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STRICKLAND, THOMAS HORTON

A TEST OF THE RELATIVE PERFORMANCES OF REAL ESTATE VALUATION MODELS

The University of Oklahoma PH.D. 1980

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THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

A TEST OF THE RELATIVE PERFORMANCES OF REAL ESTATE VALUATION MODELS

A DISSERTATION

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degree of

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THOMAS HORTON STRICKLAND

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A TEST OF THE RELATIVE PERFORMANCES

OF VARIOUS REAL ESTATE VALUATION MODELS

APPROVED

DISSERTATION COMMITTEE

ABSTRACT

The study investigated the "benefit" aspects of the cost-benefit approach to real estate project selection models. Three main objectives included (1) comparing the relative performance between commonly used, simplistic models and the more sophisticated discounted cash flow (DCF) models; (2) comparing simple and DCF models to a sophisticated metric or bench mark model; and (3) specifying a simplified version of the metric model and comparing it to the bench mark. The metric model is a risk-adjusted net present value model that discounts each project's cash flows at a rate comcomitant with its expected risk level.

Data from thirty-four actual investment projects, ranging in size from $90,000 to $100 million, was obtained through personal interviews. Risk was estimated by a simulation model which required probability distributions for various project cash flow elements. Calculating metric NPV's, the bench mark values, necessitated specifying a risk-return opportunity cost schedule for the study.

The major findings were (1) of the seven common models tested, the two DCF models (Internal Rate of Return and Ellwood) are closely related; (2) the DCF models perform better than the most popular rules of thumb; and (3) the simplified models perform better than the common models. In general, model performance is a function of information utilized. The ancillary findings include (1) the probability distributions required for the simulation, while obtained from non-statistically adept real estate experts, are relatively easy to acquire; (2) The *ex ante* risk-return schedule immensely affects metric values and hence model performance, i.e., required rate of return specification is extremely important; and (3) the three most popular income property selection models do not discriminate for risk.

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Chapter I

INTRODUCTION

1.1 NATURE AND IMPORTANCE OF THE PROBLEM

A common problem faced by real estate practitioners is that of estimating the value of prospective income-producing properties. This problem is not created by a dearth of evaluation techniques; instead, there have been so many models developed that the problem is one of choosing among the available alternatives.

1.1.1 Nature of the Problem

The valuation models available range in sophistication from heuristic rules of thumb (Payback) to generalized models that defy operationalization (Time State Preference). While surveys indicate that sophistication in capital budgeting is increasing, they also show that a large percentage of practitioners continue to use naive models even though available models are theoretically superior.[1] While naive

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[1]For a discussion of the adoption of capital budgeting techniques see Thomas P. Klammer, "Empirical Evidence in Adoption of Capital Budgeting Techniques," Journal of Business 45 (July 1972): 387-97. For a real estate survey see Arnold H. Diamond, "Tax Considerations Affecting Multi-family Housing Investment," Annual Meeting of American Real Estate

models do not include as many inputs as the more sophisticated techniques, the use of these shortcut models increases the danger of missing relevant information.[2] Bierman and Smidt note that methods which ignore the timing of cash flows are inferior to those that take timing into account.[3]

As the decision-maker utilizes more sophisticated valuation models there are presumed advantages. These more complex models, however, require a greater expenditure of management's resources and decrease the decision-maker's prerogatives. The general problem addressed in this research is whether the more sophisticated valuation models are sufficiently superior to warrant their adoption.

1.1.2 Importance of the Problem

The value of real estate in the United States is estimated to be three trillion dollars (60 to 70 percent of national wealth), and annual new construction alone, not including land costs, is $125 billion.[4] Real estate's

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and Urban Economics Association, New Orleans, Louisiana, December 28, 1971.

[2]Sherman J. Maisel and Stephen E. Roulac, Real Estate Investment and Finance (New York: McGraw Hill, 1976), p. 4.

[3]Harold Bierman, Jr. and Seymour Smidt, The Capital Budgeting Decision (New York: The Macmillan Company, 1975), ch. 2.

magnitude can be put into perspective by comparing this estimate to the defense budget of approximately $120 billion. Between World War II and 1969, the mortgage market alone has absorbed more private savings than either (1) corporate bonds, (2) corporate stocks, (3) municipal bonds, or (4) U.S. Government securities--more, in fact, than these investments combined.[5] With expenditures of capital in this magnitude, individual investors as well as society should demand that the allocation process be efficient.

1.2 HYPOTHESES

This section will state the hypotheses to be examined in the study. Terms introduced in this chapter will be further defined in Chapter II. The three general types of models that will be used in this study are:

1. Commonly used models that consist of
   a) Simplistic Models that include
      i) BRR - Broker's Rate of Return
      ii) FCR - Free and Clear Return
      iii) PB - Payback
      iv) DCR - Debt Coverage Ratio

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[4]Maisel and Roulac, p. 4.

[5]Murry E. Polakoff et al., Financial Institutions and Markets (Boston: Houghton Mifflin Co., 1970), p. 277.

b) Discounted Cash Flow, DCF, models that include

i) IRR - Internal Rate of Return

ii) ELL - Ellwood

2. A sophisticated metric model that will be used as a bench mark or criterion for the study

3. Risk Class models that simplify the sophisticated model approach and include adaptations of

a) BRR(R)

b) NPV(R)

c) ELL(R)

There will be three general areas of investigation:

1. The results of each simplistic model will be compared to the results of each discounted cash flow model.

2. The results of each common model will be compared to the results of the sophisticated metric, or bench mark, model.

3. The results of risk class models will be compared to the results of both the common models and the metric.

The metric, referred to as a bench mark, is both a valuation model and the key element in the overall approach of this study. In terms of an approach a bench mark, or metric, must be specified in order to provide a basis for comparisons of model performance. The metric model serves that purpose. The model eventually chosen as the metric for this study is a risk-adjusted Net Present Value cash flow model which uses a Monte Carlo simulation to determine the risk proxy, standard derivation of expected returns.

1.2.1 Simplistic versus DCF Models

The performance of the simplistic models relative to the more sophisticated DCF models is of interest because almost everyone assumes that DCF models yield superior results. For each DCF model, the following null hypothesis (H) will be tested against the alternatives, A(1) and A(2).

H: DCF Model(x) results are identical to Simplistic Model(Y).

where x = IRR, ELL and
y = BRR, FCR, PBBT, PBAT, DCR.

A(1): DCF Model results are superior to those of the simplistic model.

A(2): DCF Model results are inferior to those of the simplistic model.

1.2.2 Common Models versus the Metric

The performance of models presently being used--common models--is compared to the metric. The hypothesis for each common model is:

H: Common Model results are identical to those of the metric.

A: Common Model results are inferior to those of the metric.

1.2.3 Risk Class Models versus the Metric

The performance of risk class models will be compared to the metric. The following hypothesis will compare risk class models by model type and by number of risk classes (1,2,...,6):

H: Risk Class model results (by number of risk class) are identical to those of the metric.

A: Risk Class model results are inferior, and

H: Risk Class model results (by model type - NPV, ELL, BRR) are identical to those of the metric.

A: Risk Class model results are inferior.

1.3 ANTICIPATED RESULTS AND RESEARCH VALUE

The results should show specifically whether simplistic models are in fact inferior to DCF models that are currently in use. Also, the general question of comparative model performance will be addressed in the analysis. These results will point to the areas of future research by focusing on the difficult question of how the investor should allocate total resources between the process of estimating *ex ante* cash flows and actual model solutions. This problem emphasizes the need for a model with a strong theoretical base and subsequent application by risk takers, the ultimate users of decision-making models.

1.3.1 Specific Findings

The study will show whether BRR, PB, DCR, and FCR (simplistic) models are inferior to NPV, IRR, and ELL (DCF models). For example, the BRR model will be compared to each of the sophisticated models, NPV, IRR and ELL. The comparisons between the Risk Class models of IRR and ELL will show whether Risk Class models do outperform these DCF models and, if so, at which risk class number this occurs. All comparisons are made on an *ex ante* basis.

1.3.2 General Findings

The results will show comparative model performance among all models tested under different assumptions regarding the risk return tradeoff in real estate valuation.

The Risk Class models' relative performance will be compared in relation to the number of risk classes chosen by the analyst. For example, if the decision-maker wishes to classify projects into risk classes, the results will provide information on the relative merits of changing from a two-risk segment classification to a three-risk class model.

Similarly, if an analyst chooses a three-segment risk classification, the results will show the relative performance of the different risk class models.

Chapter II

REAL ESTATE VALUATION MODELS

Most real estate valuation models are adaptations of those developed in corporate finance literature.[6] This section briefly discusses the development of valuation models and outlines several real estate valuation models that can be applied to actual projects.

2.1 PRIOR RESEARCH

This section discusses some of the popular models, their origin and development, and the slow acceptance rate of new models by the business community. Some possible solutions to remedy this slow acceptance rate are subsequently examined.

2.1.1 Development of Valuation Models

The essential ingredient in valuing an income-producing asset is that of transforming the property's income stream estimate into a stock value estimate. Hirshliefer improved

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[6]Paul F Wendt, Real Estate Appraisal Review and Outlook (Athens, Georgia: University of Georgia Press, 1974), pp. 19-22.

this process by strengthening the modern technique of the discounted cash flow (DCF) analysis, but ignored uncertainty in his analysis.[7] Later embellishments of DCF analysis include the Time-State Preference,[8] Certainty Equivalent,[9] and Risk-Adjusted Net Present Value[10] valuation models, which do recognize and adjust for risk. Most multi-period models use some form of DCF technique to change cash flows into a stock of wealth.

In 1952, Markowitz developed the theoretical framework to select an optimum portfolio from among a set of risky securities.[11] Sharpe-Lintner-Mossin then developed the body of theory that became known as the Capital Asset Pricing Mo-

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[7]Jack Hirshliefer, "On the Theory of Optimal Investment Decision," Journal of Political Economy 66 (August 1965): 329-52.

[8]Jack Hirshliefer, "Investment Decision Under Uncertainty: Applications of the State-Preference Approach," Quarterly Journal of Economics 80 (May 1966): 252-77.

[9]Alexander A. Robichek and Stewart C. Myers, Optimal Financing Decisions (Englewood Cliffs, New Jersey: Prentice Hall, Inc.), pp. 79-83.

[10]Hirshliefer, Theory of Optimal Investment, p. 187.

[11]Harry Markowitz, "Portfolio Selection," Journal of Finance 7 (March 1952): 77-91.

[12]For a description of the Sharpe-Lintner/Mossin CAPM, see William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," Journal of Finance 19 (September 1964): 425-42. See also John Lintner, "The Valuation of Risk Assets and the Selection of

del.[12] In 1970, Markowitz-type portfolio analysis was applied to real estate investment analysis.[13] The securities market approach of the CAPM was later recast in a physical asset environment by Rubinstein.[14]

The classic risk simulation model was presented by Hertz in 1964, and in 1973, Stephen Pyhrr published a real estate application of that approach.[15] Other more complex real estate valuation approaches have been suggested that include utility analysis.[16]

Risky Investments in Stock Portfolios and Capital Budgets," The Review of Economics and Statistics 47 (February 1965): 13-37. See also Jan Mossin, "Equilibrium in a Capital Asset Market," Econometrica 34 (October 1966): 768-83.

[13]Harris C. Friedman, "Real Estate Investment and Portfolio Theory," Journal of Financial and Quantitative Analysis (April 1970): 861-74.

[14]Mark E. Rubinstein, "A Mean-Variance Synthesis of Corporate Financial Theory," Journal of Finance 28 (March 1973): 167-82.

[15]David D. Hertz, "Risk Analysis in Capital Investment," Harvard Business Review 42 (January-February 1964), reproduced in Stewart C. Myers, Modern Developments in Financial Management (New York: Praeger Publishers, 1976): 430-41. For a recent real estate application, see Stephen A. Pyhrr, "A Computer Simulation Model to Measure the Risk in Real Estate Investment," The Real Estate Appraiser (May-June 1973): 13-31.

[16]Richard U. Ratcliff and Bernard Schwab, "Contemporary Decision Theory and Real Estate Investment," The Appraisal Journal 38 (April 1970): 165-87.

2.1.2 Sophisticated Model Acceptance

The acceptance rate of the newer, more complex models has been slow. This was anticipated because managers, analysts, and employees must be trained to understand and use the models. Also, the more complex models require larger amounts of data and consequently absorb more management resources. Another factor, the accuracy of new models, is often questioned immediately after their development.

The slow acceptance by equity investors and mortgage lenders of the new, extremely complex techniques is not nearly as puzzling as the reluctance of many corporate financial analysts to use existing discounted cash flow models. Klammer found that forty-three percent of the large firms he surveyed did not use DCF models as late as 1970.[17] In a Housing and Urban Development survey, Diamond reported that real estate practitioners deem cash flow and tax shelter (which affects cash flow) two of the most important investment criteria. The same survey, however, shows that only 4% of the investors used a DCF criterion to choose investment projects.[18]

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[17]Klammer, p. 387-97.

[18]Arnold H. Diamond, "Tax Considerations Affecting Multi-family Housing Investement," Annual meeting of American Real Estate and Urban Economics Association, New Orleans, Louisiana, December 28,1971,p. 241.

These two surveys and information gathered from this writer's interviews indicate that, while sophistication in asset valuation is increasing, primitive models such as payback or direct capitalization (income divided by a capitalization rate) continue to be used by real estate equity investors.[19] There is general agreement that major differences exist between theoretical approaches and actual practice.

2.1.3 Theory versus Practice

In this section the views of several writers concerning the divergence between theory and practice in the capital allocation process are discussed. The subsequent section addresses possible ways to resolve the problem.

2.1.3.1 Mao

Mao states that there is a wide disparity between capital budgeting theory and actual practice as businessmen have not adopted many of the new techniques.[20] Probability

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[19]Preliminary telephone interviews conducted by the writer in Januuary, 1977. One partner of a development company stated that he was an MBA graduate of a "prestigious eastern school" and was familiar with after-tax, computer-generated printouts. He emphasized that the cash flow estimates so far overshadowed the refinements in techniques that he used "the back-of-an-envelope, payback, cash-flow analysis."

[20]James C. T. Mao, "Survey of Capital Budgeting: Theory and

distribution estimates for use as risk proxies were only intuitively used and "most likely," "optimistic," and "pessimistic" values were estimated for a sensitivity analysis approach. Portfolio theory approaches are considered impossible because projects are analyzed independently as they are submitted over time from operating divisions; diversification issues are addressed only on an intuitive basis. Mao's conclusions are that payback and accounting profit are used by widely held companies because the financial community places primary emphasis on earnings per share.[21]

2.1.3.2 Bower and Lessard

Bower and Lessard find that, "Very few firms treat risk formally in capital budgeting."[22] The reason for some companies' using IRR, sometimes considered inferior to NPV, is that the staff wants a simple rule to make decisions. The ultimate financial decision-makers do not use IRR because of a lack of sophistication, since they know (and publish in capital budgeting manuals) the problems inherent in IRR. "Quite the reverse is true," say the authors, "it is so-

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Practice," Journal of Finance 25 (May 1970): 349-60.

[21]Mao, p. 359.

[22]Richard S. Bower and Donald R. Lessard, "An Operational Approach to Risk-Screening," Journal of Finance 28 (May 1973): 321-37.

phistication, at least at the staff level, that permits firms to use simple measures effectively."[23]

2.1.3.3 Klammer

Klammer surveyed hundreds of large companies and found that while an increasing number of firms are moving toward more sophisticated DCF capital budgeting techniques, fewer are using decision analysis, utility theory, linear programming, and other forms of advanced models.[24]

2.1.3.4 Hastie

The Assistant Treasurer of the Bendix Corporation, K. Larry Hastie, implies that although more refined techniques are superior to less refined ones, two factors are vastly more important than model sophistication in making capital budgeting decisions. These factors are the overall strategy of the company and the overshadowing importance of correctly estimating cash flows. Hastie states, "Potential errors in the assumptions (cash flow estimates) tend to overwhelm the errors caused by using less sophisticated evaluation techni-

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[23]Ibid, p. 377.

[24]Klammer, p. 392.

[25]K. Larry Hastie, "One Businessman's View of Capital Budgeting," Financial Management (Winter 1974): 37.

ques."[25] That cash flow prediction errors are the dominant input factor is further analyzed by Joy and Bradley.[26]

2.1.4 Resolution of Theory and Practice

Mao suggests that, among other things, current theory might be modified to make it more meaningful in the actual business setting. He specifically points out a key element in the theory versus practice issue of choosing capital budgeting models.

> While theorists recommend IRR (or NPV) criterion of investment appraisal, this study confirms the prevalence of payback period and the accounting profit criteria in practice. The theorists must identify the reason why financial executives prefer these alternative criteria and modify the IRR (or NPV) method to make it generally more applicable.[27]

Bower and Lessard disagree with Mao's recommendation to alter theory. They suggest that theory may not yet be complete and that the answers might be found in translating theory into "terms and measurements that businessmen will use."[28]

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[26]Maurice Joy and Jerry O. Bradley, "A Note on Sensitivity Analysis of Rates of Returns," Journal of Finance 28 (December 1973):1255-1261.

[27]Mao, p. 359-60.

[28]Bower and Lessard, p. 43.

Several authors in the field of real estate approach the issue from a different angle. While none of the writers suggest that one should avoid sophistication, they advocate refining cash flow estimates and perhaps using existing models. Graaskamp advocates spending a large amount of investment analysis effort on estimating future cash flows. While he suggests using after-tax DCF techniques instead of the popular Ellwood technique, he remains committed to refining the "assumptions" (cash flow estimates) and to emphasising the influence of future after-tax cash flows on value.[29] Rams states that while model choice and mechanics of solving the model's calculation algorithms are important, the overall investment analysis (particularly cash flow estimates) should be the major thrust in real estate valuation.[30]

Hastie says that the firm should use the most sophisticated model that upper management can in fact understand. He further suggests that the firm delay introduction of more sophisticated models until it has a firm grasp on communicating the risk, in an understandable form, to upper management. He says specifically,

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[29]James A. Graaskamp, "A Rational Approach to Feasibility Analysis," The Appraisal Journal 40 (October 1972): 513-21.

[30]Edwin M. Rams, "Investment Mechanics vs. Investment Analysis," The Appraisal Journal 42 (January 1974): 64.

> The cost of educating the corporation and of using the sophisticated techniques may be significant--especially in light of other flaws in decision making. This is especially true in terms of opportunity costs. Before DCF and other refined methods are adopted, the company must determine whether its effort should be directed at refining the measurement techniques or at improving other steps in the investment decision making process.[31]

Sundem points out that decision-makers must eventually choose some capital allocation model. There are many models available, but apparently little work has been done in evaluating the relative performance of these models.

> Most evaluations justify an individual model on the conformity of its assumptions with real world conditions, whereas, the appropriate criterion for the choice of any decision model is the cost/benefit efficiency of alternative models.[32]

Sundem approaches the issue in two steps. First, he tests the performance of several capital budgeting models in use against a bench mark, or metric. Next, he specifies "risk class" models which are in turn compared to both the original models and to the bench mark itself.[33] It might be noted that the large number of firms that have not accepted

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[31]Hastie, p. 39.

[32]Gary L. Sundem, "Evaluating Capital Budgeting Models in Simulated Environments," Journal of Finance 30 (September 1975): 977.

[33]Gary L. Sundem, "Evaluating Simplified Capital Budgeting Models Using a Time-State Preference Metric," Accounting Review 49 (April 1974): 306.

the sophisticated models continue to survive and compete for funds, which indicates that existing models are adequate.[34]

2.2 COMMON REAL ESTATE MODELS

The evaluation technique chosen by an investor should either assign a value tc a proposed project or rank the projects according to their relative worth. Maisel and Roulac state that while there has been an increase in the number of available profitability measures,

> There is usually a trade off between simplicity of calculation and understanding and the total volume of information furnished---and---each investor can decide whether minimal information obtainable through simple procedures will suffice.[35]

Similarly, while arguing that real estate investment decisions are linked to other markets via "rate of return," Wendt and Cerf list several formulations that are widely used in the real estate practice.[36]

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[34]This is especially interesting if the capital markets are efficient.

[35]Maisel and Roulac, p. 345.

[36]These "rate of return" formulations are different first year cash flow estimates (Net income before interest and depreciation; Annual cash spendable income plus equity buildup) divided by either purchase price or cash down payment. See Paul F. Wendt and Alan R. Cerf, Real Estate Investment Analysis and Taxation (New York: McGraw Hill, 1969), p. 19.

Telephone and personal interviews of over fifty investors, brokers, lenders, and appraisers, conducted by this writer, indicate that the equity decision-maker does use simplistic evaluation techniques while appraisers and lenders sometimes, but not always, use more sophisticated techniques via the Ellwood method.

The actual techniques selected for comparison in this study, in addition to being used by those practitioners interviewed, are recommended in recent real estate literature. The models selected are defined in this section.

2.2.1 Simplistic Models

Two main classifications of common real estate valuation models are techniques that ignore or recognize the time value of money, i.e., simplistic models and Discounted Cash Flow models. The techniques that include the time value of money concepts are internal rate of return, net present value and Ellwood. Those that ignore the time value of money include broker's rate of return, payback, free and clear return, and debt coverage ratio; they are presented below.

2.2.1.1 Broker's Rate of Return - BRR

This method is known as "cash on cash," "cash spendable rate," or "equity dividend rate" and is expressed as:

$$BRR = \frac{CF_1}{I_o}$$

where CF_1 = Before tax, first year's equity cash flow
I_o = down payment
BRR = broker's rate of return

Wendt and Cerf state that this is one of the more widely used techniques for comparing different investment properties.[37] Maisel and Roulac agree, but caution investors to avoid inconsistent definitions of cash flow and initial equity.[38] Beaton and Robertson state that this before-tax rate can sometimes be directly compared to coupon rates on other investments.[39] The decision rule is to accept all projects that have a BRR greater than or equal to a minimum cut-off rate.

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[37]Ibid., p. 22.

[38]Maisel and Roulac, p. 346.

[39]William R. Beaton and Terry D. Robertson, Real Estate Investment 2nd ed. (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1977), p. 168.

2.2.1.2 Free and Clear Return - FCR

Another of the more traditional measures used by practitioners is the FCR which measures the overall contribution of the property itself before tax and debt considerations. This approach is comparable to the return on assets used in the capital budgeting, i.e., the total income compared to the assset price regardless of financing.[40] It is defined as:

$$FCR = \frac{ANOI}{TPP}$$

where FCR = free and clear return
ANOI = average net operating income
TPP = total purchase price

As before, this measure is subject to definitions of income and purchase price. Caution should be exercised in its comparative use. This technique is similar to the Rate of Return Analysis technique discussed by Bierman and Smidt.[41]

The decision rule for the free and clear return technique is similar to the BRR. If the FCR for a project is equal to

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[40]Robert H. Zerbst, Charles E. Edwards and Philip L. Cooley, "Evaluation of Financial Leverage for Real Estate Investments," The Real Estate Appraiser 43 (July-August 1977), pp. 7-11.

[41]Bierman and Smidt, Chapter 2.

or greater than a selected value, the project is included in the FCR portfolio.

2.2.1.3 Payback - PB

The payback period for a project is the number of years required to recover the original investment. This research will utilize both after-tax and before-tax cash flows, PBAT and PBBT respectively. The payback method, while conceptually unsound, has a pragmatic appeal in that the investor can determine when he will recover his original investment.

Rather than using some minimum return measure, the payback accept-reject decision rule is a maximum acceptable payback period. A project will be accepted if the payback period is less than or equal to the cutoff value.

2.2.1.4 Debt Coverage Ratio

Another type of simplistic model is used by institutional mortgage lenders. The debt coverage ratio is defined as:

$$DCR = NOI/DS$$

where: DCR=debt coverage ratio

NOI=net operating income, first year

DS=debt Service[42]

Lenders require different DCR's for different property types and, in fact, use this measure as a risk proxy. The decision rule is to accept a property for inclusion in the portfolio if the DCR is equal to or greater than a minimum cut-off.

2.2.2 <u>Discounted Cash Flow Models</u>

The four previous techniques are naive, nondiscounting heuristic models. The three common models that follow are more sophisticated as they recognize the time value of money.

2.2.2.1 Internal Rate of Return - IRR

Wendt and Cerf indicate that rate of return measures are the touchstone of selecting real estate investments and further emphasize, "It is generally recognized that after-tax return on equity is the most significant measure of real

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[42]Britton and Kerwood, p. 315.

[43]Wendt and Cerf, p. 26.

estate investment returns."[43] They also give the formula for extracting that return, IRR:

$$E = \sum_{t=o}^{n} \frac{R_t - I_t - A_t - T_t}{(1+r)^t} + \frac{P_n - GT - UM}{(1+r)^n}$$

where R_t = annual net income in period t
I_t = interest paid on mortgage in period t
A_t = mortgage amortization in period t
P_n = sales price or residual in period t=n
T_t = income tax allowance in period t
GT = capital gains tax
UM = unpaid mortgage
r = rate of return (IRR)
E = equity

The internal rate of return decision rule is to accept a project if its IRR is greater than or equal to an arbitrary cutoff rate. Projects that have an IRR greater than or equal to an overall minimum cutoff will be included in that portfolio.[44]

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[44]Note that the after-tax return on equity approach (which assumes an optimal financial structure) used in real estate is also advocated by some corporate financial writers. See Van Horne, Financial Management pp. 198-208 and Chapter 7 of Mao, Corporate Financial Decisions.

2.2.2.2 Net Present Value - NPV

The NPV (Inwood method of income capitalization in real estate literature) is closely related to the IRR technique . Instead of a solving for a rate of return (IRR) and comparing that to a minimum cut-off rate, a single rate of return for all projects is stipulated and used as the discount rate. This rate is the after-tax rate opportunity cost for equity funds. The model for NPV is:

$$NPV = \sum_{t=1}^{n} \frac{\overline{Y}_t}{(1+R)^t} - Io$$

where $\overline{Y}_t$ = after tax equity cash flow in period t
Io = initial outlay
R = weighted average cost of capital

A project will be selected for the portfolio if its NPV is greater than or equal to zero at a particular cut-off discount rate.

2.2.2.3 Ellwood - ELL

Many of real estate analysts simply do not use IRR or NPV techniques in analyzing potential investments.[45] The Ellwood

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[45]Recent real estate (and MBA) graduates who understand Net Present Value and Internal Rate of Return techniques do not utilize them mainly because existing customs within the real estate industry demand that they use Ellwood in-

technique, developed in 1957 by L. W. Ellwood, parallels the before-tax weighted average cost of capital valuation technique used in corporate finance. This "mortgage-equity" valuation technique separately values the total stabilized NOI by discounting the debt service at the mortgage interest rate and the equity cash flow at the equity yield rate. The Ellwood technique is used primarily by fee appraisers and mortgage lenders. It is ironic that the main body of real estate appraisers have been using DCF valuation theory for the past two decades (perhaps inadvertently) while a significant portion of their counterparts in corporate capital budgeting have been more reluctant to adopt this method.[46]

While the exact formulation of the Ellwood technique is algebraically cumbersome, it is discussed in detail in chapter six of Wendt's critical assessment of real estate appraisal.[47] The technique ignores taxes, assumes a stabilized NOI and capitalizes this stream plus a reversion at an "equity yield rate" (equity investor's before-tax required

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stead.

[46]Terry Robertson and Glenn Rufrano, "Equity Yields: A Cash Flow Verification." The Real Estate Appraiser (March-April, 1976),pp. 42-45.

[47]Paul F. Wendt, Real Estate Appraisal Review and Outlook, (Athens, Georgia: University of Georgia Press, 1974), ch. 6. See also chapter 2 of Wendt and Cerf.

rate of return). The model is shown below:

$$VEQ = (ANOI-DS)AF + (TV-TLB)PVF$$

where VEQ = value of equity
ANOI = average net operating income
AF = present value of annuity @ EYR for term of project
TV = terminal value
TLB = terminal loan balance
PVF = present value @ EYR for term of project
DS = debt service

If the equity yield rate (EYR) of a project, as determined by the Ellwood technique, is equal to or greater than the cut-off, it will be included in the Ellwood portfolio.

