Estimating Value

By Wayne E. Etter

The basics of present value were presented in two previous Instructor's Notebooks. Now, the use of present value techniques to estimate the value of income-producing real estate will be examined. Although some investment considerations are introduced, the main focus of this series continues to be explaining the mechanics of present value techniques.

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

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

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

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

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

Figure 1

	5% Vacancy		10% Vacancy	
Year	ATCF/OP	PV at 15%	ATCF/OP	PV at 15%
1	$7,695	$6,691	$5,286	$4,597
2	8,574	6,483	6,366	4,814
3	9,374	6,164	7,315	4,810
4	10,191	5,827	7,831	4,477
5	11,026	5,482	8,595	4,273
	Total	$30,647		$22,971
	ATCF/SALE			
5	161,453	80,271	137,414	68,319
PV of Equity		$110,918		$91,290
PV of Debt		240,898		240,898
Investment value		$351,816		$332,188

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

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

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

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

Figure 2

Year	ATCF/OP	PV at 15%	PV at 25%
1	$7,695	$6,691	$6,156
2	8,574	6,483	5,487
3	9,374	6,164	4,799
4	10,191	5,827	4,174
5	11,026	5,482	3,613
	Total	$30,647	$24,229
	ATCF/SALE		
5	161,453	80,271	52,905
PV of Equity		$110,918	$77,134
PV of Debt		240,898	240,898
Investment value		$351,816	$318,032

The effect of debt financing on a property's investment value also can be analyzed. For example, the effect of increasing the amount of debt from 75 percent of cost to 90 percent of cost when there is positive financial leverage is presented in Figure 3. If no other assumptions are changed, this change increases the property's investment value. Such a result is entirely in accord with what is observed in the real world: when lenders finance more generously, investors are willing to pay higher prices for property. Although investors may not make such calculations, they do understand the benefits of using more debt. Of course, they may not always consider the consequences of additional risk accompanying the additional debt.

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

Figure 3

	75% Debt		90% Debt	
Year	**ATCF/OP**	**PV at 15%**	**ATCF/OP**	**PV at 15%**
1	$7,695	$6,691	$2,143	$1,863
2	8,574	6,483	3,313	2,505
3	9,374	6,164	4,518	2,971
4	10,191	5,827	5,759	3,293
5	11,026	5,482	7,038	3,499
	Total	$30,647		$14,131
	ATCF/SALE			
5	161,453	80,271	116,903	58,121
PV of Equity		$110,918		$72,252
PV of Debt		240,898		289,877
Investment value		$351,816		$362,129

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

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

$$\text{Estimated market value} = \frac{\text{Net operating income}}{\text{Overall capitalization rate}}$$

$$\$100{,}000 = \frac{\$10{,}000}{.10}$$

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

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

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

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

Figure 4

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

In the first one, the basics are presented—how the present value of an income stream is calculated and how changes in the discount rate and timing of the cash flows change the present value. In the second article, two important measures of the rate of return—net present value and the internal rate of return—are developed from the basic concepts. In this article, the basic concepts are used to estimate investment value and market value.

Figure 5

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

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REAL ESTATE CENTER

Tierra Grande (ISSN 1070-0234), formerly *Real Estate Center Journal,* is published quarterly by the Real Estate Center at Texas A&M University, College Station, Texas 77843-2115.

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