difference between expected and actual outcomes. If the expected outcome is guaranteed, then the risk is negligible; if there is great uncertainty about the expected outcome, then the risk is significant. The usual assumption is that riskier investment streams are discounted at higher rates.

Figure 2

Year	ATCF/OP	PV at 15%	PV at 25%
1	\$ 7,695	\$ 6,691	\$ 6,156
2	8,574	6,443	5,487
3	9,374	6,164	4,799
4	10,191	5,827	4,174
5	11,026	5,482	3,613
	Total	\$ 30,647	\$ 24,229
	ATCF/SALE		
5	\$161,453	80,271	52,905
	PV of Equity	\$110,918	\$ 77,134
	PV of Debt	240,898	240,898
	Investment value	\$351,816	\$318,032

The effect of debt financing on a property's investment value also can be analyzed. For example, the effect of increasing the amount of debt from 75 percent of cost to 90 percent of cost when

there is positive financial leverage is presented in Figure 3. If no other assumptions are changed, this change increases the property's investment value. Such a result is entirely in accord with what is observed in the real world: when lenders finance more generously, investors are willing to pay higher prices for property. Although investors may not make such calculations, they do understand the benefits of using more debt. Of course, they may not always consider the consequences of additional risk accompanying the additional debt.

Figure 3

Year	75% Debt		90% Debt	
	ATCF/OP	PV at 15%	ATCF/OP	PV at 15%
1	\$ 7,695	\$ 6,691	\$ 2,143	\$ 1,863
2	8,574	6,443	3,313	2,505
3	9,374	6,164	4,518	2,971
4	10,191	5,837	5,759	3,293
5	11,026	5,482	7,038	3,499
	Total	\$ 30,647		\$ 14,131
	ATCF/SALE			
5	\$161,453	80,271	116,903	58,121
	PV of Equity	\$110,918		\$ 72,252
	PV of Debt	240,898		289,877
	Investment value	\$351,816		\$362,129

Thus, the investment value is for a particular property and for a particular set of circumstances. Because it is not an estimate of market value, the investor cannot necessarily expect to purchase or sell the property for the estimated investment value; rather, this is the value of the property using a particular set of assumptions; if unreasonable assumptions are made, the investment value calculated for a particular investor may vary from the property's market price.

Obviously, these factors also affect the property's expected internal rate of return and net present value of equity as well. However, the present value approach to estimating investment value is important because it is possible to determine the effect of particular assumptions on the property's investment value, and, therefore, it is possible to explain why particular investors are willing to pay a price for a property while other investors believe the property is overpriced: the assumptions used and the terms available produce a higher estimate of investment value. Negotiations between buyers and

sellers revolve about terms and price; therefore, the calculated investment value may be compared to a property’s cost or offering price.

Income capitalization often is used to estimate a property’s current or future market value. Typically for this purpose, a property’s net operating income (NOI) for an appropriate year is divided by the overall capitalization rate derived from the market. Assume, for example, that a property’s estimated NOI is \$10,000 and an overall capitalization rate of 10 percent is used.

$$\begin{aligned} \text{Estimated market value} &= \frac{\text{Net operating income}}{\text{Overall capitalization rate}} \\ \$100,000 &= \frac{\$10,000}{.10} \end{aligned}$$

Income capitalization and ordinary present value calculations can be combined to estimate market value. For example, assume a property’s NOI is expected to increase from \$5,000 to \$10,000 per year over a five-year period and then stabilize at \$10,000 per year. Capitalizing the first year’s NOI produces a value of \$50,000, which undervalues the property; capitalizing the stabilized NOI produces a value of \$100,000, which overvalues the property. But by adding the present value of the NOI for years one through five to the present value of the property’s capitalized value at the end of year five, a better estimate of the property’s market value is obtained. These calculations are presented in Figure 4.

Figure 4

Year	NOI	Capitalized Value	Present Value at 10%
1	\$ 5,000		\$4,545.45
2	6,000		4,958.68
3	7,000		5,259.20
4	8,000		5,464.11
5	10,000		6,209.21
	<u>10,000</u>	= \$100,000	<u>62,092.13</u>
	.10		\$88,528.79

However, what if the demand for space is currently depressed and the property's expected increase in NOI is based on an expected increase in demand for space? Although the analyst may be convinced that the demand will recover by the fifth year, the analyst is concerned that the projected demand levels in the early years will not be achieved. It may be prudent, therefore, to reflect this perceived risk by adopting the unusual approach of discounting the NOI in the early years at a higher rate than the later years when the NOI is approaching the stabilized level (see Figure 5). A comparison of Figures 4 and 5 indicates that the riskier income stream has the lower value.

Figure 5

Year	NOI	Capitalized Value	Discount Rate (%)	Present Value at 10%
1	\$ 5,000		12.0	\$ 4,464.29
2	6,000		11.5	4,826.16
3	7,000		11.0	5,118.34
4	8,000		10.5	5,365.88
5	10,000		10.0	6,209.21
	<u>10,000</u>	= \$100,000	10.0	<u>62,092.13</u>
	.10			\$88,076.01

Appraisal reports sometimes contain calculations similar to those in Figure 4 and 5. These should be examined closely; in particular, the discount rate selected should be carefully explained and justified. In some cases, the discount rate is related to returns available from securities such as U.S. government bonds or certificates of deposit rather than the property market. **However, when the same income stream is being valued, the discount rate and the capitalization rate ought to be derived from the same source.**

Because of recent developments in financial calculators and personal computer software, it is possible to solve quickly a number of real estate present value problems. Even with such assistance, however, it is necessary to know how present value works. Providing this knowledge is the purpose of the last three sections.



Direct Capitalization or Discounted Cash Flow Analysis?

Fall 1994

Wayne E. Etter

Many commercial property market brokers, lenders and owners use real estate appraisals having an income approach value estimate derived from direct capitalization and discounted cash flow (DCF) analyses. The differences between these methods and their appropriate use are the focus of this section.

To estimate value with direct capitalization, a property's stabilized net operating income (NOI) is divided by the market capitalization rate (Figure 1). Estimating value with DCF analysis requires estimates of each year's NOI along with the property's expected reversion value at the end of the analysis period. Usually the analyst uses income capitalization to estimate the reversion. These expected cash benefits are then discounted at the appropriate rate to obtain the market value estimate, also shown in Figure 1.

Estimating Net Operating Income

Although these calculations are simple and straightforward, they depend on the appraiser's assumptions or estimates. When using direct capitalization, the property's stabilized NOI must be estimated. This estimate is developed from market data (rental rates, vacancy and collection loss rates and operating expense data) for comparable properties in the market area; it represents the appraiser's opinion of how the property ought to perform.

Because the appraiser's opinion is based on observed market data, it's difficult to quibble with his or her NOI estimate. When a market is "normal," the notion of stabilized NOI is particularly useful.

But two areas are of special concern. First, what if the property has significant vacancy at the time of the appraisal? Obviously, no one develops a property with the expectation of significant, permanent vacancy. So, the appraiser may use a market vacancy rate (or the anticipated vacancy rate when the property is fully leased)

rather than the property's actual vacancy rate. This results in a larger NOI for the subject property and may overstate the property's value. Second, if the property's future NOI is expected to increase because of greater demand for space that leads to higher rental rates, direct capitalization of a single year's NOI may understate the property's value.

Because DCF analysis permits annual adjustments in rental rates, vacancy and collection loss rates and operating expenses, DCF analysis can be used to reflect a buyer's expectations of increasing NOI over time. When a property is expected to become fully leased during the next three to five years, for example, the current vacancy rate can be reduced until the desired occupancy is reached.

This specification of expected changes results in realistic NOI estimates throughout the period—a result far superior to capitalizing a single year's NOI. On the other hand, just assuming that the vacancy rate will be reduced during the three-year period may lead to overestimating NOI.

DCF analysis is ideally suited for situations such as this. However, DCF analysis does not add much useful information when the subject property is fully leased and no changes in occupancy or the external environment are anticipated that will affect NOI. As shown in Figure 1, the present value of a series of equal annual cash flows is equivalent to the capitalized value.

Figure 1. Estimating Value with Direct Capitalization and DCF Analysis

$$\text{Value} = \frac{\text{NOI}}{\text{Capitalization rate}} = \frac{\$10,000}{.10} = \$100,000$$

Year	NOI	Reversion	Total
1	\$10,000		\$10,000
2	10,000		10,000
3	10,000		10,000
4	10,000		10,000
5	10,000	\$100,000	\$110,000

Present value at 10% = \$100,000

It is not an error to use DCF analysis to value a property when no significant change in NOI is expected. However, appraisal report users should understand that this technique's results are no better than those produced by a correct application of direct capitalization. Of course, if both techniques, properly used, achieve similar values, the estimated value has greater credibility.

Selecting Capitalization and Discount Rates

Theoretically, concerns about capitalizing a single year's NOI are eliminated by the appraiser's skill in deriving the market capitalization rate from comparable sales. If the market capitalization rate is derived from sales of properties with vacancy rates comparable to the subject and with comparable buyer expectations about becoming fully leased (or for increased NOI), the subject property's value could be estimated with an unadjusted NOI and the market capitalization rate.

Buyers who expect their properties' occupancy levels to improve pay prices that reflect this expectation. Likewise, buyers who expect the future NOI of their properties to increase pay prices reflecting that expectation. In both cases, expectations are reflected by observed capitalization rates.

The appraiser's problem arises when appropriate comparables cannot be located. In this case, the appraiser must develop the capitalization rate and estimate the NOI from the best available comparables to produce a market value estimate that reflects these expectations.

For DCF analysis, an appropriate discount rate is used to convert the NOI estimates to a value estimate. When DCF analysis is used to estimate a property's market value, the discount rate ought to be extracted from the market using the data of comparable properties. Thus, the need for appropriate comparables is the same for DCF analysis and for direct capitalization. (When DCF analysis is used for investment analysis, the investor's required rate of return ought to be used to discount the expected cash flow.)

Deriving a discount rate from the market is more difficult than estimating the market capitalization rate. For each comparable property used in the derivation, the buyer's expectations about future NOI and reversion would have to be determined. This would allow calculation of the discount rate that equates these expectations to the purchase price. (Estimating the market capitalization rate requires only each comparable property's NOI and the reported sales price.)

After obtaining the discount rate for each comparable property, the analyst would select the appropriate discount rate for the subject property. The process is the same as choosing the appropriate capitalization rate from comparable sales.

While this procedure is possible, it would be difficult in practice. Therefore, the discount rate often is estimated by adding a risk premium and a liquidity premium to a relatively risk-free rate of return, such as the U.S. Treasury bill rate or to the yield of some other security. This built-up rate is used to discount the expected cash flows. Although a theoretically correct approach, its use requires a serious attempt to ascertain the risk and return differences between the subject property and the security.