2.3 RISK-ADJUSTED NET PRESENT VALUE MODEL - RANPV

The risk-adjusted NPV model is one of the most sophisticated models that can be applied to real world data. It is included in this section because it has been ultimately chosen as the bench mark, or criterion method, to which all other models are compared. The choice criterion and rationale for choosing this method will be explained in the following chapter.

2.3.1 The Model

The risk-adjusted net present value model is defined as:

$$MNPV = \sum_{t=o}^{n} \frac{\bar{Y}_t}{(1+r)^t} - Io$$

where $MNPV$ = metric risk adjusted NPV
$\bar{Y}_t$ = expected annual after-tax equity cash flow
r = risk adjusted discount rate
Io = initial cash outlay, down payment
n = holding period

2.3.2 Data Inputs

There are two distinct types of information required by the model. The expected annual cash flow estimates for each year are, of course, required of any cash flow model. The second input is the appropriate discount rate. This onerous problem is intensified by the need to estimate a discount rate for each project.

Because the risk-adjusted discount rate includes both the time value of money and the risk premium, project risk level is a major determinate of the discount rate. This model is solved for a value only after

1. The risk level for each project is estimated and
2. The discount rate commensurate with that risk level is stipulated.

A major criticism of the risk-adjusted NPV technique has been made by Robicheck and Myers.[48] When comparing the certainty equivalent DCF technique to the RANPV, the RANPV is

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[48]Alexander A. Robicheck and Stewart C. Myers, "Conceptual Problems in the use of Risk-Adjusted Discount Rates," Journal of Finance 21 (December 1966),pp.727-730.

valid only if the riskiness of the cash flow stream is assumed to increase with time.[49] Mao, however, tends to discount this problem and favors Risk-Adjusted NPV as a decision criteria because these "risk-adjusted" returns are more readily available in the market place than the variance of NPV risk proxy sometimes advocated as the alternative in corporate finance.[50]

This RANPV technique demands that <u>ex ante</u> subjective estimates for both risk level and discount rate be made before the model is solved for an estimate of value. This complex estimating procedure is detailed in Chapter III.

2.4 RISK CLASS MODELS

While the RANPV model described above is among the most sophisticated real estate models that can be used on real world data, it would be extremely difficult to implement in an appraisal or mortgage banking business. Sundem suggests that, by simplifying relatively sophisticated models, results superior to common models can be achieved at low implementation costs.[51] Three types of risk class models (NPV,

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[49] Ibid

[50] Mao, <u>Financial Decisions</u> pp. 153-154.

[51] Sundem, <u>Accounting Review</u>, pp. 306-20.

BRR and ELL) specified in this research are described in this section.

2.4.1 Net Present Value with Risk Classes - NPV(R)

The NPV(R) model[52] is identical to the risk adjusted metric model except that the projects are broken into risk subsets and then discounted at different discount rates to reflect the different risk levels in each class. For example, in a three-risk class model, NPV(3), the risk will simply be divided into three subsets or segments and the projects that fall in the second risk segment will be discounted at a rate equal to that segment's average expected rate of return. In Figure 1, the projects that fall within the three different risk segments will be discounted at D1, D2, and D3 respectively. The projects to be discounted at D2 are those in risk segment two, defined as those projects that fall between S(2) and S(3).

The intuitive appeal for this "risk class" model over the "weighted average cost of capital" discount rate model, NPV, is addressed in conjunction with Figure 2. The large cros-

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[52]The "R" enclosed in parentheses indicates a risk class model in general. When a number replaces the R, for example NPV(3), this indicates a NPV model with three risk classes.

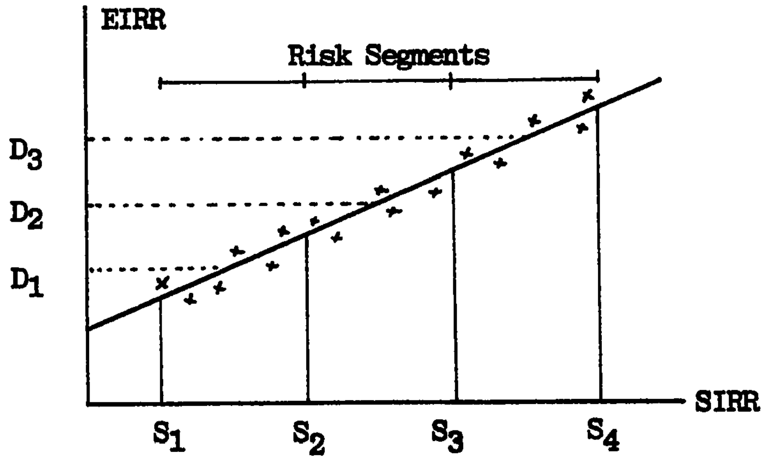

Figure 1: Three Risk Class NPV Model

shatch triangles show the areas in which the NPV model will incorrectly assign projects to a portfolio. Any project in the left hand large triangle will be rejected by the NPV model but will correctly be accepted by the metric, thereby resulting in opportunity cost losses to the investor. Conversely, the right hand large triangle shows the area in which the NPV accepts undesirable projects which have negative values.

While the three risk class model, NPV(3), will not value all projects correctly, it does substantially reduce the area of potential incorrect selection. This is emphasized in Figure 2. The double crosshatched portion shows the error region of, say, risk segment one, (R(1)). This means that project A will be correctly accepted by NPV(3) and rejected by NPV. Project B will be incorrectly rejected by

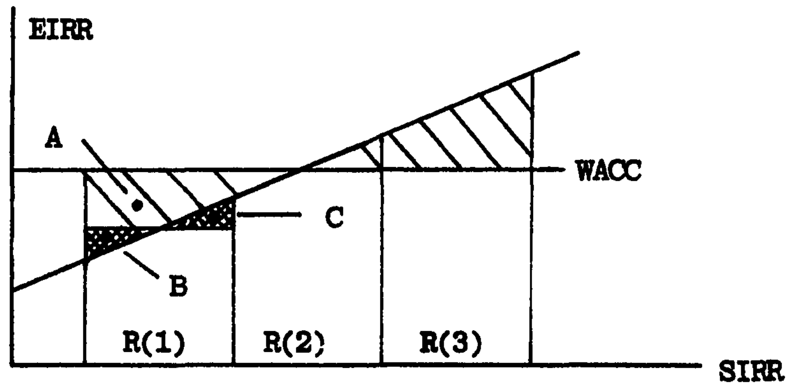

Figure 2: Error Regions of NPV(3) Model

both NPV and NPV(3) while project C will be correctly rejected by NPV and incorrectly accepted by NPV(3).

The advantage of increasing the number of risk classes is further emphasized in Figure 3. The error region for NPV on the left is the area of the two crosshatched triangles ((1/4X1X2)) and the error region of the NPV(3) model on the right is the area of the six small triangles ((1/12X1X2)), a reduction of 67% for increasing the risk class from one to three. The remaining errors are not only fewer, but smaller, so the benefit is far more than a 67% reduction in the number of errors.

The decision rule for NPV(R) is that a project will be selected for inclusion in the portfolio if its NPV at the

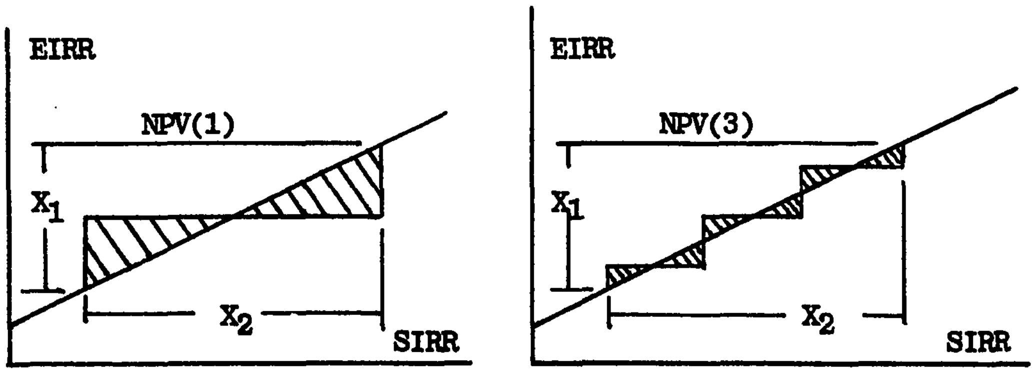

Figure 3: Error Reduction of Risk Class Models

appropriate discount rate (for its particular risk segment) is greater than or equal to zero.

2.4.2 Ellwood with Risk Classes - ELL(R)

The difference between the Ellwood technique and ELL(R) is in the selection of appropriate discount rates (before-tax equity yield rates, EYR) for the different risk segments. The procedure will be to first determine the relationship between risk and the project's expected equity yield rate and then to apply the same accept-reject decision rule used in the ELL model.

2.4.3 Broker's Rate of Return with Risk Classes = BRR(R)

This procedure will be identical to the ELL(R) except that a different required return measure, Broker's Rate of Return, will be used to define the risk and return scheduule. A decision rule similiar to ELL(R) will be used to accept projects. That is, if the minimum cut-off for a project (that projects' risk-adjusted BRR) is reached, it will be accepted in the portfolio.

The objective of real estate valuation models is to weigh the two most critical elements in estimating the worth of an income stream, the expected return and the probability of achieving that return respectively. The implicit assumption is that any popular model sufficiently performs this risk-discriminating function or that the appropriate cut-off rate used in simplistic models reflects these risk differentials. The next chapter describes the methodology in comparing real estate valuation models, and the results are presented in the following chapter.

Chapter III

METHODOLOGY

The first two sections of this chapter explore the criterion model approach for evaluating capital allocation models and then sets forth the considerations for selecting the bench mark technique and for subsequently applying the model to real data. The comparison methodology between the criterion model and other models is discussed in the last section.

3.1 CRITERION MODEL APPROACH

One of the traditional approaches to measuring model worth is to evaluate the validity of its assumptions. Sundem, however, challenges that approach and suggests that apparently little work has been done in evaluating the relative performance of these models.[53] Sundem evaluates several different models and compares their results to those of a bench mark, or criterion technique.[54]

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[53]Gary L. Sundem, "Evaluating Simplified Capital Budgeting Models in Simulated Environments", Journal of Finance 30 (September 1975),pp. 977-992.

[54]Gary L. Sundem, "Evaluating Simplified Capital Budgeting Models Using Time-State Preference Metric", Accounting Re-

Without a standard, to which results all other real estate valuation model results are compared, there can be no determination as to which model, or models, are superior or inferior. The criterion model approach allows such comparisons.

3.2 CRITERION MODEL

The technique selected for use as the bench mark will ideally have two properties that are not completely compatible. First, it will correctly value each prospective project, and second, it can be applied to actual projects. This section examines the key theoretical issues involved in selecting a bench mark model and then selects the risk-adjusted, net present value model as the criterion. The rationale for selecting this model and some problems in applying the model are then discussed. Specifically, the last part of this section is devoted to the solution of the onerous, but necessary, selection of the exogenous model parameter, the appropriate risk-adjusted required rate of return for each project.

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view 49 (April 1974), pp. 306-320. See also Rodger P. Bey and R. Burr Porter, "An Evaluation of Capital Budgeting Portfolio Models Using Simulated Data", The Engineering Economist 23 (Fall 1977), pp. 41-65.

3.2.1 Key Issues

Several points must be considered when choosing a technique to "correctly" value all projects in the study. First, the issue of whether the metric should be a single period or a multi-period model must be addressed. Then, the issue of project diversification must be considered. Another key issue is that of selecting a risk proxy for the study. These key issues are followed by a discussion of multiple-period valuation models.

3.2.1.1 Time Frames

The most common theoretical investment valuation model is cast in a single-period framework. This model is generally referred to as the Capital Asset Pricing Model.[55] Although the securities market approach of the CAPM has been applied to physical assets by Rubinstein,[56] two aspects of real estate investments --long life and absence of realistic yearly

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[55]This general model was developed simultaneously by three writers: William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," Journal of Finance 19 (September 1964), pp. 425-442.; John Lintner, "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets," The Review of Economics and Statistics 47 (February 1965), pp. 13-37; Jan Mossiu, "Equilibrium in a Capital Asset Market," Econometrics 34 (October 1966), pp. 768-783.

[56]Rubinstein, p. 167-82.

price information --generally preclude the use of a single-period approach.

3.2.1.2 Stochastic Influences

The requirement that the metric not defy operationalization makes the issue of stochastic influences very important because the problem focuses on what measurement to use for a risk proxy. There are three general approaches to selecting quantifiable risk surrogates.

The most complex approach involves the estimation of a full variance-covariance matrix of expected project returns. For example, this data set requires, in addition to expected returns and variances, 561 estimates of covariances for a portfolio of 34 projects, a cumbersome undertaking.[57] The index model approach requires only estimates of return covariances between projects and an index.[58] The third ap-

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[57]The number of covariance cells to be estimated in a full variance-covariance matrix is n(n-1)/2 ((34x33)/2 = 561). See Kalman J. Cohen and Jerry A. Pogue, "An Empirical Evaluation of Alternative Portfolio Selection Models." Journal of Business Finance, (April 1967): 169-93.

[58]Two index models are available, but no generally acceptable real estate indexes are available. See William F. Sharpe, "A Simplified Model for Portfolio Analysis," Management Science (January 1963): 277-93. Also see Kalman J. Cohen and Jerry A. Pogue "An Empirical Evaluation of Alternative Portfolio Selection Models." Journal of Business Finance 40 (April 1967), pp. 163-193.

proach ignores both the covariances between project returns and the covariance between projects and a market index.

The last approach, that of ignoring stochastic influences and hence the "within firm" diversification effect, is used in this study. There is essentially one reason for this choice. The data requirements could be satisfied for this approach where the requirements for the other choices are not available. The decision was made easier also because several writers suggest this approach. Haley and Schall suggest that firm diversification is not relevant and that stochastic influences should be ignored at the firm level.[59]

Mao states that while firms do diversify, they rarely follow the financial theory framework. As proposals are submitted independently by divisions, they simply do not include variance-covariance information necessary for within-firm diversification.[60]

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[59]Lawrence D. Schall and Charles W. Haley, Introduction to Financial Management (New York: McGraw Hill, 1977), Chapter 9 and 14, See also Rubinstein.

[60]James C. T. Mao, Corporate Financial Decisions Palo Alto, California: Pavan Publishers, 1976), 177.

3.2.1.3 Risk Measures

Van Horne questions the assumptions of the capital asset pricing model for real asset applications and arrives at the conclusion that total risk is important and that stochastic influences within the firm can be ignored.[61] Mao also advocates the use of total variance (or standard deviation) for two reasons. Business managers try to predict certainty of "earnings," which can be quantifiied by standard deviation, and in real applications the covariance figures are not available.[62] Real estate literature emphasizes the use of standard deviation as a risk measure.[63]

3.2.1.4 Multi-Period Models

The three generally accepted DCF approaches for determining the value of an asset stream are (1) time-state preference (2) certainty equivalent and (3) risk adjusted discount models.

<u>Time-State Preference</u>. This generalized model assumes that:

1. An investment's outcome possibilities are known. These future outcomes must be mutually exclusive and exhaustive.

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[61] Van Horne ,p 209.

[62] Mao, <u>Corporate Financial Decisions</u>, 176-177.

[63] Britton and Kerwood, pp. 31-34 and 353-355.

2. The expected value of the investment is the value of each outcome times the probability of each outcome.

3. Each outcome must be evaluated in relation to the time frame of the occurance.[64]

Obviously, preparing an exhaustive list of mutually exclusive possible outcomes becomes an onerous and operationally impossible task.

<u>Certainty Equivalent</u>. Each year's cash flow distribution is first reduced to an expected value. Risk is incorporated in the model by subjectively "adjusting" that expected cash flow value downward. This procedure changes a risky cash flow to one that is assumed to be riskless. These "riskless" cash flows are then discounted at a riskless rate to account for the time value of money.[65]

<u>Risk-Adjusted Net Present Value</u>. This model is one of the most widely used sophisticated techniques used in practice. Although disadvantages exist for this model, the primary advantage of using this approach, both here and in

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[64]Jack Hirshliefer "Investment Decision Under Uncertainty: Applications of the State-Preference Approach." <u>Quarterly Journal of Economics</u> 80 (May 1966): 252-277.

[65]Alexander A. Robicheck and Stewart C. Myers, <u>Optimal Financing Decisions</u> (Englewood Cliffs, N.J. : Prentice-Hall, Inc, 1965), pp. 79-93.

[66]Lawrence D. Schall and Charles W. Haley, <u>Introduction to Financial Management</u> (New York: McGraw Hill, 1977), p. 292.

corporate finance, is its simplicity.[66] The model is:

$$MNPV = \sum_{t=0}^{n} \frac{\bar{Y}_t}{(1+r)^t} - Io$$

where
- $MNPV$ = metric risk adjusted NPV
- $\bar{Y}_t$ = expected annual equity after-tax cash flow in time t
- r = risk adjusted discount rate
- Io = initial cash outlay, down payment
- n = holding period

3.2.2 The Model Choice

A multi-period model that ignores stochastic influences between projects is selected as the criterion model. It must be reemphasized that the major consideration in selecting a metric is that real world projects can be analyzed by that model.

3.2.2.1 Rationale for Model Choice

The primary reason for choosing this model for the metric is that it can be applied to data that is actually available in the market. The model must be operational for use in this research, and, while this technique satisfies this requirement, it is not commonly used because applying the model is complex and time consuming. Several important issues and problems are discussed in this section.

The potential problem of project diversification is solved by ignoring the project stochastic influences primarily because of data inaccessibility. Stochastic relationship data between project cash flows for real estate are next to impossible to assess because:

1. There is no readily identifiable market index. If no index is available, a full variance-covariance data set is required.

2. Anual holding period returns are not available as is stock market information.[67]

3. As project opportunities are "discovered" the decision-maker must make accept-reject decisions. The more attractive the opportunity, the less time a manager/investor has to act.

The end result of the three points outlined above is that, for practical purposes, the data is simply not available.

Therefore, the metric model chosen ignores the stochastic relationship between projects. In fact, if the markets are not sufficiently efficient to ignore stochastic influences, real problems arise. The question of what approaches to use if the capital markets are not efficient has been asked. "The answer," state Haley and Schall, " currently is that we

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[67]This problem of directly comparing single-period security returns and multiple-period project returns has been addresssed by Van Horne. Yearly selling price surrogates must be estimated to reflect returns. For an example, see Van Horne, pp. 202-203.

[68]Haley and Schall, p. 329.

do not know except in a very general way."[68] If stochastic influences are relevant[69],

1. The organization must consider the stochastic relationships between all opportunities facing the firm, and

2. The current and future assets that the firm will acquire must be analyzed for cash flow and stochastic influences.

The data required to satisfy the two points listed above are clearly impossible to determine. Haley and Schall further state,

> The results of these comments (about imperfections) is to present the firm with both a very large problem and one that may have no theoretical solution which provides a simplification of the analysis. The most promising current 'solution' is evidence that the capital markets may be sufficiently perfect to make the problem not significant in practice.[70]

The criterion model selected allows risk to be specified as the total project risk, and due to the CAPM's unrealistic assumptions for real assets, may be more theoretically satisfying for real estate applications.[71] Mao states that while some large portfolio managers undoubtably use the portfolio approach, some data show that institutional investors limit their holdings to few issues.[72] In fact, one

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[69]Haley and Schall,p.329.

[70]Haley and Schall, p. 330.

[71]Van Horne advocates this approach for capital budgeting applications, 208-210.

survey shows that the typical investor in the United States holds a portfolio of less than four stocks.[73] Because of these factors, Mao advocates the specific-security approach to risk measurement, that is, stochastic influences are ignored and total risk is used as a risk measure.

The choice between a multi-period and a single-period model is influenced by different data problems. Real estate projects are long-lived assets that change ownership infrequently. Therefore, because the year-end values that are necessary to calculate holding period returns are unavailable, a multiple-period valuation model is desirable.

Of the available multi-period valuation models, only the risk-adjusted NPV model is really operational. The certainty equivalent model is preferred by some theorists, but they admit that its application is next to impossible.[74] The time-state preference (TSP) model is simply impossible to specify. For example, the future states of nature (and present worth of each state) are "mutually exclusive and ex-

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[72] Mao, Corporate Financial Decisions p. 36.

[73] John Lintner, "Expectations, Mergers and Equilibrium in Purely Competitive Securitities Markets," American Economic Review 61 (May, 1971), 108.

[74] Stewart C. Myers, Modern Develepements in Financial Management (New York: Praeger Publishers, 1976), p. 279.

haustive,"[75] a rather stringent requirement for data preparation.

The risk-adjusted NPV model, a subset of the STP, is chosen for use in this research because it is an acceptable compromise. It is the most satisfying theoretical model that can be applied by most organizations in the real estate market.

This model, an after-financing equity cash flow approach, is a widely used risk-adjusted valuation model with applications in security valuation and capital budgeting. While some capital budgeting applications use before-financing cash flows and risk proxies, after-financing applications are also used. Mao advocates using after-financing cash flows. Cash flows accrue to the stockholder and, if the objective of the firm is to maximize ownership interests, the value of after-financing cash flow is the relevant decision variable.[76]

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[75]Jack Hirshliefer, "Investment Decision Under Uncertainty," pp. 161-65.

[76]Mao, Corporate Financial Decisions, pp. 93-94.

3.2.3 Model Application

The criterion model discounts expected annual cash flows at a required rate of return commensurate with each project's risk level. Project risk level estimates are calculated from original cash flow data.[77] Once a risk measure is calculated for each project, an additional estimate is necessary for the required rate of return (discount rate) for that risk level. In summary, cash flow estimates, both deterministic and probabilistic, are used by a Monte-carlo simulation package to calculate a vector of expected returns. The risk proxy, standard deviation of expected returns, is determined from the expected return vector. A discount rate is then estimated for each project consistent with its risk level.

The cash flow estimating procedures and the simulation are discussed next. Then, the most elusive question of specifying the trade-off between risk and return is addressed.

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[77]The cash flow elements that affect risk assessment are in the form of a cumulative probability distribution (cdf) obtained from the project expert. A Hertz-type simulation package then calculates project expected return and standard deviation of those returns.

3.2.3.1 Cash Flow Estimates

Personal interviews resulted in obtaining cash flow estimates pertaining to costs, expenses, and revenue projections for each specific project. The data are further discussed in Chapter 4. Because cash flows have been shown to be a major determinate of expected return,[78] stochastic projections are made for:

1. Rental income
2. Occupancy rates
3. Rental income growth rates
4. Operating expenses
5. Operating expense growth rates
6. Residual value at end of holding period.

<u>Deterministic Estimates</u>. The deterministic estimates are simply point estimates that the subject matter expert chooses for each required input.

<u>Probabilistic Estimates</u>. Because the stochastic input requirements required by OUPROB are ultimately used to build a CDF, the required inputs were designed to facilitate obtaining estimates from real estate practitioners. The probabilistic information used to calculate the risk proxy is obtained by using the fractile procedure to

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[78] Joy and Bradley, "Sensitivity Analysis," pp. 1258-1261.

define a cumulative distribution function. The fractile procedure assigns a value estimate for five point values. These five points form the boundaries for four intervals (quartiles) that have an equal chance of occuring.[79] The fractile procedure for defining cumulative distribution functions is recommended by Brown, Kahr, and Peterson.[80]

3.2.3.2 Simulation Model

The next part will describe the computer program OUPROB and the two basic changes made in the program. A brief discussion of the stochastic input format is also included.

This computer program is a stochastic model for use in the analysis of real estate investments. The program is a Hertz-type cash flow model that draws heavily from Dr. Stephen Pyhrr's RE003 package.[81] Given project expert esti-

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[79] See Estimating procedure for page 2 of Input Data Sheet in Appendix A. A detailed discussion of the data gathering process is presented in Chapter IV.

[80] Rex V. Brown, Andrew S. Kahr, and Cameron Peterson, Decision Analysis for the Manager (New York: Holt, Rinehart and Winston, 1974), pp. 31-36. Also, Howard Raiffa, Decision Analysis - Introductory Lectures on Choices Under Uncertainty (Reading, Massachusetts: Addison-Wesley, 1968), pp. 161-168. The interview process is discussed in the next chapter.

[81] John R. Frazier, "Instructor's Manual and Reference Guide to OUPROB - Probablistic Discounted Cash Flow Model for Real Estate Investment Analysis" (MS thesis, University of Oklahoma, 1977) pp. 2-3.

mates for various cash flow distributions, the program builds CDF's for user-specified cash flow elements (six for this research) and randomly selects 250 observations for each stochastic input. For each observation, the OUPROB algorithm calculates, among other things, an internal rate of of return (IRR) for the project. Each observation's IRR is retained until 250 iterations have been performed. The program then finds the expected value of IRR and the standard deviation of the IRR (SIRR).[82] The risk surrogate used in this research is the standard deviation of expected returns as calculated by OUPROB.

The OUPROB computer program was altered for this research in two basic ways. First, the program was changed to allow for annual cash flows and other summary data to be printed out for use in further analysis (e.g., Ellwood and FCR). Second, the stochastic data input format was also changed to make the program easier to implement in actual practice. This change requires further amplification.

The original program estimates a CDF according to the following procedure.[83]

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[82]John Frazier, Chapter 3.

[83]John R. Frazier, Chapter 4.

1. Select maximum and minimum values for stochastic input (say gross monthly income value of $232 to $262).

2. Divide the range by the number of divisions for which probabilities are required.

3. This provides Section A in Figure 4 for which probablities must be estimated to build a probability distribution and subsequently a CDF with which to apply random numbers for the simulation.

4. A CDF can be constructed for the four ranges as shown in Section A of Figure 4.

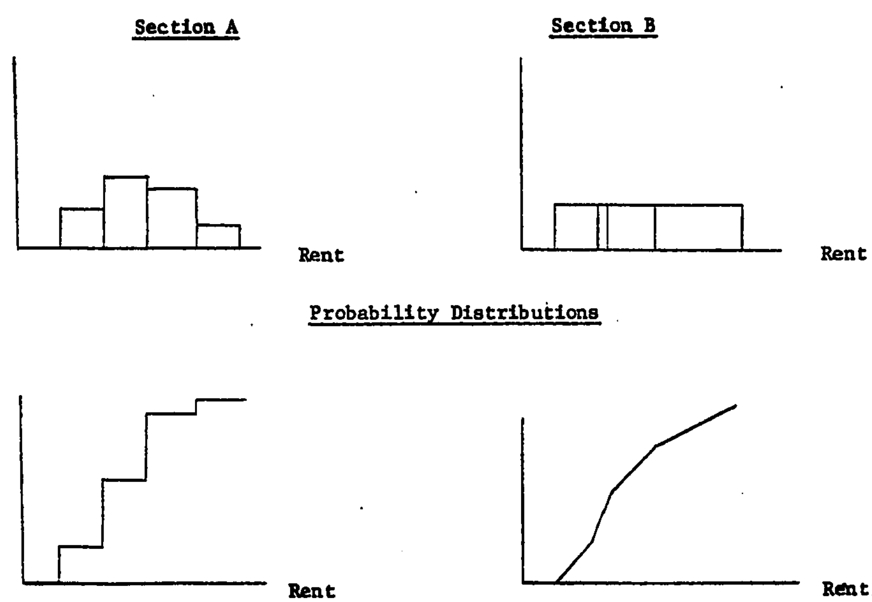

Figure 4: Cumulative Probability Distributions

This type of estimation procedure is ideal for educational instruction, but trying to get businessmen, who are not conversant in statistics, to think in terms of probabilities is a different situation. Brown, Kahr, and Peterson suggest communicating with business executives in terms of equal chances and state, "Most people...feel much more confident with indifference procedures than...relative probabilities."[84] The indifference, or quartile,, procedure used in the modification is briefly addressed in the next paragraph.

The procedure used in the modified OUPROB program to build a CDF is shown in Section B of Figure 4:

1. Estimates for a most likely value, a minimum and a maximum value are first obtained from the project expert (e.g., $240, $232, $262)

2. If further refinement is desired, each segment is "split" by estimating another point which insures that the actual value will have <u>equal</u> <u>chance</u> of falling above or below that estimate (e.g., points corresponding to $238 and $248)

3. The probability distribution and CDF are shown in Section B of Figure 4.

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[84]Brown, Kahr and Peterson, p.458.

