

HP 17bII+ Capitalization Rates and Value

Reconstructed Operating Statement

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A capitalization rate is a conversion factor, a number that translates income into an indication of value for a subject property. So, the first step in valuing a property is presenting that property's ability to generate income in what is known as a "reconstructed operating statement."

RECONSTRUCTED OPERATING STATEMENT:

Let's work up one of these statements for a ten-unit apartment building that has the following rental structure:

Six units rent for \$1,000. per month per unit Four units rent for \$1,250. per month per unit

Calculate the monthly gross income and the potential gross income (annual) with these keystrokes:



This is the monthly gross rent, that is, what this property is expected to generate on a monthly basis if all the units are rented and the tenants pay the rent. To annualize this monthly rent total, use these keystrokes:

x 12 = Answer: 132,000.

This is the "potential gross income," the annual gross income the property can generate if all the units are occupied throughout the year and the tenants pay the rent.

RPN:

Answer:	11,000.
	Answer:

This is the monthly gross rent, that is, what this property is expected to generate on a monthly basis if all the units are rented and the tenants pay the rent. Use these keystrokes to annualize the monthly gross rent:

12 x Answer: 132,000.

This is the "potential gross income," the annual gross income the property can generate if all the units are occupied throughout the year and the tenants pay the rent.

It is estimated for the market in which this property is located that an appropriate vacancy and collection loss is, we will say, 7%. That means a property owner cannot expect to be renting the units out every day of the year and that there are going to be some vacancies and occasionally someone who does not pay the rent. The estimate of 7% is saying that the property will be rented and the tenants paying the rent 93% of the year. So, the 100% figure for the potential gross income must be adjusted downward by the 7% vacancy and collection loss factor:

Algebraic:	132000	(put this in if you cleared the last calculation)
	-	
	7	
	%	
	=	Answer: 122,760.
This is what is called the "effective expected to be earned from the loss is taken into account.	ective gro the tenan	oss income," the income ts after vacancy and collection
RPN:	132000	(put this in if you cleared the last calculation)
	ENTER	(if you kept the 132,000. in your display from the previous calculation you do not need to enter it with this keystroke)
	7	
	%	
	-	Answer: 122,760.

This is what is called the "effective gross income," the income expected to be earned from the tenants after vacancy and collection loss is taken into account.

GETTING THE NET:

Now we are ready to calculate the net operating income, which is the income that our rate is going to capitalize, that is, convert into an indication of value. From the effective gross income we deduct annual property operating expenses, such as real property taxes, hazard, insurance, utilities, reserves, management. Let's say these annual expenses are \$45,000. The keystrokes for calculating our net operating income are:

Algebraic:	122760 (put this in if you cleared the last calculation)
	-
	45000
	= Answer: 77,760.

This is the "net operating income," the basis for our valuation using the capitalization rate.

RPN:

122760 (put this in if you cleared the last calculation)
ENTER (if you kept the 122,760. in your display from the previous calculation you do not need to enter it with this keystroke)
45000
Answer: 77,760.

This is the "net operating income," the basis for our valuation using the capitalization rate.

DERIVING THE CAP RATE FROM SALES:

A capitalization rate for a property that has sold in the market is the ratio of its net operating income to its sales price, that is, the net operating income divided by the sales price. It is a rate of return in net operating income as a percentage of that sales price. So, the property that sells for \$500,000. with a net operating income of \$55,000. has a capitalization rate of 11% (\$55,000. divided by \$500,000.). That means that the net income is 11% of the sales price, or that the purchaser who paid \$500,000. for the property is getting an 11% return on that sales price in net operating income.

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Cap Rate Formula

R = I ÷ V

R = capitalization rate

I = net operating income

V = value/sales price
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Set your display for four places to the right of the decimal with: 'DSP,' 'FIX,' '4,' 'INPUT.' It is common to express a cap rate in decimal form with this many places.

The keystrokes for calculating the cap rate shown above:

Algebraic:	55000
	÷
	500000
	= Answer: .1100
RPN:	55000
	ENTER
	500000
	+ Answer: .1100

Comparable Sales

To derive a capitalization rate by sales it is necessary to evaluate a range of comparable sales the analyst feels best reflects the current demand by investors for properties similar to the subject property being valued.