Investor surveys offer another approach for selecting an appropriate discount rate. Such surveys report investors' expectations for several different property types. The obvious problem with their use is that they report general expectations rather than the expectations for a specific property in a specific market.

Sometimes several different discount rates are tried; the rate that results in a market value estimate approximately the same as that obtained with direct capitalization is selected. Then, the reasonableness of this rate of return is verified by comparing it to investor returns in other markets.

Figure 2. A Comparison of Direct Capitalization and DCF Analysis with Income Growth

Year	NOI	Reversion	Total
1	\$10,000		\$10,000
2	10,500		10,500
3	11,000		11,000
4	11,500		11,500
5	12,000	\$125,000	\$137,000

Present value at 14.6% = \$100,000

$$\text{Value} = \frac{\text{NOI}}{\text{Capitalization rate}} = \frac{\$10,000}{.10} = \$100,000$$

Normally, the discount rate is greater than the capitalization rate. Why? As reported in Figure 1, if no change in cash flows is anticipated, the discount rate is equal to the capitalization rate. However, as Figure 2 shows, an increasing income stream requires that the discount rate be greater than the capitalization rate if the two separately determined values are to be equal. (They must be equal because the property can not have two values.) Therefore, because forecasts of increasing income are common, the discount rate used is normally greater than the discount rate. In fact, in a perfect world, the discount rate is equal to the capitalization rate plus the weighted average of the net operating income and the property value annual growth rates.

Choice Difficult, Necessary

Direct capitalization and DCF analysis are each appropriate in certain circumstances. In particular, direct capitalization is well suited for properties expected to have stable NOI; DCF analysis is well suited for properties expected to have fluctuating NOI. Selecting the appropriate capitalization rate and discount rate may sometimes be difficult for both techniques.

A prime benefit of DCF analysis is that in gathering the data required to estimate NOI for the analysis period, a good deal is learned about the subject property's prospects. A DCF analysis requires careful consideration of expected supply and demand for a particular type of space and operating expenses. Properly done, such an analysis can provide much information not apparent through direct capitalization.

Often, however, the primary use of DCF analysis is the confirmation of the direct capitalization market value estimate. Despite the fact that for some properties the NOI estimates used in DCF analysis may be more accurate, independent confirmation of the direct capitalization market value estimate requires an appropriate discount rate. Merely using a discount rate that seems reasonable to get a value estimate with DCF analysis approximately equal to the value estimate obtained with direct capitalization is not a confirmation.

Analyzing Risk and the Use of Debt

9



Debt Financing: Rewards and Risks

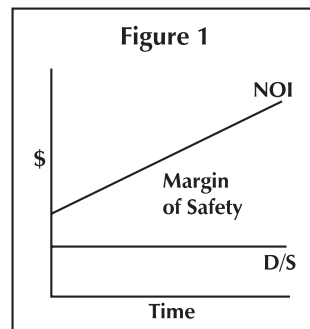
October 1989

Wayne E. Etter

Using debt to finance income-producing real estate is an accepted practice. Although the rewards of debt financing can be significant, so are the risks. Unfortunately, many investors anticipate only the rewards of debt financing and give little attention to risks.

Obviously, when debt financing is arranged, both the lender and the investor anticipate that income will be adequate to service the debt; in fact, the usual assumption is that a property's net operating income will increase during the holding period. With fixed debt service, this assumption results in an improving margin of safety during the holding period (Figure 1).

Nevertheless, the use of debt gives rise to financial risk—the risk that there will be inadequate income to meet debt service requirements. Although there may be a trend toward the use of less debt in some real estate syndications, the possible benefit of using less debt is



not well understood. In today's market, however, consideration should be given to revising the accepted practice of using as much debt as can be obtained to finance real estate. This could create a new investment product with reduced risk that appeals to investors wary of traditionally financed real estate.

Why Use Debt?

The expected after-tax rate of return from a real estate investment is determined by the expected benefits of the investment—after-tax cash flow and appreciation—and the cash required to purchase the property. Investors determine a proposed real estate investment's expected rate of return and compare the result with the minimum return required to undertake the investment. A further test is a comparison of the property's estimated investment value with its cost. A property's investment value is equal to the present value of all the cash benefits expected by the equity investor, discounted at the investor's required rate of return, plus the amount of the mortgage.

Real estate investors wish to use debt if its use will increase the after-tax return on equity (ATRE) and the property's investment value. Using debt this way is known as financial leverage. For instance, the ATRE and the investment value were calculated for a typically structured income property using varying amounts of debt with the following results:

Amount of debt (%)	ATRE (%)	Investment value (\$)
None	13.26	301,198
50	17.23	334,943
75	23.84	351,815
90	37.27	361,329

When the amount of debt is held constant at 75 percent and the interest rate is varied, the following results are obtained:

Interest rate (%)	ATRE (%)	Investment value (\$)
10	27.04	362,974
12	23.84	351,815
14	20.42	340,106
16	16.77	327,506
18	13.26	314,829
20	9.90	302,103

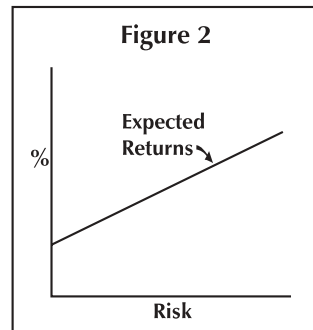
Analyzing these results reveals that the ATRE and the investment value of the property increase as a larger proportion of the property is financed with debt having a constant cost. Also the ATRE and the investment value decrease as the interest rate is increased when the proportion of financing is held constant. Eventually, the ATRE and the investment value, when financed with high-cost debt, are less than the property's ATRE and the investment value without debt. Thus, the beneficial effects of debt financing are limited—expensive debt is worse than no debt.

Other factors also affect whether or not the use of debt is favorable. If the expected benefits (after-tax cash flow and appreciation) increase for reasons such as increased rent levels, reduced vacancy rates or operating expenses, increased rate of appreciation or reduced tax rates, the expected ATRE and the investment value will increase at any given debt level or interest rate. Therefore, increased investor expectations justify the use of higher cost debt. During periods of rapid property appreciation, high interest rates will not deter investors from using debt financing to buy properties.

An investor is indifferent between two investment opportunities having the same expected rate of return only if they have the same risk. Thus, the returns of various investments often are compared by evaluating both their risk and their expected return. The usual assumption is that riskier investments have increased returns (Figure 2). **Such investments also can have increased losses; the line represents expected returns.**

Risk exists in all projects, but some are more risky than others. The degree of risk depends on the difference between expected and actual outcomes. If the expected outcome is guaranteed, then the risk is negligible; if there is great uncertainty about the expected outcome, then the risk is significant.

As earlier stated, financial risk is present when debt is used. Because the investor and the lender believe that the debt can be managed when the property is financed, the principal source of financial risk is unanticipated variation in the property's income stream over time. There is a particularly important connection between business risk (the risk of failing to generate sufficient income), management risk (the risk of failing to respond properly to changes in the



business environment and, therefore, failing to earn a satisfactory return) and financial risk (the risk of having inadequate income to meet debt service requirements).

If a project is believed to have little business and management risk, then a high proportion of potential gross income could be committed to the payment of operating expenses and debt service. If the opposite is true, a much lower proportion of potential gross income should be committed to the payment of operating expenses and debt service. A project's operating expenses are somewhat fixed in the short-run and vary directly with potential gross income over time; the operating expense ratio should be constant over time. Limiting the total funds available for the payment of operating expenses and debt service has a direct impact on the amount of funds available for debt service and, therefore, the amount of debt, called *allowable debt*.

Projects believed to have little business and management risk (i.e., there is little expected variation in the income stream) could have higher levels of debt without creating excessive financial risk. On the other hand, projects believed to have significant exposure to business and management risk should have much less debt so that excessive financial risk is not created. For example, assume two properties are identical except for risk:

	Low-risk property	High-risk property
Potential gross income	\$100,000	\$100,000
Percentage allowed for operating expenses and debt service	.90	.60
Funds available for operating expenses and debt service	\$90,000	\$60,000
Operating expenses	30,000	30,000
Available for debt service	\$60,000	\$30,000
Divide by mortgage constant	.1275	.1275
Allowable debt	\$470,588	\$235,294

At any given mortgage constant, \$60,000 will service twice as much debt as \$30,000. This approach allows the risky building much less debt financing and achieves a result similar to what is observed in other types of enterprises. Risky businesses must borrow less than safer ventures.

What Are the Benefits of This Approach?

The foregoing approach to risk results in some properties being financed with much less debt than is considered normal. But, for either building, the use of more debt to increase the expected ATRE or investment value increases the likelihood of default.

Suppose, therefore, that a property is financed with more than the amount of allowable debt to raise its expected ATRE and investment value. This will cause total risk to exceed an acceptable level given the investors' required return. Under such a circumstance, investors should increase their required rate of return. The additional return expected from the additional debt is not without additional risk—greater risk must be matched by a greater required return—and, therefore, the calculated increase in the ATRE is not an additional benefit received without cost. Likewise, when estimating a property's investment value, investors must apply a higher discount rate to the expected benefit stream. As a result, the beneficial effect of using more debt may be offset by the effect of the higher discount rate with the possible result of a decrease in the property's investment value.

On the other hand, it is possible to use even less debt or no debt to further reduce the exposure to financial risk and, thereby, reduce total risk. Using less debt (or no debt) should increase the investment quality of a property; such a course of action should result in investors reducing their required rate of return for the property and applying a lower discount rate when calculating investment value. As a result, the reduced benefits from using less debt may be offset by the willingness of investors to accept a lower ATRE and by the effect of the lower discount rate with the possible result of an increase in the property's investment value.

Assume, for instance, that a commercial property is leased to quality tenants; the lease has several years to run and there is reason to believe the current tenants will wish to renew their lease. The property may be classified as a low-risk property because there is a reasonable probability that the difference between the property's expected income stream and actual income stream will be small. If the property is conservatively financed (perhaps even 100 percent equity), it will be even more attractive to conservative investors. Under such circumstances, the property's income stream will be highly predictable; investors will pay a premium price for such a property.

Next consider a property characterized by more business and financial risk—fewer quality tenants with less assurance of lease renewal when the current leases expire. There is a greater probability that there will be a difference between the expected income stream and the actual income stream. Financing such a property with, say, 75 percent debt may result in the property's total risk being excessive. But, if this property is financed with less than 75 percent debt (again, perhaps even 100 percent equity), investors may view the property as an attractive investment. Properly estimated, the property's investment value may be higher with less or no debt.

Thus, the question is: Can an investor's lower required rate of return or discount rate offset the beneficial effects of financial leverage on a property's expected rate of return and investment value? If so, income-producing real estate could be transferred from the high-risk investment category when it is financed with a large proportion of debt to a much lower risk category. Only by relating investors' required returns with risk and by calculating the investment value of a property using various assumptions can this question be answered. If the answer is positive, more investors might be attracted to real estate because income-producing real estate can become a much less risky investment.