The estimation procedure for the modified OUPROB inputs is detailed in Chapter IV and in Appendix A.

3.2.3.3 The Market Price of Risk

The appropriate discount rate is much harder to specify in practice than in theory. This is an important consideration because the discount rate parameter has a substantial influence on the metric net present value for each project and hence on the entire study. This problem is so important that the issue of assigning an *ex ante* discount rate for each project deserves special attention. Thus, the market price of risk, MPR, is discussed in this section.

Practical applications of the "appropriate discount rate" are in the final analysis an estimate by the decision-maker. Most literature pertaining to this "market price of risk" seems to agree that there is a linear relationship between risk and return as shown by the CAPM.[85] Empirical evidence shows that, although there exists a linear relationship between risk and return, the empirical line has a smaller slope than the theoretical line. There is no clear agreement as to why theoretical and empirical relationships are not iden-

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[85]Franco Modigliani and Gerald A. Pogue, "An Introduction to Risk and Return," Part II, *Financial Analysts Journal* 30 (May-June 1974): 82.

tical. Another issue in specifying the market price of risk is that both elements, risk and return, are indeed hard to define. While general agreement exists that individual investment decision-makers should use dollar-weighted return as a measure of return, the quantification of real-world risk is even more elusive.[86] The following complications cause even larger problems when deciding on the discount rates for this study:

1. *Ex ante* risk-return is needed and only sketchy information exists on *ex post* real estate returns,

2. Real estate risk and return relationship information is even more scarce, and

3. No *ex ante* risk-return agreement exists *even* for the stock market, the most efficient of capital markets.

That an asset's value is inversely related to its expected risk is generally recognized in the financial literature. Therefore, the specification of an operational risk-return schedule is an essential ingredient in capitalizing cash flow streams of risk assets into value estimates. This section will review (1) risk and return measures, (2) historical investment return results, (3) both theoretical and empirical risk-return work, and (4) procedures used in this study for specifying normative risk-return schedules.

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[86] Ibid, p. 68.

Risk and Return Defined. This summary draws from Modigliani and Pogue[87] writing in the *Financial Analysts Journal*. A discussion of return measures is followed by a summary of risk measures used in the financial literature.

The most common return measures fall into two categories, single-interval returns and a return measure for a series of single intervals. The return to an investor during a single period is a ratio of the change in value (plus cash payments) of the investment to the original investment.

While the single-period return usually is expressed for a single year, investors often think in terms of a series of years. There are three common measures of multi-period return: (1) arithmetic average return, (2) time-weighted return, and (3) dollar-weighted return.

The arithmetic average return and the time-weighted return have applications, but for this study the dollar-weighted return allows both for compounding and for withdrawals and additions to an investment during the holding

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[87] Franco Modigliani and Gerald A. Pogue "An Introduction to Risk and Return." Part I. *Financial Analysts Journal* 19 (March-April 1974), pp. 68-80. See also Part II (May-June 1974), pp. 69-86.

period. The dollar-weighted return is defined as the internal rate of return, or

$$Vo = \sum_{t=0}^{n} \frac{CF_t}{(1+r)^t}$$

where Vo = original equity value
CF = equity cash flow
r = dollar weighted return (IRR)
t = time period

While there are several acceptable ways to measure return, "The definition of investment risk leads into much less well developed territory. Not everyone agrees how to define risk, let alone how to measure it."[88] Francis and Archer state that risk can be defined verbally as a chance of injury, damage, or loss, but quickly point out that for more objective analysis, one must use a more quantifiable surrogate for risk.[89] Several risk measures have been used, but the most common is that of standard deviation of expected return.

Risk is generally associated with a probability distribution of expected rate of return and intuitively includes the

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[88]Modigliani and Pogue, Part I, p. 70.

[89]Jack Clark Francis and Stephen H. Archer, Portfolio Analysis (New Jersey: Prentice Hall, Inc., 1971), p. 14.

left hand portion of a probability distribution (the probability of loss or injury). Within this context, the semi-variance of E(r) (SVr) can be used for a risk surrogate. The SVr is a special case of variance and because variance is much more tractable, variance is almost universally used as a risk proxy to depict total portfolio risk.[90]

Individual security risk can be addressed in two ways. If a stochastic relationship between the security return and an overall market return is considered, the risk is measured by some form of correlation with the market. Second, the security itself can be considered as a portfolio, that is, the diversification aspects can be ignored. In the second case, risk can be specified as the standard deviation of expected returns.

In the first case, where diversification can benefit investment decisions, the relevant risk is not total project risk, but the systematic part of the project's risk.[91] Both the required rate of return of a project and that project's value are influenced by the correlation coefficient of the project's return and that of the market. The major implication of the model is that a single project's value is

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[90]Modigliani and Pogue, Part I, p. 71.

[91]James C. Van Horne, Financial Management and Policy (Englewood Cliffs: Prentice Hall, 1974), ch.3.

determined not by which firm accepts a project, but by the project's risk as measured by the covariance with the market index.[92]

The second way to address project risk is to consider total risk. Van Horne suggests that in view of one of the CAPM's unrealistic assumptions, that bankruptcy cost is zero, perhaps total risk is the appropriate measure. Put another way,

> When solvency and/or bankruptcy costs are significant, investors may well be served by the firm paying attention to the total risk of the firm in capital budgeting for risk investments and not just its undiversifiable risk.[93]

<u>Historical Returns</u>. Neither investment textbooks nor investment literature attempts to compare the risk-return characteristics of real estate versus common stocks. In fact, real estate is seldom mentioned in theoretical investment literature. However, recent disappointing returns in the stock market for the last ten years have made these alternative investments at least worthy of consideration. Stephen Roulac, writing in the <u>Journal of Portfolio Management</u>, states that prior to his article there has not

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[92]Rubinstein, p. 73. See also Van Horne, p. 199. This issue, in relation to this study, is considered in a previous section of this chapter.

[93]Van Horne, p. 209.

been an objective comparison of relative risk-return levels of real estate and common stocks.[94]

Roulac notes that the Fisher and Lorie study shows historical "returns" of 9.3% for the stock market[95], but cautions:

> Great care must be exercised in seeking to generalize about what the historical rate of return has been. On this point it is worth noting that Fisher and Lorie reported thousands of returns for different combinations of holding period, tax status, dividend re-investment assumption, and time period of investment.[96]

Roulac examines eleven real estate studies that report findings of rates of return. Not only do the real estate studies suffer from the same comparability problems as do securities studies, each of the eleven real estate studies "suffers from at best one, and in most cases multiple, shortcomings that substantially diminish their representativeness and reliability."[97]

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[94]Stephen E. Roulac, "Can Real Estate Returns Outperform Common Stocks?" The Journal of Portfolio Management 2 (Winter 1976): pp. 26-43.

[95]Lawrence Fisher and James H. Lorie, "Rates of Return on Investments in Common Stock: The Year by Year Record 1926-1965," Journal of Business (July 1968),291-316.

[96]Roulac, p. 27.

[97]Roulac, pp. 27, 31.

Roulac's findings are that real estate, contrary to popular opinion, does not significantly outperform common stocks. He further states

> There is no empirical evidence that real estate as an investment has outperformed common stocks. . . While the empirical studies of real estate investments as compared to common stocks are not reliable as evidence of probable realized returns in the future they do provide meaningful information on the relative risk characteristics of real estate and common stock investment. The evidence clearly indicates real estate returns are less variable, and therefore less risky than those from common stocks. Significantly, real estate markets appear to be less efficient than the stock market. The implications of this point are that information in the real estate setting is relatively more valuable and that management can exert greater influence over real estate investment returns than is the case with common stocks.[98]

It is generally recognized that the efficiency of the stock market precludes investors from achieving above average returns and that inefficiencies in the real estate market could possibly allow real estate investors to achieve better risk-adjusted returns than could be realized in the stock market.[99] Roulac discusses twelve possible reasons for real estate market efficiencies:

1. The local orientation of real estate markets,

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[98]Roulac, p. 38.

[99]E.F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance 25 (May 1970): 38-41.

2. The lower incidence of transactions for specific properties,

3. The uniqueness and relative lack of comparability of different real estate investments as contrasted to different common stocks,

4. The importance of financing - cost and availability - which may often be subject to political as opposed to economic forces,

5. The relative unsophistication of many participants,

6. The dearth of disciplined analysis of probable future events,

7. The reliance on crude rule of thumb techniques,

8. The lack of widespread appreciation for realistic rate of return expectations in real estate,

9. The extreme divergence between expectations and actual accomplishment on the part of industry participants,

10. Utilizations of a variety of specialized financing techniques which serve to cloud the comparability of one property investment to another,

11. The presence in the market of participants with significantly different investment objectives, especially as regards their relative priorities on immediate income, tax consequences, and change in value over time, and

12. The extreme volatility in construction activity leading in turn to sharp swings in vacancy factors and related short-term cash flow yields.[100]

While it appears that real estate markets are not efficient, opportunities for abnormal gains remain infrequent. Professional real estate management does, as opposed to stock analysis, "enhance overall returns."[101] But because

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[100]Roulac, p. 31.

such management expertise is in such short supply, the cost of this expertise tends to dilute much, if not all, of this abnormal gain. Projects with extraordinary gains may be identified, but the question is whether or not the returns (after paying management costs) are any higher than they would have been if real estate markets were efficient.[101]

<u>Market Price of Risk - Empirical Work</u>. Although historical risk-return information is not useful in itself, it is valuable if it helps the analyst predict the future. This section discusses some of the empirical work concerning risk and return under different situations. Some tests of the capital asset pricing model are presented and a recent study of historical risk return results for the major security markets is examined.

The CAPM attempts to quantify into a two-parameter framework the stochastic relationship between assumed risk and expected return. The question of how useful is the CAPM in explaining the risk-return relationship was addressed by Francis when he asked whether the stocks with higher betas really have higher rates of return, "or, put more crassly: Is this risk/return theory really any good?"[102] The evidence

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[101]Roulac, p. 33. This statement of course assumes that the "efficient market-random walker's" are indeed correct in their analysis.

[102]Jack Clark Francis, <u>Investments</u>: <u>Analysis and Management</u>,

is that there is a predictable relationship between risk and return, but not all studies show identical results.

Sharpe and Cooper investigated the risk/return characteristics of the stock market from 1931 to 1967, and concluded that:[103]

1. There was an approximately linear relationship between risk and return, but the intercept was higher than safe investments.

2. The shorter the time period, the less predictable the results.

3. While risk projections based on historical data were very accurate for a portfolio in one class, a single security risk was not easy to predict.

Modigliani and Pogue summarize several empirical tests of the CAPM and report, "Though the risk/return relationships seem to be linear, they are generally flatter than predicted by the CAPM, implying that the tradeoff of risk for return is less than predicted."[104] They state

> This evidence raises more doubt as to whether the CAPM market line provides the best bench mark for performance measurement and suggests instead that other bench mark portfolios may be more appropriate. For example, under certain conditions, the 'empirical' risk/return lines developed by Black,

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2nd Ed. (New York: McGraw Hill, 1976), p. 340.

[103]W.F. Sharpe and G. Cooper, "Risk-Return Classes of N.Y.S.E. Common Stocks, 1931-67," <u>Financial Analysts Journal</u> (March-April 1972): 54.

[104]Modigliani and Pogue, Part II, p. 84.

Jensen, and Scholes and others would seem to be a reasonable alternative to the CAPM market line standard.[105]

Modigliani and Pogue suggest that other risk-return lines could be used but they themselves lean toward using the CAPM relationship, although, "The information should not be regarded as being very precise."[106]

Eubank studied the New York and American exchanges along with the OTC market in a recent paper and found some interesting relationships.[107] Relevant to this study is the determination of historical rates of return and risk for each of the three markets for a period from 1960 through 1963. Of particular interest are the means and standard deviations of the stock exchange returns[108] shown in Table 1 and Figure 5.

<u>Ex Post Returns Substituted as Ex Ante</u>. Lorie and Hamilton state that few investors will be astounded by the assertion that assets have values in proportion to the future anticipated benefits of those assets.[109] The authors

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[105]Ibid.

[106]Modigliani and Pogue, Part II, p. 85.

[107]Arthur A. Eubank, Jr., "Risk/Return Contrasts: NYSE, AMEX, and OTC," <u>Journal of Portfolio Management</u> (Summer 1977): 25-30.

[108]Eubank, pp. 27-28.

[109]Lorie and Hamilton, p. 113.

Table 1

Means and Standard Deviations

	NYSE	ASE	OTC	N-A	N-O	A-O	N-A-O
Arithmetic Means	.116	.162	.205	.139	.161	.177	.161
Std Dev	.237	.371	.437	.328	.301	.395	.336

N- New York Stock Exchange
A- American Stock Exchange
O- Over the Counter

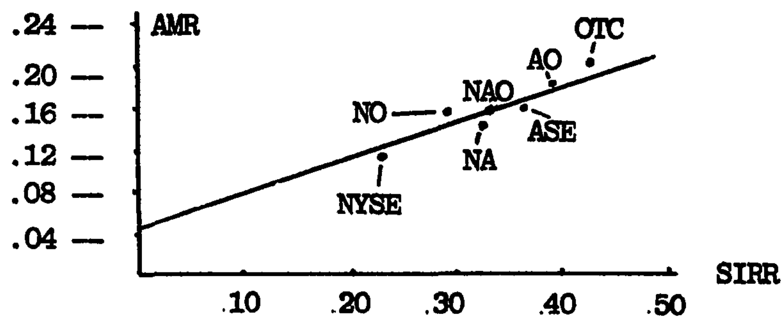

Figure 5: Risk and Return of Exchanges

continue to address the valuation of financial assets question and generalize that an asset's worth is a function of (1) expected benefits (cash flows) and (2) some relative certainty of achieving those benefits. A major problem in finance, they write, is that of specifying an "appropriate" discount rate so often referred to in finance and accounting literature.

> In theory, the answer is simple. The appropriate rate for each investor . . . is the opportunity cost of making the investment, i.e., the expected rate of return in alternative assets of similar risk. In a world of certainty . . . this market-determined rate is <u>the</u> appropriate rate . . . In the real world, the discount rate is more complex since varying degrees of uncertainty regarding the outcomes of alternative investments create different opportunity costs and rates of discount.[110]

Not only is there disagreement in specifying the most essential *ex ante* required rate of return, there is little agreement in simply stating *ex post* performance. This problem is further complicated by the fact that the discount rate, an exogenous variable in most models, must ultimately be estimated by the individual investor. To aid in specifying *ex ante* risk-return relationship for this study, some insights can be gained from the recent literature.

One common procedure is to substitute *ex post* returns for *ex ante* returns. This procedure is recognized as less than optimal, but little is written to justify the practice. It is interesting that less than one half page is devoted to this specific problem in Francis' *Investment Analysis and Management*. There he notes that, "A 'jump' is made in going from the capital market theory, which is stated in terms of expectations, to actual historical data."[111] Because expec-

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[110]Lorie and Hamilton, p. 123.

[111]Francis, p. 459.

tations must be observed (an impossible task) to correctly test evaluation models, several authors simply use *ex post* rates of return.

In the mid 1960's, Arditti attempted to identify the relationship between risk and required return on equity. The relevance of Arditti's work to this study is his choice of expected rate of return. He assumed that investors received what they expected for a certain period and used historical returns for expected returns.[112] In the Sharpe-Cooper study *ex ante* return estimates were actual returns.[113] Blume examined the question of beta stability over time and concluded that for portfolios of over fifty securities, risk assessments derived from historical data are extremely accurate.[114] Again realized returns, expressed as a price relative, were used for expected returns of the securities. The investor is assumed to have expected the return he actually received.

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[112] Fred D. Arditti, "Risk and the Required Return on Equity," *Journal of Finance* 22 (March 1967): 19-36.

[113] W.F. Sharpe and G. Cooper, "Risk-Return Classes of N.Y.S.E. Common Stocks, 1931-67," *Financial Analysts Journal* (March-April 1972): 48.

[114] Marshall E. Blume, "On the Assessment of Risk," *Journal of Finance* 25 (March 1971): 465.

Other Ex Ante Specifications. Litzenberger and Budd reviewed several empirical studies that attempted to test the basic relationship between risk and return. The prevailing practice of equating expected return to realized historical returns, say the authors, suffers from the problem that in theory expected returns are expressed in terms of nonobservable variables, that is, *ex ante* subjective estimates.[115] They state that

> Since *ex ante* subjective investor beliefs concerning expected rates of return are not directly observable, the burden of the empiricist is to develop reasonable surrogates for these expected parameters.[116]

Their surrogate for expected return is a form of price/earnings ratio and is defined as

> The mean of . . . earnings on common equity for the respective cross sectional year and the two previous years divided by the market value of the firm's common equity at the beginning of the cross section year.[117]

That expected returns and risk are relevant decision parameters is not the issue. The practical problem is how to estimate the appropriate measures that are necessary for inclusion in any valuation model. Where price-earnings ratios are not available, another technique is possible. Bierman

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[115]R. Litzenberger and A.P. Budd, "Corporate Investment Criteria and the Valuation of Risk Assets," *Journal of Financial and Quantitative Analysis* (December 1970): 102.

[116]Litzenberger and Budd, p. 405.

[117]Litzenberger and Budd, p. 407.

and Alderfer suggest another method that may be used to select a firm's risk-adjusted required rate of return. The analyst can simply ask several market participants what rate of return they will require for particular securities.[118]

More Problems : Unwarrantied Expectations. The substantial difference between optimistic investors' hopes and frequently lower realized returns raises many questions. Both security market and real estate literature address the question of this divergence in *ex ante* versus *ex post* returns.

Peter L. Bernstein, writing about common stocks in the Journal of Finance, asks the question, "What rate of return can you reasonably expect?"[119] He then emphasizes the question's ambiguousness with four further questions:

1. Is the time span covered by Fisher-Lorie relevant for today?

2. If no, (as Bernstein suggests) what time span is relevant?

3. Given the time span, what is a reasonable expectation for the market?

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[118] Harold Bierman, Jr. and Clayton P. Alderfer, "Estimating the Cost of Capital, a Different Approach," Decision Sciences 1 (January-April 1970): 40-53.

[119] Peter L. Bernstein, "What Rate of Return Can You 'Reasonably' Expect ?" Journal of Finance 28 (May 1973), p. 273.

4. Given the answer to three, what can you expect from a managed portfolio?[120]

The relevance of Bernstein's work to this study is that while historical security returns are much lower (Fisher and Lorie's 9.3% and his own estimate of future returns of 8%), a survey of fifteen professional portfolio managers report objectives in the 10 to 15% range. Bernstein suggests that while these goals are in fact interesting, professional market managers seldom beat the market:

> Indeed the literature of portfolio performance is uncomfortably crowded with evidence that the more ambitious expectations of rates of return in excess of 10% over five or more years are little more than pipe dreams.[121]

Roulac recasts Bernstein's argument into the area of real estate,

> Investors and managers generally, and in real estate particularly, almost uniformly indicate that they expect to out-perform historical investment results.[122]

Roulac attempts to explain some of the reasons for this general inflation of expectations in excess of realized returns. While he lists several reasons, he indicates that the major reason for this wide divergence is naivete. In analyzing surveys of investor "objectives" and "criteria," he states,

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[120]Ibid.

[121]Bernstein, p. 278.

[122]Roulac, p. 34.

> There is a shocking lack of consistency in how profitability measures are interpreted and applied --- so much so that one must question entirely the reliability of any investor objective not subject to verification. In this sense, it can be concluded that most investor "objectives" or "criteria" are little more than irresponsible hearsay and are totally lacking in trustworthiness.[123]

Roulac further states that this divergence is caused by the "penciling-out" of rents, expenses, etc., and the market insider's desires to keep real estate "returns" high.[124]

In addition to those provided by Bernstein and Roulac, Mao suggests different reasons for this problem of inflating "expectations". The primary reason, in relation to this study, is that the analysts for new projects (perhaps due to vested interests) tend to be optimistic, "So management sets the cut-off rates quite high to allow for slippage."[125]

Market Price of Risk Specification. A decision to specify each project's discount rate must ultimately be made. In the case where several projects are being analyzed, an opportunity cost schedule must be specified. The financial literature provides little help, especially in the real estate market.

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[123]Roulac, p. 35.

[124]Roulac, p. 36.

[125]Mao, Corporate Financial Decisions pp. 176-177.

Any single, arbitrary specification of a risk-return schedule for this study would be subject to criticism. Therefore, because a "correct" risk return schedule is impossible to specify, several possible ex ante risk return lines will be estimated. By assigning several MPR examples, problems in assigning this opportunity cost schedule can be recognized and avoided. By assigning several slopes (risk return trade-offs) and intercepts (general valuation parameters), model results can be tested for consistency.

For example, two MPR lines are considered in Figure 6. If line 1 is estimated by real estate analysts, this implies a certain level of expected returns and, hence, a general price level. If the risk return trade-off is considered acceptable to the investor (slope of line 1) but the estimated cash flows are suspected to be inflated, the entire price level can be deflated by raising the y-intercept, thus creating line 2. Project A and B in Figure 6 will be acceptable under line 1 assumptions, but only project B will be acceptable if a general price deflator raises the entire MPR schedule to line 2.

Different risk return trade-offs can be evaluated by changing the slope of the MPR. In Figure 7 projects C and D will both be accepted if the risk return schedule is line 1. However, if another investor is more risk-averse, and views

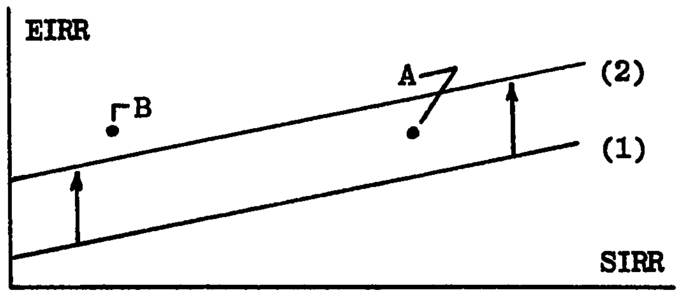

Figure 6: General Price Deflator

the risk-return schedule as line 2, Project C will no longer be acceptable.

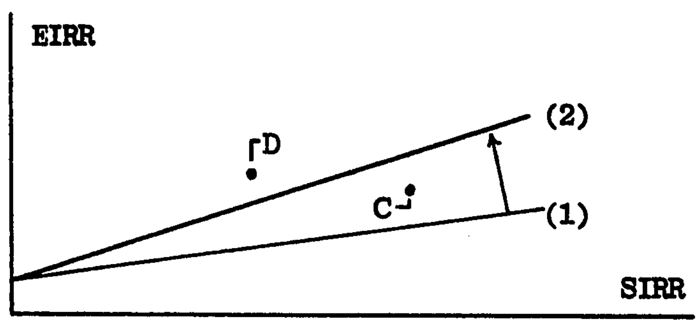

Figure 7: Risk Return Change

Two items concerning the empirical problem of specifying the MPR are particularly distressing. The first two are that once the decision has been made there are no assurances that the correct specification has been made and that, even if it has been correctly specified, there is no evidence of that fact. The second problem is that the MPR is constantly changing due to investors' new expectations of risk and return.[126] Regardless of the inherent problems in specifying a market price of risk schedule, it is done, explicitly or implicitly, each time an investor commits funds.

Mao suggests two procedures for estimating a tradeoff between risk and return.[127] One is by simply asking investors what rate of return they require on different investments. The current risk level (presumably from historical information) is used in order to get a risk-return point for that security. This is analogous to estimating a single point on a demand curve where what is needed is a price-quantity schedule (demand curve). A practical way to determine a risk-return opportunity schedule is to regress historical return and risk.[128]

This study will use both these approaches. Since expected risk and return, not history, is the essential ingredient in the determination of risk asset values, the subjective estimates of both risk and return are obtained from

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[126] Robert M. Soldofsky and Roger L. Miller, "Risk-Return Curves for Different Classes of Long-Term Securities, 1950-1966," Journal of Finance 24 (June, 1967) 429-446.

[127] See Mao, Corporate Financial Decisions, pp. 169-174.

[128] Soldofsky and Miller.

project experts. A linear regression is chosen as the best linear unbiased estimator of the risk-return opportunity schedule. This is the maximum likelihood estimator for the sample. As explained above, more than one possible MPR line could exist. Several different MPR's will be analyzed in order that the consistency of results can be investigated. The exact specification of the lines will be provided in Chapter 5.

3.3 COMPARISON METHODOLOGY

The underlying assumption in using a criterion approach is that the criterion, or metric, will correctly value each asset, and hence will select and value an optimal metric portfolio value for each MPR specification. Each alternative technique will then be used to make accept-reject decisions for each project according to its unique rules. The projects chosen by that model will comprise a portfolio. The value of the alternative technique portfolio will be determined by using the metric model values for each project.

3.3.1 Comparison Standards

The relationship between the metric portfolio value and the alternative portfolio value will be the first comparison standard used in this study.[129] This will be called the Relative Total Portfolio Value standard (RTPV). The second comparison standard will be the number of times each alternative method misclassifies an accept or reject decision and will be called the Classification Error standard (CE).[130]

3.3.1.1 Relative Total Portfolio Value Standard - RTPV

For each MPR, the metric will value each potential project and choose a metric portfolio. The metric portfolio value is the sum of the values of the projects with positive net present values. This metric portfolio value, MPV, will then be compared, on a percentage scale, to the portfolio value of each alternative technique.

For example, if the metric portfolio value is $1000 and the portfolio value for payback is $800, the percent efficiency of the alternative to the metric is 80%. If the IRR portfolio value is $900, the ratio is 90%. Therefore, in this example, the IRR would be superior to the Payback as determined by the Relative Total Portfolio Value comparison methodology.

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[129]Sundem, Accounting Review p. 312.

[130]Bey and Porter, p. 54.

3.3.1.2 Classification Error - CE

Another comparison methodology simply keeps track of the project accept-reject decisions and compares the alternative methods' decisions to those of the metric. This standard has two subdivisions of error classes. The number of projects accepted by the alternative technique that were rejected by the metric is one error class and the number of projects rejected by the alternative that were accepted by the metric is another. The total number of classification errors, the sum of the two error classes, will comprise the classification error standard.

3.3.2 Critical Valuation Parameters

Just as a "correct" discount rate was required for the metric model, a critical valuation parameter[131] must be specified for each alternative technique. An arbitrary cut-off rate chosen for, say, IRR, will directly affect projects chosen and subsequently the comparison standards and results of this study.

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[131] Sundem calls this variable (e.g., appropriate discount rate, payback period) an environmental parameter and chose it *ex post* to allow optimum model performance. See Gary L. Sundem, "Evaluating Simplified Capital Budgeting Models Using a Time-State Preference Metric," *Accounting Review* 49 (April 1974): 312.

Few, if any, guidelines exist for estimating these critical valuation parameters (CVP's). In order to test a model, a single arbitrary selection of a payback period or discount rate is subject to criticism. Therefore, a procedure analogous to Sundem's will be used to select the alternative models' CVV's *ex post*. In testing the IRR model, for example, the IRR's of each project (plus one slightly higher to eliminate all projects) will be used. The value of the cut-off rate that maximizes model results will be chosen.[132] This will allow each alternative model to perform as well as possible, so that the analysis will focus on model behavior, not on the arbitrary selection of optimal discount rates or payback periods.

In order to perform the methodology described in this chapter, project specific information (cash flow projections, both determinate and stochastic) must be analyzed. The next chapter describes the data-gathering process and some of the inherent informational problems in real estate investment analysis.

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[132] Sundem, *Accounting Review*, p. 312.

Chapter IV

DATA

The paucity of real estate data is well known[133]. The raw data for this study is an attempt to gather actual, *ex ante* subjective information on prospective real estate investment projects in order to compare the performance of several valuation models. This data, obtained for thirty-four projects in the spring of 1977, consists mainly of cash flow inputs or those elements that are used to calculate inputs necessary to calculate cash flow. The data was obtained on actual, not contrived, projects[134] for a variety of reasons. The choice of actual project information gives credence to the study as well as providing insights about actual investor behavior. In addition, questions about the sensitivity of different "assumptions" can be investigated.[135]

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[133] Wendt and Cerf indicate that more has been spent on "peanut" research than on real estate and that information about real estate investment is practically nonexistent. See p. vi.

