

# Beginners' Guide to Real Estate Financial Terms



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## Time Value of Money

Basic premise - A dollar today is worth more than a dollar in the future.

Money has interest earning potential and “interest earned” over a period is referred to as the “time value” of money.

- A Dollar today is worth more than a Dollar tomorrow because it can be invested and earn a day’s worth of interest, making the value accumulate to a value more than a Dollar tomorrow.
- It follows that if one has to choose between receiving \$ 100 today and \$ 100 in one year and assuming savings account interest rate is 5%, the person has to be offered at least \$ 105 in one year so that two options are equivalent (either receiving \$ 100 today or \$ 105 in one year).

		Today	After 1 Year
Option 1	Amount	100	-
Option 2	Interest rate	-	5%
	Interest Amount		5
	Total amount		105

- Similarly, inflation has a time value impact, as it erodes value of money; a 5% inflation rate means that \$100 today will only purchase goods worth \$ 95 in a year’s time. Thus money loses its value over a period of time due to the effect of inflation.

Hence, \$ 100 in 2013 will only buy goods of \$ 95 (100/105) in 2014.

Inflation Rate	5%	
	Year 2012	Year 2013
Worth of \$ 100	100	95

## Discounting & Discount Rate

The operation of evaluating the present value (value as of today) of a future amount of money – is called discounting (i.e. how much will \$100 received in 5 years be worth today).

The rate at which the cash flow is discounted to the present value is referred to the discount rate.

The discount rate reflects two things:

- Time value of money (as discussed in the previous page)
- A risk premium – requirement for extra return to compensate for risk (as the amount to be received in the future is not certain).

**Example:** Suppose one is to receive \$ 100 each year for next 5 years, what will be the discounted value (present value) of this cash flow, if discounted at 10%

Discount Rate	10%					
	Year	Year	Year	Year	Year	Year
	2012	2013	2014	2015	2016	2017
Amount	100	100	100	100	100	100
Discounted Value	100	91	83	75	68	62

It can be seen that money if not invested to earn market returns, loses value.

## **Present Value (PV)**

Because money has time value, money which occurs at different points in time cannot be compared directly but must first be converted to a common point of time – the present.

The time value of money is taken into account through the discounting process. Therefore in evaluating projects, cash flows which occur at different points in time have to be converted to values at one point in time (present value) for comparative purpose.

## Net Present Value (NPV)

The net present value (NPV) of an income stream is the sum of the present values of the individual amounts in the income stream and cost (or investment).

The word 'net' in the 'net present value' indicates that the calculation includes the initial costs as well as the subsequent profits. All amounts in the income stream are profits, revenues minus cost. In other words, 'net' means the same as 'total'.

Interpretations:

- NPV is monetary value.
- Positive NPV indicates that shareholder or the investor's wealth is being increased by that amount in present value terms.
- Positive NPV indicates that the project is generating a return which is greater than the discount rate or the cost of capital.
- Negative NPV represents a loss in wealth of the investor.
- Another interpretation of NPV concept is that if X amount were borrowed say at 10% interest (also the discount rate), in order to undertake a project, then positive NPV indicates that the project would generate a sufficient cash flow to pay the interest (at 10%), repay the loan and leave a surplus (positive NPV) in present value terms.
- This interpretation is applied in evaluation profitability of projects i.e. to accept or reject projects. Therefore, projects with positive NPV should be accepted and those with negative NPV should be rejected.

As long as the project's discount (or cost of capital) is lower than the project IRR, the NPV will be positive.

## Internal Rate of Return (IRR)

The internal rate of return on a project is the rate of return that makes the net present value (NPV) of all cash flows from a particular investment equal to zero. In other words the internal rate of return (IRR) is the average annual return earned through the life of the project.

In more specific terms, the IRR of an investment is the discount rate at which the net present value of CAPEX of the project equals the net present value of the future cash flows of the project.

Let's take an example; we invest \$100 in a project which gives us \$10 each year for 3 years. By the end of 3<sup>rd</sup> year we sell the project for \$110.

