

Optimal Holding Period Analysis: Much Ado About Not Much

by Austin J. Jaffe

INTRODUCTION

One area in real estate investment analysis that has recently come under close scrutiny has been the analysis of the appropriate period of time an investor should maintain his interests in real property. Optimal holding period analysis, although not a new concept,¹ has generally been by-passed by most researchers seeking more fruitful vineyards. However, a series of recent articles has emphasized the selection of the "optimal planning horizon" as an important consideration the decision-maker must face. Although the horizon designated as "optimal" tends to vary according to the criteria used, the effective decision-maker implicitly has much to gain (or lose) if he considers (or fails to consider) the analysis presented.

This paper will review the literature analyzing holding period considerations for real estate projects. Most recently, several studies have begun to directly discuss "optimal holding period analysis," proposing that the process increases accuracy and reliability of investment analysis." It should be pointed out that a difference exists between analysis of holding periods of real estate projects from the investment point of view and from the market valuation perspective (and consequently a different impact on appraised value). It is also generally felt that optimal holding period analysis, if vital at all, offers significantly more benefit for the investor-client than for the market appraiser.

Finally, this paper will present additional results which cast new light on this misunderstood subject. It will show that although the optimal holding period is frequently misunderstood by many students, researchers, and decision-makers, the recent interest in selection of an optimal holding period is misdirected in terms of potential benefits for decision-makers. In a

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sense, this paper questions the usefulness of optimal investment period analysis, since the costs of implementing the analysis may outweigh the expected benefits.

It will be argued that in terms of investment planning and analysis, the estimation of the optimal holding period is a relatively unimportant and insignificant endeavor. This statement will be supported by results of an analysis of the potential gains in wealth portions permitted by the optimal choices, as well as comparisons of the relative potential gains to changes in other variables.

Although a number of writers have presumed certain holding periods for investment planning purposes, a survey by Wiley suggested that most analysts have not agreed on the optimal holding period for real estate investment projects.²

TABLE I
WILEY'S (1976) SURVEY RESULTS ON PLANNED
HOLDING PERIODS FOR REAL ESTATE
"EQUITY INVESTORS"

Years	% of 70 Insurance Cos.	% of 48 REITS	% of 33 Corporations	% of 151 Total
5	4	17	15	11
10	33	29	33	32
20	13	12	24	15
All other time period(s)	50	42	28	42
	100	100	100	100

Note: Only data available; results by property type unavailable.

Source: Robert J. Wiley, "Real Estate Investment Analysis: An Empirical Study" *The Appraisal Journal* 44 (October 1976), table 7, p. 592.

Wiley's results suggested that a lack of agreement exists as to the appropriate holding period which real estate investors anticipate or project for income-producing property. His results also pointed out the strongly expected use of ten years as the most appropriate planning horizon.

Ellwood's text and methodology apparently presumed a ten-year projection period. Although the analysis is not clearly specified, Ellwood attempted to justify the use of confining mortgage-equity analysis to a ten-year period.

. . . Optimum terms of ownership have tended to become shorter in recent years because of changes in the monetary side of the market and the ever-increasing impact of income taxes on take-home income.

Public records pertaining to many thousands of conventional income properties indicate that on average this type of real estate changes hands or recasts its financing within ten years of purchase.³

Ellwood also numerated the advantages of a short-term projection period.

The short projection will produce the same total value as a longer one, regardless of the capitalization technique so long as we assume the same income stream, the same rate of value change, and the same rate of interest. . . .

The short-term projection offers a better chance for accuracy not only because the estimate of periodic income can be based on current facts and well-remembered experience but also because total value will not be attributable to income alone. . . . The law of compensating errors favors short projections. . . .

The normal net cash flow stream . . . does not follow a straight line path in either direction. A reasonably reliable estimate of average, annual net cash flow for a term of ten years or less can be treated as a level annuity with no significant error in the result. . . .⁴

Therefore, Ellwood concluded that projections using his method should be confined to ten years. The obvious implication is that Ellwood presumed that the "optimal holding period" was about ten years or, if not, this consideration was not very significant in terms of valuing income property.

Textbook treatment of the issue is very limited and follows the traditional presumptions. Most of the writers failed to discuss this consideration. Cooper,⁵ Roulac,⁶ and Wiley⁷ addressed this question although Cooper apparently presumed the investor "knows" how long he will desire the property (typically ten years, or perhaps, up to and including the year when the internal rate of return is greatest). Roulac is less clear and dismissed the subject in one paragraph.