[134] All information is on an *ex ante* basis. The projects consist of those that were seriously being considered or that had recently been selected.

[135] The difference between using Ellwood and a similiar non-DCF technique, FCR, can, for example, be examined. Note

The raw data consists of two categories of *ex ante* cash flow elements, deterministic and probabilistic. Several proposed projects with values of over fifty million dollars were included in the data. Accurate data inputs of this nature created several problems. First, a senior member (or owner) of the organization was required to authorize the release of this confidential information.[136] The nature of the data, specifically the extraction of a cumulative probability distribution for several input items, also demanded some senior person knowledgeable about both the organization and the project. Second, the sensitivity of the information, particularly on projects not yet announced and by those provided by MAI's, necessitated sterilization of the description.[137] In more than one case, the scaling down of large projects was necessary to disguise unannounced projects. Many firms, or at least the top executives, would simply not

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that the term "assumption" is sometimes used by practitioners to denote possible outcomes of elements that affect cash flow, e.g., vacancy rates, rents, absorption rates.

[136]In more than one instance, executive vice presidents of large mortgage companies, while sympathetic to my problem, would not make the decision to release even disguised data. The president of one firm was afraid of eventual legal action while another simply would not allow one of his senior people, or any employee for that matter, to take the time to organize the data for even a single project.

[137]The Appraiser's Code of Ethics.

allow a personal interview at all, possibly because these people are highly paid, busy business executives.

The sensitive and confidential nature of the information in conjunction with the time requirements of a firm's senior officer restricted the number of interviews. Time and travel resources also restricted the data search primarily to the major financial center of Dallas, Texas. Some projects were provided by the office of a large national mortgage company affiliate in Oklahoma City, Oklahoma. Most projects are physically located in the Mid-South.

This chapter will first discuss the general data gathering process for cash flow elements in detail. Then a summary of project types used in this study will be presented.

4.1 CASH FLOW INFORMATION

Two general types of data input are required for this study. The first type of data that is required is of a deterministic nature. The second type of data requires sufficient information for each input element to build a cumulative probability function. Both data element types are discussed in this section.

4.1.1 Deterministic Data Elements

The analyst was simply asked to estimate the information required for each of the deterministic elements in Table 2.

Table 2

Deterministic Input List

Element		Information
01	Property Type	
02	Investor Holding Period (Years)	
03	Number of Units in Project	
04	Average Size per unit (SQFT)	
08	Total Cost (or appraisal) of Land	
09	Cost of All Improvements (Total or $ per sqft.)	
10	Investor's required rate of return on equity (%)	
11	Reinvestment rate on equity Cash Flow (%)	
14	Depreciation Method	
15	Depreciable Life of Improvements (Years)	
16	Salvage Value of Depreciable Basis (if other than zero)	
17	Ordinary Income tax Rate (%)	
18	Capital Gains Tax Rate (%)	
20	Sales Commission at End of Holding Period (%)	
21	Investor's Short-term Borrowing Rate (%)	
22	Amount of Mortgage ($AMT or % of Purchase Price)	
23	Interest Rate on Mortgage (%)	
24	Amortization Term of Mortgage (Years)	
25	Call Term of Mortgage (Years)	

Two problems necessitated items 17 and 18 to be estimated uniformly for this study. First because equity investors have different tax situations and the objective of the research is to study valuation models, a uniform tax rate was used. Second, some of the analysts were fee appraisers who used valuation methods on a before-tax cash flow basis (Ellwood) and were really not capable of making these estimates. Estimates of typical tax rates (40% for ordinary income and 25% for capital gains) were necessary to complete the after-tax analysis.[138]

4.1.2 Probabilistic Data Elements

In an attempt to capture some quantifiable measures of relative risk among the sample properties, a Hertz-type approach was chosen. This necessitated the use of probability distributions for some of the inputs.

4.1.2.1 Probabilistic Elements

Six inputs, shown in Table 3, were chosen as stochastic inputs for the study.

4.1.2.2 Quartile Estimation Procedure

The actual estimation of cumulative probability distributions (CDF's) was obtained exactly like the procedures explained in Kahr, Brown, and Peterson.[139]

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[138] These estimates were based on the suggestions of Dr. J.P. Klingstedt, an income tax authority at the University of Oklahoma.

[139] Rex V. Brown, Andrew S. Kahr, and Cameron Peterson, <u>Decision Analysis for the Manager</u> (New York: Holt, Rinehart

Table 3

Probabilistic Input List

Input	Information
05	Average Monthy Rental per unit
06	Expected Occupancy
07	Annual Growth of Rental Income
12	Operating Expenses
13	Annual Growth Rate of Operating Expenses
19	Ending Property Value

This study's estimating procedure instructions were prepared after the first few interviews.[140] The analysts were knowledgeable about real estate, but most knew very little about statistics and only two were conversant about statistical dispersion's use as a surrogate for risk. The first few interviews took up to an hour to extract the CDF information, but, as the writer's experience increased, the probability estimates for the first project could be obtained in less than 15 minutes. Usually, five minutes or less was needed for an additional project from the same analyst.

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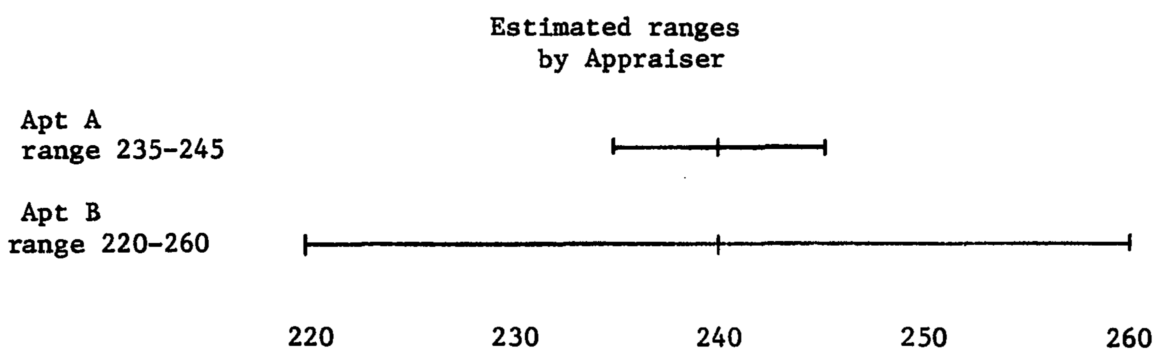
and Winston, 1974), pp. 31-36. Also, Howard Raiffa, _Decision Analysis - Introductory Lectures on Choices Under Uncertainty_ (Reading, Massachusetts: Addison Wesley, 1968), pp. 161-65.

[140] The "ESTIMATING PROCEDURE for page 2 of Input Data Sheet" used one of the actual project inputs as an example. The data input forms are shown in Appendix A.

The process, after the writer's first few interviews, proceeded in this general manner. First, a brief explanation of a quantifiable risk measure was presented. This explanation depicted two hypothetical apartment complexes that are <u>physically identical</u> in all respects except for the estimated "range" of the assumed stabilized monthly incomes (due to some market reason such as a different location). Both apartments' estimated monthly stabilized incomes are equal to $240. They are shown in Figure 8.



Stabilized rents are $240 for both properties.

Figure 8: Risk Example

It is intuitively obvious that apartment A (range 235-245) is less risky than apartment B (range 220-260) and that a rational purchaser would pay more for each dollar of stabilized rent from property A than from property B. The required rate of return for A will be less than for B. The analyst was told that the range estimates are used in a computer program to calculate a standardized "range" for each project's cash flows and hence a measure of relative risk.

Next, the second page of the data input sheet was explained to the analyst by discussing each step in the "Estimating Procedure" as follows:

1. Step 1 was discussed and an explanation that a "best guess" and a range were required for each input factor (Ave. Mo. Rent/Unit in the example).

2. Step 2 was then addressed and the actual estimation process explained by:

   a) Locating point #3, the best guess, on the scale (in step 3) such that the actual value has an equal chance of falling above or below that point.

   b) Locating the range (under normal circumstances) by placing points #1 and #5 on the scale.

   c) Locating point #2 which breaks the interval between Points 1 and 3 (this interval has a 50% chance of containing the actual value) into two equal-chance intervals. Point 4 is located the same way.

3. Step 4 was a final check that requires the analyst to recheck and insure that the points are placed such that the actual value has an equal chance of falling in each of the four quartiles.

Finally, the actual estimating process for a real project was started, beginning with average monthly rents. A mode, point #3, was located on the input sheet's horizontal scale.

A rough scale was produced along the line and the range, points #1 and 5, were estimated. Points #2 and 4 were then located. The analyst was then asked to determine, as a final check, if the actual value's chances of falling into each of the four intervals was equal. The process continued for the remainder of the probabilistic input items. Those stochastic input elements that the analyst could not estimate or that were contractually fixed were treated as deterministic.

4.1.3 Tax Considerations

Because Federal Income Tax considerations are so vitally important in real estate investment decisions, it is necessary to analyze the implications on this study. The computer program, OUPROB, used to analyze projects in the spring of 1977 reflected the 1976 tax laws in effect at that time.[141] Annual cash flow calculations are influenced by the maximum allowable depreciation method chosen at purchase. Similarly, the options available for the determination of the cash flow at the end of the investment period (selling price less taxes) are affected by the existing tax law and the previous depreciation decisions made by the taxpayer.

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[141]The most important item in the Tax Reform act of 1976 affecting this study is that 100% of all excess depreciation (except for some government-subsidiary programs) is recaptured as ordinary income. See Section 1250(a)(1) of the Tax Reform Act of 1976.

Even though no two taxpayers are identical, it was essential, for comparison reasons, that a real-world estimate of the typical tax-shelter participant be standardized for the study. Dr. John P. Klingstedt, a national authority on federal tax shelters, provided rate estimates of 40% and 25% for ordinary income and capital gains, respectively. The program ignored the minimum tax on tax preference items.

While investors generally make decisions in terms of current tax laws, the general thrust, aside from the very recent capital gains tax reduction, has not been toward aiding capital formation.[142] For example, each time the legislators eliminate a provision favorable to, say, residential housing investment, the investor's future cash flows and return are reduced.[143]

The analyst must not only be knowledgeable about current taxes but must also understand the legislators' staff and the "legislative intent" to accurately make valid projec-

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[142] See Appendix B for relevant details of the Revenue Act of 1978.

[143] The history of ordinary income "recapture" in residential real estate shows a gradual tightening starting after 1963 to eventually include all excess depreciation after 1975. One could reasonably expect all, or a portion of, total depreciation to eventually come under recapture pressure by "reformers". See PH Cumulative Changes Sec 1250, 1979.

tions even for periods of three years or longer. For example, future real estate loss deductions could be affected by the at risk rules.[144] Because tax laws so vitally affect real estate investment decisions, one must not only be relatively current, but must also seek professional tax assistance before committing funds. For example, a potential investor should investigate the stategy of using straight-line component depreciation instead of accelerated depreciation due to the total recapture provisions.[145]

It should be emphasized that the decision to use uniform tax rates for all projects was based on the necessity of isolating model behavior from individual tax considerations. Obviously, each equity investor should attempt to take advantage of the available individual income tax shelter provisions on an individual basis.

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[144] Before 1979, several activities were excluded from the "at risk" rules but now only real estate and some leasing operations reamain. See Sec 465(c)(3)(D) IRC. For a chronological review of this pattern see Sec 465, PH Code Volume, 1979.

[145] See PH Federal Taxes para 15,253(40) for summary of cases on component depreciation for used real estate.

4.2 PROJECT SUMMARY

The following sections will discuss and briefly describe the data. The projects are grouped by:

1. PROTYPE Property Type is categorized according to residential or commercial

2. CATEGORY This grouping breaks PROTYPE down into several categories:

   a) Residential

      i) APT Apartment

      ii) GDN APT Garden Apartment

      iii) LUX APT Luxury Apartment

      iv) LRNT APT Low Rent Apartment

      v) HLTH CTR Health Center

   b) Commercial

      i) SHOP CTR Shopping center

      ii) OFFICE Office space

      iii) OFF WHSE Office warehouse

      iv) OFF RTL Office Retail

      v) OFF MED Medical Office

      vi) RETAIL Retail

      vii) HOTEL Hotel

      viii) WHSE Warehouse

      ix) MINI WHS Miniwarehouse

3. SIZE TYPE

   a) If the project is a residential property, the size will be "number of units"

b) If the property is commercial, the size will be in "K SQFT," thousands of square feet.

The following properties, by project number, used in the study are presented in Table 4 on the next page. There are 10 residential and 24 commercial projects.[146] Each common model is then applied to each of the thirty four projects. The results are discussed in the next chapter.

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[146]Complete project input data, both deterministic and stochastic, for all projects is shown in Appendix C.

Table 4

Project List

IRR	SIRR	PROTYPE	CATEGORY	SIZE	TYPE
0.25106	0.09909	RESIDNTL	LUX_APT	330	NO UNI
0.20232	0.04617	COMMRCL	OFFICE	250	K SQFT
0.18460	0.07243	COMMRCL	SHOP_CTR	19	K SQFT
0.19664	0.02428	COMMRCL	WHSE	224	K SQFT
0.35002	0.03503	COMMRCL	SHOP_CTR	962	K SQFT
0.07019	0.01872	COMMRCL	OFF_WHSE	102	K SQFT
0.10314	0.03062	COMMRCL	SHOP_CTR	178	K SQFT
0.12400	0.04805	COMMRCL	OFFICE	81	K SQFT
0.10924	0.01415	COMMRCL	SHOP_CTR	207	K SQFT
0.08524	0.05996	RESIDNTL	APT	100	NO UNI
0.10752	0.05837	RESIDNTL	APT	280	NO UNI
0.08418	0.07508	COMMRCL	OFFICE	1000	K SQFT
0.18111	0.03082	RESIDNTL	APT	886	NO UNI
0.09459	0.05331	COMMRCL	OFFICE	194	K SQFT
0.26043	0.03400	COMMRCL	OFFICE	32	K SQFT
0.31366	0.02797	RESIDNTL	HLTH_CTR	406	NO UNI
0.12769	0.11877	COMMRCL	OFFICE	157	K SQFT
0.16267	0.08548	RESIDNTL	GDN_APT	300	NO UNI
0.07913	0.06826	COMMRCL	RETAIL	37	K SQFT
0.08908	0.00326	COMMRCL	RETAIL	39	K SQFT
0.09543	0.07765	RESIDNTL	GDN_APT	120	NO UNI
0.05339	0.06337	COMMRCL	HOTEL	154	K SQFT
0.09563	0.03271	COMMRCL	WHSE	40	K SQFT
0.21799	0.06275	COMMRCL	OFF_MED	14	K SQFT
0.19300	0.12236	RESIDNTL	LRNT_APT	13	NO UNI
0.32156	0.00987	COMMRCL	OFF_WHSE	100	K SQFT
0.10707	0.06290	COMMRCL	MINI_WHS	41	K SQFT
0.36944	0.16932	COMMRCL	RETAIL	48	K SQFT
0.31066	0.07617	RESIDNTL	APT	236	NO UNI
0.32431	0.11094	RESIDNTL	LRNT_APT	16	NO UNI
0.17947	0.02959	COMMRCL	OFF_WHSE	30	K SQFT
0.19110	0.04472	COMMRCL	OFFICE	5	K SQFT
0.08326	0.05381	COMMRCL	OFF_MED	14	K SQFT
0.05066	0.04440	COMMRCL	WHSE	50	K SQFT

Source: Original Data

Chapter V

EMPIRICAL RESULTS

This chapter reports the results of the study. The first section analyzes and compares the results of the common model measures in general. The second section reports the numerical results of the market price of risk. The third section investigates the performance of both common models and risk class models relative to the metric model.

5.1 COMMON MODEL RESULTS

This section first shows the results of each common model for each project and then reports the correlations between models. Then the risk-discriminating properties of each common model are investigated.

5.1.1 Results

Each model's algorithm, as defined in Chapter 2, is

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[147]The results are calculated for each model's Critical Valuation Parameter for each project. These are, for example, broker's rate of return for each project and payback for each project.

solved for each of the 34 projects. The results[147] are shown in Table 5. The risk proxy, standard deviation of expected returns, is also reported for each project for comparison purposes.

5.1.2 Correlations

One method of comparing the common models is by observing the correlations of each model's results with those of the other models. The product-moment correlations are shown in Table 6. The risk proxy, the standard deviation of the internal rate of return (SIRR), is also included in the table.

Starting the analysis with the first row, Broker's Rate of Return is most closely related to the PBBT and IRR models and least related to the FCR. The Free and Clear Return model has the largest correlation with the ELL and the smallest with DCR.

The PBBT model is, in addition to having a correlation coefficient of 0.929 with PBAT, most highly correlated with IRR and ELL. It has the smallest correlation with DCR. Similarly, PBAT is most highly correlated with IRR and ELL. However, it is least correlated with FCR.

Table 5

Common Model Results

OBS	BRR	FCR	PBBT	PBAT	DCR	IRRIRR	ELL	SIRR
1	0.142750	0.127296	4.699	5.016	1.255	0.250554	0.365639	0.09909
2	0.084390	0.259370	5.473	6.489	1.300	0.231963	0.743480	0.04617
3	0.048593	0.151728	6.574	8.131	1.237	0.203386	0.318590	0.07243
4	0.082847	0.096239	12.000	12.000	1.274	0.208293	0.251624	0.02428
5	0.362347	0.214866	2.564	3.581	2.284	0.342070	0.589412	0.03503
6	0.088463	0.109687	9.878	13.893	0.000	0.070989	0.114651	0.01872
7	0.070421	0.120847	9.571	13.222	1.405	0.106951	0.160964	0.03062
8	0.061536	0.108839	9.239	10.362	1.213	0.136260	0.187991	0.04805
9	0.111845	0.138679	8.038	11.743	0.000	0.107707	0.161344	0.01415
10	0.014001	0.081225	10.000	10.000	1.074	0.086101	0.110942	0.05996
11	0.017165	0.087145	10.000	10.000	1.103	0.115642	0.148691	0.05837
12	0.002076	0.093483	14.700	15.000	1.007	0.097795	0.131989	0.07508
13	0.115860	0.167589	4.873	6.052	1.376	0.189885	0.369035	0.03082
14	-0.064249	0.105819	9.923	10.000	0.800	0.083770	0.135786	0.05331
15	0.239319	0.166370	3.799	5.556	1.978	0.264482	0.379913	0.03400
16	0.313402	0.175355	2.979	3.838	1.977	0.311821	0.438363	0.02797
17	-0.059231	0.073167	10.000	10.000	0.812	0.099993	0.124307	0.11877
18	0.084233	0.138597	5.900	6.487	1.278	0.210051	0.309649	0.08548
19	0.052133	0.106130	10.000	10.000	1.155	0.110918	0.165599	0.06826
20	0.115937	0.104661	8.625	12.309	1.383	0.089983	0.128340	0.00326
21	0.102865	0.103472	5.000	5.000	1.176	0.128154	0.210212	0.07765
22	0.086520	0.085454	10.000	10.000	1.412	0.075225	0.099898	0.06337
23	0.065433	0.103980	7.000	7.000	1.208	0.096379	0.148198	0.03271
24	0.040258	0.142214	6.896	8.197	1.134	0.209380	0.328423	0.06275
25	-0.023386	0.128215	7.000	7.000	0.926	0.208220	0.263628	0.12236
26	0.450395	0.176453	2.220	3.384	2.043	0.321867	0.473033	0.00987
27	-0.002296	0.091254	10.000	10.000	0.992	0.061944	0.082264	0.06290
28	0.131950	0.123856	4.196	5.344	1.141	0.436113	0.580356	0.16932
29	0.224136	0.154155	3.285	3.645	1.375	0.327983	0.492457	0.07617
30	0.287878	0.145427	2.983	3.252	1.538	0.330144	0.466307	0.11094
31	0.202249	0.148545	4.675	6.055	1.649	0.174187	0.284499	0.02959
32	0.131554	0.145138	5.489	7.463	1.440	0.195098	0.310273	0.04472
33	0.032537	0.104987	10.000	10.000	1.104	0.103081	0.155251	0.05381
34	0.019848	0.088424	10.000	10.000	1.060	0.048260	0.079609	0.04440

Source: Appendix C

Table 6

Common Model Correlation Matrix

	BRR	FCR	PBBT	PBAT	DCR	IRRIRR	ELL	SIRR
BRR	1.00000 0.0000	0.62390 0.0001	0.77759 0.0001	0.67215 0.0001	0.68701 0.0001	0.71182 0.0001	0.64318 0.0001	-0.26718 0.1266
FCR	0.62390 0.0001	1.00000 0.0000	0.72448 0.0001	0.60914 0.0001	0.49346 0.0030	0.65196 0.0001	0.87243 0.0001	-0.19636 0.2657
PBBT	0.77759 0.0001	0.72448 0.0001	1.00000 0.0000	0.92875 0.0001	0.58297 0.0003	0.79631 0.0001	0.78389 0.0001	-0.07165 0.6872
PBAT	0.67215 0.0001	0.60914 0.0001	0.92875 0.0001	1.00000 0.0000	0.63157 0.0001	0.77661 0.0001	0.74875 0.0001	-0.24458 0.1633
DCR	0.68701 0.0001	0.49346 0.0030	0.58297 0.0003	0.63157 0.0001	1.00000 0.0000	0.56804 0.0005	0.53975 0.0010	-0.12837 0.4694
IRRIRR	0.71182 0.0001	0.65196 0.0001	0.79631 0.0001	0.77661 0.0001	0.56804 0.0005	1.00000 0.0000	0.89566 0.0001	0.31526 0.0693
ELL	0.64318 0.0001	0.87243 0.0001	0.78389 0.0001	0.74875 0.0001	0.53975 0.0010	0.89566 0.0001	1.00000 0.0000	0.17441 0.3239
SIRR	-0.26718 0.1266	-0.19636 0.2657	0.07165 0.6872	0.24458 0.1633	-0.12837 0.4694	0.31526 0.0693	0.17441 0.3239	1.00000 0.0000

Source: Table 5

The Debt Coverage Ratio model has the lowest correlations among the models in general. While this model, which is used by a majority of lending institutions and thus presumably has a major influence on real estate markets, is poorly related to other common methods, it is most highly correlated with the most simplistic model, the Broker's Rate of Return. Perhaps the two most simplistic models reinforce each other. The DCR is, however, most poorly related to another popular simplistic model, the FCR.

The Ellwood and Internal Rate of Return are, as expected, highly correlated. These models are again least correlated with DCR.

5.1.3 Risk-Return Relationships Displayed by the Common Model Results

This section describes the relationship between common model results and risk. For each model the value of each project's decision parameter (e.g., BRR, IRR, Payback) was regressed on the risk proxy, standard deviation of expected return (SIRR). The results should provide insight to each model's risk-discriminating power and suggest its desirability as a decision-making tool within this context.

Before analyzing each model separately, the regression equations[148] are summarized in Table 7.

Table 7

Risk Regression Summary

DEP VAR	INT	SLOPE	P VALUE
BRR	.157	- .867	0.13
FCR	.141	- .219	0.27
PBBT	7.64	- 6.21	0.69
PBAT	9.51	-22.05	0.16
DCR	1.33	- 1.65	0.47
ELL	.226	.820	0.32
IRR	.127	.871	0.07

Source: Appendix D

5.1.3.1 BRR

The relationship between Broker's Rate of Return and risk is first analyzed. When BRR is the dependent variable, the results do not agree with original ex ante expectations. If the BRR technique is valuable in terms of reflecting each project's risk level, the value of the regression coefficient should be positive, e.g., the greater the risk level for a project, the higher its required BRR. The empirical results show exactly the opposite with a P value for the

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[148]The P Value reported in the summary can be interpreted as follows. The P value is the probability of the independent variable coefficient's reported value being due to sample error when the actual value of the coefficient is zero. See Appendix D for full regression equation analysis for the entire study.

risk coefficient of 0.13. That is, the probability of the reported value being due to sampling error is only 13% if there is actually no relationship among the population.

5.1.3.2 FCR

The Free and Clear Return measure, if it consistently reflects project risk levels, should also be positively associated with risk. The higher the risk level, the higher the required rate of return as measured by FCR.

The results do not show this relationship to exist. The regression coefficient for SIRR is negative with a P value of 0.27. Again, like the BRR model, FCR ignores the appreciation element (assumes that APP is zero).

5.1.3.3 PB

Both of the Payback models, PBBT and PBAT, should have negative risk coefficients if the payback model reflects project risk. Both the PBBT and PBAT models have negative slope coefficients with P values of 0.69 and 0.16, respectively. The high P value for PBBT indicates a high probability that no relationship exists.

5.1.3.4 DCR

The debt coverage ratio should, if it performs as most lenders suggest, exhibit a positive slope. It can be argued that as project risk increases, the lender should demand a higher DCR as compensation for the additional risk. The results of the study show negative relationship with a P value of 0.47. Again, the high P value indicates a high probability of a zero slope coefficient.

5.1.3.5 IRR

The required rate of return, IRR, should increase as risk increases. The regression equation shows that the IRR coefficient is positive with a P value of 0.07. Return and risk appear to be positively correlated as is predicted.

5.1.3.6 ELL

The Ellwood model, essentially a before-tax internal rate of return technique that assumes a stabilized NOI, shows essentially the same results as IRR except that the P value of the risk coefficient is 0.32.

5.1.3.7 Summary of Risk Regressions

One of the findings is that BRR, the most simplistic technique, appears to be unsuitable as a predictor of project risk level. The model's lack of risk discrimination is due to two factors that are not considered by BRR. The risk and return of each project, as originally determined by the simulation package, is influenced not only by the CDF of the first year's cash flow estimates, but by the remaining year's operating cash flows and the reversion cash flow as well.

This problem may be related to the ever-present excessive enthusiasm of real estate analysts, particularly those who seek to inflate prices or justify certain value estimates. The "appreciation" factor estimate required by the Ellwood technique has been shown to be inflated. Comparisons of original appreciation estimates by appraisers have been compared to what "the market" is really paying for that appreciation. Robertson and Rufrano found that actual prices paid reflect lower "appreciation" rates than are often estimated.[149]

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[149]Terry D. Robertson and Glenn Rufrano,"Equity Yields: A Cash Flow Verification," <u>The Real Estate Appraiser</u> (March-April, 1976) 42-45.

The debt coverage ratio should, if it discriminates for risk, demand a higher DCR for each project as risk increases. That is, the general relationship shown in Figure 9 should hold. As the risk of a project increases, _ceteris paribus_, the suppliers of debt funds should demand a higher debt coverage ratio.

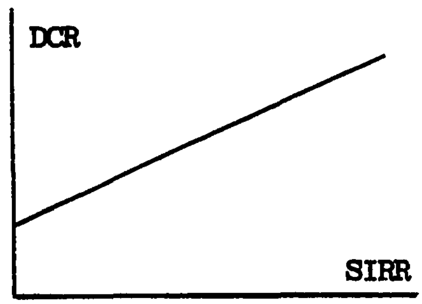

Figure 9: DCR for Lenders

In the regression of DCR against risk, the risk coefficient is negative. The P value, however, is 0.47, indicating that there is almost a 50% chance of this result happening from chance, i.e., there is a high probability of no risk-DCR relationship.

This apparent contradiction, a negative relationship, can be explained by further analysis. As risk increases, two factors that influence DCR are also affected in the market place-- the loan to value ratio (LVR) and the interest rate of the mortgage (I). The relative sensitivity of DCR to these factors may in fact overshadow the influence of risk on DCR if the following relationships hold:

DCR = f(risk)

LVR = f(risk)

I = f(risk).

As risk changes, the basic DCR model

DCR= NOI/DS

should react to market pressures as follows:

As Risk Rises	Then	and DCR
LVR decreases	DS decreases	Increases
I increases	DS increases	Decreases.

The regression results for this sample do not follow this pattern completely. As risk rises, interest rates do increase. The coefficient is positive with a P value of 0.13. The LVR, when compared to risk, shows a different pattern with a positive coefficient and a P value of 0.02.