Appraising in Difficult Markets

January 1992

Wayne E. Etter

The real estate appraisal process depends on sales of comparable properties and other market data. Although adjustments can be made when the sold properties are not perfectly comparable to the subject property, some sales are required. However, there have been few recent property sales in some markets, and bid and ask price may differ considerably.

Today, therefore, real estate appraisers often work in markets where sales of comparable properties are infrequent or nonexistent. To value properties in such a difficult market, they must use techniques to compensate for the lacking market data.

This article examines the effect of few comparable sales on one aspect of the appraisal process.

Approaches to Real Estate Appraisal

There are three commonly accepted approaches to estimating value: the sales comparison approach, the cost approach and the income approach. Each is dependent on accurate market data. But in a market characterized by few sales and little development activity, certain data are difficult to obtain.

- **Sales comparison approach.** The estimate of market value is based on recent sales of comparable properties. A lack of recent comparable sales reduces this approach's contribution to the final estimate of value.
- **Cost approach.** The estimate of market value is based on the cost of developing a similar property. When market values are less than the cost of developing a new property, little, if any, development takes place and the cost approach's contribution to the final estimate of value is limited.
- **Income approach.** The estimate of market value is based on the relationship between the income and value of similar properties. A lack of recent sales of comparable properties makes it difficult to estimate the relationship between income and value. When sufficient recent sales are not available, appraisers sometimes use other methods, such as the *band of investment approach*, to estimate the relationship.

Because the sales comparison approach obviously cannot be used when there are few, if any, recent sales of comparable properties and because the cost approach explains little when the cost of development exceeds the market value, appraisers rely on the income approach in such markets.

Income Capitalization Approach

To estimate a property's market value by the income capitalization approach, the property's stabilized net operating income (NOI) is divided by the appropriate overall capitalization rate (OAR).

NOI is a proxy for the investor's expected benefits—the after-tax cash flow from operations and resale (NOI ignores debt and tax implications). NOI is estimated by using market rents and vacancy rates, typical operating expenses and so forth. The OAR is estimated from comparable properties—comparable properties' NOI is divided by their reported sales price and the OAR is obtained. Thus, the resulting value is estimated from market data; if the data are gathered from actual comparables, the resulting value estimate is reliable.

The price paid by an investor for the expected benefits reflects the investor's required return. The OAR is not a real rate of

return; rather, it reflects the relationship between a proxy for the expected benefits and the price paid for those benefits. As the perceived risk of receiving the benefits is reduced, the investor will pay a greater price for the benefits (and vice versa).

Appraisers also use the band of investment approach to estimate the OAR. This approach recognizes that income-producing real estate typically is financed with a mixture of debt and equity and that each financing source must receive a satisfactory return. If there are no recent comparable sales, the OAR cannot be derived from market data, but the band of investment approach can be used to estimate the OAR **if financing is available on the assumed terms**.

When using the band of investment approach, the OAR is estimated by taking a weighted average of the lender's required return (the mortgage constant) and the investor's required equity capitalization rate (before-tax cash flow divided by the initial equity investment).

In theory, the OAR estimated by the band of investment approach is equal to the OAR estimated from comparable sales because both approaches should yield the same value. Thus:

$$\frac{\text{NOI}}{\text{OAR}_1} = \frac{\text{NOI}}{\text{OAR}_2} = \text{Value}$$

OAR₁ = market data approach
 OAR₂ = band of investment approach

The method used to estimate the OAR does not matter **if the assumed financing terms are available**. But, what if the OAR is estimated by the band of investment approach and the assumed financing terms are not actually available in the market? **This is an important question. Although many income properties cannot be financed today, many appraisers continue to assume the availability of typical financing when they estimate the value of such properties.** To answer this question, the role of *financial leverage* must be considered.

The purpose of financial leverage is to enhance the investor's after-tax return on equity. If there is less debt (or no debt), the after-tax return on equity is reduced, **holding all other variables constant**. Of course, using less debt reduces the **project's financial risk** and an investor might reduce the required rate of return because of the project's reduced financial risk. (For a more complete discussion of financial leverage, see "Debt Financing: Rewards and Risks.")

However, using less debt than has been typical (especially if the typical debt is nonrecourse debt), may be viewed as an increased risk by the investor who must now contribute a larger percentage of equity than before. The investor may require a larger return on equity, even though the project's financial risk is reduced. At the very least, the advantage of financial leverage is lost and the investor may offer less for the property to earn the same after-tax return when the property is acquired with reduced debt or no debt.

Consider, for example, an income property producing a \$39,000 NOI. Assuming that it can be financed with 75 percent debt having a 12.75 percent mortgage constant and that the equity investor's required capitalization rate is 10.3 percent, the estimated OAR is 12.1 percent and the property's estimated value is \$322,314.

	Proportion	x	Cost		
Debt	.75		.1275	=	.096
Equity	.25		.1030	=	.026
OAR					.121*
Value	=	$\frac{\text{NOI}}{\text{OAR}}$	$\frac{\$39,000}{.121}$	=	\$322,314
(* difference due to rounding)					

Further assume that an investor uses a discounted cash flow model with specific assumptions about rent, vacancy rates, operating expenses, holding period, resale price and so forth to calculate the expected after-tax internal rate of return on equity (ATIRRE). If the investor uses these assumptions along with a \$322,314 purchase price and the foregoing financing terms, the expected ATIRRE is approximately 24 percent. If the investor discovers that lenders will lend only 60 percent of the purchase price, what is the OAR and the property's estimated value? If the debt and equity proportions are changed, the following result is obtained.

	Proportion	x	Cost		
Debt	.60		.1275	=	.077
Equity	.40		.1030	=	.041
OAR					.118
Value	=	$\frac{\text{NOI}}{\text{OAR}}$	$= \frac{\$39,000}{.118}$	=	\$329,950

This, however, is an error. The property's value actually will decrease (**rather than increase from \$322,314 to \$329,950**) because of the reduced financing. Why? If the investor requires an ATIRRE of approximately 24 percent to undertake the investment, the purchase price must decrease, holding constant all factors except financing. Using the same assumptions as before, an ATIRRE of about 24 percent results when the investor pays \$289,000 and obtains a loan equal to 60 percent of the purchase price using a mortgage constant of 0.1275. Thus, the property's capitalization rate is 13.5 percent instead of 11.8 percent; this implies a required equity capitalization rate of 14.5 percent.

$\frac{\text{NOI}}{\text{Value}}$	=	OAR	=	$\frac{\$39,000}{289,000}$	=	.135
		Proportion	x	Cost		
Debt		.60		.1275	=	.077
Equity		.40		.1450	=	.058
OAR						<u>.135</u>

What if financing is unavailable? If the investor's required ATIRRE remains the same, the price must decrease to approximately \$208,600. Holding all other factors constant, the property's capitalization rate and equity capitalization rate increase to 18.7 percent.

$\frac{\text{NOI}}{\text{Value}}$	=	OAR	=	$\frac{\$39,000}{208,600}$	=	.187
		Proportion	x	Cost		
Debt		n.a.		nil	=	nil
Equity		1.00		.1870	=	<u>.187</u>
OAR						.187

Relationship to Current Market

How do these calculations relate to the current market? They help to explain the gap between the sellers' expected price and the price buyers are willing to pay. **Potential buyers are noting both the reduced expectations about rental income and the lack of typical financing.** In the absence of market transactions, many appraisal reports rely on the band of investment approach (or one of the similar approaches) to derive an OAR. **However, to assume financing terms that are not available overstates the property's estimated market value, even though the property's NOI may be appropriately stabilized.**



Towards Evaluating Commercial Properties

Spring 1994

Wayne E. Etter

Many lenders no longer actively pursue commercial real estate loans. Because of the widespread delinquencies of commercial real estate loans made in the 1980s, lenders apparently believe other sectors offer fewer problems, more opportunities or both. Additionally, bank risk-based capital regulations and proposed insurance company regulations require significantly more capital for commercial real estate loans than for some other types of loans and assets.

The amount of capital required is based on the risk class of the particular loan or asset. For example, investments in U.S. government securities are considered risk-less; commercial real estate loans are in the most risky category. A bank with assets concentrated in commercial real estate loans (or other assets considered equally risky) needs more capital than if it invests in less risky assets or loans. Because capital has a cost, many commercial banks find that investing in U.S. government securities is more profitable than extending commercial real estate loans. With similar rules set to take effect in the life insurance industry, that industry's role as a supplier of commercial real estate loans may diminish.

Among lenders who consider making new commercial real estate loans, many are unwilling to make them on a nonrecourse basis; they require personal guarantees in addition to liens on the property. While other sources of commercial real estate financing, such as real estate investment trusts, are increasingly important, the issue of evaluating project risk appears to be central to the current problems of financing commercial real estate.

Almost everyone who considers the problem of analyzing commercial real estate suggests increasing the discount rate as a means of compensating for risk. Increasing the discount rate reduces the present value of the estimated cash flows and, therefore, the property's value because it is risky. Although this approach is correct, this section focuses on **controlling risk rather than adjusting for**

risk. Paying a smaller price for risky real estate does not eliminate the risk—the buyer just loses less.

Although several risks affect real estate value, three risks—financial, business and management—are discussed here. Financial risk (the possibility of inadequate income to service debt) is present when debt is used. The investor and the lender must be convinced that the debt can be managed if the *pro forma* projections made when the property is financed are achieved. The principal reasons why the debt service requirements may not be met are business risk (the property may fail to generate sufficient income) and management risk (the property's managers may fail to respond properly to changes in the business environment and, therefore, fail to earn a satisfactory return).

A property's income stream is the principal determinant of its value and the source of the loan's repayment unless the loan is otherwise secured. Thus, if the property's income stream varies over time, there is great potential for default if the loan amount is determined, for example, by assuming a 95 percent occupancy rate and lending 75 percent of a property's capitalized value.

If the degree of business and management risk is assessed and variation in the property's income stream over time is highly probable, less debt should be used.

Rating properties according to the expected stability of the income stream permits lenders to loan an appropriate amount for specific properties so total risk is not excessive. Although this would be a new approach to financing real estate, it is similar to the approach used in home mortgage lending.

A prospective homebuyer cannot get a large loan just because an expensive home is being purchased. This is true even though the loan amount normally is limited to a percentage of the home's value; this allows the lender to foreclose on the asset in the event of a default and sell it for an amount equal to or greater than the unpaid loan balance. However, foreclosure and sale are the lender's last resort; lenders prefer to have the loan repaid as agreed.