Investment value is derived as the result of a careful study of the property's projected operations over an assumed holding period. This holding period is indicated by the objectives of the particular real estate investor proposing to acquire the property.⁸

Wiley devoted an entire chapter to "holding period strategy" but failed to develop the necessary analysis or theory as to why a "ten-year planning horizon is often appropriate for the newly constructed property as well as used property."⁹ He suggested that since most of the interest on the typical mortgage will be paid and deducted within the ten-year period, and since accelerated depreciation allowances are expended in the early periods, "a planned holding period in the general area of ten years is appropriate."¹⁰

However, Wiley proposed that the knowledgeable investor might also choose one of the following strategies:

. . . A particular investor may, of course, acquire a variety of real estate projects (a portfolio) for which he has various planning horizons.¹¹

The planning horizon for an investment made in anticipation of a changed use of the property would logically be set as the time that is estimated will pass before the property will be desired for the new use.¹²

. . . An alternative approach would be to make the planning horizon equal to the number of years in which *positive* cash flows are expected to be received.¹³

. . . Another possible choice would be the number of years during which tax-shelter benefits are expected to be received.¹⁴

. . . The investor may plan to *refinance* the investment, rather than to dispose of the property at a time when it appears that the after-tax cash flows will drop to a relatively low level.¹⁵

Based upon Wiley's recommendations, it seems the determination of the optimal holding period tends to vary according to one's definitional preference, and then, it appears to be based only upon general principles and considerations. His presumption of a necessity of a careful understanding of the factors that influence the selection of the appropriate period seems to beg the issue.

HOLDING PERIOD ANALYSIS AND ITS CRITICS

A number of authors have attempted to analyze the effects of changes in holding periods on valuation and rate of return. Shenkel, using a mortgage-equity capitalization approach, analyzed the effects on investment value of varied "investment terms."¹⁶ He concluded that "the investment period, for the problem at hand, has less bearing on the final results than did changes in other variables."¹⁷

His results showed the insensitivity of value to changes in the planned investment period. Using his example, a 10% change in the holding period resulted in less than a 1% change in value. By extending the holding period from ten to 20 years, this would result in only a 2.89% change.¹⁸ It should be noted that in this framework, since the discount rates tend to be static, the effects of inflation over the holding period tend to be ignored. This study, like many others, presumes *ceteris paribus* changes in the holding period. Therefore, Shenkel's early article (1969) suggested relatively little could be gained by very careful and expensive analyses of the holding period. This paper may be viewed as one of the first sensitivity analyses tests, in which one holding period is one of the variables.

In 1971, Ricks attempted to analyze the effects of changing the planned holding period from five to ten years under growth or no growth conditions on rates of return.¹⁹ He also analyzed the effect of financial leverage on return. His sensitivity analysis showed that the effect of increasing the holding period from five to ten years had little or no effect on the expected rate of return.

TABLE 2
SUMMARY OF RICKS' 1971 RATE OF RETURN RESULTS

		Expected Holding Period	
		5 Years	10 Years
Expected	00	4.3 (7.2)	4.4 (7.4)
Growth Rates (%)	03	6.4 (15.9)	6.4 (13.8)

Note: All results are calculated rates of return with 100 % and 20% equity contributions.

Source: Adapted from R. Bruce Ricks, "Computers and the Real Estate Investment Process," *Real Estate Computerization*, ed. David W. Walters (Berkeley, Ca.: Center for Real Estate and Urban Economics, Research Report #35, 1971), p. 159.

Therefore, Ricks also implied an unimportance for holding period analysis.

In the same volume, Walters analyzed various holding periods on a before-tax basis and reported that the importance of the holding period is a function of the projected property growth in the future.²⁰ Furthermore, he found that in the absence of growth in the reversion, the analysis of the holding period yields little information.

It is clear that if no property growth is assumed the analyst or investor can be almost indifferent as to the length of time he holds the piece of income property.²¹

He suggested that the investor should analyze the holding period expectation only when growth is expected.

However, while changes in holding periods are not significant when the analyst assumes no project growth or decline, they become very important when some project growth or decline is assumed. The analyst should note that depending on whether an increase or a decrease in value is projected, the attractiveness of the different holding periods changes.²²

Given our experience during the past quarter century with rapidly increasing property values, Walters' criticisms appear to be unrealistic. However, his paper (and others) attempted to isolate changes in value as a result of changes in expected holding period. If the analyses were to examine changes in value *given* a rate of growth in the reversion, then the results could not be distinguished between changes in holding period or reversion growth rate or both.