The risk surrogate reported in this study is standard deviation of after-tax internal rate of return on equity. This is an after-financing measure which focuses on the equity investor. If the risk-assessment decisions of lenders are originally determined before financing decisions are made, then the DCR ratio might behave differently. That is, as the lender considers a project, the required debt coverage ratio should be positively correlated with the project's basic, or before-financing, risk. The LVR should also be negatively related to the before-debt risk proxy.

The regression equation for before-financing risk and LVR again shows a positive coefficient, suggesting that mortgage companies may be overlending on real estate in general[150]. This could be explained by the common practice of lending on the developer's track record and his personal balance sheet. This information further strengthens the argument that the real estate market is not efficient.

The other common model that does not appear to discriminate for risk is the Free and Clear Return measure. Alt-

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[150]Statements from several mortgage lending employees indicated that "upper management" sometimes dictated that they place an arbitrary amount of money in a given time period, that is, to "get (say) $100 million on the street in July."

hough the FCR model does use more information (average NOI versus one year's data for BRR and DCR), it does not include the selling price of the project in its calculation.

One reason for the lack of risk discrimination for the BRR and FCR could be the absence of some reversion cash flow information. While the project's horizon-time cash flow is inherent in the models, this implicit reversion assumes zero appreciation. The relative impact of the reversion's risk posture, as compared to the operating cash flows, is neglected as well. The probability distribution of the first year cash flow is substantially less risky than both the probability distribution of the subsequent operating flows as well as the reversionary cash flow. The higher risk and the concomitant higher returns (expected returns derived substantially from optimisitic price escalation) are not included in the models.

Three types of models-- IRR, ELL and the two Payback formulations-- appear to reflect project risk in this study. Ellwood and IRR are so similiar in nature to the metric that this result was predictable. Payback, among the most simple models available, exhibits some interesting characteristics. The real estate analysts, those who were actually involved in the risk assessment decisions (and, as opposed to researchers, who must live with those decisions), chose to analyze projects over different time horizons. That is, perhaps the greater the perceived project uncertainty, the shorter the payback period for that project. Payback period values used in this study generally reflect the investment horizon so that the planning period may be solely due to the analyst's implicit ability to discriminate for risk. This time period reflects the transition between relative "certainty" and "uncertainty" in cash flow estimates. Payback, under these conditions, is a valid form of risk discrimination whose inputs are reflected by the analyst's subjective probability distributions.

In summary, the ability of the common models to discriminate for equity holder risk is limited to the following models:

PBBT

PBAT

IRR

ELL

The high P values of PBBT and ELL reduce the reliance on these measures as risk-sensitive techniques. The R-squared value for all these regressions is extremely small. If the data adequately reflects risk and return, this indeed indicates the existence of an inefficient real estate market.

5.2 MARKET PRICE OF RISK

The obvious problem of using the metric model is, in addition to estimating cash flows, the determination of a market price of risk. Different specifications of slope or intercept will, of course, create different metric project values. The approach to solving this onerous problem was first to try to estimate the MPR by regressing expected return on risk and then to specify other plausible *ex ante* risk-return lines.

This approach allows several comparisons to be made between the metric and the other models. Before these different comparisons' results are shown, the nine MPR lines are discussed. The next section explains the procedure for specifying the MPR, and the subsequent section presents the results of the risk-return calculations. In all, nine market price of risk lines are used in the analysis. The specific MPR lines tested in this research are derived in the following manner:

1. The first line assumes that the 34 projects' risk and return estimates are part of a somewhat efficient market. Therefore, MPR1 will be the simple regression between the expected return (E(R)) and the standard deviation of that return (SIRR).

2. The next line, MPR(2), assumes a somewhat efficient market but forces the regression through an assumed risk-free rate on the E(R) intercept. These two regressions are shown in the subsequent section.

3. The next possibility is that the slope of the MPR is not as steep as M-1 or M-2. Perhaps the slope, M-3, is much less and approaches the figure found by Eubank in the stock market. So far, three slopes and two intercepts have been estimated.

4. Lowering the discount rate schedule for any one slope, in essence, raises the NPV estimates for all projects. Thus, the choice of an MPR line below another would indicate that the investor estimates that all projects are underpriced and warrant lower discount rates in general. Similarly, raising the discount rates in general will have the effect of assuming that either the projects are overvalued or the cash flow estimates are inflated (which seems to agree with actual practice). An overall deflation of all project values will be achieved by estimating an arbitrary E(R) 3 above E(R) 1.

Nine specifications of the MPR are derived from the three different estimates of slope and intercept. The results follow.

5.2.1 Market Price of Risk Estimates

The first of the nine market price of risk lines is obtained by regressing expected return against the risk proxy, the standard deviation of expected returns. This line, which assumes that the MPR is the locus of equilibrium points for each project in the E-S space, is the linear maximum likelihood estimator for the sample. The regression equation is

$$E(R) = .13 + .66(SIRR),$$

Where E(R) = Dependent variable (stochastic returns)

SIRR = Independent variable (standard deviation)

0.13 = Y intercept

0.66 = Market determined price of risk (MPR).

Another specification of a "correct" MPR is one in which a regression estimator is useful. If one assumes that the equilibrium MPR line passes through the risk-free rate, then the E(R) - intercept should be forced through an estimate of the risk-free rate. The regression equation for this line is

$$E(R) = .06 + 1.56\ SIRR,$$

where

E(R) = Dependent variable

SIRR = Independent variable

0.06 = Forced Y-intercept

1.56 = Market price of risk.

The study by Eubank, in which the risk-return trade-offs in the organized securities markets were analyzed, also suggests another realistic market price of risk estimate. The slope of the risk-return line was approximately 0.35[151].

Due to investors' herd instincts, excessive optimism, psychology, industry-vested interests, etc., there is a distinct possibility that the entire sample is over priced. In order to "deflate" the entire group, the general level of required rate of return figures can be arbitrarily raised to, say, 0.20[152]. These four different *a priori* possibilities give the following plausible approaches to specifying different market price of risk estimates[153]:

Approach	Intercept	Slope
1. Regression	.13	.66
2. Forced regression	.06	1.56
3. Eubank Study	--	.35
4. Price deflator	.20	--

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[151] Eubank, p. 28.

[152] Roulac, p. 34.

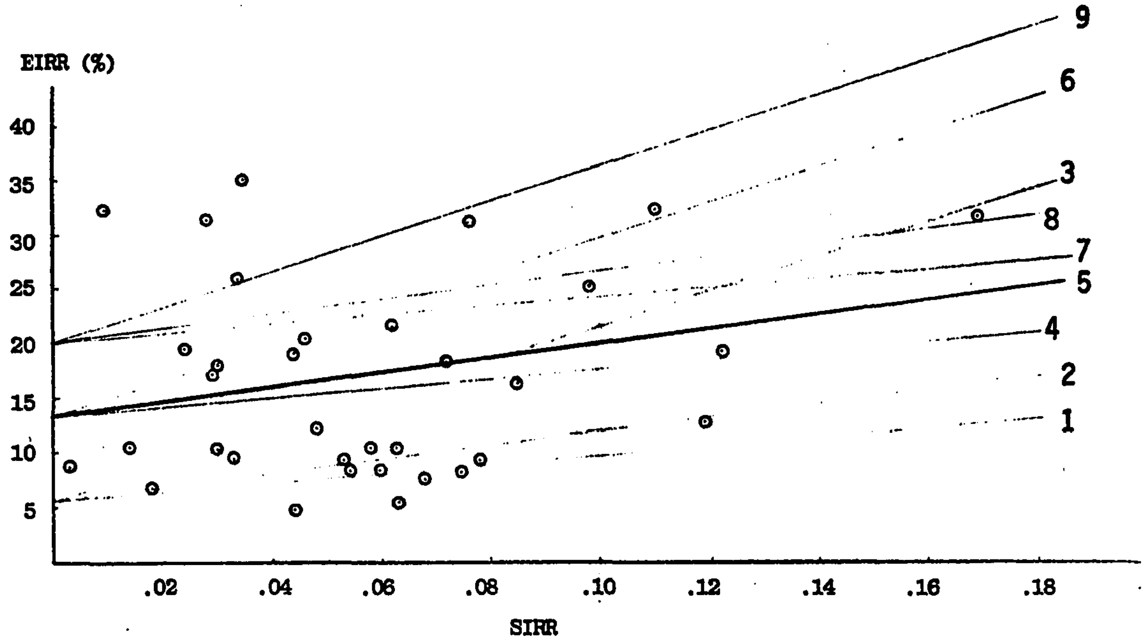
[153] The regression coefficient gives one estimate, and the .06 and 0.20 are arbitrary selections.

If the three slopes and three intercepts are considered, then there could be a total of nine combinations, shown in Figure 10. Note that if line 9 in fact is "correct," only four projects will have a positive net present value. Also, if line 1 is "correct," all projects are acceptable except the four that fall below the line.

The market price of risk question has not been resolved by "specifying" nine plausible *ex post* lines; the question of which line to use when comparing real estate valuation models remains. The next section will explain several different ways to approach the problem by using different weighting combinations of the nine MPR lines.

5.2.2 Weighting Procedures

Four different weighting procedures for the nine lines are investigated in the study. The first scheme assumes that the correct MPR is one of the estimated lines and that it is always correctly estimated. The next two approaches give different weights to each possible line. The last approach assigns total weight to the line generated by the maximum likelihood estimating procedure.



Source: Appendix C

Figure 10: MPR Estimates with 34 Projects

5.2.2.1 Omniscience

The primary objective of this study is to evaluate the relative performance of capital allocation models in a real estate setting. This can be done irrespective of an analyst's ability to forecast, predict or estimate the correct specification of risk and return. If the assumptions are made that for each MPR there is a separate metric and that the selection of critical valuation parameters (cut-off's for IRR, PB, etc.) is made ex post, then the performance of each model, not the ability of the analyst to "pick" a "good" MPR for use as a metric, can be evaluated[154].

5.2.2.2 Equal Weights

Although the results of the omniscient approach are interesting, it is highly unlikely that an analyst can consistently pick the correct MPR. If the nine different estimates for MPR are given equal weights, then an overall weighted result can be calculated for each model. That the lines have an equal probability of occuring is unlikely. The equal weighting combination is not used.

5.2.2.3 Likelihood Weights

If the sample of thirty-four projects does, in fact, represent the "population," then the regression line is the most likely estimate for MPR. The other eight *a priori* estimates do have a likelihood of occurring. One example of this likelihood, discussed above, is that they be weighted equally. This choice, however, is not as realistic as the weighting procedure developed in the following discussion.

In the second edition of Johnston's *Econometric Methods*, the two-variable linear model is developed. The parameters for a least squared model are first developed, and then the maximum likelihood parameters are shown to be indentical to

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[15]*This is Sundem's main thrust in evaluating Capital Budgeting models.

the least squares parameters. The likelihood function for the sample is given as[155]:

$$L = \frac{1}{(\sigma_u^2 2\pi)^{n/2}} \exp\left[-\frac{1}{2\sigma_u^2}\sum_{i=1}^{n}(Y_i - \alpha - \beta X_i)^2\right]$$

Where L = likelihood
σu = standard deviation of error term
n = number of observations
Y_i = dependent variable
α = Y intercept
β = slope
X_i = independent variable

The procedure and results for weighting the likelihood of each of the nine lines is shown in Figure 11. The relative weights were found to be :

1.	0.000000	2.	0.000024
3.	0.041851	4.	0.276525
5.	0.677706	6.	0.003900
7.	0.003443	8.	0.000061
9.	0.000000		

These relative weights will be used in calculating the expected results of the various techniques.

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[155] J. Johnston, Econometric Methods, 2nd ed. (New York: McGraw-Hill, 1972), p. 25.

STEP	PROCEDURE
1.	Using SAS regression and matrix procedures, regress expected return on risk and save disturbance term matrix E.
2.	Calculate unbiased estimate of population variance (EE'/n-2).
3.	Nine likelihood solutions are calculated by using slopes and intercepts for each MPR.
4.	Normalize (weights totaled 100%) nine lines for percentage likelihoods.

Figure 11: Weighting Procedure

5.2.2.4 Maximum Likelihood Estimate - MLE

The practical aspects of first estimating several risk-return opportunity curves, statistically weighting them and then analyzing the expected results is less then appealing. The practical procedure of fitting a risk-return schedule could possibly be a simple least-squares regression. This has the intuitive appeal of being theoretically attractive while at the same time being easy to accomplish[156].

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[156]See Mao, Chapters 7 and 8.

The MLE weighting scheme, the omniscient, and likelihood weights are used in comparing the different valuation techniques. These comparisons are described in the next section.

5.3 BENCH MARK COMPARISONS

The bench mark is compared to the different models according to the two different comparison standards. Both the total errors and the relative efficiency of the Relative Total Portfolio Value are used, ERRT and EFF, respectively[157]. The models compared to the metric are divided into different groups in order to better organize the results. These groupings are shown in Table 8.

5.3.1 Common Models

Three different weighting schemes for the metric are examined. The two comparison standards, ERRT and EFF, are tested for the omniscient model, the likelihood-weighting model and the MLE estimate model.

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[157] See Chapter 3 for a detailed description of these standards.

Table 8

Models for Comparison

<u>Common Models</u>

1) Simplistic Models
   - BRR
   - FCR
   - PBBT
   - PBAT
   - DCR

2) Discounted Cash Flow Models - DCF
   - IRR
   - ELL

<u>Risk Class Models</u>

1) NPV(R) with omniscience
   R= 1,2,...,6
2) NPV(R) with MLE
   R= 1,2,...,6
3) ELL(R) with MLE
   R= 1,2,...,6

5.3.1.1 Omniscient Model

Since the correct market price of risk and the model's best critical valuation parameter are chosen *ex post*, then the major thrust of the analysis is on the performance of the techniques, not on the hypothesized ability of an analyst to "pick" the correct MPR and the critical valuation parameters[158]. The summary results, shown in Table 9, were obtained for each MPR estimate by using the following procedure:

1. Using the MPR schedule as a predictor for the required rate of return, the metric model finds a value for each project. Each project that has NPV

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[158]Sundem, *Accounting Review*, p. 312.

greater than or equal to zero is classified as an acceptable project and is included in the metric portfolio.

2. The model being evaluated, for example BRR, will provide different results for each cut-off rate. If the acceptable cut-off rate is -0.06 (the lowest BRR value for all 34 projects), then all projects will be accepted. As the acceptable BRR is increased, nothing is affected until the value reaches the next lowest BRR in the sample. When this break point is reached, that project is eliminated from the projects categorized as acceptable by the BRR. The cut-off is raised until all the projects are excluded from the BRR portfolio.

3. Portfolio ERRT and EFF measures are calculated for each break point in the cut-off rate.

4. If the "best" BRR cut-offs are selected ex post, then two values are chosen that maximize EFF and minimize ERRT, respectively. This process is repeated for all nine lines and presented in Table 9.

The "best" standards, minimum ERRT and maximum EFF, do not necessarily occur at the same value of the CVP. The values for "best" CVP's are shown in Table 10. Note that while the models cannot be compared across the table, five of the seven model's CVP's are identical for the ERRT and EFF standards. This shows that the best EFF and ERRT values for MPR1 both occur at the BRR cut-off of −6.429%. For MPR5, the best EFF occurs at 8.2847% and the best ERRT occurs at 11.586%.

The EFF and ERRT information is reduced to ranked data in Table 11. Note that, while the rankings are not identical for all models, some consistently outperform others.

Table 9

Common Models vs Metric with Omniscience

Efficiencies (%)

MPR	BRR	FCR	PBBT	PBAT	ELL	IRR	DCR
1	99.64	99.80	99.64	99.64	99.9	99.8	99.64
2	98.96	99.37	97.89	97.92	99.7	99.6	97.81
3	95.17	96.52	92.48	88.40	98.9	97.4	90.18
4	83.51	90.28	94.72	94.62	100.0	100.0	91.30
5	78.33	92.11	94.50	94.32	99.9	99.9	88.27
6	83.81	94.96	92.80	88.95	94.9	94.1	81.96
7	92.84	94.10	92.84	91.96	99.0	100.0	88.02
8	99.10	95.62	99.24	98.36	100.0	99.2	95.61
9	99.94	74.65	99.94	99.66	75.3	99.9	99.47

Error Totals

MPR	BRR	FCR	PBBT	PBAT	ELL	IRR	DCR
1	4	2	4	4	1	2	4
2	4	3	4	6	1	2	3
3	6	4	4	7	4	3	5
4	7	2	3	3	0	0	6
5	6	3	2	4	1	1	5
6	4	3	3	4	1	3	6
7	2	4	2	2	1	0	5
8	2	3	1	3	0	1	4
9	1	2	1	2	3	2	1

Source: Table 5 and Figure 10

The original EFF and ERRT results originally shown in Table 9 are summarized in Table 12. This table shows that of the nine possible risk-return environments, BRR had five efficiency values in excess of 95%, six observations in excess of 90% and three observations with efficiencey values of 90% or less. This breakdown shows that both IRR and its before-tax shadow ELL perform well with most observations in excess of 90-95% and few observations of less than 90%. One non-

Table 10

CVP's for ERRT and EFF

MPR	BRR EFF	BRR ERRT	FCF EFF	FCF ERRT	PBBT EFF	PBBT ERRT
1	-0.0642	-0.0642	0.0871	0.0934	14.700	14.700
2	0.0171	0.0171	0.0871	0.0962	12.000	10.000
3	0.0828	0.0828	0.0962	0.1238	9.239	9.239
4	0.0828	0.1158	0.1422	0.1238	6.896	6.896
5	0.0828	0.1158	0.1422	0.1238	6.896	6.896
6	0.1158	0.2241	0.1541	0.1541	5.473	4.196
7	0.1319	0.1319	0.1753	0.1541	4.699	4.699
8	0.2241	0.2241	0.1753	0.1541	4.196	4.196
9	0.2241	0.2241	0.1753	0.1541	3.799	3.799

MPR	PBAT EFF	PBAT ERRT	ELL EFF	ELL ERRT	IRR EFF	IRR ERRT	DCR EFF	DCR ERRT
1	15.000	15.000	0.1109	0.1109	0.0837	0.0837	0.000	0.000
2	13.222	13.222	0.1481	0.1481	0.1030	0.1030	0.000	1.103
3	12.309	8.197	0.1613	0.1613	0.1077	0.1362	1.213	1.213
4	8.197	8.197	0.2516	0.2516	0.1741	0.1741	1.237	1.237
5	8.197	8.197	0.2516	0.2516	0.1741	0.1741	1.237	1.237
6	6.489	6.052	0.3690	0.3690	0.1898	0.2319	1.977	1.977
7	5.556	5.556	0.3799	0.3799	0.2319	0.2319	1.977	1.977
8	3.838	3.838	0.3799	0.3799	0.2644	0.2644	1.977	1.977
9	3.838	3.838	0.3799	0.3799	0.2644	0.2644	1.977	1.977

Source: Table 9

Table 11

Rankings of Common Models

MPR	STD	BRR	FCR	PBBT	PBAT	ELL	IRR	DCR
1	EFF	5.5	3	5.5	5.5	1.0	2.0	5.5
	ERRT	5.5	2.5	5.5	5.5	1.0	2.5	5.5
2	EFF	4.0	3	6.0	5.0	1.0	2.0	7.0
	ERRT	5.5	3.5	5.5	7.0	1.0	2.0	3.5
3	EFF	4.0	3	5.0	7.0	1.0	2.0	6.0
	ERRT	6.0	3.0	3.0	7.0	3.0	1.0	5.0
4	EFF	7.0	6	3.0	4.0	1.5	1.5	5.0
	ERRT	7.0	3.0	4.5	4.5	1.5	1.5	6.0
5	EFF	7.0	5	3.0	4.0	1.5	1.5	6.0
	ERRT	7.0	4.0	3.0	5.0	1.5	1.5	6.0
6	EFF	6.0	2	4.0	5.0	1.0	3.0	7.0
	ERRT	5.5	3.0	3.0	5.5	1.0	3.0	7.0
7	EFF	4.5	3	4.5	6.0	2.0	1.0	7.0
	ERRT	4.0	6.0	4.0	4.0	2.0	1.0	7.0
8	EFF	4.0	6	2.5	5.0	1.0	2.5	7.0
	ERRT	4.0	5.5	2.5	5.5	1.0	2.5	7.0
9	EFF	1.5	7	1.5	4.0	6.0	3.0	5.0
	ERRT	2.0	5.0	2.0	5.0	7.0	5.0	2.0

Source: Table 9

DCF technique, PBBT, does perform well with all nine observations in excess of 90% and none less than 90%. Debt coverage ratio has the lowest overall performance, i.e., the lowest number of observations above 95% and above 90%.

Table 13 is constructed to reflect approximately the same information for error total comparisons. BRR, for example, has one observation of one or less classification error. Three observations exist for three or less errors, and there are six observations of four or more errors. Ellwood and

Table 12

Summary of Common Models with Omniscience-EFF (%)

	Number of Efficient Observations		
Model	Over 95%	Over 90%	90% & Under
BRR	5	6	3
FCR	4	8	1
PBBT	4	9	0
PBAT	4	7	2
ELL	7	8	1
IRR	8	9	0
DCR	4	6	3

Source: Table 9

IRR perform best, while DCR and BRR appear to have the weakest performance.

Table 13

	Number of ERRT Observations		
Model	1 or Less	3 or Less	4 or More
BRR	1	3	6
FCR	0	7	2
PBBT	2	6	3
PBAT	0	4	5
ELL	7	8	1
IRR	4	9	0
DCR	1	2	7

Source: Table 9

The ranked performance results for common models from Table 11 are used to calculate an overall average rank in Table 14. For example, the average efficiency rank of BRR is 4.83, the average of all nine efficiency ranks from Table 11. The average rankings show that Ellwood, using both EFF and ERRT with omniscience, ourperforms all common models. Again DCR ranks last for EFF and ties for last with PBAT for error totals.

Table 14

Overall Ranking of Common Models

MODEL	EFF	ERRT
BRR	4.83	5.17
FCR	4.22	3.94
PBBT	3.89	3.67
PBAT	5.06	5.44
ELL	1.78	2.11
IRR	2.06	2.22
DCR	6.17	5.44

Source: Table 9

The preceding analysis, in order to isolate the effect of MPR choice from model performance, has been based on the assumption that the correct MPR be selected *ex post*. This approach did provide some interesting results. However, in the interest of applicability to real problems, the analyst can not realistically be expected to accurately estimate the MPR *ex ante*. The next two approaches investigate two different weighting procedures for the MPR that require less stringent assumptions.

5.3.1.2 Likelihood Weighting

The raw data for the both EFF and ERRT standards is organized in matrix form. Each common model being evaluated has itself 35 sub-models[159] (each corresponding to a different cut-off rate) because for each ascending BRR cut-off there is one new project deleted from the portfolio. As each new project is deleted, the total relative portfolio value can increase, remain the same, or decrease, according to the value of the metric Net Present Value for that project[160]. An example of the EFF data structure for each common model is given in Figure 12. The first column alongside the EFF matrix represents the five cut-off values for the BRR example. This column is only for reference. The matrix cells, represented in brackets, are efficiency values for each MPR and cut-off rate, three MPR's and five cut-off rates, respectively. The actual data sets similarly constructed exist for both EFF and ERRT for all common models, but have 35 cut-off values and nine MPR columns.

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[159]There are, in essence, 35 separate BRR models, 34 project cut-off rates and an artificial BRR that is an "epsilon" greater than the highest project BRR that will reject all projects (a real possibility in real estate and perhaps one that could be followed more often).

[160]As the portfolio value changes, the EFF and ERRT's can also change.

Columns Are:

$$
\begin{array}{l}
 \\
\text{BRR1} \\
\text{BRR2} \\
\text{BRR3} \\
\text{BRR4} \\
\text{BRR5}
\end{array}
\begin{array}{c}
\underline{\text{MPR1}} \quad \underline{\text{MPR2}} \quad \underline{\text{MPR3}} \\
\begin{bmatrix}
.90 & .92 & .93 \\
.91 & .93 & .94 \\
.90 & .89 & .92 \\
.86 & .84 & .90 \\
.95 & .80 & .80
\end{bmatrix}
\end{array}
\quad \text{Efficiency Matrix "A"}
$$

$$
\begin{bmatrix} 1/3 & 1/3 & 1/3 \end{bmatrix} \quad \text{Equal Weight Matrix "B"}
$$

Weighted Efficiency Vector "WEFF"

$[\text{WEFF}] = [A]\,[B']$ or

$$
[\text{WEFF}] = \begin{bmatrix} .91667 \\ .92667 \\ .90333 \\ .86667 \\ .85000 \end{bmatrix}
$$

Figure 12: Likelihood Weighting Example

Using the example in Figure 12, the expected WEFF from the five models for the first and second rows are:

$$0.90(1/3) + .92(1/3) + .93(1/3) = .91667$$

$$0.91(1/3) + .93(1/3) + .94(1/3) = .92667$$

and in matrix form the likelihood-weighted efficiencies are given as [WEFF] = [A] [B']. The best equally weighted expected WEFF is shown to be the second model, BRR2, for a value of .92667.

This approach, which assigns weights to each MPR, can be directly contrasted to the "omniscient" weighting described in the previous section. In the previous example, the best <u>ex post</u> cut-off for MPR1 is BRR5 with an WEFF of 0.95. The best cut-off for MPR2 is BRR2 for an WEFF value of 0.93. In a more practical setting the best overall choice for BRR is BRR2, for a likelihood-weighted EFF (WEFF) of 0.92667, which is the second value in the WEFF matrix in Figure 12.

The likelihood-weighted results for this study are shown in Table 15. The values represent the overall best value for each model. Note that the strict assumption of omniscience, that of choosing the correct MPR from among nine possibilities, has been relaxed. This information now allows one to compare across all common models. Ellwood and IRR are tied for the best model, while BPR and DCR are tied for last place.

Table 15

Likelihood Weight Results

	EFF%	Cutoff	ERRT	Cutoff
BRR	80.17	.0828	6.31	.1158
FCR	91.32	.1420	2.78	.1240
PBBT	94.19	6.896	2.42	6.896
PBAT	94.03	8.197	3.86	8.197
ELL	99.69	.2516	.87	.2516
IRR	99.69	.1741	.87	.1741
DCR	89.04	1.2370	5.33	1.2370

Source: Table 9 and Figure 12

While the likelihood-weighting approach is more practical than the omniscient approach, another procedure can be used to evaluate an overall best common model. This method is discussed in the next section.

5.3.1.3 MLE Estimate

The original maximum likelihood estimate of the market price of risk is a regression of expected IRR on the risk surrogate, standard deviation of expected return. This estimate is extremely easy to obtain from available statistical packages. The MPR5 is the maximum likelihood estimate for the sample data. The study's results using this procedure are shown in Table 16. Note that Ell and IRR are judged best by both the EFF and ERRT standards.

Table 16

MLE Estimate Results

Model	EFF%	Cutoff	ERRT	Cutoff
BRR	78.33	.0828	6	.1158
FCR	92.11	.1422	3	.1238
PBBT	94.50	6.896	2	6.896
PBAT	94.32	8.197	4	8.197
ELL	99.99	.2516	1	.2516
IRR	99.99	.1741	1	.1741
DCR	88.27	1.237	5	1.237

Source: Table 9

5.3.1.4 Comparisons - MLE and Likelihood

Comparisons between the two previous approaches are of interest. The MLE approach specifies the "correct" risk-return trade-off as the best linear estimate. The MLE line is MPR5. The likelihood-weighting approach uses all nine lines, but weights them according to their likelihoods. The results, as shown in Table 15 and Table 16, show that the results of the two approaches are similar.

Note that both the values for EFF and for ERRT are very close and that within both subgroups, EFF and ERRT, the models rank identically. This information suggests that the differences between the two statistical approaches, MLE and likelihood-weighting, are small. This result is expected because of the 68% weight assigned to MPR5. Consequently, for the remainder of the study, the likelihood-weighting process was abandoned in favor of the simple, theoretically sound maximum likelihood estimate (MLE) for the market price of risk.

