Derivation of interest yield (Property yield)

for the income approach

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Derivation of interest yield (Property yield) for the income approach

today	publicly certified and sworn in expert in real estate Valuation in Berlin
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and much and many more….

Derivation of interest yield (Property yield) for the income approach

Real Estate Valuation can be so simple:

The market value is the capitalisation of the property's rental and other income.

Derivation of interest yield (Property yield) for the income approach

EVS 2020 by TEGoVA describes the Income Approach method:

The income method used within the Income Approach can be divided into two types of a model:

- Traditional income growth-implicit models, known as capitalization methods, including direct capitalization, term and reversion, layer (hardcore and top slice) and growth-implicit discounted cash flow models;

and

- Income growth-explicit models usually known as Discounted Cash Flow (DCF). The main feature of the growth-explicit discounted cash flow method (explicit DCF) is that anticipated growth in income and costs is explicitly incorporated into the model by the valuer.

EVS 2020, II. Valuation Methology, 7.4. S. 157

Derivation of interest yield (Property yield) for the income approach

Very often and in many cases a simple formula is used:

$$MV = \frac{RE \times 100}{p}$$

with

MV: Market Value
RE: net profit in a year (income)
p: interest rate

Derivation of interest yield (Property yield) for the income approach

Certain problems are inherent to this kind of valuation:

$$MV = \frac{RE \times 100}{p}$$

"Net profit" (RE) needs to be defined.

It must be clear whether net profit is

- the actual income on the day of valuation,
- the typical market income based on actual rents or whether
- the net profit is based on other definitions.

Derivation of interest yield (Property yield) for the income approach

Certain problems are inherent to this kind of valuation:

$$MV = \frac{RE \times 100}{p}$$

The gross annual income is needed

so as to have the difference between gross and net income.

Derivation of interest yield (Property yield) for the income approach

Certain problems are inherent to this kind of valuation:

$$MV = \frac{RE \times 100}{p}$$

This simple formula is suitable for an unlimited capitalisation

but valuation of properties requires calculation of the period of income.

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In Germany a special kind of the Income Approach method is used:

The values for the building and of the land are considered separately, so in this model the income is earned from the building and **the land is lost money.** At the building's end of life, the land is ready for a new one and at this point in time the value of the land must be a part of the valuation.

This model is set down in law in the German valuation regulation.

Derivation of interest yield (Property yield) for the income approach

This presentation contains the German formulas but without the special German criterion the formulas and the result are the same (simply by doing without ‘BW’), so that the means to achieving a yield founded on property market results and based on real prices is the same.

Derivation of interest yield (Property yield) for the income approach

The formula for the German method is:

$$vEW = (RE - BW \times LZ) \times KF + BW$$

with

$$KF = \frac{q^n - 1}{q^n \times (q - 1)}$$

$$q = 1 + LZ$$

$$LZ = \frac{p}{100}$$

vEW	= Income Approach value = Market Value
RE	= net profit in a year (income)
BW	= Value of the ground
LZ	= Property Yield
KF	= present value factor
n	= remaining Life expectancy (useful remaining life)
p	= interest rate

Derivation of interest yield (Property yield) for the income approach

The formula without the value of the ground is:

$$vEW = (RE \times LZ) \times KF$$

with

$$KF = \frac{q^n - 1}{q^n \times (q - 1)}$$

$$q = 1 + LZ$$

$$LZ = \frac{p}{100}$$

vEW	= Income Approach value = Market Value
RE	= net profit in a year (income)
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Derivation of interest yield (Property yield) for the income approach

This formula is the basic to calculate the real yield for every transaction.

The final result of every transaction is a price,
enabling derivation of the yield describing this transaction.

The price a buyer payed is the market value.

If all elements of the formula are known, it is possible to calculate a capitalization approach for every transaction,
enabling description and proof of a yield formed in the market.

The capitalization approach in the market is the average of all single values.

The formula must convert to calculate the yield.

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Derivation of interest yield (Property yield) for the income approach

The formula to calculate the yield with the data of every transaction is:

$$p = \left(\frac{RE}{KP} - \frac{q-1}{q^n-1} \times \frac{KP-BW}{KP} \right) \times 100$$

with

p: interest rate in %
RE : net profit in a year (income)
KP: purchase price
BW: Land value without buildings
q: 1 + 0,01 x p
n: remaining life expectancy (remaining useful life)

Derivation of interest yield (Property yield) for the income approach

The formula contains a problem:

$$p = \left(\frac{RE}{KP} - \frac{q-1}{q^n-1} \times \frac{KP-BW}{KP}\right) \times 100$$

The interest rate is part of the formula on both sides of the equation, so it is not possible to calculate the yield directly.

p: interest rate in %
and
q: 1 + 0,01 x p

But there is a way because this equation is an iterative algorithm.

Derivation of interest yield (Property yield) for the income approach

The formula contains a problem:

$$p = \left(\frac{RE}{KP} - \frac{q-1}{q^n-1} \times \frac{KP-BW}{KP}\right) \times 100$$

p: interest rate in %
and
q: 1 + 0,01 x p

The solution is to calculate more than one step. For the first calculation the approximation is

$$p_0 = \frac{RE}{KP} \text{ x } 100$$

The calculation is complete if the result and the approximation used are identical. Normally the iteration ceases in these cases after three to five calculations.

Derivation of interest yield (Property yield) for the income approach

$$p = \left(\frac{RE}{KP} - \frac{q-1}{q^n-1} \times \frac{KP-BW}{KP} \right) \times 100$$

Proceeding this way with most or all transactions gives an overview of the real interest yield in the market and proof that the yield is based on transactions and not speculation. There are four steps to achieving this:

1. Establish the real process of purchase with all necessary data: prices, rents, costs, remaining life expectancy

2. Calculate the interest yield for every comparison price.

3. The result must be an overview of property market interest yields.

4. The average of all transactions and their yields must be an interest yield made using a comparative method describing what the buyers and sellers arrange in the contracts.

Derivation of interest yield (Property yield) for the income approach

$$p = \left(\frac{RE}{KP} - \frac{q-1}{q^n-1} \times \frac{KP-BW}{KP} \right) \times 100$$

It is possible to calculate the yield with other equations, for example without a special part for the land value or with another definition for income in the years of calculation. All that is needed is a formula.

For the calculation real data is to be used for every case but it is possible to develop a model for special interests or modifications.

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THANK YOU

Don‘t forget:

I can explain it to you,

but I can‘t understand it for you

Contact: info@sachverstaendiger-bischoff.de

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