In 1973, Walters argued that the effect of changes in the holding period for appraisal reports of market value has far less impact than do changes in some of the other input parameters. Thus, he suggested that "less attention can be spent on determining the optimum holding period than in estimating other variables."²³

While an accurate estimate of the holding period is certainly important to income capitalization methods, the analyst can provide a better overall appraisal by devoting less time to estimating the optimum holding period and more time to estimating other variables.²⁴

An additional paper by Walters substantiated these findings.²⁵ This paper found a 10% change in the holding period resulted in only a .5 of a percentage point change in yield.²⁵ He recommended the property management variables (income and expenses) as those more worthy of careful analysis.

THE PROPONENTS OF HOLDING PERIOD ANALYSIS

In 1973, Cooper and Pyhrr investigated the effects of different holding periods on the internal rates of return on equity and total capital.²⁶ In attempting to determine the optimal holding period as "that holding period

* It should be noted that a portion of Ellwood's technique deals with changes in income and property values during a given holding period. The use of Ellwood's "j" factor may be applicable in this area.

over which the internal rate of return is the highest," they suggested that when taken in conjunction with expected changes in other variables, changes in the holding period will have significant effects on yield. They concluded that the optimal length of the holding period would depend upon the investment criterion used (i.e., for IRR on equity, a short holding period would be "optimal" and for IRR on total capital, a longer holding period would maximize yield on total capital).²⁷

The most adamant defense of holding period analysis can be found in an important 1975 paper by Messner and Findlay.²⁸ After introducing the Financial Management Rate of Return (FMRR) model and its superiority over the IRR model and criterion, they demonstrated that this model can be used to determine "correct" optimal holding periods. They also suggested that few investigators have thought about the selection of the optimal holding period.

Although it would appear that almost nobody buys real estate with the intention of holding it forever, it would also appear that very little consideration is given to the timing of sale when a commitment is undertaken. More specifically, the notion that such information can be of value in an investment decision does not appear to be widely held (except for tax effects).²⁹

Their results showed differences in FMRR as a result of various holding periods for the project used as an example. In this case, the FMRR after an eight-year holding period would be 10.85% , and after ten years, 11.11% . The FMRR peaked after holding the property for 15 years at 11.35% , before slowly declining back to 10.84% after a proposed 20-year holding period. Thus, Messner and Findlay reported that the true optimal holding period is 15 years in this example, and this determination is a significant feature of the FMRR.

The objection raised here is not with the mechanics of the method or with the derivation of the optimal period, but rather with the significance of the finding. The differences between years 10 to 15 is only .24 of a percentage point (or only a 2.16% change). In fact, the "worst" holding period selected would result in only a 4.49% change in return.³⁰ Therefore, the importance of the optimal holding period selection appears to be somewhat nebulous.

To this point, Messner and Findlay quantify their analysis.

From this analysis, we can say that an investor planning to hold the property 15 ± three years would optimize his position The greater the spread in years, the less important are exact knowledge of the investor's circumstances or market conditions at the optimal moment of disposition.³¹

This, of course, is precisely the issue. If the rate of return or value is insensitive to changes in the holding period, then the analysis of optimal holding periods is a futile endeavor. Similarly, if "the return is not very sensitive to holding period," as some investigators have found, then the analyst would become better off by examining those variables that are influential in impacting return. Finally, if the sensitivity of changes in one variable is small compared to the sensitivity of another variable on return or value, then it appears that the effective decision-maker should discard

the analysis of the changes in the insignificant variable as he optimized his time and resources.

Friedman's Pull Factor (1976) is a technique which purported to enable potential investors "to determine whether to hold or sell income-producing real estate in any given year."³² Although Friedman has defended this technique as an extension of the traditional internal rate of return calculation, Messner and Findlay have questioned its worth and ability to determine the optimal holding period.³³ Friedman has also reported that an analysis of depreciation methods, depreciable lives, and amortization terms had little or no effects on the optimal holding period for income property.³⁴ In general, the gains available from use of the Pull Factor appear to be relatively small for the analyst.

Two additional papers require identification. A paper by Findlay and Howson (1975) used mathematical programming to extend the FMRR "for richer and fuller information in market equilibrium."³⁵ This paper showed how abandonment considerations might be taken into account in order to arrive at an "optimal holding pattern." A paper by Findlay, Messner, and Tarantello (1976) intended the FMRR to include simulation of returns.³⁶ An alleged attraction of this FMRR simulation model is its ability to enable the "evaluation of multiple holding periods."