To help ensure this result, lenders qualify the prospective borrower's ability to repay the loan by considering the applicant's current income and financial situation, credit history and employment record. If the applicant has an erratic income or employment history or if an excessive proportion of the applicant's current monthly income is required to service the requested loan, the lender refuses to grant the loan. Evaluating the stability of a commercial

property's expected income stream is an entirely analogous analytical problem.

As in home mortgage lending, the beginning point in assessing the riskiness of a commercial property's income stream is developing a list of factors contributing to income stream fluctuations. The factors must be developed separately for each property type (multifamily residential, office, retail, industrial). Furthermore, the major property types must be subdivided into groups of properties of varying size. Other property categories are possible. The important point is to compare only like properties within the relevant market area.

What factors are included? The following suggestions are a starter list; they are not all-inclusive.

- Economic differences among market areas are important.
- Supply and demand conditions in the property's market area must be evaluated. Determine if an unmet need can be satisfied. How much vacant space exists currently in the market? How likely is new space to enter the market? What is the attitude of local planning authorities toward new space?
- The competitive position of the property must be assessed. Evaluate the property's site, age, size, construction quality and design relative to similar properties.
- The property's performance must be assessed. Analyze occupancy, tenants' credit quality, type of lease, average lease rates and length of lease. When appropriate, tenant mix must be evaluated.
- Additional factors must be considered for to-be-developed properties. These include the developer's reputation and experience and the amount of pre-leasing. However, to-be-developed properties should be scrutinized more than seasoned properties because they have no market or operating history. Many properties developed in the 1980s never achieved their *pro forma* projections; perhaps to-be-developed properties should be financed with more equity than seasoned properties until their *pro forma* projections are achieved.

Identifying these factors is an ideal project for organizations of real estate professionals. Once general agreement is reached about which factors should be included and their relative importance, a rating scale could be constructed.

Rating a property forces the analyst to consider carefully each property characteristic in relation to other comparable properties in

the market area. For example, “Retail Center A” with several “mom and pop” tenants on month-to-month leases has a much less predictable income stream than “Retail Center B” with national credit tenants on income long-term leases. Thus, Retail Center A receives a lower score because it has more business and management risk. For the more subjective factors, scaling may be difficult.

A property’s total score varies inversely with business and management risk; a low score indicates more business and management risk. When this is the case, the amount of debt financing should be limited because the addition of financial risk creates excessive total risk. For example, assume two properties are identical except for risk:

	High-risk property	Low-risk property
Potential gross income	\$100,000	\$100,000
Percentage allowed for operating expenses and debt service	<u>x .60</u>	<u>x .90</u>
Funds available for operating expenses and debt service	\$60,000	\$90,000
Operating expenses	<u>- 30,000</u>	<u>- 30,000</u>
Available for debt service	\$30,000	\$60,000
Divide by mortgage constant	<u>.1275</u>	<u>.1275</u>
Allowable debt	\$235,294	\$470,588

At any given mortgage constant, \$60,000 will service twice as much debt as \$30,000. This approach allows the risky building much less debt financing and achieves a result similar to what is observed in other enterprises. Risky businesses qualify for less debt than safer ventures.

Should an acceptable means of rating projects be developed, the regulators might reduce the amount of capital required when lenders grant an appropriate amount of credit to finance commercial real estate. And even when debt financing is not used, an analysis of a property’s business and management risk is useful. A proper assessment of such risk assists in the assembly of all-equity portfolios with a given risk level.

Finally, a project risk rating scale recognized by the market would increase real estate’s liquidity. Illiquidity is a major real estate risk; if illiquidity can be reduced, there is a positive impact on real estate values.



Asset Management Essentials

April 1993

Wayne E. Etter

For the past several years, *asset management* has been much discussed in real estate circles. Generally, this term describes a decision-making technique for choosing a strategy to maximize the value of an income-producing property.

This process is applied to a broad range of problems such as analyzing the impact on value of a proposed property refurbishment or considering the impact on value of gaining or losing a specific tenant. Often competing strategies are under consideration, but the one that maximizes the property's value should be chosen.

Maximizing value is the goal of financial managers in many industries outside real estate. For example, when financial managers make plant expansion or product-line decisions, they often use discounted cash flow analysis—a technique that helps select the course of action giving the maximum present value.

Discounted cash flow analysis techniques have been adopted by asset managers in the real estate industry for two basic reasons. First, these techniques are made easy by powerful financial calculators and personal computers. Second, and much more important,

until recently, real property values appeared to increase without management; the goal was to finance and build. Management of the completed asset did not appear necessary.

Eventually, the degree of overbuilding and its effects became obvious. Today, properties require management because an annual increase in value can no longer be taken for granted. With excess leasable space, competing successfully for tenants has become an important goal of asset managers attempting to maintain or increase property values. With this competition, the asset manager must make a number of decisions that could affect the property's value. For example, how will refurbishing a property affect the occupancy rate? Or, how will increasing or decreasing the rental rate affect occupancy? These actions affect the income stream and, in turn, the value of the property.

Analyzing the impact on value of such changes requires accurate estimates of their impact on the future income stream. When the effects are properly specified, discounted cash flow analysis can be used to calculate whether the estimated change in the income stream will have a positive or a negative effect on the property's value. Thus, there are two stages in the asset management process: developing an asset management plan to generate the data necessary for the analysis and analyzing the plan's impact on the property's value.

Developing the Asset Management Plan

Developing the asset management plan is the most important part of the analysis because it is the basis for selecting the best strategy. The plan enables the asset manager to quantify the differences between competing proposals and/or the status quo. The plan must be developed in detail for each alternative strategy under consideration and should include the following points.

First, the asset manager must have a comprehensive market study for the property. The market study should provide information about the types of space available in the market, the amount of space available, the type of space being demanded, the changes expected in the supply and demand for space and any currently unmet market needs. Finally, the market study should provide an estimate of the price prospective tenants (or buyers) are willing to pay for the space.

Second, a *pro forma* operating budget must be developed for each alternative strategy being considered. The market study provides information about the number of square feet to be leased and the likely rental rate. Other data to be forecast for the holding period include the expected operating expenses and the marketing

expense; the budget must emphasize both the need to provide tenants with adequate services and cost control. Each budget will become the basis for estimating that strategy's effect on the property's present value and on its future selling price.

Third, any physical problems that need to be corrected before the property can be leased (or sold) must be addressed. Likewise, are there opportunities to upgrade the property through renovation or refurbishment? The cost of both the necessary and optional changes should be estimated carefully.

Fourth, a marketing plan must be developed. Without a plan for action, nothing is likely to happen. The marketing plan should cover the property's image, strategies for positioning the property in the market, pricing, marketing methods and materials and performance standards. The marketing plan will have a cost; this cost must be included in the *pro forma* operating budget.

Analyzing Each Strategy

The value of any asset, including income-producing real estate, is equal to the present value of all the expected cash benefits, discounted at the appropriate rate. Because present value mechanics have been discussed previously, this discussion focuses on using discounted cash flow analysis in asset management decisions. Using discounted cash flow analysis to estimate a particular strategy's impact on value requires a clear understanding of what is to be discounted and how to compare competing strategies.

Three different cash benefit streams can be discounted: net operating income, before-tax cash flow and after-tax cash flow. The calculation of these three measures is shown in the table.

Calculating the Cash Benefit Stream

Estimated potential gross income	\$210,000
Less estimated vacancy and collection allowance	<u>-21,000</u>
Estimated effective gross income	\$189,000
Less estimated operating expenses	<u>-63,000</u>
Estimated net operating income	\$126,000
Less estimated mortgage payment	<u>-99,180</u>
Estimated before-tax cash flow	\$ 26,820
Less estimated income tax liability	<u>-1,447</u>
Estimated after-tax cash flow	\$ 25,373

When the net operating income is used to estimate the value resulting from a particular strategy, no consideration is being given to financing or taxes. Thus, the before-tax cash flow or after-tax cash flow should be used when the asset manager's decision involves choosing among financing alternatives or analyzing tax impacts.

Because mutually exclusive strategies to maximize the property's value are being considered, the strategy producing the largest net present value is chosen. Net present value is equal to the present value of the expected income stream plus the present value of the property's estimated value at the end of the analysis period minus the strategy's cost. This result is compared with the net present value of the property if no change is made.

When before-tax cash flow or after-tax cash flow from operations and resale is chosen as the benefit stream to discount, only the value of the equity interest is estimated; to estimate the property's value, therefore, the mortgage financing amount must be added to the present value of the equity. To compare competing strategies, each strategy's cost must be subtracted from the property's estimated value. As before, the final value is compared with the property's value if no change is made.

The appropriate discount rate must be applied to the benefit stream selected. **In general, the following relationships should be used as a guide in choosing the appropriate discount rate.**

<i>Cash benefit stream</i>	<i>Appropriate discount rate</i>
Net operating income	Capitalization rate
Before-tax cash flow	Before-tax, cash-on-cash return
After-tax cash flow	After-tax return on equity

Sometimes the discount rate is estimated by examining returns available from securities such as U.S. government bonds, certificates of deposit or corporate bonds. Although such comparisons are interesting from a risk-return standpoint, the appropriate discount rate should be obtained from the property market.

Once the detailed elements of the plan are developed, discounted cash flow analysis may be used to choose the optimal strategy. Today, however, discounted cash flow analysis is not as well regarded as it once was.

For example, Cushman and Wakefield reports that "many investors seem to have lost faith in cash flow forecasts and report placing more emphasis on direct capitalization of current (as opposed to forecasted) net operating income." However, the poor investment decisions of the past decade based on discounted cash flow analysis

techniques resulted from flawed assumptions, such as unrealistic occupancy and rental rates, rather than from the techniques themselves. The importance of making proper forecasts will be considered in "A Matter of Assumptions."



San Felipe Court: A Successful Renovation

Fall 1993

Wayne E. Etter
E.J. Cummins, Jr.

Renovating an income-producing property is an ideal application of asset management techniques. The first step in using these techniques is the development of an asset management plan.

The plan should include a market study, a careful determination of the plan's cost and an analysis of the renovation's impact on the income stream and the property's value. Then, using the data developed in the asset management plan, the decision maker must determine if the renovation is justified by the increase in the property's value. This article demonstrates the application of asset management techniques to the proposed renovation of St. Regis Place, a Houston mixed-use complex.

The property, located in the Galleria-River Oaks area is a 242,909-square-foot, 325-unit apartment complex. In addition, a 54,975-square-foot office-retail development is on the site. The complex was constructed in 1954 and needed substantial repair when renovation was proposed in 1990.

The April 1990 monthly operating statement was typical of the property's performance prior to renovation.

Rental income	
Apartments	\$108,982
Office-retail	26,182
Total	\$135,164
Operating expenses	76,222
Net operating income	\$ 58,942
Annualized net operating income	\$707,304

Based on the actual rent collections and assuming 95 percent of the total space was occupied, the average monthly rental rate for the unrenovated apartments was 47.2 cents per square foot. The average monthly rental rate for the unrenovated office-retail space rate was 50.1 cents per square foot. Capitalizing the annualized net operating income at 10 percent yields an estimated April 1990 market value of \$7,073,040.