Let's say our analyst is using the above comparable sale along with three other sales shown below:

#1 \$55,000. \$500,00	.1100
#2 \$57,000. \$550,00	.1036
Keystrokes: Alg: 57000, RPN: 57	÷, 550000, = 000, ENTER, 550000, ÷
#3 \$61,000. \$620,00	.0984
Keystrokes: Alg: 61000, RPN: 61	÷, 620000, = 1000, ENTER, 620000, ÷
#4 \$51,000. \$475,00	.1074
Keystrokes: Alg: 51 RPN: 51	000, ÷, 475000, = 000, ENTER, 475000, ÷

Reconciliation

In order to decide upon the rate to be used - a process called "reconciliation" - the analyst must consider the individual rates from the comparable sales and weight them based upon their relevance to the subject property, that is, the property being valued. This weighting comes from the considered judgment of the analyst and takes into account which comparables are most relevant (in physical condition, location, income-producing ability, etc.) to the subject. The result should be a greater weighting to those sales more relevant and lesser weighting to those less applicable.

Let's say our analyst decides upon the following weightings:

<u>Comparable</u>	R = I/V	Weighting
#1	.1100	40%
#2	.1036	10%
#3	.0984	10%
#4	.1074	40%

Note: the individual weightings must add up to 100%

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To calculate the reconciled capitalization rate based on the above weightings we convert each of the percentage weightings to decimals, multiply each cap rate in decimal form by its weighting, also expressed as a decimal, and then add up the individual weighted rates for an overall capitalization rate as follows:

<u>Comparable</u>		<u>R = I</u>	<u>/V Weig</u>	ghting	Weighted	average
#1	.1100	Х	.40	=	.0440	
#2	.1036	Х	.10	=	.0104	
#3	.0984	Х	.10	=	.0098	
#4	.1074	х	.40	=	+ <u>.0430</u>	
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Overall weighted average: .1072

A capitalization rate of this type is usually expressed as a percentage, 10.72%.

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The keystrokes for calculating the weighted capitalization rate:

Algebraic:	.11 x .4 + (.1036 x .1 = + (.0984 x .1 = + (.1074 x .4
RPN:	 Answer: .1072 .11 ENTER .4 x .1036 ENTER .1 x + .0984 ENTER .1 x + .1074 ENTER .4 x + Answer: .1072

VALUING THE SUBJECT USING A CAP RATE DERIVED FROM COMPARABLE SALES:

Recall that the net operating income we calculated previously for our subject property was \$77,760.

The Valuation Formula

 $V = I \div R$

V = value of the subject property

I = net operating income of the subject

R = the derived capitalization rate

The Subject Value

 $V = $77,760. \div .1072$

= \$725,373. (rounded)

Keystrokes:

RPN: 77760, ENTER, .1072, ÷

Alg: 77760, ÷, .1072, =

There are other rates that can be used to value property. Income can be capitalized with the application of factors that multiply the income to estimate value. Discounting is another capitalization technique for valuing property. See our section on discounted cash flow analysis for more on the use of discounting to value property.

The preferred method for deriving a capitalization rate is with comparable sales. Once a real property appraiser, real estate broker, or other analyst is satisfied what an appropriate capitalization rate is for a particular market through studying enough comparable sales, the property can be valued using that capitalization rate.

DERIVING THE CAP RATE WITH BAND-OF-INVESTMENT:

But there may not be enough good sales that can be used to derive a meaningful capitalization rate and it may become necessary to mathematically derive a rate.

One commonly used technique for doing so is the band-of-investment method using the financial components of debt and equity. This takes a weighted average of what the investor wants as a return on equity (down payment) invested in the property and what the lender is looking for in a return on the loan it makes to the investor so that the investor can buy the property.

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The formula for calculating the capitalization rate with this band-of-investment technique is:

 $R(o) = [LTVR \times R(d)] + [ETVR \times R(e)]$

R(o) = overall capitalization rate that will be applied to the subject property's net operating income in order to value the subject

LTVR = the loan-to-value ratio, the percentage of the property value that the lender is willing to make as a loan

R(d) = the capitalization rate for the debt, which means it is the rate of return the lender wants on the money it is loaning

ETVR = the equity-to-value ratio, the remaining percentage of the purchase price not covered by the mortgage loan that the investor must put into the property as equity or down payment to complete the purchase.