The work cited above typically is of high quality and is quite rigorous. Certainly many students and researchers have not emphasized optimal holding period analysis as a primary tool for investors and appraisers. In addition, however, the papers that have attempted to provide a framework for the analysis of optimal holding period considerations have largely been based on proper methodology and theory. The questions raised here relate to the direction and impetus of some of these papers. The question which remains unanswered is, how significant is the analysis of the optimal holding period? This question will hopefully be answered in the remainder of this paper.

THE IMPORTANCE OF HOLDING PERIOD ANALYSIS

If the determination of the best time to sell income property can be shown to be important in terms of enabling potential investors to plan for a specific holding period which would maximize their wealth positions, then it can be argued that optimal holding period analysis may be important enough to warrant the attention it has been receiving in the recent literature. One way to test this hypothesis is to examine the percentage changes in output using a well-known and generally accepted discounted cash flow model for real estate investment valuation.³⁷ Thus, this analysis may tend to be more important for investment purposes rather than market appraisal purposes.

The property selected as a "typical project" and the computations made were based upon data selection procedures and techniques discussed elsewhere.³⁸ The data sources came from a variety of services and series. Based upon this analysis, *Table 3* summarizes the inputs used in the study.

TABLE 3
SUMMARY OF TYPICAL INPUTS FOR SENSITIVITY ANALYSIS

<u>Variables</u>	<u>Values</u>
Effective Gross Income (EGI)	\$4103 per month
Operating Expenses (OE)	53.4%
Cost (COST)	\$20.00 per square foot
Required Rate of Return on Equity (r)	10%
Interest Rate on Mortgage (COUP)	7.25%
Loan-to-Value Ratio (L/V)	74.2%
Length of Mortgage (TERM)	25 years
Depreciation Method (DEP)	Straight-Line Method
Effective Tax Rate on Increase (TRATE)	35%
Depreciable Life of Improvements (LIFE)	40 years
Expected Holding Period (HP)	10 years

Using the following after-tax equity valuation model and the estimates found in *Table 3*, the valuation of equity was found to be \$62,585.12 and the internal rate of return was 9.85%.

$$E = \sum_{i=1}^n \frac{R_i - I_i - A_i - T_i}{(1+r)^i} + \frac{SP - UM - GT}{(1+r)^n}$$

where

- E = Equity Value
- R_i = Net Operating Income in the i th period
- I_i = Interest Payment in the i th period
- A_i = Principal Reduction Payment in the i th period
- T_i = Income Taxes in the i th period
- SP = Net Selling Price
- UM = Unpaid Mortgage Balance
- GT = Capital Gains Tax
- r = Required Rate of Return on Equity

The results of this sensitivity analysis are presented in *Table 4*. This table shows the effects of changes in the expected holding periods (from five to 20 years).

It can easily be seen that the sensitivity of value or return to changes in the holding period, in this case, is very insignificant. For example, 50% decrease (from ten to five years) in the expected holding period, resulted in less than a 1% change in value and about a 1.5% change in return. Therefore, holding period analysis would offer relatively few rewards for those seeking the optimal period.

TABLE 4
HOLDING PERIOD SENSITIVITY RESULTS

<u>% Δ in Holding Period</u>	<u>Present Value (\$)</u>	<u>% Δ in Present Value</u>	<u>Internal Rate of Return (%)</u>	<u>% Δ in Internal Rate of Return</u>
-50	63,100.57	0.98	10.00	1.52
-40	63,136.18	0.88	9.98	1.32
-30	63,043.46	0.73	9.97	1.22
-20	62,921.07	0.54	9.92	0.71
-10	62,768.41	0.29	9.89	0.41
0	62,585.12	0.00	9.85	0.00
10	62,371.70	(0.34)	9.82	(0.30)
20	62,128.68	(0.73)	9.78	(0.71)
30	61,856.97	(1.16)	9.74	(1.12)
40	61,557.86	(1.64)	9.69	(1.62)
50	61,232.65	(2.16)	9.65	(2.03)
60	60,882.76	(2.72)	9.60	(2.54)
70	60,509.86	(3.32)	9.56	(2.94)
80	60,115.44	(3.95)	9.51	(3.45)
90	59,701.21	(4.61)	9.46	(3.96)
100	59,268.94	(5.30)	9.41	(4.47)

As a word of caution, it should be pointed out that these results are presented under one presumption—that the change in holding period is the only change contemplated. Certainly this may not be realistic in some cases and is a limitation of deterministic sensitivity analysis. Therefore, these results must be viewed *ceteris paribus* although changes in property values and return may occur as a result of many dynamic changes in many factors.