Asset Management Plan

The existing office-rental space tenants agreed to remain and pay an increased rental rate after the renovation. However, a comprehensive study of the local apartment market was made to determine if sufficient tenant demand would exist for the renovated apartments. The apartment market area contains multiple employment centers within five to ten minutes driving time of the site, many retail attractions, hotels and several high-income residential neighborhoods. The location of the complex relative to employment was an important reason for tenants choosing to live there.

Within the market area there had been limited construction of new apartments, some renovation of existing apartments and some existing apartments being operated without renovation. Occupancy rates generally in excess of 95 percent were found for each category, indicating a strong demand for each.

However, monthly rental rates showed marked differences. Depending on the size and type of unit, monthly rents in five newly constructed apartment developments ranged from 85 cents to \$1 per square foot whereas monthly rents in five renovated apartment developments ranged from 75 cents to 90 cents per square foot. Monthly rental rates for apartments in five unrenovated developments ranged from 50 cents to 75 cents per square foot per month.

Thus, within one market area, demand came from three distinct market segments or tenant types. Because of this, the required rental rates for a renovated project seemed achievable in the market area; current tenants would be replaced by other tenants willing to pay higher rents.

To attain these higher rental rates, the property had to be repositioned in the market. This was to be accomplished in part by renaming the complex—San Felipe Court—and renovating inside and out. External renovation included:

- construction of a new facade;
- re-roofing, pool repair and parking improvements; and
- new security gate and landscaping.

Internal renovation included:

- new floor coverings;
- new appliances;
- new ceiling fans, light fixtures and mini-blinds;
- painting; and
- refinishing cabinets and counters.

The estimated cost of these renovations was \$1.75 million. In addition, the office space renovation was estimated to cost \$250,000 for a total of approximately \$2 million. Thus, the essential questions to be answered by the analysis are, first, whether or not the renovation will increase the property's value by more than the renovation's cost and, second, whether or not the expected return on the incremental investment is sufficient.

To answer the first question, a *pro forma* December 1993 operating statement was prepared. By then, the renovation's effect on the property's income stream was expected to be complete. A 68.6 cents estimated average monthly rental rate was used to figure the rent collections for the renovated apartments, and a 68.8 cents average monthly rental rate was applied to the renovated office-retail space. These rental rates seemed achievable given the market study findings. A 5 percent vacancy rate was assumed. The *pro forma* statement was as follows:

Rental income	
Apartments	\$ 166,636
Office-retail	37,823
Total	\$ 204,459
Less 5% vacancy	10,223
Effective gross income	\$ 194,236
Operating expenses	110,434
Net operating income	\$ 83,802
Annualized net operating income	\$1,005,624

Capitalizing the annualized net operating income at 10 percent yielded an estimated value of slightly more than \$10 million—a value increase of about \$3 million between April 1990 and December 1993.

Thus, a \$2 million renovation was expected to increase value by \$3 million. Had the value increase been less than the estimated renovation costs, the analysis would have ended at that point.

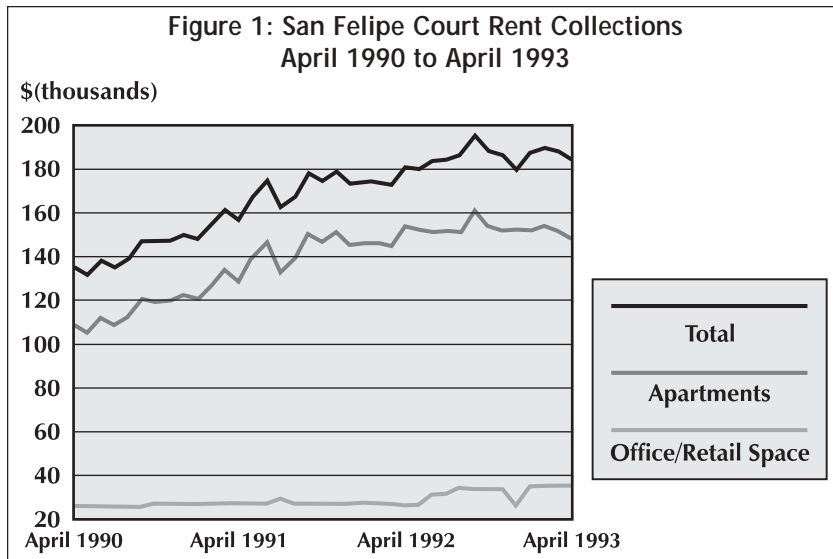
Of course, the sufficiency of the expected return on incremental investment was another important consideration before proceeding with the renovation. Estimating the return allowed the expected return to be compared with those of other investment opportunities. In this case, the incremental \$2 million investment was planned to take place during a 24-month period with the bulk of renovation to be completed within 12 months. The \$3 million increase in value was assumed to be realized at the end of 42 months to permit the calculation of the internal rate of return. In addition, the change (positive or negative) in monthly net operating income during the 42 months was treated as a positive or negative benefit, as appropriate. The expected return on the incremental investment was approximately 25.8 percent.

With San Felipe Court's location and the market area demand for space, the expected 25.8 percent return was considered attractive given the low risk. The asset management plan was adopted, financing was obtained and the renovation began. What were the results?

Renovation Results

The renovations began in April 1990 and were largely completed by September 1991, somewhat ahead of schedule.

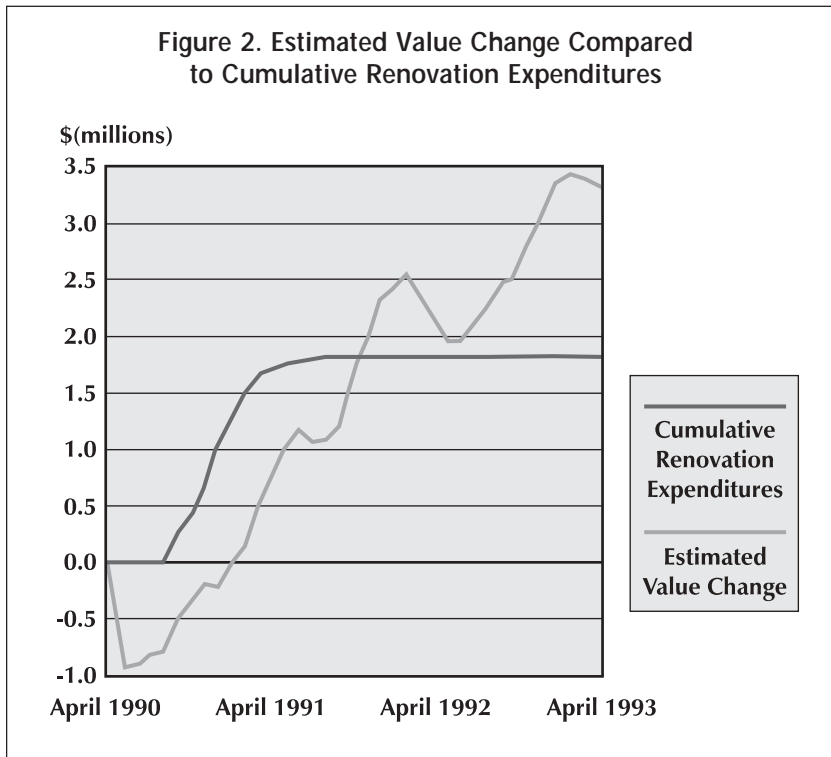
Renovation costs totaled \$1,821,463. The accompanying graphs show an overview of the results achieved by the renovation decision.



Monthly rental collections through April 1993 are shown in Figure 1. The increase in rental collections during the period demonstrates that the asset management plan succeeded. The planned increase in rental rates for the renovated property was achieved because San Felipe Court's location made it a desirable place to live, and the renovation made tenants willing to pay higher rent to live there.

In Figure 2, a three-month moving average of the property's estimated **monthly change in value** is compared to the cumulative amount of renovation expenditure. The property's monthly value was estimated by capitalizing the annualized net operating income. Then, the monthly change in value was estimated by subtracting each month's value from the estimated April 1990 value.

The property's estimated value declined when the renovation began as those units vacated for renovation did not generate rent. As the renovation proceeded, however, rental collections and the property's estimated value began to increase. The goal of a \$3



million value increase was reached in December 1992—one year earlier than planned. Although the renovation and repositioning of San Felipe Court was a success, a renovation can accomplish only limited goals.

In general, overspending will not make an old property competitive with new properties; after renovation, the property will still be an old property. On the other hand, if renovation spending is insufficient, the property's planned repositioning will not be achieved; repositioning the property requires more than performing needed maintenance. Thus, the extent of the renovation must be based on a carefully developed plan for the property.



A Matter

Summer 1993

of Assumptions

Wayne E. Etter

Asset management generally describes the use of decision-making techniques to choose a strategy for maximizing the value of an income-producing property. (See previous article on page 114 for overview.) Often, discounted cash flow (DCF) analysis is used to help select the course of action that maximizes value. However, no technique can yield a good decision if inappropriate assumptions are used in the analysis. The importance of assumptions is the focus here.

Today's asset managers commonly use computerized DCF analysis programs that calculate a property's net operating income (NOI) and the expense of maintaining the NOI; before-tax cash flow and after-tax cash flow are not considered. These programs focus on present and future leases on a tenant-by-tenant basis to estimate a property's value and require specific assumptions about the property on a tenant-by-tenant basis. In addition to selecting a time period for analysis, discount rate and a terminal capitalization rate, the required assumptions for each present lease include:

1. current rental rate and rental growth rate,
2. estimated vacancy and collection loss,
3. current operating expense and operating expense growth rate and
4. proportion of operating expense passed through to the tenant according to the terms of the lease.

For a present tenant's lease that expires prior to the end of the analysis period or for a space that is currently vacant, additional required assumptions include:

- items one to four if the current tenant is expected to renew the lease,
- leasing commissions to secure the current tenant's lease renewal,
- time required to locate a new tenant if the current tenant does not renew the lease or the space is currently vacant,
- alteration costs required to attract a new tenant,
- leasing commissions to secure the new tenant and
- items one to four for the new tenant.

With these data as inputs, the DCF program is used to estimate the entire property's annual NOI for the analysis period and its reversion value at the end of the analysis period. The DCF program is then used to calculate the present value of these future cash benefits, i.e., the estimated property value.

The necessary assumptions appear rather straightforward and well within the experience of most asset managers. Many users might not question the effect of an individual assumption on the final value estimate. **However, they are important.** To illustrate their significance, the following example demonstrates the effect of different assumptions on the present value of a single rental unit's NOI.