R(e) = the capitalization rate for the equity, the rate of return the investor wants on the invested equity in money earned by the property.

Let's work an example. Say that current market financing for the type of property an investor is interested in purchasing is available at an interest rate of 8.75% over a loan term of 20 years fully amortized monthly at a loan-to-value ratio of 70%. The investor wants a 12% return on equity invested.

We are given most of the information we need for our band-of-investment formula. The loan-to-value ratio is 70%, which means the equity-to-value ratio will be the other 30% to complete the purchase. The equity capitalization rate or return on equity demanded by the investor is 12%. That leaves us having to calculate the debt capitalization rate.

Return "On" and Return "Of"

Let's look at the loan terms. The interest rate the bank wants is 8.75% and you might say that is all we need. But, the bank wants more than interest dollars paid back to it, doesn't it. It wants principal dollars too. It not only wants to make money "on" its loan investment - its return "on" - it also wants to get back its dollars loaned out - its return "of" the investment. Together these two returns will constitute the lender's "overall" return. This is the "debt capitalization rate" or "R(d):"

R(d) = R(on) + R(of) R(on) = return "on" R(of) = return "of"

We can use our calculator's TVM registers to calculate this debt capitalization rate. We know the return "on," the 8.75%. We need the return "of." Put \$1. in the FV register. That is what we want to recapture. We are expressing our rate as a return per dollar of investment. How long does the lender have to recapture that dollar? 20 years. The loan is being recaptured (amortized) on a monthly basis. So, we will calculate the rate monthly and then annualize it by multiplying by 12, since a capitalization rate is usually expressed as an annual rate.

We will put 8.75% into the interest rate register to show that as the money is recaptured it will earn interest at that rate in a recapture (sinking fund) account.

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Be sure your calculator is set to 12 payments per year. From the TVM menu press:

OTHER 12 P/YR EXIT

That puts you back in the TVM menu again. Now, here are the keystrokes to calculate the return "of" factor:

1	
FV	
20	
SK	
Ν	
8.75	
I%YR	
PMT	Answer: .0015

This is the rate per month at which the lender will recapture its loaned funds.

Annualize it with these keystrokes:

<u>Alg</u>	
x 12 =	Answer: .0185
<u>RPN</u>	
12 x	Answer: .0185

Hence, the lender's debt capitalization rate, its overall return, is the sum of these two returns:

$$R(d) = R(on) + R(of)$$
$$= .0875 + .0185$$
$$= .1060 = 10.60\%$$

Interestingly, this overall rate can be calculated directly by placing the "1" that we put into the FV register instead into the 'PV' register:

1 PV 20 SK N 8.75 I%YR PMT Answer: .0088

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This is the monthly debt capitalization rate. Annualize with these keystrokes:

<u>Alg</u>	
x 12 =	Answer: .1060
<u>RPN</u>	
12 x	Answer: .1060

Calculating the Overall Rate

Now, to get the overall capitalization rate for valuation of the property, plug the numbers into the band-of-investment formula:

$$R(o) = [LTVR \ x \ R(d)] + [ETVR \ x \ R(e)]$$

$$= (.70 \ x \ .1060) + (.30 \ x \ .12)$$

$$= .0742 + .0360$$

$$= .1102 = 11.02\%$$
Keystrokes:
Alg: .7, x, .1060, +, (, .3, x. .12,), =
RPN: .7, ENTER, .1060, x, .3, ENTER, .12, x, +

VALUING THE SUBJECT USING A CAP RATE DERIVED WITH BAND-OF-INVESTMENT:

We use the same valuation formula we had with a cap rate derived from comparable sales: V = I \div R

Earlier we calculated the property's net operating income to be \$77,760. If we decide to use the capitalization rate we derived by the band-of-investment technique, the valuation of our subject would be:

	$V = $77,760. \div .1102$
	= \$705,626.
Keystrokes:	Alg: 77760, ÷, .1102, = RPN: 77760, ENTER, .1102, ÷

RECONCILED VALUE:

The difference in value from the previous valuation is attributable, of course, to the variation in the capitalization rates used. The analyst should then reconcile the two values to a final opinion of value, determined by the analyst's judgment of the relative importance each of the two techniques for deriving a cap rate.