5.3.2 Risk-Class Models

The initial research design proposed to test risk class models for BRR, ELL and NPV techniques. However, when BRR was regressed against the risk proxy, a negative relationship was discovered. This precludes the testing of a risk-class BRR model.

The two risk-class models compared are the NPV(R) and the ELL(R), where R= the number of risk-class segments to be tested. Both the omniscient and MLE models will be tested for NPV(R). The ELL(R) and NPV(R) will then be compared using the MLE market price of risk.

5.3.2.1 NPV(R) with Omniscience

Direct comparisons between the common models and the NPV(R) models can be made by evaluating each risk class for each of the nine MPR'S. The efficiency results are shown in Table 17. The error total results are shown in Table 18.

Table 17

NPV(R) Efficiencies (%)

Model	Market Price Risk								
	1	2	3	4	5	6	7	8	9
NPV (1)	99.699	91.908	84.362	100	99.893	82.930	100.000	99.246	71.947
NPV (2)	99.898	99.924	93.165	100	100.000	92.956	100.000	100.000	99.719
NPV (3)	99.936	99.701	92.225	100	100.000	99.952	100.000	100.000	99.470
NPV (4)	99.975	99.964	99.495	100	99.997	91.289	100.000	99.246	100.000
NPV (5)	100.000	100.000	99.466	100	100.000	99.976	99.983	99.246	99.470
NPV (6)	100.000	100.000	99.947	100	100.000	99.976	99.983	100.000	99.719

Source: Table 5, Figure 1 and 10

The results show that, with a few exceptions, the higher the number of risk classes, the better the performance. These exceptions will be addressed at the end of this section.

Table 18

NPV(R) Error Totals

Model	Market Price of Risk								
	1	2	3	4	5	6	7	8	9
NPV(1)	4	7	7	0	2	5	0	1	4
NPV(2)	1	1	3	0	0	6	0	0	1
NPV(3)	1	2	3	0	0	2	0	0	1
NPV(4)	1	1	3	0	1	3	0	1	0
NPV(5)	0	0	4	0	0	1	1	1	1
NPV(6)	0	0	1	0	0	1	1	0	1

Source: Table 5, Figure 1 and Figure 10

The efficiencies of a single-risk class (WACC at mid-range of discount rates) range from 71.95% in MPR 9 to 100% in MPR 4 and 7. Efficiency improvements are most dramatic when moving from a one- to a two-risk class model. For example, MPR 3 moves from 84.36 to 93.17%, and MPR 9 moves from 71.95 to 99.72%.

Similar improvements are seen when using the Error Total standard. Moving from a one- to a two-risk class model results in changes from, for example, 4 to 1 in MPR1 and MPR9 and 7 to 1 in MPR2. An increase in errors as risk classes increase is also evident. This can happen when a project's risk and return plot lies near the MPR and the midpoint between risk class boundaries.

While this omniscient approach is interesting from an academic point of view in that it allows the analysis to focus on specific model performance, it has little application value. The next two sections analyze the study's results for the Ellwood and NPV Risk Class Models using the MLE estimates for the Market Price of Risk.

5.3.2.2 NPV(R) with MLE

The MLE estimate of the market price of risk, the most "practical" estimating procedure, has been used to compare the common models. The NPV(R) model will also be compared to the common models according to the following procedure:

1. For each risk class (R = 1,2,3,4,5,6)[161] each project is accepted or rejected according to the NPV rule.
2. This NPV(R) portfolio is compared to the metric portfolio according to the two standards, EFF and ERRT.

The results for NPV(R) are shown in Table 19. Note that the additional benefits gained by increasing the number of risk classes falls rapidly after three risk classes for both standards.

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[161] For example, the NPV(1) model simply uses the NPV model with a single discount rate (halfway between the lowest risk and the highest risk projects.) The NPV(3) breaks the risk range into three segments and uses each segment mid-point to arrive at a discount rate for each project in that segment.

Table 19

NPV(R) Results with MLE

Standard	NPV(1)	NPV(2)	NPV(3)	NPV(4)	NPV(5)	NPV(6)
EFF%	99.893	100.	100.	99.997	100.	100.
ERRT	2	0	0	1	0	0

Source: Table 17 and Table 18

Table 19 shows the NPV(R) results for the MLE risk-return specification. The NPV(1) model misclassifies two projects with an efficiency of 99.893%. All others, with the exception of NPV(4) have zero errors and 100% efficiency. NPV(4) has one error and an efficiency of 99.997 because it apparently misclassified one relatively small project.

5.3.2.3 ELL(R) with MLE

Even though most appraisers use a very narrow range of Ellwood values for most projects, the choice of an equity yield rate[162] is supposed to account for project risk. A larger problem exists for an analyst in estimating a before-tax, after-financing "appropriate" discount rate for each project. The estimating procedure was indentical to the

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[162]One real estate analyst, familiar with risk adjusted NPV, explained that appraisers simply use 11% for "safe" projects and 13% for "risky" ones.

choice of the MLE market price of risk. The value of Ellwood's equity yield rate (EYR) was calculated for each project. These values were regressed on the original risk proxy. The resulting line,

$$EYR = .226 + .820(SIRR)$$

provides a market price of risk (in terms of EYR) for the Ellwood technique.

The ELL(R) models are tested exactly like the NPV(R) models explained above. The only difference is that EYR derived from the regression is used as the discount rate to capitalize average net operating income. The results are shown in Table 20.

Table 20

Standard	ELL(1)	ELL(2)	ELL(3)	ELL(4)	ELL(5)	ELL(6)
EFF%	94.68	94.79	94.79	100.	100.	100.
ERRT	2	1	1	0	0	0

Source: Table 5, Figure 1 and Appendix D

Errors decrease and efficiency results increase as the number of risk classes increase. Two errors in ELL(1) are reduced to one in ELL(2) and ELL(3). Risk classes 4-6 have zero errors.

5.3.3 Summary Results for MPR

This section discusses the difficult question of selecting discount rates for specific projects. The raw risk-return results are presented first. Then the impact of different MPR specifications on results are analyzed. A section concerning how to select a 'best' MPR is then presented.

The original data for expected return and risk do not readily indicate the anticipated linear trade-off. The regression line has a coefficient of determination of 0.06. This poor regression fit could be the result of either poor data or evidence of an inefficient market. Some data problems do exist because different people contributed the cash flow inputs. This lack of consistent results from "well qualified" project experts is in itself indicative of an inefficient market. The appraisal practice of examining relatively few comparables (an implicit assumption of efficiency) may not capture enough market information to make sound investment decisions.

The market price of risk specification defines the metric value of each project via the discount rate and is essentially one of the most important aspects of the study. This is one of the most evasive issues involved in capital asset valuation, but must be done, either explicitly or implicitly, each time an investment decision is made.[163]

The impact of different MPR specifications on results are summarized in Table 21 and in Table 22. Table 21 shows the different "best" efficiency results solely due to the change in MPR specification. BRR, for example, accepts and rejects the same projects for each different cut-off value regardless of MPR. The efficiency value differences are the result of different metric values for different market price of risk specifications.

In Table 21, the ELL model shows the largest range of 'best' values among the common models. If an investor could always choose the equity yield rate that provides the best performance, the relative performance ranges between 75 % and 100 % depending on the actual MPR. In this case, the results for the maximum likelihood estimator, MPR 5, were very good. This is not the case for BRR and DCR with values of 78.3 % and 88.3 % for the MLE estimator.

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[163]Mortgage company executives stated that a particular investor (insurance company or other mortgage purchaser) would review a project's preliminary report and verbally tell the mortgage company to use a specific cap rate in their written presentation in order to make the project look attractive to investment committees and regulators.

Table 21

Best Efficiencies for Omniscient Models
(In Percentage Terms)

Model	Hi	Low	MPR5
BRR	99.9	78.3	78.3
FCR	99.8	74.6	92.1
PBBT	99.9	92.5	94.5
PBAT	99.7	88.4	94.3
ELL	100.0	75.4	99.9
IRR	100.0	94.1	99.9
DCR	99.7	82.0	88.3
NPV(1)	100.0	71.9	99.9
NPV(2)	100.0	93.0	100.0
NPV(3)	100.0	92.2	100.0
NPV(4)	100.0	91.3	99.9
NPV(5)	100.0	99.3	100.0
NPV(6)	100.0	99.7	100.0

Source: Table 9

The NPV(R) model exhibits two intersting results. If the NPV(1) model, which specifies a single discount rate (the midpoint of the IRR range) for all projects, is used, the range of efficiencies is even wider. The results range from 71.9 % to 100 %. Also, these models were sensitive to the MPR specitication through four risk class models. When five and six risk classes were used, the model was less sensitive to MPR, and the range of differences in efficiencies became smaller; 99.3 - 100 % and 99.7 - 100 %, respectively.

In Table 22 the impact on the correct choice of critical valuation parameter is even more dramatic. Depending on MPR choice, the value for FCR cut-off ranges from 9% to 18% with MPR5 at 14%.

Table 22

Impact of MPR on CVP

CVP for Best Efficiency

Model	Low	Hi	MPR5
BRR (%)	-6	22	8
FCR (%)	9	18	14
PBBT (Yr)	3.8	14.7	6.9
PBAT (Yr)	3.8	15.0	8.2
ELL (%)	11	38	25
IRR (%)	8	26	17
DCR (times)	0.0	1.97	1.2

Source: Table 10

The wide ranges for different market price of risk specifications again points out that, in addition to current or future annual cash flow estimates which are required in varying degrees in all models, the choice of an investor's required rate of return on equity is extremely important.

5.3.3.1 Selection of Market Price of Risk

That higher expected returns accompany additional risk is evident even to the most naive investor. Capital Asset Pricing Model risk-return trade-off theory is well developed, but practical applications are most scarce. Given the assumptions of the CAPM, these decisions are reduced in importance. One need only to buy the market portfolio and move along the Capital Market Line which dominates all other portfolios by combining it with the risk-free security. The presumption in investment theory is that the market, given transaction costs, is "efficient enough" to make this approach optimal.

The risk-return results from this study, conventional wisdom, and Roulac's analysis indicate the existence of an inefficient real estate market. If true, one must specify (explicitly or implicitly) a risk-return schedule for investment decisions in this, or any other, imperfect market.

The regression approach outlined in Chapter 3 and applied in this chapter can be justified. Two variations could be used. First, it is possible that the data could be fitted to a non-linear regression curve. Second, an investor could plot the data, hand fit a personal preference line and then choose two- or three-risk classes.

The most appropriate method for specifying an operational MPR seems to be the MLE approach. This procedure is theoretically satisfying and relatively easy to apply. Also, in this study the complex likelihood-weighting prodedure results were almost identical to those of the MLE.

5.3.4 Summary of All Models with MLE

The sample results of the common models and the risk-class models are shown in Table 23. Notice that the higher NPV(R) models perform best, but that the three-risk class model outperforms any of the naive or DCF models. The ELL(R) model requires four risk classes to out-perform all common models. The results indicate that the two classification standards, EFF and ERRT, are roughly equivalent. The best seven models are identical.

Table 23

Summary of All Models - MLE

	EFF		ERRT	
Model	Percent	Rank	Number	Rank
BRR	78.335	19	6	19
FCR	92.118	17	3	16
PBBT	94.507	15	2	13
PBAT	94.326	16	4	17
DCR	88.279	18	5	18
IRR	99.997	8	1	8
ELL	99.997	8	1	8
NPV(1)	99.893	11	2	13
NPV(2)	100.000	1	0	1
NPV(3)	100.000	1	0	1
NPV(4)	99.997	8	1	8
NPV(5)	100.000	1	0	1
NPV(6)	100.000	1	0	1
ELL(1)	94.681	14	2	13
ELL(2)	94.785	12	1	8
ELL(3)	94.785	12	1	8
ELL(4)	100.000	1	0	1
ELL(5)	100.000	1	0	1
ELL(6)	100.000	1	0	1

Source: Table 9 and Table 17

The models that utilize more information tend to give better results, as was generally expected. That the simplistic models (non-DCF) all finished in last place for both EFF and ERRT was interesting. Some combination of these five models is used by almost all real estate decision makers in some form and, as a result, were expected to perform reasonably well.

Chapter VI

SUMMARY AND CONCLUSIONS

The original thrust of the study was to investigate the "benefit" aspects of the cost-benefit approach to the problem of allocating investment funds in the commercial real estate market. Rather than use hypothetical, contrived data structures that often point out possible inconsistencies in model accept-reject performance, the study used actual real estate projects ranging in size from $90,000 to $100 million.

The study was undertaken because of the diversity of interests in the results. Theorists would be interested in the relative performance of the different levels of model sophistication. Real estate investors could relate to different projects' risk and expected return. A most interesting result would be the use of the relatively sophisticated simulation model as applied to actual projects. The gathering of actual, confidential data for real projects with the inclusion of stochastic probability distributions from non-statistical real estate experts presents a genuine challenge.

The main objectives of the study are listed below:

1. The first objective was to investigate the relative performance between simplistic, non-DCF valuation models and the performance of more sophisticated, commonly used models such as internal rate of return and the Ellwood techniques. This "common model" category included DCF models and popular rule af thumb decision criteria that exclude the time value of money concepts.

2. The second objective was to compare the performance of the common models to a metric or bench mark model which classifies projects into quantifiable risk categories. Implicit to this objective is the specification of an acceptable metric that can be applied to actual data.

3. The third major objective was to test the performance of simplified sophisticated models (Risk Class models) against the metric model.

A major problem in practical application of DCF asset valuation models is the necessity of specifying a discount rate for each asset. The correct, or even plausible specification of a discount rate for use in discounting project cash flows is an absolute necessity. How this is to be done is largely ignored in the literature. This issue was a most evasive problem that, of course, had to be addressed.

Assuming project risk is inversely related to project worth created the need to investigate the implicit risk resolution properties of the models tested in this study. Therefore, the following ancillary objectives are given:

1. The specification of an <u>ex</u> <u>ante</u> risk proxy, standard deviation of expected return.

2. The specification of a usable risk-return opportunity cost schedule, the Market Price of Risk.

3. Investigation of the ability of the common models to reflect project risk levels.

Representative real estate investment models were selected from authoritative finance and real estate literature for investigation in the study. The "common model" category included:[164]

1. BRR-Capitalization of the first year's before-tax cash flow (Broker's Rate of Return)

2. FCR-Capitalization of the stabilized net operating income (Free and Clear Return)

3. PBBT-Payback period before tax

4. PBAT-Payback period after tax

5. DCR-First year's net operating income divided by the debt service (Debt Coverage Ratio)

6. IRR-After tax cash flow IRR (Internal Rate of Return)

7. ELL-Stabilized before-tax cash flow internal rate of return (Ellwood)

The subclassification of the common models included the first five "simplistic" models and the last two "DCF" models.

The model chosen as the bench mark, or metric, model, to which the other models are compared, is a risk-adjusted, net

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[164] See chapter 2 for detailed descriptions of the models.

present value model (RANPV). Each period's after-tax cash flows are discounted at a rate concomitant with its expected risk level, the standard deviation of expected returns.

The simplified versions of the sophisticated RANPV metric model are designated as "Risk Class" models. These models essentially combine the projects into groups according to risk (and "correct" discount rates). Presumably two influences are evident as the projects are classified into 2-,3- or more-risk classes. First, the performance should improve as the number of risk classes and the number of different discount rates increase. Second, the cost of information needed to classify projects rises with the number of divisions. Therefore, model performance as the number of risk classes increases is investigated. In addition to the RANPV risk class model, NPV(R), a roughly equivalent risk class model was developed for the popular Ellwood model, ELL(R).

Each project's unique risk-adjusted discount rate proved to be not only important but difficult to resolve. Two basic steps were involved in determining the market-determined price of risk. First, a Hertz-type simulation was used to find each project's expected return and standard deviation of expected return (SIRR). The E(r) and SIRR for all projects were considered when making the final determination(s) for the "correct" MPR.

The second step in MPR determination necessitated simply making a schedule of required rates of return. Because a single schedule of required returns might seem unnecessarily arbitrary, several plausible lines with different weighting schemes were investigated. The final decision was to use a linear regression (MLE) between the expected returns and standard deviation of those returns.

Two different comparison standards were used to compare the results of various models to the metric. One comparison standard measures the relative total portfolio value in percent efficience (EFF) of the model being investigated as compared to the metric model portfolio.

The major problem inherent in the EFF comparison is the indivisibility of project magnitude. In order to eliminate this problem a second comparison standard was applied. Using the metric as a bench mark, the total error standard (ERRT) counts each time a model misclassifies an accept-reject decision.

Thirty-four actual projects were chosen, primarily on the basis of availability, for the study in the spring of 1977. These income-producing properties were either recently accepted or were seriously being considered. The cash flow data was provided by project experts who were either mortgage bankers, insurance company analysts or equity investors.

Cash flows, or elements needed to calculate cash flows, were either deterministic or stochastic. Single point estimates were used on all but six stochastic elements. The stochastic elements included gross income, vacancy rates, expenses, reversion values and growth rates for income and expense items.

The format used to extract probability estimates from non-statistical project experts was a five-point, equal probability distribution. Essentially, the project expert estimated a most likely, worst, and best case with two intermediate points. These five points define four ranges for each stochastic input in which the actual value has a 25% probability of occurring.

This section summarizes the major findings of the study:

1. The two DCF models, IRR and ELL are closely related under all conditions. The correlations between these models and the non-DCF models are lower. DCR and FCR were generally less related to the DCF models than other common models.

2. The relative performance between the metric and the common models indicates that the more sophisticated DCF techniques perform better than the non-DCF models. The two most popular rules of thumb, BRR and DCR, consistently rank last. In

general more usable information increases model performance, as was expected.

3. Risk Class models, the simplified versions of NPV and Ellwood, performed very well under all conditions. The marginal improvement of increasing the number of risk classes generally decreases as the number of risk classes increases beyond three or four. This finding is consistent with Sundem's results[165]

The ancillary objectives that were addressed in the study revealed the following:

1. The probability distributions required for the risk-return simulation were relatively easy to obtain from project experts with only a minimum of statistical expertise.

2. The Market Price of Risk (MPR) selection immensely affected project value and hence model performance. The maximum likelihood estimator for MPR provided a plausible risk-return opportunity schedule.

3. The three most popular common models (BRR, FCR and DCR) appear not to discriminate for risk. Only IRR, ELL and Payback regressions against risk were in the theoretically expected direction.

While better and more sophisticated models will be welcomed and are indeed needed, this study points to several other important issues that warrant further study. The optimum resources to be expended on the various selection, analysis and decision-making phases of the investment effort deserves a most critical review. The "cost of capital" dis-

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[165]Sundem, <u>Accounting Review</u>, p. 317.

count rate specification for each project, instead of being given in the problem, is an evasive, yet extremely critical valuation issue that needs considerable study.

If the research could be replicated with different data with an enlarged sample size, the consistency of results could be studied. The data set from a large equity investor, or a major institutional lender, would be particularly interesting. The problem of different project experts' data inconsistencies could be eliminated or reduced if one manager or "function" provided the complete data structure for an entire study. If post-audit data were available, in order to compare with the *ex ante* nature of the CAPM theory, the results would be even more interesting.

Market efficiency studies concerning issues such as investor sophistication, broker/non-broker transactions and periods of high interest rates need to be designed and implemented. This *ex ante* data, with adequate follow-up, could be a start to explaining the cyclical nature of successes and bankruptcies in the real estate market.

The linkage, assumed to be complete in an efficient market, between securities and real estate assets needs more investigation within the total capital market framework.

The implicit assumption of project independence among real estate assets should be subjected to the test of rigorous research. Similiarly, the assumption of time-independent annual cash flows needs further study.

That investors, both large and small, within both the real estate and the corporate finance markets continue to use simplistic valuation models is fact. The success rates of both market participants, while using so-called naive, non-sophisticated valuation techniques, could be analyzed. Even in an imperfect market, the reasons that firms using inferior valuation techniques for capital allocation still survive need further amplification.

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Appendix A

INPUT AND OUTPUT OF MODIFIED OUPROB

This appendix includes the following:

1. Raw data input forms
    a) Deterministic input form
    b) Stochastic input form
    c) Instructions for b above
2. A copy of a complete computer printout of the rivised OUPROB.

INPUT DATA SHEET

Property Description[a] (see notes below) ______________________

____

Analyst ______________________ Phone # ______________

01 Property (New Res = 1.0, Old Res = 2.0, New Com = 3.0, Old Com = 4.0. . . . . ________
02 Investor Holding Period (Years) . . . . ________
03 Number of Units in Project. . . . . ________
04 Average Size per Unit (SQFT). . . . . ________
05 Average Monthly Rental per Unit ($) . . . . ________
06 Expected Occupancy (%). . . . . ________
07 Annual Growth of Rental Income (% or $AMT). ________
08 Total Cost (or appraisal) of Land . . . . ________
09 Cost of All Improvements (Total or $ per SQFT). . . . . ________
10 Investor's Required Rate of Return or Equity (%). . . . . ________
11 Reinvestment Rate on Equity Cash Flow (%) . . . . ________
12 Operating Expenses (% of Gross Rental or $AMT First Year) . . . . ________
13 Annual Growth Rate of Operating Expenses (% or $AMT). . . . . ________
14 Depreciation Method (SL = 1.0, 125% = 1.25, 150% = 1.5, DD = 2.0, SYD = 3.0). ________
15 Depreciable Life of Improvements (Years). . . . . ________
16 Salvage Value of Depreciable Basis (if other than zero) . . . . ________
17 Ordinary Income Tax Rate (%). . . . . ________
18 Capital Gains Tax Rate (%). . . . . ________
19 Ending Value (Annual % Growth Rate or Ending Selling Price) . . . . ________
19 (a) Gross Rent Multiplier @ End of Holding Period . . . . ________
20 Sales Commission at End of Holding Period (%) . . . . ________
21 Investor's Short-term Borrowing Rate (%). . . . . ________
22 Amount of Mortgage ($AMT or % or Purchase Price). . . . . ________
23 Interest Rate on Mortgage (%) . . . . ________
24 Amortization Term of Mortgage (Years) . . . . ________
25 Call Term of Mortgage (Years) . . . . ________

Notes:

a. Please indicate whether new, used, commercial, strip, office, general location, etc. Identification of property is not requested.

b. If units are not homogeneous, for example a shopping center or an office warehouse, list as one unit and use totals for entire project.

c. If you are not the equity investor, indicate what typical investor would accept as a minimum long-term, after-tax yield on equity investment.

d. What investor expects to yield on reinvested cash flows

e. If %, compounded annual rate over holding period

f. Tax rate of typical equity investor

g. Selling price determination at end of holding period

h. If second mortgage exists, indicate details on bottom of sheet.

INPUT DATA SHEET[a]

1. Monthly Rental Income (#05)[b] ______________________

2. Expected Occupancy (#06) ______________________

3. Annual Growth of Rental Income (#07) ______________________

4. Operating Expenses (% of Gross Rental or $AMT) (#12) ______________________

5. Annual Growth Rate of Operating Expenses (% or $AMT) (#13) ______________________

6. End of Holding Period Value (% Annual Growth Rate of Ending Selling Price) (#19) ______________________

7. Gross Rent Multiplier at End of Holding Period (#19a) ______________________

Notes:

[a]See enclosed Estimating Procedure

[b]Please indicate five values and label 1 through 5

ESTIMATING PROCEDURE

For Page 2 of

Input Data Sheet

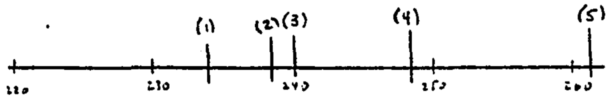
1. The objective is to assign 5 points for each input factor such that the four intervals between them have an equal chance of occurring.

2. The analyst should choose these 5 points in the following manner (the example is a Dallas developer's estimates for an apartment's average monthly rent per unit):

	Estimate	Decision Rule for Estimate	Example
a.	Point #3	Actual value has 50% chance of being above and 50% chance of being below point #3	$240
b.	Point #1 Point #5	Actual value will fall between #1 and #5	$234 $262
c.	Point #2	Actual value has equal chance of falling within intervals (#1 to #2) and (#2 to #3)	$238
d.	Point #4	Actual value has equal chance of falling within intervals (#3 to #4) and (#4 to #5)	$248

3. The estimated points and corresponding values should be presented on the Input Data Sheet as follows (Dallas apartment example):

Ave. Mo. Rent/Unit



4. For a final check, the analyst should "move the estimates around" until satisfied that the actual value has an equal chance of falling into the four intervals.

Interval	Chance
#1 to #2	25%
#2 to #3	25%
#3 to #4	25%
#4 to #5	25%

COMPLETE PRINTOUT FOR PROJECT #23

```
OUPROB  OKLAHOMA UNIVERSITY REAL ESTATE INVESTMENT ANALYSIS PROGRAM
           COPYRIGHT BY THE UNIVERSITY OF OKLAHOMA, 1976
          THE UNIVERSITY OF OKLAHOMA, COLLEGE OF BUSINESS
                      REAL ESTATE PROGRAMS


********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)      4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS          7.0
*03  NUMBER OF UNITS IN THE PROJECT                               6.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                   6667.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                           1.00
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY   VALUE
      0.           666.66992
     25.           700.00000
     50.           703.50000
     75.           716.66992
    100.           750.00000
*06  EXPECTED OCCUPANCY (%) @                                    1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY   VALUE
      0.             0.88000
     25.             0.90000
     50.             0.95000
     75.             0.97000
    100.             0.99990
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @            1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY   VALUE
      0.             0.01000
     25.             0.02500
     50.             0.03000
     75.             0.03500
    100.             0.05000
*08  TOTAL COST OF THE LAND @                               100000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @         301000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY  (%)           0.1100
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @               0.1000
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @        1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY   VALUE
      0.          9750.00000
     25.          9900.00000
     50.         10028.00000
     75.         10500.00000
    100.         11500.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @          1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY   VALUE
      0.             0.01000
     25.             0.02500
     50.             0.03000
     75.             0.04000
    100.             0.05000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)   1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                         25.0
```

```
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                      0.0
*17  ORDINARY INCOME TAX RATE (%) @                                  0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                    0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             6.50000
    25.             6.80000
    50.             7.00000
    75.             7.20000
   100.             7.50000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @             0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                       0.0800
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @            0.7500
*23  INTEREST RATE ON LOAN # ONE (%) @                               0.0950
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                     25.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                            0.

      @ = VARIABLES AVAILABLE FOR PROBABILISTIC INPUT

THE FOLLOWING OUTPUT CONTAINS PROBABILISTIC DATA.
THOSE NUMBERS INDICATED AS A MEAN, BUT FOR WHICH THE HI, LO AND STANDARD
DEVIATION ARE MISSING, HAVE BEEN CALCULATED AS A SINGLE POINT RESULTANT.


                    ***** PROPERTY SUMMARY *****


THIS PROJECT TO BE FORECAST FOR  7. YEARS

TOTAL SQUARE FEET OF IMPROVEMENTS              40002.
COST OF IMPROVEMENTS PER SQUARE FOOT    X         7.52
COST OF IMPROVEMENTS(DEPRECIABLE BASIS)=    301000.
COST OF LAND                            +    100000.
TOTAL COST OF PROPERTY                  =    401000.
DEBT BORROWED TO FINANCE PURCHASE       -    300750.
INITIAL OWNER EQUITY INVESTMENT         =    100250.

                    ***** DEPRECIATION SUMMARY *****

        BASIS       LIFE    METHOD    SALV%     PROP TYPE

       301000.      25.0     1.00     0.0  %       4.

YEAR    ANNUAL     ADJUSTED      TOTAL      TOTAL EXCESS SUBJECT
        DEPREC     BASIS         DEPREC     TO RECAPTURE

  1     12040.     288960.      12040.             0.
  2     12040.     276920.      24080.             0.
  3     12040.     264880.      36120.             0.
  4     12040.     252840.      48160.             0.
  5     12040.     240800.      60200.             0.
  6     12040.     228760.      72240.             0.
  7     12040.     216720.      84280.             0.

                    ***** LOAN SUMMARY *****

LOAN      AMOUNT       RATE     TERM    MORT CONST     ST(YR)    CALL(YR)    #PAY/YR

# 1    300750.00     9.500%    25.0     0.10484         1.         25.          12.

YEAR    ANNUAL      INTEREST    AMORT. OF    REMAINING    EFFECTIVE
     DEBT PAYMENT   EXPENSE     PRINCIPAL    PRINCIPAL    MORTGAGE CONSTANT

  1     31532.      28439.        3093.       297657.     0.10593
  2     31532.      28132.        3400.       294257.     0.10716
  3     31532.      27794.        3737.       290520.     0.10854
  4     31532.      27424.        4108.       286412.     0.11009
  5     31532.      27016.        4516.       281896.     0.11186
  6     31532.      26568.        4964.       276932.     0.11386
  7     31532.      26075.        5457.       271475.     0.11615
```

CASH FLOW SUMMARY

YEAR	GROSS INCOME	- VAC & COLL ALLOWANCE	= EFFECTIVE GROSS INCOME	- OPERATING EXPENSES	= NET OPERATING INCOME	- INTEREST EXPENSE	- DEPRECIATION EXPENSE
	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
1	51036.	3109.	47927.	10235.	37693.	28439.	12040.
HI	53981.	6336.	53681.	11496.	43761.	28439.	12040.
LO	48082.	95.	42525.	9755.	31798.	28439.	12040.
SD	1423.	1880.	2287.	472.	2380.	0.	0.
2	52588.	3206.	49382.	10557.	38825.	28132.	12040.
HI	56646.	6543.	56034.	11983.	45560.	28132.	12040.
LO	49011.	98.	43412.	9879.	32762.	28132.	12040.
SD	1546.	1940.	2363.	503.	2455.	0.	0.
3	54191.	3305.	50886.	10891.	39995.	27794.	12040.
HI	59443.	6864.	58490.	12571.	47909.	27794.	12040.
LO	49607.	101.	43940.	10003.	33069.	27794.	12040.
SD	1818.	2002.	2531.	561.	2626.	0.	0.
4	55848.	3408.	52440.	11237.	41203.	27424.	12040.
HI	62379.	7200.	61054.	13188.	50364.	27424.	12040.
LO	50210.	104.	44474.	10130.	33370.	27424.	12040.
SD	2205.	2067.	2790.	642.	2892.	0.	0.
5	57561.	3515.	54046.	11596.	42451.	27016.	12040.
HI	65459.	7553.	63730.	13835.	52931.	27016.	12040.
LO	50821.	107.	45015.	10258.	33665.	27016.	12040.
SD	2678.	2135.	3133.	742.	3245.	0.	0.
6	59331.	3625.	55706.	11967.	43740.	26568.	12040.
HI	68691.	7923.	66524.	14514.	55614.	26568.	12040.
LO	51439.	110.	45563.	10387.	33953.	26568.	12040.
SD	3219.	2206.	3550.	860.	3676.	0.	0.
7	61161.	3739.	57422.	12351.	45071.	26075.	12040.
HI	72083.	8311.	69440.	15226.	58418.	26075.	12040.
LO	52065.	113.	46117.	10518.	34234.	26075.	12040.
SD	3817.	2281.	4034.	992.	4177.	0.	0.