The Riverside Center is a multi-tenant retail building with nine leasable units totaling 46,344 square feet. Unit 2 contains 5,221 square feet and is currently leased at a monthly rental rate of 45 cents per square foot; the lease has three remaining years. The building manager estimates an annual 2 percent vacancy and collection loss.

Operating expenses are estimated to increase at an annual rate of 5 percent; all operating expenses are passed through to the tenant. A 2 percent commission will be paid for lease renewal; a 4 percent commission will be paid for a replacement tenant. All renewals are based on three-year leases.

Typically, an asset manager might assume that the current tenant in Unit 2 will renew the lease at a market rent, say 52 cents per square foot per month, when the lease expires. Using these assumptions to prepare a five-year analysis, the asset manager produces the NOI forecast reported in Table 1. With a discount rate of 12 percent, the estimated present value of Unit 2's NOI is \$103,526.

Table 1: NOI Forecast for Unit 2

	Year 1	Year 2	Year 3	Year 4	Year 5
Gross Rental Income	\$28,193	\$28,193	\$28,193	\$32,579	\$32,579
Expected Expense Recapture	7,022	7,373	7,742	8,129	8,536
Gross Potential Income	35,216	35,567	35,935	40,708	41,115
Less: Vacancy and Collection Loss	564	564	564	652	652
Expected Effective Gross Income	34,652	35,003	35,372	40,057	40,463
Less: Turnover Rent Loss	0	0	0	0	0
Expected Expense Recapture Loss	0	0	0	0	0
Operating Expenses	7,022	7,373	7,742	8,129	8,536
Net Operating Income	27,630	27,630	27,630	31,927	31,927
Other Expenditures					
Alterations	0	0	0	0	0
Commissions	0	0	0	1,955	0
Cash Flow After Other Expenditures	27,630	27,630	27,630	29,973	31,927
Present Value of Net Operating Income	104,768				
Less Present Value of Other Expenditures	1,242				
Total Present Value	\$103,526				

Although any number of assumptions can be made about Unit 2's future, two are chosen to illustrate their effect on the present value of Unit 2's NOI. First, what if Unit 2 is vacated at the end of year three and no replacement tenant is located? This would not be an unusual assumption for a small retail property. Were this to occur, not only would the unit not produce income in years four and five, Unit 2's pro rata share of operating expenses but also would be borne by the owner during years four and five. Thus, NOI is negative in years four and five. As reported in Table 2, the present value of the NOI is \$56,352—a significant reduction from the first estimate of \$103,526.

Second, what if Unit 2 is vacated by the current tenant at the end of year three, but a replacement tenant is located? Again, this is not an unusual assumption, but it does require the asset manager to estimate the time needed to locate the new tenant.

With this assumption, the amount of rent and expense recapture lost while the property is vacant can be estimated. Also, the asset manager must estimate the per square foot cost of making any property alterations necessary to meet the needs of the new tenant.

Assuming three months are required to locate a new tenant and make the necessary alterations at a cost of \$3.47 per square foot, the present value of the NOI is \$84,303. These are critical assumptions. For example, if six months are required to locate another

tenant, and the alteration costs are \$4 per square foot, the present value of the NOI declines to \$76,076. As shown in Table 2, both present values sharply differ from that reported in Table 1.

Selecting the course of action that will maximize a property's value is another important use of such DCF programs. For example, an asset manager may be negotiating a lease renewal with Unit 2's current tenant. If the lease is renewed at 52 cents per square foot per month, and no alterations are required, the estimated present value of the NOI is \$103,526 as reported in Table 1. Suppose, however, that the current tenant is negotiating for a lower rental rate.

If the current tenant does not renew the lease, a number of results are possible. But, if the asset manager assumes that a replacement tenant can be found in three months if alteration costs of \$3.47 per square foot are incurred to satisfy the replacement tenant's requirements, the present value of Unit 2's NOI will decline to \$84,303 as previously reported.

Table 2: A Comparison of Alternative Assumptions

Assumption	Present value of NOI
1. Unit 2's lease renewed by current tenant	\$103,526
2. Unit 2 vacated at the end of year 3	56,352
3. Unit 2 occupied by replacement tenant (1)	84,303
Unit 2 occupied by replacement tenant (2)	76,076

Using a DCF model, the asset manager can determine that even if the current tenant's monthly rental rate is reduced to 25 cents, it is sufficient to produce a present value equal to that of seeking a new tenant if alterations are required. If the current tenant agrees to a rate greater than 25 cents per square foot per month, and no alterations are required, the property's value will be greater than if a new tenant is secured at 52 cents per square foot per month.

Rather ordinary assumptions have a significantly different impact on the property's value. In the example, a difference of about \$47,000 in the property's value results from altering one assumption about one rental unit.

Three observations seem warranted. First, each of the example assumptions is ordinary; the user of a report based on the DCF program might not question an asset manager who made any one of them or appreciate the impact on value of such ordinary

assumptions. Second, while it may be reasonable to assume a certain future event, forecasting the details of that event may be difficult if not impossible. For example, estimating the time required to re-lease a unit and the per square foot costs of the alterations required to re-lease it more than three years in the future is not likely to be accurate. Third, when a DCF program is being used to estimate the value of a larger property and these assumption are made for a large number of tenants, the impact of the assumptions on the property's value may be significant.

Clearly, such DCF programs have the potential to produce more accurate property value estimates. For an asset manager to achieve that potential, however, requires considerable experience and sophistication in making the required assumptions.



Buy or Lease?

January 1995

The Commercial Property Decision

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The decision to buy or lease the space needed for conducting the firm's business activities is important. Although space costs are significant business expenses, the buy or lease decision is more than a financial decision. This article focuses on the analytical framework for making this decision.

Although there are many variations, the buy or lease decision typically arises in the following circumstances:

1. A business requires new or additional space. Its needs can be satisfied by leasing space or by constructing or buying a single-tenant or a multi-tenant building.
2. A business is currently leasing satisfactory space in a single-tenant or a multi-tenant building and has the opportunity to purchase the building.

The decision is a three-part process: the market analysis, the financial analysis and other considerations.

Market Analysis

Real estate market research considers those factors that affect the supply and demand for a particular type of space within the

specific market area. Conducting this research is a vital step in deciding to buy or to lease because the property must be a good real estate investment if it is purchased. Market information is crucial to negotiating a competitive lease if the property is not purchased.

If rental rates are expected to rise (or fall) during the analysis period, property values should rise (or fall) as well. When it is concluded that rental rates and property values will increase, buying the property is supported and vice versa. Because these conclusions are so important for the financial analysis, the data used to reach them must be carefully developed through market analysis.

For a basic outline of the real estate market research process, see "Development by Design."

Financial Analysis

In making the buy or lease decision, the financial analysis is used to identify the **financial advantage** of one alternative over the other. The principal focus of the analysis is to choose the alternative that will provide the needed space at the least net cost. To determine this, the present value of the after-tax cost and benefits of owning the property is compared with the after-tax cost of leasing the space. All other things being equal, the course of action with the least net cost is chosen. Because lease payments, operating expenses, depreciation and interest are deductible expenses, the analysis is usually made on an after-tax basis.

When the choice is between buying or constructing a multi-tenant building and leasing space, the consequences of becoming a landlord are added to the analysis. By investing sufficient equity to purchase or construct a multi-tenant building, the owner acquires the present value of the after-tax income stream from the building's other tenants and the present value of the building's after-tax cash flow from resale and avoids the present value of the after-tax cost of leasing space.

The firm's required rate of return (or its cost of capital) is used as the discount rate to calculate the present value of the cost to lease and the cost to own. Because different firms have different required rates of return (or cost of capital), they might use the same assumptions about the costs and benefits of buying or leasing but reach different conclusions about the best course of action.

The basic elements of a buy or lease analysis are illustrated in the table. Assume the owner of an unincorporated business with a 31 percent marginal tax rate can either purchase a building or lease it for five years. If it is purchased for \$100,000 plus \$3,000 closing

costs, the initial cash investment will be \$28,000. The balance can be financed with a \$75,000, 9.5 percent, 20-year mortgage. The building's depreciable value is \$83,000. The first year's operating expenses of \$3,500 are estimated to increase 3 percent annually. Because annual operating expenses, depreciation and interest are tax-deductible, the actual annual cash outflow associated with purchasing the building is the sum of the operating expenses and the mortgage payment less the tax shield provided by the deductible expenses. To make an appropriate comparison with a five-year lease, it is necessary to assume the property will be sold at the end of the fifth year and to estimate the after-tax cash flow from resale. The property's estimated resale price at the end of the fifth year is \$116,000; the estimated after-tax cash flow from resale is \$33,454.

If the building is leased for five years, the first year's lease payment will be \$10,000. The following year's lease payments are scheduled to increase 3 percent annually. Annual lease payments will be due in advance. The tenant will pay all operating expenses; annual operating expenses are estimated to be the same as if the building is purchased. Because the lease payments and the operating expenses are tax deductible, the after-tax cost of leasing is the sum of the lease payment and operating expenses less the tax shield provided by the deductible expenses.

Using a cost of capital of 10 percent, estimating the after-tax cost of buying the property and leasing the property is illustrated in the table. These calculations indicate a financial advantage for buying the property; however, this advantage is dependent upon the assumptions made about the resale of the property at the end of the fifth year. Without the resale benefits, the total cost of leasing the property is less than buying the property. Therefore, the assumption of a 3 percent annual increase in the property's value is critical. This indicates the dependence of the financial analysis on the market analysis.

The use of a resale assumption does not imply that the property must be sold; rather, it is used to estimate the net equity in the property so that buying can be compared with leasing over the life of the lease.

Other Considerations

Because most leasing literature concerns leasing business equipment, such as a truck, the buy or lease decision usually is treated purely as a financial decision. Whether leased or purchased, there is no difference in the truck's ability to do the job. Thus, the

decision of whether to buy or lease a truck is about determining the most financially advantageous way to gain the use of the truck for the analysis period.

The decision of whether to buy or lease real estate is much more than a financial decision, although the financial analysis is important. The following points must be considered:

1. Business enterprises need space to conduct their business activities, but in most cases, real estate is not their principal business. If the firm leases needed space, it can adjust the amount of leased space as market requirements change. If the firm owns real estate, adapting quickly to changes in the market may be more difficult because of the time required to plan and construct a property or to buy a property when more space is needed or to sell the property when less space is needed. A retailer, for example, may prefer to lease space so that store locations can be changed in response to market shifts.

On the other hand, an owner may enjoy greater flexibility in using the property than a tenant. As space needs change, an owner can make choices that support these needs.

2. If a multi-tenant building is constructed or purchased, the business also becomes a landlord. Aside from the other consequences of owning real estate, how will being a landlord fit in with other business activities?