However, the results reported in *Table 4* are particular to the input series used. The problem of data sensitivity might preclude the generality and implications of the results. Further testing has found that the magnitude of the results will tend to vary according to the parameters of the case, but that the relative rankings of variables according to their sensitivities will remain the same.³⁹ In other words, the actual results of any sensitivity analysis must remain limited to the case studied, but the relative size and impact of each variable will remain constant for most projects. Therefore, the small impact that holding period changes have on value and return will be small for most income producing projects, although the precise effects will tend to vary.

It has been shown that the ranking of holding period changes was found to be typically ninth out of eleventh in its potential impact on return.⁴⁰ Similar findings were also reported for rankings of sensitivities of value.⁴¹

Table 5 presents some of the results which show the relatively small impact that changes in holding period have on return.

TABLE 5
SUMMARY OF SENSITIVITY RESULTS:
CHANGES IN INTERVAL RATES OF RETURN^a

Changes in Input	Variable Changed					
	EGI	OE	COUP	TERM	TRATE	HP
-40	0.37 (-96.24)	19.84 (101.42)	13.76 (39.70)	8.72 (11.47)	11.18 (13.50)	9.98 (1.32)
-20	5.63 (-42.84)	14.80 (50.25)	11.90 (20.81)	9.39 (-4.67)	10.52 (6.80)	9.92 (0.71)
+20	14.16 (43.76)	5.02 (-49.04)	7.65 (-22.34)	10.18 (3.35)	9.19 (-6.70)	9.78 (-0.71)
+40	18.53 (88.12)	-1.45 (-114.72)	5.30 (-46.19)	10.41 (5.69)	8.53 (-13.40)	9.69 (-1.62)

^a Initial internal rate of return was 9.85%, given values found in *Table 3*. Percentage changes reported below each result in parenthesis.

Therefore, given the results reported in *Table 5*, it appears that changes in expected holding period impact far less on return due to changes in most of the other variables. Thus, a major conclusion from this analysis is that the relative importance of holding period analysis is small in a real estate investment framework based upon the potential gains available for users.

CONCLUSION

Since changes in the holding period have been found to be relatively insignificant, the recent attempts to identify, measure, and analyze the optimal holding periods for real estate projects nearly becomes a futile exercise. Given these results, the rewards from these analyses can be expected to be very limited. Analysis of the more influential variables and the changes in their values would seem to provide more information for the decision-maker.

However, as has been pointed out in a different context, "even minor deviations of the rules of thumb . . . imply uncompensated departures from optimality."⁴² The proponents of optimal holding period analysis are quite correct in arguing that the selection of the optimal period for real estate investment planning would result, *ceteris paribus*, in the best choice among alternatives. The objection raised in this paper centers around the cost savings to the investor.

In other words, is optimal holding period analysis cost-effective (i.e., relative to the gains to be made)? Is this analysis worth the costs of acquisition? Finally, is the analysis of optimal holding periods feasible given the analyst is selling to optimize his time, energy, and resources? Clearly, this

paper attempts to argue "no." This determination becomes especially critical in view of the fact that much more can be gained by analyzing more influential variables.

In the final analysis, the results presented here attempt to demonstrate that the marginal product to one investor of optimal holding period analysis is very small. In consideration of its cost and in comparison to the possible returns from closer analysis of other variables, the usefulness of optimal holding period analysis may be even further diminished.

In the end, it may be true that this consideration cannot be very helpful to the analyst.^{3*}

Ideally, the decision-maker seeking wealth-maximization would employ an optimal holding period in his investment planning for each specific real estate investment project. This analysis would be combined with the myriad other analyses believed to be helpful in making the investment decision. Based upon the investor's goals and objectives, financial theory, and real world experience, he would implement a decision.

This paper has attempted to place an area of recent interest in real estate investment analysis into its proper perspective. Optimal holding period analysis may have a place in the analysis of investment decisions. The results presented here suggest that perhaps the importance of this analysis for decision-making is far less than the recent literature has presumed. At least, the suggested benefits appear to be largely illusory.

* It has been often suggested that the optimum holding period selection may be most useful in terms of advance planning and expected portfolio duration. The author agrees in that regard. The results presented here suggest relatively small benefits in terms of valuation and rate of return effects.

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