YEAR	= TAXABLE INCOME	EQUITY CASH FLOW (BEFORE TAXES)	- INCOME TAX LIAB(CREDIT)	= EQ CASH FLOW (AFTER TAXES)	PRESENT VALUE OF ADJ EQ CASH FLOW	CASH FLOW TO TOTAL CAPITAL	PROJECTED PROPERTY VALUE(END OF YEAR)
	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
1	-2786.	6161.	-1115.	7275.	6554.	27432.	357718.
HI	3282.	12229.	1313.	10916.	9834.	31072.	398471.
LO	-8681.	267.	-3472.	3739.	3368.	23895.	316941.
SD	2380.	2380.	952.	1428.	1286.	1428.	16897.
2	-1347.	7293.	-539.	7832.	6357.	28111.	366587.
HI	5388.	14028.	2155.	11873.	9636.	32152.	417273.
LO	-7410.	1230.	-2964.	4194.	3404.	24473.	327026.
SD	2455.	2455.	982.	1473.	1195.	1473.	17653.
3	160.	8463.	64.	8399.	6141.	28813.	379820.
HI	8074.	16377.	3230.	13147.	9613.	33561.	436962.
LO	-6766.	1537.	-2706.	4243.	3103.	24657.	333988.
SD	2626.	2626.	1050.	1576.	1152.	1576.	19099.

4	1739.	9671.	696.	8975.	5912.
HI	10901.	18832.	4360.	14472.	9533.
LO	-6094.	1838.	-2438.	4276.	2816.
SD	2892.	2892.	1157.	1735.	1143.
5	3395.	10919.	1358.	9561.	5674.
HI	13875.	21399.	5550.	15849.	9406.
LO	-5391.	2133.	-2156.	4290.	2546.
SD	3245.	3245.	1298.	1947.	1155.
6	5132.	12208.	2053.	10155.	5429.
HI	17006.	24082.	6802.	17279.	9238.
LO	-4654.	2421.	-1862.	4283.	2290.
SD	3676.	3676.	1470.	2206.	1179.
7	6956.	13539.	2782.	10757.	5181.
HI	20303.	26886.	8121.	18765.	9038.
LO	-3881.	2703.	-1552.	4255.	2049.
SD	4177.	4177.	1671.	2506.	1207.

***** ANALYSIS OF PROCEEDS FROM SALE (END OF 7 YEARS) *****

		MEAN	HI	LO	SD
SALES PRICE(END OF HOLDING PERIOD)	=	428645.	525456.	349640.	30863.
SALES COMMISION EXPENSE	-	25719.	31527.	20978.	1852.
REMAINING DEBT PRINCIPAL	-	271475.			
NET PROCEEDS FROM SALE (BEF TAX)	=	131451.	222453.	57186.	29012.
TAX ON SALE AT END OF PERIOD	-	21552.	44302.	2985.	7253.
NET PROCEEDS (AFTER TAX)	=	109900.	178151.	54201.	21759.

***** PRESENT VALUE & INTERNAL RATE OF RETURN ANALYSIS *****

		MEAN	HI	LO	SD
PRESENT VALUE OF EQ CASH FLOWS (AT)		41249.	66058.	19929.	7914.
PRESENT VALUE OF NET SALE PROCEEDS(AT)	+	52934.	85808.	26107.	10480.
ORIGINAL MORTGAGE BALANCE	+	300750.			
TOTAL PROJECT VALUE	=	394934.	449092.	351932.	15700.
INTERNAL RATE OF RETURN ON TOTAL CAPITAL		6.743%	9.728%	4.141%	0.918%
IRR (OWNER EQ) REINVESTED AT THE IRR		9.563%	19.208%	0.0 %	3.271%
IRR (OWNER EQ) REINVESTED AT 10.000%		9.632%	17.189%	0.659%	2.657%

THE PROBABILITY OF THIS PROJECT ACHIEVING THE REQUIRED 11.0% RATE OF RETURN IS 29.6%

```
    75 +=
        =
F       =
R       =
E       =
Q   50 +=
U       =
E       =
N       =
C       =                             R   R
Y   25 +=                           I   0 I
        =                         R R I     R   R
        =                     0 0 I         I 0 I 0
        =         I       0 0                       0 I I
        = I 0   0 R 0 0 0                             R R 0 I 0       I
     0    ===============================================================
            +    +    +    +    +    +    +    +    +    +    +    +    +
         0.0 %     3.20%     6.40%     9.60%     12.81%    16.01%    19.21%

              I = IRR (OWNER EQ) REINVESTED AT THE IRR
                  REINVESTMENT RATE(X) = 10.00%
              R = IRR (OWNER EQ) REINVESTED AT  X
              0 = COINCIDENT POINTS (I & R) ON THE GRAPH
```

***** INVESTMENT RATIO ANALYSIS *****

YEAR	NOI TO TOTAL PROP COST	NOI TO PROP VALUE	EQUITY CASH FLOW TO INIT EQ INVEST BEF TAX **	AFT TAX	GR YIELD ON INIT. EQUITY	DEBT COVER RATIO	LOAN TO VALUE RATIO	BREAKEVEN OCCUPANCY RATE	GROSS INCOME MULTIPLIER	OPER EXPENSE TO GROSS INCOME	GR EFF INCOME
	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
1	0.094	0.106	0.061	0.073	0.103	1.195	0.834	0.819	7.009	0.201	0.214
HI	0.109	0.124	0.122	0.109	0.140	1.388	0.939	0.887	7.488	0.234	0.261
LO	0.079	0.089	0.003	0.037	0.068	1.008	0.747	0.768	6.501	0.182	0.184
SD	0.006	0.007	0.024	0.014	0.014	0.075	0.039	0.025	0.274	0.011	0.015
2	0.097	0.105	0.073	0.078	0.112	1.231	0.800	0.801	7.009	0.201	0.214
HI	0.114	0.124	0.140	0.118	0.152	1.445	0.900	0.863	7.488	0.236	0.267
LO	0.082	0.089	0.012	0.042	0.076	1.039	0.705	0.741	6.501	0.178	0.186
SD	0.006	0.007	0.024	0.015	0.015	0.078	0.038	0.026	0.274	0.012	0.015
3	0.100	0.105	0.084	0.084	0.121	1.268	0.767	0.784	7.009	0.201	0.215
HI	0.119	0.124	0.163	0.131	0.168	1.519	0.870	0.857	7.488	0.242	0.272
LO	0.082	0.089	0.015	0.042	0.080	1.049	0.665	0.714	6.501	0.174	0.181
SD	0.007	0.007	0.026	0.016	0.016	0.083	0.038	0.029	0.274	0.013	0.016
4	0.103	0.105	0.096	0.090	0.131	1.307	0.734	0.767	7.009	0.202	0.215
HI	0.126	0.123	0.188	0.144	0.185	1.597	0.845	0.852	7.488	0.249	0.279
LO	0.083	0.089	0.018	0.043	0.084	1.058	0.626	0.687	6.501	0.169	0.175
SD	0.007	0.007	0.029	0.017	0.017	0.092	0.040	0.033	0.274	0.014	0.017
5	0.106	0.105	0.109	0.095	0.140	1.346	0.701	0.751	7.009	0.202	0.215
HI	0.132	0.123	0.213	0.158	0.203	1.679	0.823	0.847	7.488	0.257	0.285
LO	0.084	0.089	0.021	0.043	0.088	1.068	0.588	0.662	6.501	0.165	0.169
SD	0.008	0.007	0.032	0.019	0.019	0.103	0.041	0.038	0.274	0.016	0.019
6	0.109	0.105	0.122	0.101	0.151	1.387	0.669	0.735	7.009	0.202	0.216
HI	0.139	0.123	0.240	0.172	0.222	1.764	0.800	0.842	7.488	0.265	0.291
LO	0.085	0.088	0.024	0.043	0.092	1.077	0.552	0.635	6.501	0.161	0.164
SD	0.009	0.007	0.037	0.022	0.022	0.117	0.044	0.043	0.274	0.019	0.021
7	0.112	0.105	0.135	0.107	0.162	1.429	0.637	0.720	7.009	0.203	0.216
HI	0.146	0.122	0.268	0.187	0.242	1.853	0.776	0.841	7.488	0.274	0.298
LO	0.085	0.087	0.027	0.042	0.097	1.086	0.517	0.610	6.501	0.157	0.159
SD	0.010	0.008	0.042	0.025	0.025	0.132	0.046	0.048	0.274	0.021	0.023

Appendix B

REVENUE ACT OF 1978, RELEVANT PROVISIONS FOR INDIVIDUALS

Capital Gains and Minimum Taxes

1. The long-term capital gains deduction was increased from 50% to 60%. Sec 402/IRC Sec 1202.

2. The alternative tax on long-term capital gains was repealed. Sec 401/IRC Sec 1201.

3. The long-term capital gains deduction is no longer included in tax preferences. Sec 421(6)(2)/IRC Sec 57.

4. A new alternative minimum tax, with graduated amounts of 10% to 25% above $20,000, is applied to taxable income plus a) long-term capital gains deduction and b) itemized deduction preferences (which now excludes a and b above). Sec 421(a)/IRC sec 55 (added).

Tax Shelter

1. The "at risk" loss rules extended, by a "catch all" clause, all activities except real estate and some leasing operations. Sec 201(a)(3)/IRC Sec 465(c)(3).

2. The five-year amortization for low-income housing rehabilitation costs extended through 1981. Sec 367/IRC Sec 167(k)

Appendix C

INPUT DATA FOR 34 PROJECTS

This appendix provides both the deterministic and stochastic data inputs for all thirty-four projects.

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Project #1

```
********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        1.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS            7.0
*03  NUMBER OF UNITS IN THE PROJECT                               330.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                       709.00
*05  AVERAGE MONTHLY RENTAL PER UNIT a                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              234.00000
     25.              238.00000
     50.              240.00000
     75.              248.00000
    100.              262.00000
*06  EXPECTED OCCUPANCY (%) a                                        1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.                0.92000
     25.                0.94000
     50.                0.95000
     75.                0.97500
    100.                0.98000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) a                1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.                0.02000
     25.                0.05000
     50.                0.06000
     75.                0.08500
    100.                0.09000
*08  TOTAL COST OF THE LAND a                                    1431925.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) a                 15.89
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                 0.1200
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) a                    0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) a             1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.                0.34500
     25.                0.35000
     50.                0.35800
     75.                0.37000
    100.                0.37500
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) a               1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.                0.07000
     25.                0.07250
     50.                0.07500
     75.                0.09000
    100.                0.10000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)   2.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                        40.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                   0.0
*17  ORDINARY INCOME TAX RATE (%) a                               0.4000
*18  CAPITAL GAINS TAX RATE (%) a                                 0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) a         1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.                3.50000
     25.                4.50000
     50.                5.00000
     75.                5.50000
    100.                6.50000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) a              0.1000
*21  INVESTORS SHORT TERM BORROWING RATE (%) a                        0.0800
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) a      4350000.0000
*23  INTEREST RATE ON LOAN # ONE (%) a                                0.0975
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS a                      30.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                             0.
```

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Project #2

```
********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           20.0
*03  NUMBER OF UNITS IN THE PROJECT                                 1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                    250944.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.          123600.00000
     25.          127100.00000
     50.          134200.00000
     75.          141200.00000
    100.          148300.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               0.80000
     25.               0.90000
     50.               0.95000
     75.               0.98000
    100.               0.99000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               0.04000
     25.               0.05000
     50.               0.08000
     75.               0.09000
    100.               0.11000
*08  TOTAL COST OF THE LAND @                                  2300000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @            8410000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)               0.1200
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                  0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               0.32500
     25.               0.33000
     50.               0.33400
     75.               0.34000
    100.               0.34500
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @             1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               0.01500
     25.               0.02000
     50.               0.03000
     75.               0.06000
    100.               0.08000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)     1.50
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          45.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                    0.0
*17  ORDINARY INCOME TAX RATE (%) @                                0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                  0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               3.00000
     25.               4.00000
     50.               5.00000
     75.               5.50000
    100.               6.50000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @           0.1000
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                     0.0850
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @   8000000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                             0.0900
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                   32.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                          0.
```

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Project #3

```
********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           10.0
*03  NUMBER OF UNITS IN THE PROJECT                                 1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                    18980.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.           4162.00000
     25.           4333.00000
     50.           4375.00000
     75.           4417.00000
    100.           4750.00000
*06  EXPECTED OCCUPANCY (%) @                                     1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.90000
     25.              0.94000
     50.              0.95000
     75.              0.98000
    100.              1.00000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @             1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.0
     25.              0.07500
     50.              0.10000
     75.              0.12000
    100.              0.15000
*08  TOTAL COST OF THE LAND @                                 196203.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @                10.50
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)              0.1000
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                 0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.23800
     25.              0.26700
     50.              0.29500
     75.              0.31400
    100.              0.37100
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.0
     25.              0.04500
     50.              0.05000
     75.              0.07500
    100.              0.10000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)    1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                        28.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                   0.0
*17  ORDINARY INCOME TAX RATE (%) @                               0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                 0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @         1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              5.00000
     25.              6.50000
     50.              7.00000
     75.              8.50000
    100.             10.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @          0.0800
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                    0.0800
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @  260000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                            0.0975
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                  25.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                         0.
```

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Project #4

```
********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)         4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS            12.0
*03  NUMBER OF UNITS IN THE PROJECT                                  1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                     224000.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                           32083.00
*06  EXPECTED OCCUPANCY (%) @                                       0.9999
 07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               0.0
*08  TOTAL COST OF THE LAND @                                   640000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @                15.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                0.1200
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                   0.0600
 12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @            0.0
 13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              0.0
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)      1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          60.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                     0.0
*17  ORDINARY INCOME TAX RATE (%) @                                 0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                   0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.05000
     25.              0.08000
     50.              0.10000
     75.              0.10500
    100.              0.12000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @            0.0500
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                      0.0800
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @   3000000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                              0.0900
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    25.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                           0.
```

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Project #5

```
********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           12.0
*03  NUMBER OF UNITS IN THE PROJECT                                 1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                    961790.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.        222085.00000
    25.        233187.00000
    50.        244292.00000
    75.        246508.00000
   100.        255396.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.             0.92000
    25.             0.95000
    50.             0.96000
    75.             0.99000
   100.             1.00000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.             0.03000
    25.             0.04000
    50.             0.05000
    75.             0.07500
   100.             0.10000
*08  TOTAL COST OF THE LAND @                                   2000000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @                15.70
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                0.1500
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                   0.0850
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @            0.0200
 13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              0.0
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)     1.50
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          50.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                     0.0
*17  ORDINARY INCOME TAX RATE (%) @                                 0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                   0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.             6.00000
    25.             7.50000
    50.             7.75000
    75.             8.00000
   100.            10.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @            0.0500
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                      0.0800
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @           0.7500
*23  INTEREST RATE ON LOAN # ONE (%) @                              0.0900
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    35.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                           0.
```

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Project #6

```
********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS            15.0
*03  NUMBER OF UNITS IN THE PROJECT                                  1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                    102000.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.          7067.00000
    25.          8392.00000
    50.          8833.00000
    75.          9054.00000
   100.          9275.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             0.90000
    25.             0.92000
    50.             0.95000
    75.             0.97500
   100.             1.00000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             0.0
    25.             0.01000
    50.             0.03000
    75.             0.05000
   100.             0.06000
*08  TOTAL COST OF THE LAND @                                  162000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @                 9.36
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                0.1050
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                   0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             0.01600
    25.             0.01760
    50.             0.01800
    75.             0.01840
   100.             0.02000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             0.02000
    25.             0.02750
    50.             0.03000
    75.             0.05000
   100.             0.06000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)    1.50
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                         60.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                    0.0
*17  ORDINARY INCOME TAX RATE (%) @                                0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                  0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             7.50000
    25.             7.85000
    50.             8.20000
    75.             9.50000
   100.            11.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @           0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                     0.0900
 22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @          0.0
 23  INTEREST RATE ON LOAN # ONE (%) @                             0.0
 24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    0.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                          0.
```

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Project #7

```
********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS          15.0
*03  NUMBER OF UNITS IN THE PROJECT                                 1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                   178000.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.          43750.00000
     25.          45000.00000
     50.          46083.00000
     75.          47920.00000
    100.          50000.00000
*06  EXPECTED OCCUPANCY (%) @                                     1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.               0.91000
     25.               0.93000
     50.               0.96000
     75.               0.96500
    100.               0.98000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.               0.0
     25.               0.01500
     50.               0.03000
     75.               0.04000
    100.               0.06000
*08  TOTAL COST OF THE LAND @                                 1100000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @                15.40
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)              0.1250
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                 0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.               0.24900
     25.               0.26700
     50.               0.28300
     75.               0.32000
    100.               0.37500
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.               0.0
     25.               0.01500
     50.               0.03000
     75.               0.04000
    100.               0.06000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)   1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                        25.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                   0.0
*17  ORDINARY INCOME TAX RATE (%) @                               0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                 0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @         1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.               4.50000
     25.               5.50000
     50.               5.70000
     75.               6.00000
    100.               6.50000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @          0.0400
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                    0.0900
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @  2310000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                            0.0940
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                  18.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                          0.
```

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Project #8

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           15.0
*03  NUMBER OF UNITS IN THE PROJECT                                 1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                     81000.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.          56250.00000
    25.          57083.00000
    50.          57417.00000
    75.          58750.00000
   100.          59167.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.               0.90000
    25.               0.92000
    50.               0.95000
    75.               0.97000
   100.               0.98000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.               0.0
    25.               0.02000
    50.               0.03000
    75.               0.04000
   100.               0.06000
*08  TOTAL COST OF THE LAND @                                   500000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @            3770000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                0.1050
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                   0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.               0.35000
    25.               0.40000
    50.               0.40600
    75.               0.45000
   100.               0.50000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.               0.0
    25.               0.02000
    50.               0.03000
    75.               0.04000
   100.               0.06000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)      1.50
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          45.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                     0.0
*17  ORDINARY INCOME TAX RATE (%) @                                 0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                   0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.               5.50000
    25.               6.00000
    50.               6.30000
    75.               6.40000
   100.               6.50000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @            0.0400
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                      0.0900
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @  3200000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                              0.0900
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    30.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                           0.
```

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Project #9

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           15.0
*03  NUMBER OF UNITS IN THE PROJECT                                 1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                   207000.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.          87500.00000
     25.          93750.00000
     50.          97500.00000
     75.         100000.00000
    100.         108300.00000
*06  EXPECTED OCCUPANCY (%) @                                     1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               0.96000
     25.               0.97000
     50.               0.98000
     75.               0.98100
    100.               0.98500
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               0.02000
     25.               0.02500
     50.               0.03000
     75.               0.04000
    100.               0.05000
*08  TOTAL COST OF THE LAND @                                 2200000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @                15.60
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)              0.1046
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                 0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               0.40000
     25.               0.45000
     50.               0.46100
     75.               0.50000
    100.               0.55000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               0.02000
     25.               0.02500
     50.               0.03000
     75.               0.04000
    100.               0.05000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)    1.50
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                         50.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                   0.0
*17  ORDINARY INCOME TAX RATE (%) @                               0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                 0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @         1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               6.00000
     25.               6.50000
     50.               6.70000
     75.               7.50000
    100.               9.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @          0.0350
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                    0.0900
 22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @         0.0
 23  INTEREST RATE ON LOAN # ONE (%) @                            0.0
 24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                   0.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                         0.
```

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Project #10

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        2.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           10.0
*03  NUMBER OF UNITS IN THE PROJECT                               100.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                      1150.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.          216.00000
    25.          233.00000
    50.          240.00000
    75.          247.00000
   100.          264.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.            0.78000
    25.            0.84000
    50.            0.92000
    75.            0.94000
   100.            0.96000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.            0.0
    25.            0.04000
    50.            0.05000
    75.            0.07500
   100.            0.10000
*08  TOTAL COST OF THE LAND @                                  100000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @                17.50
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)               0.1500
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                  0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.            0.33300
    25.            0.39500
    50.            0.41600
    75.            0.43700
   100.            0.47800
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @             1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.            0.0
    25.            0.04000
    50.            0.06500
    75.            0.09800
   100.            0.13000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)     1.25
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                         37.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                    0.0
*17  ORDINARY INCOME TAX RATE (%) @                                0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                  0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.            5.00000
    25.            5.75000
    50.            6.00000
    75.            6.25000
   100.            7.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @           0.0350
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                     0.0900
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @   1400000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                             0.0900
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                   30.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                          0.
```

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Project #11

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        2.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           10.0
*03  NUMBER OF UNITS IN THE PROJECT                               280.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                       785.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.           183.00000
     25.          197.00000
     50.          203.00000
     75.          210.00000
    100.          223.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             0.76000
     25.            0.82000
     50.            0.90000
     75.            0.92000
    100.            0.94000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             0.0
     25.            0.04000
     50.            0.05000
     75.            0.07500
    100.            0.10000
*08  TOTAL COST OF THE LAND @                                  280000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @                17.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                0.1500
*11  REINVESTMENT RATE ON EQUITY CASH FLOW (%) @                    0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             0.39400
     25.            0.46700
     50.            0.49200
     75.            0.51700
    100.            0.56600
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             0.0
     25.            0.04000
     50.            0.05000
     75.            0.07500
    100.            0.10000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)      1.25
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          37.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                     0.0
*17  ORDINARY INCOME TAX RATE (%) @                                 0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                   0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             5.00000
     25.            5.75000
     50.            6.00000
     75.            6.25000
    100.            7.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @            0.0350
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                      0.0900
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @  2500000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                              0.0950
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    30.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                           0.
```

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Project #12

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)           3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS              15.0
*03  NUMBER OF UNITS IN THE PROJECT                                    1.0
*C4  AVERAGE NUMBER OF SQUARE FEET PER UNIT                       20000.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                                 1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.          17625.00000
     25.          18600.00000
     50.          19580.00000
     75.          20560.00000
    100.          21540.00000
*06  EXPECTED OCCUPANCY (%) @                                          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.77700
     25.              0.82700
     50.              0.87700
     75.              0.93500
    100.              0.97700
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @                  1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.             -0.03000
     25.              0.0
     50.              0.03000
     75.              0.04500
    100.              0.06000
*08  TOTAL COST OF THE LAND @                                     112500.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @               830000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                   0.1400
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                      0.1000
*12  OPERATING EXPENSES (% CF GR INC OR $AMT 1ST YEAR) @               1.0000
NUMBER OF PROBABILITY PCINTS =    5
PROBABILITY    VALUE
      0.         128250.00000
     25.         131625.00000
     50.         135000.00000
     75.         145125.00000
    100.         155250.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @                 1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.             -0.03000
     25.              0.0
     50.              0.03000
     75.              0.04500
    100.              0.06000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)   1.25
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                            45.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                       0.0
*17  ORDINARY INCOME TAX RATE (%) @                                   0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                     0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @             1.0000
NUMBER OF PROBABILITY PCINTS =    5
PROBABILITY    VALUE
      0.              2.08000
     25.              3.04500
     50.              4.01000
     75.              4.60500
    100.              5.20000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @              0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                        0.1000
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @     690000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                                0.0950
*24  AMORTIZATION TERM CF LOAN # ONE IN YEARS @                      28.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                             0.
```

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Project #13

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        2.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           10.0
*03  NUMBER OF UNITS IN THE PROJECT                                 1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                      852.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                             1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.        238440.00000
     25.        247300.00000
     50.        251730.00000
     75.        254390.00000
    100.        256160.00000
*06  EXPECTED OCCUPANCY (%) @                                      1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.             0.90000
     25.             0.95000
     50.             0.97000
     75.             0.98000
    100.             1.00000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.             0.08000
     25.             0.09500
     50.             0.10000
     75.             0.10500
    100.             0.12000
*08  TOTAL COST OF THE LAND @                                 2067000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @          12749550.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)               0.1100
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                  0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.       1284000.00000
     25.       1336000.00000
     50.       1359000.00000
     75.       1382000.00000
    100.       1435000.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @             1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.             0.09000
     25.             0.10000
     50.             0.10200
     75.             0.10500
    100.             0.11000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)    1.25
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                         40.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                    0.0
*17  ORDINARY INCOME TAX RATE (%) @                                0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                  0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.      13050000.00000
     25.      14210000.00000
     50.      14500000.00000
     75.      14790000.00000
    100.      15950000.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @           0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                     0.0850
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @          0.7500
*23  INTEREST RATE ON LOAN # ONE (%) @                             0.0925
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                   25.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                          0.
```