3. An existing building can be inspected to determine its quality and its suitability for the business enterprise before it is leased or purchased. In certain markets, an existing building's market value may be less than its replacement cost; if the space is suitable for the business, it can be obtained at an attractive price. How does buying an existing property differ from constructing the property? A newly constructed property should have no functional (or other) obsolescence and should be designed especially for the user's needs; however, when completed the new building may be unsatisfactory and may have cost more than planned or both.

4. Balance sheet issues may be important to a company making the buy or lease decision. For example, future borrowing restrictions resulting from real estate debt may be a concern; if so, leasing to keep real estate off the balance sheet may be an attractive option.

Conclusion

The buy or lease decision melds the market and financial analyses with other business considerations. This might result in a

decision to lease even though purchasing the property appears to be financially advantageous. The possibility of such an outcome emphasizes the difference between purchasing real estate and other business assets.

Buy or Lease Analysis

A. Buy

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Equity investment	\$28,000					
Operating expense	\$ 3,500	\$ 3,605	\$ 3,713	\$ 3,825	\$ 3,939	
Depreciation		2,043	2,128	2,128	2,128	2,128
Interest		<u>7,125</u>	<u>6,993</u>	<u>6,849</u>	<u>6,691</u>	<u>6,519</u>
Total expense	\$12,668	\$12,726	\$12,690	\$12,644	\$12,586	
Tax rate		<u>0.31</u>	<u>0.31</u>	<u>0.31</u>	<u>0.31</u>	<u>0.31</u>
Tax shield	\$ 3,927	\$ 3,945	\$ 3,934	\$ 3,920	\$ 3,902	
Operating expense		3,500	3,605	3,713	3,825	3,939
Interest		7,125	6,993	6,849	6,691	6,519
Principal		1,386	1,518	1,662	1,820	1,992
Tax shield		<u>(3,927)</u>	<u>(3,945)</u>	<u>(3,934)</u>	<u>(3,920)</u>	<u>(3,902)</u>
Annual after-tax cost of buying		\$ 8,084	\$ 8,171	\$ 8,290	\$ 8,416	\$ 8,548
After-tax cash flow resale						\$33,454

B. Lease

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Lease payment	\$10,000	\$10,300	\$10,609	\$10,927	\$11,255	
Operating expense		<u>3,500</u>	<u>3,605</u>	<u>3,713</u>	<u>3,825</u>	<u>3,939</u>
Total expense	\$10,000	\$13,800	\$14,214	\$14,640	\$15,080	\$3,939
Tax rate		<u>0.31</u>	<u>0.31</u>	<u>0.31</u>	<u>0.31</u>	<u>0.31</u>
Tax shield	\$ 3,100	\$ 4,278	\$ 4,406	\$ 4,538	\$ 4,675	\$1,221
Lease payment	10,000	10,300	10,609	10,927	11,255	
Operating expense		3,500	3,605	3,713	3,825	3,939
Less tax shield		<u>(3,100)</u>	<u>(4,278)</u>	<u>(4,406)</u>	<u>(4,538)</u>	<u>(1,221)</u>
Annual after-tax cost of leasing	\$ 6,900	\$ 9,522	\$ 9,808	\$10,102	\$10,405	\$2,718

C. Summary of the Analysis

	Buying	Leasing
Initial outlay	\$28,000	\$ -0-
Present value of annual cost	<u>\$31,387</u>	<u>\$40,046</u>
Total cost	\$59,387	\$40,046
Present value of after-tax cash flow from resale	<u>(20,772)</u>	<u>-0-</u>
Net cost	\$38,614	\$40,046



Distressed Property Decisions

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Today, there are numerous distressed Texas properties. Many, unable to generate sufficient net operating income (NOI) to service debt, have been foreclosed and are in the hands of the original lender. Further, the deterioration of the Texas commercial real estate market resulted in the downfall of several of the state's major commercial banks and savings and loan associations (S&Ls).

In many cases, the problems of distressed properties can no longer be solved by the particular financial institution that made the loan. Instead, solving these problems is the responsibility of public and private successor institutions. In addition to managing acquired property, public agencies must wrestle with the larger issue of disposing of entire institutions. While real estate literature has little to offer with regard to the latter, much is known about the process of analyzing distressed property.

Whether the final decision about these properties is made by a private institution (commercial bank or S&L) or a public institution (the Federal Deposit Insurance Corporation or the Resolution Trust Corporation), ideally, the decision will be made best if a proper analytical approach is used to evaluate and manage these properties.

Losses suffered from nonfull repayment represent a significant federal insurance problem that ultimately becomes a taxpayer problem, but it is not related to the current market value of specific

properties. Failure to grasp this distinction results in an overstatement of the current real estate overhang and postpones the recovery of Texas real estate markets. While national attention is focused on the disposition of distressed real estate, similar energy has yet to be spent on analyzing the institutional failures that contributed to the crises. Analysis of such institutional problems is outside the focus of this article.

Cost Considerations

The lender originally extends a loan with the expectation that the borrower will repay it with interest. (Throughout the remainder of this article, lender shall be used to denote the party to whom the task of managing distressed real estate has fallen.) However, the analysis of a problem property requires recognizing that the question has become one of selecting the course of action providing the maximum recovery. In some cases, this solution will recover less than the amount owed. Thus, the concept of sunk cost is an important consideration for the lender in dealing with a problem property; **the amount owed is not unimportant, but it is not relevant for making decisions.** No future course of action can affect the amount previously loaned; such actions can affect only the amount of recovery. If a course of action is the best available solution, it must not be rejected because it will not result in full repayment of the loan.

Opportunity cost also is important when considering holding a nonperforming property or working with the borrower rather than selling the property at its current value. If the property is sold, the proceeds of the sale can be invested or loaned elsewhere to earn profits for the lender. Thus, opportunity cost is the profit foregone from other possible courses of action. Although the ultimate payoff may be higher if the property is held, the opportunity cost of holding the property must be considered. Finally, the out-of-pocket costs of holding a nonperforming property or working with the borrower must be considered. Utilities, insurance, property taxes, maintenance, attorney fees, security and other costs of property management must be considered.

Proceeding with the analysis first requires identification of the problem. Is the principal reason for the property's difficulty the market (a lack of demand for space), physical or management? In many cases, some element of each is involved; generally, however, the most significant problem will be an apparent lack of demand for the space. If the property is complete, but empty, there likely are market problems. If the property is incomplete, it may be because

there would be insufficient tenants to successfully operate the property.

Physical problems with ingress, egress, signage, visibility, quality of construction and so forth inhibit leasing the property or achieving the expected rental rate. The cost of correcting these problems needs to be weighed against the probability that their solution results in the property being leased. In some cases, the property may be incomplete, and a decision must be made about completing the property. Again, it is necessary to consider whether the property can be leased when it is completed. The cost of eliminating any environmental hazards also must be taken into account.

Management problems may exist as well. Developers without adequate management skills may not be aware of possible solutions or the need to test their feasibility. When this is the case, lenders need to supply the expertise.

Solutions and Options

With the property's primary problems identified, there are four broad solutions available to the lender. The analytical problem is not only to judge which of the proposed solutions is best but also to decide whether or not the best solution makes the lender better off.

The first option is to sell the property "as is" for its current market value. The property's value may equal only the land value because the improvement is deemed useless. Presumably this results in a loss to the lender, but this may be the best course of action if the project has little future. By disposing of the property, the out-of-pocket holding costs and the opportunity costs of keeping it will be avoided.

The second option is to hold the property or work with the borrower to avoid default until market conditions improve. However, this option results in both out-of-pocket holding costs and opportunity costs to the lender.

The third option is to advance the funds necessary to improve the project, and then sell it. This may involve completing or rehabilitating the property, initiating a new marketing program or restructuring financial arrangements. This requires deciding whether advancing the additional funds will make the project financially feasible and whether the project's value will increase by more than the newly invested funds. As well as the added investment, this option involves both out-of-pocket holding costs and opportunity costs.

The fourth option is the same as the third except that, after advancing the funds necessary to improve the project, it is operated rather than sold. This option involves the same considerations as option three in determining if the additional funds will make the project economically feasible and if the project's value will increase by more than the amount of the added funds advanced.

In considering the third and fourth options, lenders must make economic judgments about the merits of acquiring a property and investing adequate funds to cause it to perform at the highest level possible in the current market. Over time the lender expects to be rewarded by an enhanced market value for the property. Lenders must be convinced that the property is a good investment at the price paid for it: the sum of the property's current market value plus rehabilitation cost.

Economic Feasibility

Next, the economic feasibility of each proposed solution must be established. **An income property is economically feasible if there is an adequate demand for the space and if it can generate adequate NOI to support sufficient debt to finance the property and provide a satisfactory cash return to its owner.** Thus, ascertaining a proposed solution's economic feasibility requires both market research and financial feasibility analysis.

Market research is, of course, usually considered in connection with new developments. Developers, lenders and investors want to know if there will be sufficient demand for the to-be-built space for it to be taken up when the project is put on the market. But market research also can play an equally important role for problem properties.

In the case of many distressed properties, no market research was carried out prior to the property's development. Making the decisions that were described previously requires considerable dependence on a market study and, therefore, the first step with almost all problem properties is to undertake a market study. For such properties, the market research report should provide information beyond that ordinarily found in a report prepared for new developments.

Market research analyzes the supply and demand for space within a given market and should provide answers to questions such as:

- What types of space are available in the market?
- How much space of each type is available?

- What types of space users are in the market now?
- What types of space are being demanded?
- What changes in the demand for space are foreseen?
- What is the underlying cause of the expected change in future demand?
- Is an expected increase in the demand for space because of the expansion of businesses within the market area?
- Is an expected increase in the demand for retail shopping space related to an increased residential population in the market?
- When will there be a need for additional space?
- Are there any current unmet needs for space?

If there is no unmet demand for space in the market area that the property can supply now or later, the property should be sold for its current value. If there is an unmet need for space that the property can reasonably be expected to supply, the research should provide an estimate of the number of square feet of space required, the price that space users are willing to pay and an estimate of the time required to lease.

The market study might show that the property is unsuited for its intended use. If this conclusion is reached, the costs and benefits of retro-fitting for conversion to another use must be evaluated.

The report also should address the property's physical problems, if any. Are there physical shortcomings to correct before the property can be leased at the anticipated rental rate?

Finally, the report should address the implementation of a marketing plan for the property. Merely identifying an unmet need is insufficient; the market must be aware of the available space.

Although the market study is an important test for possible solutions, the analyst also must test the proposed solution's financial feasibility before implementing it. Given the current market value of the property and the proposed solution's cost, it is financially feasible if the property can generate adequate net operating income to support sufficient debt to finance the property and provide a satisfactory cash return to a potential buyer. The determination of financial feasibility is dependent on the following information.

- Given a solution's implementation, how much rent will the project produce; what are the expected operating expenses; and how much NOI will the project generate?
- Given current market conditions and lending requirements, how large a loan will the NOI support?

- Given the probable equity contribution of a potential buyer, can the property be financed?

But even if a solution is found to be financially feasible, it must be evaluated further by comparing the property's expected increase in value as a result of the proposed solution with the cost of the proposed solution—is the increase in value greater than the cost of improvements? If not, the property should be sold immediately for its current market value. Making this decision is dependent on the following information:

- What is the estimated maximum price a potential buyer will pay for the property?
- Given the current market capitalization rate, what is the estimated capitalized income value of the property?
- What is the estimated market value of the property now?
- What is the estimated cost of the solution?
- Will there be any special out-of-pocket holding costs?

Financially feasible solutions that require holding the property until a higher market value is achieved must be tested with discounted cash flow analysis. To pursue the final stage of the analysis, it is necessary to estimate the following.

- How long must the property be held for the proposed plan to work?
- What cash benefits will be received during the holding period?
- What is the estimated maximum price a potential buyer can pay at the end of the holding period?
- What is estimated capitalized income value of the property at the end of the holding period?
- What rate of discount should be applied to the expected cash benefits during the holding period and the expected resale proceeds? What is the opportunity cost of not selling the property for its current value?

The solution chosen should be both economically feasible and provide the greatest present value differential over immediately selling the property for its current value plus the cost of the solution. If none of the proposed solutions provides a positive present value differential, it should be sold as is.



The Disinvestment

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Decision

Wayne E. Etter

Real estate investment is studied diligently, but disinvestment (the decision to sell or hold a property) rarely is considered. Unfortunately, lack of knowledge about disinvestment can diminish an investor's return because sometimes portfolio performance is improved by selling a property and buying another property or other asset with a higher expected return. This section **focuses on the fundamentals of making the decision to sell or hold a property.**

Fundamentals of Disinvestment

Although a holding period must be selected when estimating a property's net present value (NPV) or after-tax internal rate of return on equity (ATIRRE), the decision to sell does not depend on the expiration of the assumed holding period nor take place at some predetermined time. An investor dare not make an investment anticipating a seven-year holding period, for instance, and give the property no further consideration for seven years. **Instead, the process of deciding whether to sell or hold the property should be continual.** Effectively, this process results in regular review of current investments with the whole range of analysis techniques: market research, financial feasibility study and discounted cash flow diagnosis. Each of these techniques is used to make the disinvestment decision in the same way as in the investment decision.

The decision to sell or hold the property is made by comparing the NPV or ATIRRE of

- selling the property and reinvesting the resale proceeds in a property (or alternative investment) with equivalent risk to that of
- continuing the investment in the property.

All other things being equal, the course of action with the largest NPV or ATIRRE should be selected.

To compare, new investment opportunities are identified and their expected cost and cash benefits estimated to determine their expected NPV and ATIRRE. Then, these values are compared with

the NPV and ATIRRE of the current property if it is kept by the investor. Calculating these values involves estimating the property's current market value and its resale proceeds to estimate the current equity investment in the property. In addition, after-tax cash flows from operations during the anticipated holding period and from resale at the end of the holding period are estimated.

An Example Calculation

This discussion focuses on the use of discounted cash flow analysis in making the disinvestment decision (the fundamentals of market research and financial feasibility analysis have been presented elsewhere).

An example property, purchased by an investor five years ago, illustrates the analysis. The initial equity investment and the estimated (pro forma) after-tax cash flows from operations and resale at the time the property was purchased are presented in Figure 1. Now, suppose the five-year period has elapsed. Although there is an opportunity to sell this property for \$450,000, the owner is considering keeping it because prospects seem promising. If the property is retained for another five years, what is the estimated NPV and ATIRRE?

Answering this question first requires identifying the current equity investment. This is the amount that the investor can reinvest elsewhere if the property is sold and is, therefore, the amount committed to this property if it is kept. Put another way, this is the *opportunity cost* of continuing the investment. **Thus, when estimating the rate of return and NPV of keeping the property, the estimated after-tax cash flow from resale should be used as the cost of the investment rather than the amount of the initial equity investment.**

Figure 1

(Based on Original *Pro Forma*
Rather than Actual Cash Flows)

Year	Equity Investment	After-tax Cash Flow	After-tax Resale Proceeds
0	\$80,299		
1		\$7,695	
2		8,574	
3		9,374	
4		10,191	
5		\$11,026	\$161,453

Internal rate of return: 23.84%

Required rate of return: 15%

Net present value: \$30,618

Although the original equity investment was \$80,299 (see Figure 1), the investor now has estimated recoverable equity of \$159,989 if the property is sold for \$450,000 (see Figure 2); this is the opportunity cost of holding the property. The increase from \$80,299 results from appreciation and repaying the loan.

Figure 2
(Based on Today's Market Analysis)

Expected sales price	\$450,000
Less: Selling expenses	18,000
= Net sales price	432,000
Less: Unpaid mortgage balance	229,420
= Before-tax cash flow	\$202,580
Less: Capital gains tax	42,591
After-tax cash flow from resale	\$159,989

If the example property is held for another five years, the estimated after-tax cash flow from operations and resale reported in Figure 3 are expected. For this example, these cash flow projections were estimated by continuing the original assumptions made for growth rates and other variables.

Figure 3
(Based on Holding Property an Additional Five Years)

Year	Equity Investment	After-tax Cash Flow	After-tax Resale Proceeds
5 (end of year)	\$159,989		
6		\$11,879	
7		12,749	
8		13,635	
9		14,537	
10		\$15,453	\$219,791

Internal rate of return: 14.0%
Required rate of return: 15%
Net present value: -\$5,785

The investor's required return is 15 percent and continuing to hold the property results in a negative NPV of -\$5,785 and an ATIRRE of 14 percent, which is less than the required rate of return (Figure 3). Based on these calculations, the property should be sold because it does not meet the investor's requirements.

Of course, even if the property's NPV is positive and its ATIRRE in excess of 15 percent, it should be sold if another investment opportunity offers a higher return with equivalent perceived risk. **Practically speaking, however, such a sale will not occur unless the improvement in return is worthwhile.**

Why would a property that had a positive NPV and an acceptable ATIRRE at the time of acquisition be unacceptable now? And, in particular, why is this true when the estimated after-tax cash flows from operations and its market value are expected to increase at the same annual rate during the next five years as the previous five years? **The answer is that the equity in the property has increased relatively more than the expected benefits, causing the NPV and ATIRRE to decline to unacceptable levels.**

What about the property's cash-on-cash return? The after-tax, cash-on-cash return calculated with the initial equity investment is reported in Figure 4. Because after-tax cash flow from operations increases annually and the initial equity is held constant, there is the appearance of increased cash-on-cash return. However, using the opportunity cost of continuing the investment rather than the initial equity as the denominator for years six through ten provides additional evidence of the investment's decreased current return (Figure 4, column 2).

Figure 4

Year	After-tax Cash-on-Cash Return on Initial Equity (%)	After-tax Cash-on-Cash Return on Fifth Year Equity (%)
1	9.58	
2	10.68	
3	11.67	
4	12.69	
5	13.73	
6	14.79	7.42
7	15.88	7.97
8	16.98	8.52
9	18.10	9.09
10	19.24	9.66

Another explanation of the property's reduced return is that by holding it the investor is not taking as much advantage of financial leverage as when the property was purchased. Financial leverage is the use of debt to increase the investor's ATIRRE; when debt is used effectively, the return to equity increases as the proportion of cost financed by debt increases. The original loan-to-value ratio was

75 percent; the current loan-to-value ratio is 51 percent (Figure 5). The loan balance has decreased, the property's value has increased and the benefits of financial leverage have decreased.

Presumably, the property is appreciating because net operating income is increasing; this may result in an increasing debt-coverage ratio and a decreasing break-even occupancy ratio for the property (Figure 6). By selling the property and reinvesting the after-tax resale proceeds, the investor can recapture the benefits of financial leverage in another property rather than provide the lender with greater security.

Figure 5

$$\frac{\text{Loan amount}}{\text{Property value}} = \text{Loan-to-value ratio}$$

$$\frac{\$240,888}{\$321,197} = 75\% \text{ (year property purchased)}$$

$$\frac{\$229,420}{\$450,000} = 51\% \text{ (current year)}$$

Finally, either a larger property or more than one property might be purchased with the after-tax cash flow from resale. If a property is appreciating and the debt is being reduced, then the opportunity cost of continuing with the property increases with time. Unless the expected benefits increase even faster than equity, at some point the sale of the property will be attractive because the equity freed from the property can be used to acquire properties with greater returns than the property being held.

Figure 6

Year	Debt Coverage	Break-even Occupancy
1	1.27	0.81
2	1.31	0.80
3	1.35	0.78
4	1.39	0.77
5	1.43	0.75
6	1.47	0.74
7	1.52	0.73
8	1.56	0.72
9	1.61	0.70
10	1.66	0.69

Refinancing the Property

The foregoing example assumes the investor is willing and able to sell the property if the NPV or ATIRRE of another option is greater. Presumably, the investor can locate other investment opportunities that do meet the minimum requirements. In the real world, however, this may not always be the case. For example, an investor may be in a comfortable position with a property—it has a high occupancy rate, a positive after-tax cash flow and is appreciating nicely. Selling it to achieve a larger expected NPV in another property may be viewed as risky and unappealing. Or, selling the current property at a favorable price may be difficult because of market inefficiencies; the characteristics of investment real estate preclude its being bought and sold like securities.

An alternative to selling is to refinance the property. This allows the investor to hold a known property while reducing the equity investment and increasing the benefits of financial leverage. For example, the owner of the example property could increase the amount of debt to \$283,500 and maintain a 1.25 debt coverage ratio; this would reduce the equity investment (or opportunity cost) of holding the investment to \$107,373—a reduction of \$52,616. If the investment is continued for another five years, the estimated after-tax cash flow from operation and sale also must be adjusted; the larger loan amount results in larger interest payments and a larger remaining mortgage balance at the end of the tenth year. These changes are summarized in Figure 7.

Figure 7

Year	Equity Investment	After-tax Cash Flow	After-tax Resale Proceeds
5 (end of year)	\$107,373		
6		\$ 8,265	
7		9,450	
8		10,096	
9		11,042	
10		\$12,009	\$158,991

Internal rate of return: 16.2%

Required rate of return: 15%

Net present value: \$4,928

The refinancing has a favorable effect on the property's rate of return. The estimated NPV is positive, and the ATIRRE is 16.2 percent. Because the investor's required return is 15 percent, keeping

the property is now an acceptable option. In addition, the investor has \$52,616 to invest elsewhere, but an expected return of at least 15 percent must be obtained. However, the property should be sold rather than refinanced if another investment opportunity offers a higher return with equivalent risk.



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