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Project #14

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           10.0
*03  NUMBER OF UNITS IN THE PROJECT                                 1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                    193837.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY PCINTS =    5
PROBABILITY    VALUE
      0.        65833.00000
     25.        66417.00000
     50.        66500.00000
     75.        66667.00000
    100.        67500.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY PCINTS =    5
PROBABILITY    VALUE
      0.              0.90000
     25.              0.94000
     50.              0.95000
     75.              0.96000
    100.              1.00000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY PCINTS =    5
PROBABILITY    VALUE
      0.              0.05000
     25.              0.09000
     50.              0.10000
     75.              0.11000
    100.              0.15000
*08  TOTAL COST OF THE LAND @                                  1000000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @            3752100.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                0.1000
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                   0.0600
*12  OPERATING EXPENSES (% CF GR INC OR $AMT 1ST YEAR) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.       287800.00000
     25.       431700.00000
     50.       453300.00000
     75.       460500.00000
    100.       57560C.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.08000
     25.              0.09000
     50.              0.09500
     75.              0.09750
    100.              0.10000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)     1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          25.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                     0.0
*17  ORDINARY INCOME TAX RATE (%) @                                 0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                   0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.      4783500.00000
     25.      4927000.00000
     50.      4936000.00000
     75.      4946130.00000
    100.      5070510.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @            0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                      0.0850
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @           0.7500
*23  INTEREST RATE ON LOAN # ONE (%) @                              0.0975
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    25.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                           0.
```

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Project #15

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS          10.0
*03  NUMBER OF UNITS IN THE PROJECT                                1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                   32000.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                            1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.          8000.00000
     25.          9000.00000
     50.          9500.00000
     75.         10000.00000
    100.         10500.00000
*06  EXPECTED OCCUPANCY (%) @                                    0.9000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @            0.0600
*08  TOTAL COST OF THE LAND @                                168000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @          267000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)             0.1200
*11  REINVESTMENT RATE ON EQUITY CASH FLOW (%) @                 0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @     39444.0000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @           0.1000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)   1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                        32.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                   0.0
*17  ORDINARY INCOME TAX RATE (%) @                              0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @        5.0000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @         0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                   0.0900
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @        0.7000
*23  INTEREST RATE ON LOAN # ONE (%) @                           0.0950
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                  25.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                        0.
```

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Project #16

```
********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)      3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           7.0
*03  NUMBER OF UNITS IN THE PROJECT                              416.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                      465.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                             1.00
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY   VALUE
      0.             585.00000
     25.             617.50000
     50.             650.00000
     75.             682.50000
    100.             715.00000
*06  EXPECTED OCCUPANCY (%) @                                      1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY   VALUE
      0.               0.95000
     25.               0.95500
     50.               0.96000
     75.               0.98000
    100.               1.00000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY   VALUE
      0.               0.04500
     25.               0.05250
     50.               0.06000
     75.               0.06500
    100.               0.07000
*08  TOTAL COST OF THE LAND @                                1450000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @          7350000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)               0.0675
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                  0.0800
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @           0.5300
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @             1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY   VALUE
      0.               0.07000
     25.               0.07500
     50.               0.08000
     75.               0.08500
    100.               0.09000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)     1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                         20.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                    0.0
*17  ORDINARY INCOME TAX RATE (%) @                                0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                  0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @          1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY   VALUE
      0.               0.03500
     25.               0.03750
     50.               0.04000
     75.               0.04250
    100.               0.04500
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @           0.0300
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                     0.0700
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @          0.7500
*23  INTEREST RATE ON LOAN # ONE (%) @                             0.0975
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                   25.0
*25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                         12.
```

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Project #17

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           10.0
*03  NUMBER OF UNITS IN THE PROJECT                                 1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                    157016.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.          52502.00000
     25.          55419.00000
     50.          58336.00000
     75.          61253.00000
    100.          64170.00000
*06  EXPECTED OCCUPANCY (%) @                                     1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.85000
     25.              0.87500
     50.              0.90000
     75.              0.92500
    100.              0.95000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @             1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.0
     25.              0.01500
     50.              0.03000
     75.              0.09000
    100.              0.15000
*08  TOTAL COST OF THE LAND @                                  450000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @           2292000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)              0.1100
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                 0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @          0.6500
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.02000
     25.              0.02500
     50.              0.03000
     75.              0.09000
    100.              0.15000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)    0.10
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          40.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                     0.0
*17  ORDINARY INCOME TAX RATE (%) @                               0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                 0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @         1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              3.91000
     25.              4.25500
     50.              4.60000
     75.              5.29000
    100.              5.98000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @          0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                    0.0850
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @         0.7500
*23  INTEREST RATE ON LOAN # ONE (%) @                            0.0950
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    25.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                           0.
```

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Project #18

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        1.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS          10.0
*03  NUMBER OF UNITS IN THE PROJECT                                1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                   214141.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                             1.00
NUMBER OF PROBABILITY PCINTS =    5
PROBABILITY   VALUE
     0.         63434.00000
     25.        66958.00000
     50.        70482.00000
     75.        74006.00000
    100.        77530.00000
*06  EXPECTED OCCUPANCY (%) @                                    1.0000
NUMBER OF PROBABILITY PCINTS =    5
PROBABILITY   VALUE
     0.             0.80000
     25.            0.88000
     50.            0.96000
     75.            0.97250
    100.            0.98500
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.             0.0
     25.            0.02500
     50.            0.05000
     75.            0.07500
    100.            0.10000
*08  TOTAL COST OF THE LAND @                                1039000.00
*C9  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @          3961000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)             0.1100
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @    328277.0000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @           1.0000
NUMBER OF PROBABILITY PCINTS =    5
PROBABILITY   VALUE
     0.            -0.02000
     25.           -0.01000
     50.            0.0
     75.            0.07500
    100.            0.15000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)    2.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                        40.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                   0.0
*17  ORDINARY INCOME TAX RATE (%) @                              0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @        1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.             4.00000
     25.            5.00000
     50.            6.00000
     75.            6.50000
    100.            7.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @         0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                   0.0850
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @        0.7500
*23  INTEREST RATE CN LCAN # ONE (%) @                           0.0950
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                  30.0
 25  INPUT 1.0 FOR LCAN OPTIONS, ELSE 0.0                         0.
```

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Project #19

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******** DATA RECAPITULATION ** RUN NUMBER 1. ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)          4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS             10.0
*03  NUMBER OF UNITS IN THE PROJECT                                   1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                       37259.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                                1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.        17270.00000
    25.        17541.00000
    50.        18083.00000
    75.        18354.00000
   100.        18625.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.              0.85000
    25.              0.90000
    50.              0.95000
    75.              0.97500
   100.              0.99990
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.              0.0
    25.              0.01000
    50.              0.02000
    75.              0.03500
   100.              0.05000
*08  TOTAL COST OF THE LAND @                                    548000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @              952000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)               0.1100
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                   0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.              0.25000
    25.              0.26500
    50.              0.28000
    75.              0.30500
   100.              0.33000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.              0.0
    25.              0.01000
    50.              0.02000
    75.              0.03500
   100.              0.05000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)       1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                           35.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                      0.0
*17  ORDINARY INCOME TAX RATE (%) @                                 0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                   0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @           1.0000
NUMBER OF PROBABILITY POINTS =    6
PROBABILITY   VALUE
     0.             6.62500
    20.             6.75000
    40.             6.87500
    60.             7.00000
    80.          2000.05981
   100.          2100.08496
 20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @             0.0
 21  INVESTORS SHORT TERM BORROWING RATE (%) @                       0.0
 22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @           0.7500
 23  INTEREST RATE ON LOAN # ONE (%) @                              0.0950
 24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                     20.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                            0.
```

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Project #20

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)           3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS              25.0
*03  NUMBER OF UNITS IN THE PROJECT                                    1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                        38720.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              9805.00
*06  EXPECTED OCCUPANCY (%) @                                        0.9999
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @                0.0
*08  TOTAL COST OF THE LAND @                                    431000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @                  17.90
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                 0.1100
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                    0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @             0.0
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @               0.0
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)       1.50
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                           50.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                      0.0
*17  ORDINARY INCOME TAX RATE (%) @                                  0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                    0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @            1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
      0.             7.50000
     25.             8.62500
     50.             9.75000
     75.            10.37500
    100.            11.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @             0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                       0.0850
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @            0.7500
*23  INTEREST RATE ON LOAN # ONE (%) @                               0.0950
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                     30.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                            0.
```

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Project #21

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        1.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS            5.0
*03  NUMBER OF UNITS IN THE PROJECT                               120.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                       757.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.             215.00000
     25.             222.00000
     50.             225.00000
     75.             230.00000
    100.             235.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               0.85000
     25.               0.92000
     50.               0.95000
     75.               0.98000
    100.               0.99990
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               0.01000
     25.               0.02000
     50.               0.03000
     75.               0.04000
    100.               0.05000
*08  TOTAL COST OF THE LAND @                                  113000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @           1650000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                0.1200
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                   0.1000
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.          129000.00000
     25.          133000.00000
     50.          136000.00000
     75.          140000.00000
    100.          143000.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               0.01000
     25.               0.02500
     50.               0.03000
     75.               0.05000
    100.               0.06000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)      2.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          40.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                     0.0
*17  ORDINARY INCOME TAX RATE (%) @                                 0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                   0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.               4.50000
     25.               4.80000
     50.               5.00000
     75.               5.10000
    100.               5.30000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @            0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                      0.0750
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @           0.8585
*23  INTEREST RATE ON LOAN # ONE (%) @                              0.0900
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    30.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                           0.
```

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Project #22

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)         4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS            10.0
*03  NUMBER OF UNITS IN THE PROJECT                                239.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                        644.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                               1.00
NUMBER OF PROBABILITY POINTS =     5
PROBABILITY    VALUE
     0.          1258.00000
    25.          1388.00000
    50.          1492.00000
    75.          1513.00000
   100.          1563.00000
*06  EXPECTED OCCUPANCY (%) @                                        1.0000
NUMBER OF PROBABILITY POINTS =     5
PROBABILITY    VALUE
     0.             0.70000
    25.             0.72000
    50.             0.75000
    75.             0.77000
   100.             0.78000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @                1.0000
NUMBER OF PROBABILITY POINTS =     5
PROBABILITY    VALUE
     0.             0.01000
    25.             0.01500
    50.             0.02000
    75.             0.04000
   100.             0.05000
*08  TOTAL COST OF THE LAND @                                   780000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @            5184000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                 0.1500
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                    0.1200
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @             1.0000
NUMBER OF PROBABILITY POINTS =     5
PROBABILITY    VALUE
     0.       2500000.00000
    25.       2600000.00000
    50.       2629000.00000
    75.       2700000.00000
   100.       2750000.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY POINTS =     5
PROBABILITY    VALUE
     0.             0.02000
    25.             0.02500
    50.             0.03000
    75.             0.04000
   100.             0.05000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)      1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          35.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                     0.0
*17  ORDINARY INCOME TAX RATE (%) @                                 0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                   0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @           1.0000
NUMBER OF PROBABILITY POINTS =     5
PROBABILITY    VALUE
     0.       6250000.00000
    25.       6500000.00000
    50.       7000000.00000
    75.       7250000.00000
   100.       7500000.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @            0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                      0.0700
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @           0.6670
*23  INTEREST RATE ON LOAN # ONE (%) @                              0.0950
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    25.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                           0.
```

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Project #23

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS            7.0
*03  NUMBER OF UNITS IN THE PROJECT                                 6.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                      6667.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.           666.66992
     25.           700.00000
     50.           703.50000
     75.           716.66992
    100.           750.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.             0.88000
     25.             0.90000
     50.             0.95000
     75.             0.97000
    100.             0.99990
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @                1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.             0.01000
     25.             0.02500
     50.             0.03000
     75.             0.03500
    100.             0.05000
*08  TOTAL COST OF THE LAND @                                    100000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @              301000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                0.1100
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                   0.1000
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.          9750.00000
     25.          9900.00000
     50.         10028.00000
     75.         10500.00000
    100.         11500.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.             0.01000
     25.             0.02500
     50.             0.03000
     75.             0.04000
    100.             0.05000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)   1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          25.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                     0.0
*17  ORDINARY INCOME TAX RATE (%) @                                 0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                   0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
      0.             6.50000
     25.             6.80000
     50.             7.00000
     75.             7.20000
    100.             7.50000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @            0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                      0.0800
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @           0.7500
*23  INTEREST RATE ON LOAN # ONE (%) @                              0.0950
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    25.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                           0.
```

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Project #24

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS          12.0
*03  NUMBER OF UNITS IN THE PROJECT                                 1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                    14000.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.            6500.00000
     25.            6800.00000
     50.            6925.00000
     75.            7100.00000
    100.            7292.00000
*06  EXPECTED OCCUPANCY (%) @                                     1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.                0.89000
     25.                0.93000
     50.                0.95000
     75.                0.97500
    100.                0.99990
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @             1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.                0.04000
     25.                0.06000
     50.                0.08000
     75.                0.12000
    100.                0.15000
*08  TOTAL COST OF THE LAND @                                   85000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @            530000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)              0.1000
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                 0.0800
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.                0.26000
     25.                0.28000
     50.                0.32000
     75.                0.35000
    100.                0.40000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.                0.0
     25.                0.03000
     50.                0.06000
     75.                0.10000
    100.                0.12000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)   1.25
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                        50.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                   0.0
*17  ORDINARY INCOME TAX RATE (%) @                               0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                 0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @         1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.                6.00000
     25.                6.50000
     50.                7.00000
     75.                7.50000
    100.                8.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @          0.0300
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                    0.0850
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @         0.7500
*23  INTEREST RATE ON LOAN # ONE (%) @                            0.0925
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                  28.0
*25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                        15.
```

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Project #25

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS            7.0
*03  NUMBER OF UNITS IN THE PROJECT                                13.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                       450.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
      0.             61.50000
     25.             67.70000
     50.             73.84999
     75.             76.89999
    100.             80.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
      0.             0.77000
     25.             0.84000
     50.             0.92000
     75.             0.96000
    100.             0.99990
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
      0.             -0.06000
     25.             0.0
     50.             0.06000
     75.             0.12500
    100.             0.19000
*08  TOTAL COST OF THE LAND @                                   10000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @             50000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                0.1000
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                   0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @            1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
      0.             0.33000
     25.             0.37500
     50.             0.41000
     75.             0.45000
    100.             0.50000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
      0.             -0.02000
     25.             0.0
     50.             0.02000
     75.             0.05000
    100.             0.10000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)      1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          12.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                     0.0
*17  ORDINARY INCOME TAX RATE (%) @                                 0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                   0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @           1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
      0.             4.00000
     25.             5.00000
     50.             6.00000
     75.             7.50000
    100.             9.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @            0.0300
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                      0.0850
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @      40000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                              0.1000
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    10.0
*25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                           7.
```

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Project #26

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)          3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS             10.0
*03  NUMBER OF UNITS IN THE PROJECT                                   1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                     100000.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                           25000.00
*06  EXPECTED OCCUPANCY (%) @                                      0.9999
 07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @                 0.0
*08  TOTAL COST OF THE LAND @                                   200000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @            1500000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)               0.0800
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                  0.0800
 12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @              0.0
 13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @                 0.0
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)       1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                            30.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                       0.0
*17  ORDINARY INCOME TAX RATE (%) @                                0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                  0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY   VALUE
     0.             0.0
    25.             0.01000
    50.             0.02000
    75.             0.02500
   100.             0.05000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @           0.0300
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                     0.0800
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @          0.8000
*23  INTEREST RATE ON LOAN # ONE (%) @                             0.0900
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                      20.0
*25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                            20.
```

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Project #27

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS          10.0
*03  NUMBER OF UNITS IN THE PROJECT                                1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                   41000.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                            1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.          6450.00000
     25.          6680.00000
     50.          6883.00000
     75.          7025.00000
    100.          7170.00000
*06  EXPECTED OCCUPANCY (%) @                                   1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.             0.90000
     25.             0.93000
     50.             0.96000
     75.             0.98000
    100.             1.00000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.             0.0
     25.             0.02000
     50.             0.04000
     75.             0.06000
    100.             0.10000
*08  TOTAL COST OF THE LAND @                                100000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @          670000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)            0.1200
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @               0.0800
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @        1.0000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.             0.0
     25.             0.03000
     50.             0.05000
     75.             0.08000
    100.         14001.25000
 14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)  0.0
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                      30.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                 0.0
*17  ORDINARY INCOME TAX RATE (%) @                             0.4000
*18  CAPITAL GAINS TAX RATE (%) @                               0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @       1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.             6.00000
     25.             6.50000
     50.             6.80000
     75.             7.00000
    100.             7.50000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @        0.0300
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                  0.0800
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @  550000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                          0.1000
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                25.0
*25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                      15.
```

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Project # 28

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01   PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        4.
*02   PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS            6.0
*03   NUMBER OF UNITS IN THE PROJECT                                 2.0
*C4   AVERAGE NUMBER OF SQUARE FEET PER UNIT                      2400.00
*05   AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.          275.00000
     25.          500.00000
     50.          550.00000
     75.          600.00000
    100.          625.00000
*06   EXPECTED OCCUPANCY (%) @                                      0.9600
*07   ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.            0.0
     25.            0.02000
     50.            0.05000
     75.            0.08000
    100.            0.10000
*08   TOTAL COST OF THE LAND @                                   20000.00
*09   COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @             80000.00
*10   INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)               0.1000
*11   REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                  0.1000
*12   OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.            0.12000
     25.            0.13500
     50.            0.15000
     75.            0.18000
    100.            0.20000
*13   ANNUAL GROWTH IN OPERATING EXPENSES  (% OR $AMT) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.           -0.05000
     25.           -0.03000
     50.            0.0
     75.            0.03000
    100.            0.05000
*14   DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)     1.00
*15   DEPRECIABLE LIFE OF THE IMPROVEMENTS                         30.0
 16   SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                    0.0
*17   ORDINARY INCOME TAX RATE (%) @                                0.4000
*18   CAPITAL GAINS TAX RATE (%) @                                  0.2500
*19   REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.            8.00000
     25.            8.50000
     50.            9.30000
     75.            9.60000
    100.           10.00000
*20   SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @           0.0300
*21   INVESTORS SHORT TERM BORROWING RATE (%) @                     0.0900
*22   AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @          0.9000
*23   INTEREST RATE ON LOAN # ONE (%) @                             0.0850
*24   AMORTIZATION TERM OF LOAN # ONE IN YEARS @                   20.0
*25   INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                         15.
```

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Project #29

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)         1.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS              7.0
*03  NUMBER OF UNITS IN THE PROJECT                                 236.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                         789.37
*05  AVERAGE MONTHLY RENTAL PER UNIT @                                1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.            212.00000
    25.            220.00000
    50.            229.00000
    75.            240.00000
   100.            250.00000
*06  EXPECTED OCCUPANCY (%) @                                         1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.              0.80000
    25.              0.90000
    50.              0.95000
    75.              0.97000
   100.              0.99990
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @                 1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.              0.04000
    25.              0.06000
    50.              0.08000
    75.              0.09000
   100.              0.10000
*08  TOTAL COST OF THE LAND @                                    245000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @             3155000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                  0.1025
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                     0.1000
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.        186291.00000
    25.        195600.00000
    50.        204920.00000
    75.        214230.00000
   100.        232863.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @                1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.              0.06000
    25.              0.07000
    50.              0.08000
    75.              0.10000
   100.              0.12000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)       1.25
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                            30.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                       0.0
*17  ORDINARY INCOME TAX RATE (%) @                                   0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                     0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @             1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.              0.0
    25.              0.01000
    50.              0.02000
    75.              0.04000
   100.              0.06000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @              0.0200
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                        0.0800
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @  2900000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                                0.0975
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                      30.0
*25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                            30.
```

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Project #30

```
********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)          2.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS              5.0
*03  NUMBER OF UNITS IN THE PROJECT                                  16.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                         700.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                                1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.           130.00000
    25.           138.00000
    50.           145.00000
    75.           154.00000
   100.           165.00000
*06  EXPECTED OCCUPANCY (%) @                                         1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             0.80000
    25.             0.90000
    50.             0.95000
    75.             0.97000
   100.             1.00000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @                 1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             0.05000
    25.             0.07000
    50.             0.08000
    75.             0.09000
   100.             0.10000
*08  TOTAL COST OF THE LAND @                                     10000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @               85000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                  0.3000
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                     0.0800
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.         12600.00000
    25.         13500.00000
    50.         14100.00000
    75.         14500.00000
   100.         15400.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @                1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.             0.08000
    25.             0.09000
    50.             0.10000
    75.             0.12000
   100.             0.15000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)      1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                            15.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                       0.0
*17  ORDINARY INCOME TAX RATE (%) @                                   0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                     0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @             1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.         90000.00000
    25.         96000.00000
    50.        100000.00000
    75.        108000.00000
   100.        120000.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @              0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                        0.0900
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @         80000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                                0.0800
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                      20.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                             0.
```

```
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Project #31

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)       3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS          25.0
*03  NUMBER OF UNITS IN THE PROJECT                                4.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                     7500.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                             1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.           1030.00000
     25.           1075.00000
     50.           1120.00000
     75.           1200.00000
    100.           1250.00000
*06  EXPECTED OCCUPANCY (%) @                                      1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.90000
     25.              0.95000
     50.              0.97000
     75.              0.99000
    100.              1.00000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.              0.0
     25.              0.00500
     50.              0.01000
     75.              0.02000
    100.              0.03000
*08  TOTAL COST OF THE LAND @                                  96000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @           240000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)               0.1200
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                  0.0600
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.           6000.00000
     25.           7000.00000
     50.           9000.00000
     75.          11000.00000
    100.          12000.00000
 13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @             0.0
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)     1.25
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                         25.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                    0.0
*17  ORDINARY INCOME TAX RATE (%) @                                0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                  0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
      0.         275000.00000
     25.         300000.00000
     50.         350000.00000
     75.         450000.00000
    100.         550000.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @           0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                     0.0800
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @          0.7500
*23  INTEREST RATE ON LOAN # ONE (%) @                             0.0938
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                   25.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                          0.
```

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Project #32

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********


*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           12.0
*03  NUMBER OF UNITS IN THE PROJECT                                  1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                       5032.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                               1.00
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
     0.           2200.00000
    25.           2300.00000
    50.           2350.00000
    75.           2400.00000
   100.           2500.00000
*06  EXPECTED OCCUPANCY (%) @                                        1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
     0.              0.90000
    25.              0.92000
    50.              0.93000
    75.              0.95000
   100.              0.96000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
     0.              0.01000
    25.              0.03000
    50.              0.05000
    75.              0.07000
   100.              0.09000
*08  TOTAL COST OF THE LAND @                                     65000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @              150000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                0.0700
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                   0.0550
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @            1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
     0.           2400.00000
    25.           2500.00000
    50.           2548.00000
    75.           2600.00000
   100.           2700.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
     0.              0.03000
    25.              0.05000
    50.              0.06000
    75.              0.07000
   100.              0.10000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)    1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          40.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                      0.0
*17  ORDINARY INCOME TAX RATE (%) @                                  0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                    0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @            1.0000
NUMBER OF PROBABILITY POINTS =   5
PROBABILITY    VALUE
     0.              6.50000
    25.              7.00000
    50.              7.50000
    75.              8.00000
   100.              8.50000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @            0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                       0.0850
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @    160000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                               0.0925
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                      25.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                            0.
```

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Project #33

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********  DATA RECAPITULATION  **  RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        3.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS           10.0
*03  NUMBER OF UNITS IN THE PROJECT                                 1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                     14400.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                              1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.          9600.00000
    25.         10000.00000
    50.         10800.00000
    75.         11000.00000
   100.         11600.00000
*06  EXPECTED OCCUPANCY (%) @                                       1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.               0.83000
    25.               0.85000
    50.               0.89000
    75.               0.91000
   100.               0.93000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @               1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.               0.0
    25.               0.01000
    50.               0.03000
    75.               0.05000
   100.               0.07000
*08  TOTAL COST OF THE LAND @                                   180000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @             670000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)                0.1000
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                   0.0700
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @            1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.          32000.00000
    25.          35000.00000
    50.          37500.00000
    75.          40000.00000
   100.          42000.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.               0.0
    25.               0.02000
    50.               0.03000
    75.               0.05000
   100.               0.07000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)      1.00
*15  DEPRECIABLE LIFE OF THE IMPROVEMENTS                          40.0
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                     0.0
*17  ORDINARY INCOME TAX RATE (%) @                                 0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                   0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.               5.25000
    25.               5.50000
    50.               6.00000
    75.               6.25000
   100.               6.50000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @            0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                      0.0900
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @     625000.0000
*23  INTEREST RATE ON LOAN # ONE (%) @                              0.0962
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                    20.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                           0.
```

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Project #34

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********  DATA RECAPITULATION  ** RUN NUMBER  1.  ********

*01  PROPERTY TYPE (NEWRES=1.,OLDRES=2.,NEWCOM=3.,OLDCOM=4.)        4.
*02  PROJECTED HOLDING PERIOD OF THE INVESTMENT IN YEARS          10.0
*03  NUMBER OF UNITS IN THE PROJECT                                1.0
*04  AVERAGE NUMBER OF SQUARE FEET PER UNIT                    50000.00
*05  AVERAGE MONTHLY RENTAL PER UNIT @                             1.00
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.            6000.00000
    25.            6250.00000
    50.            6450.00000
    75.            6875.00000
   100.            6900.00000
*06  EXPECTED OCCUPANCY (%) @                                      1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.               0.88000
    25.               0.90000
    50.               0.91000
    75.               0.93000
   100.               0.95000
*07  ANNUAL GROWTH OF THE RENTAL INCOME (% OR $AMT) @              1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.              -0.01000
    25.               0.0
    50.               0.01000
    75.               0.02000
   100.               0.05000
*08  TOTAL COST OF THE LAND @                                  125000.00
*09  COST OF ALL IMPROVEMENTS (TOTAL OR PER SQFT) @            475000.00
*10  INVESTORS REQUIRED RATE OF RETURN ON EQUITY (%)               0.1000
*11  REINVESTMENT RATE ON EQUITY CASH FLOW  (%) @                  0.0700
*12  OPERATING EXPENSES (% OF GR INC OR $AMT 1ST YEAR) @           1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.           15000.00000
    25.           16000.00000
    50.           18000.00000
    75.           20625.00000
   100.           22000.00000
*13  ANNUAL GROWTH IN OPERATING EXPENSES (% OR $AMT) @             1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.               0.0
    25.               0.02000
    50.               0.03000
    75.               0.05000
   100.               0.07000
*14  DEPREC METHOD (SL=1., 125%=1.25, 150%=1.5, DD=2., SYD=3.)    1.00
*15  [illegible]
 16  SALVAGE VALUE OF THE DEPRECIABLE BASIS (%)                    0.0
*17  ORDINARY INCOME TAX RATE (%) @                                0.4000
*18  CAPITAL GAINS TAX RATE (%) @                                  0.2500
*19  REVERSION AMOUNT (GROWTH % OR $SALES PRICE OR GIM) @          1.0000
NUMBER OF PROBABILITY POINTS =    5
PROBABILITY    VALUE
     0.               5.50000
    25.               6.00000
    50.               7.00000
    75.               7.50000
   100.               8.00000
*20  SALES COMMISSION AT END OF THE HOLDING PERIOD (%) @           0.0600
*21  INVESTORS SHORT TERM BORROWING RATE (%) @                     0.0900
*22  AMOUNT OF LOAN # ONE ($AMT OR % OF PURCHASE PRICE) @          0.7500
*23  INTEREST RATE ON LOAN # ONE (%) @                             0.0925
*24  AMORTIZATION TERM OF LOAN # ONE IN YEARS @                   20.0
 25  INPUT 1.0 FOR LOAN OPTIONS, ELSE 0.0                          0.
```

Appendix D

REGRESSION EQUATIONS

Regression	Dep Var	Ind Var	Slope	T Value	Prob T > To	R^2
1	BRR	SIRR	-.86	-1.57	.13	.07
2	FCR	SIRR	-.22	-1.13	.27	.04
3	PBBT	SIRR	-6.2	-.41	.69	.005
4	PBAT	SIRR	-22.0	-1.43	.16	.06
5	DCR	SIRR	-1.65	-.73	.47	.02
6	ELL	SIRR	.82	1.00	.32	.03
7	IRR	SIRR	.87	1.88	.07	.10
8	XI	SIRR	.17	1.55	.13	.07
9	LVR	SIRR	2.05	2.38	.02	.15
10	LVR	RND	.70	.30	.76	.003
11	EIRR	SIRR	.66	1.47	.15	.06
12	EIRR	SIRR	1.56	6.26	.00	NA

Regression	Type Model
1-7	Common Model Results on Risk
8	Mortgage Interest Rate on Risk
9	Loan to Value Ratio on Risk
10	LVR on Risk with No Debt
11	Expected Return on Risk
12	Expected Return on Risk; Intercept Forced Through 0.06