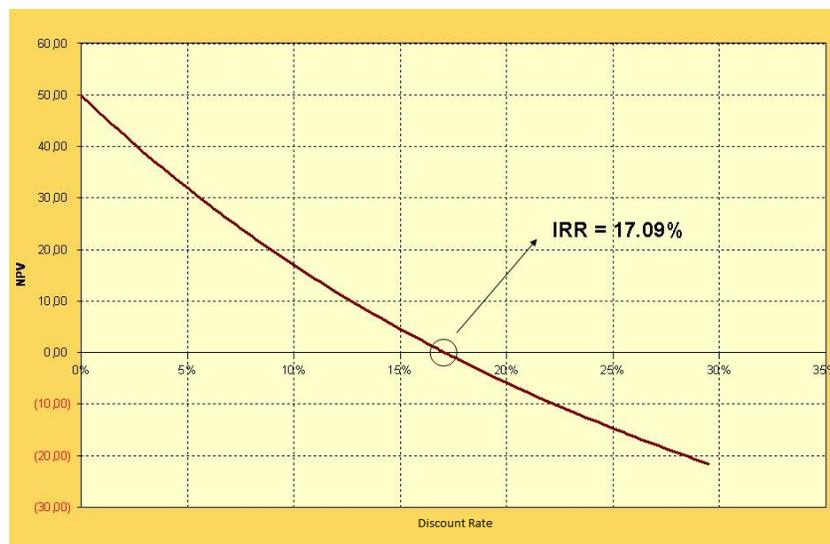
$$NPV = -100 + 10/(1+r)^1 + 10/(1+r)^2 + 10/(1+r)^3 + 110/(1+r)^3$$

$$0 = -100 + 10/(1+r)^1 + 10/(1+r)^2 + 10/(1+r)^3 + 110/(1+r)^3$$

By solving the above equation for unknown r we get **12.90%**, this is the IRR of project.

### Interpretation:

- If the IRR is higher than the desired rate of return or the cost of capital, then the project is a profitable one. A project whose IRR exceeds its cost of capital adds value to the company.
- A project whose IRR is less than the cost of capital, reduces the value of the company.



### **Limitation of IRR**

- As an investment decision tool, the calculated IRR should not be used to rate mutually exclusive projects but only to decide whether a single project is worth investing in.
- Since IRR does not consider cost of capital, it should not be used to compare projects of different duration.
- In case of positive cash flows followed by negative ones and then by positive ones (+ + - - +) or negative cash flows followed by positive ones and then by negative ones (- - + + -) the IRR may have multiple values.
- Of the two methods of investment evaluation – NPV / IRR, the net present value is the more correct method giving consistent investment decision making.

## Payback Period

Payback is the period of time required for the return on an investment to repay the original capital outlay.

**Example:** The payback period is 8 years for a project with capital layout of \$ 1,500,000 and which generates \$ 160,000 per annum.

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Project Cost	(1,000,000)	(500,000)	-	-	-	-	-	-	-	-
Rental Income	-	120,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000
Operating Expense	-	(18,000)	(36,000)	(36,000)	(36,000)	(36,000)	(36,000)	(36,000)	(36,000)	(36,000)
Net Cash Flow	(1,000,000)	(398,000)	204,000	204,000	204,000	204,000	204,000	204,000	204,000	204,000
Cum. Cash Flow	(1,000,000)	(1,398,000)	(1,194,000)	(990,000)	(786,000)	(582,000)	(378,000)	(174,000)	30,000	234,000

### Limitation of Payback Period

- Generally the time value of money is not taken into account.
- Payback period calculation ignores the cash flow beyond the payback period.
- Complexity arises when the cash flow changes sign several times during the project lifetime.

**Alternative Payback Period:** Payback period calculation based on the present value of cash flow stream.

### Rental Yield

Rental yield is the net amount of money a landlord receives in rent over one year (after deducting operating expenses), shown as a percentage of the amount of money invested in the property.

$$\text{Cash Yield} = (\text{Net Annual Rent} / \text{Cost or Current Market Value}) \times 100$$

Example:

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Cost of Property	1,000,000
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Operating Income	150,000
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Cash Yield	=	150,000 / 1,000,000 X 100
	=	15%

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Rental Yield is also called Cash Yield.

Cash Yield or Rental Yield is calculated on Net Operating Income without considering interest payment, tax and depreciation.

## Cost of Debt

**Cost of Debt ( $K_d$ ):** The effective rate that a company pays on its current debt.

- The cost of debt is computed by taking the rate on a risk free bond whose duration matches the term structure of the corporate debt, then adding a risk premium.
- A company will use various debt instruments like bonds, loans and other forms of debt; cost of debt reflects the overall rate paid by the company for debt financing.
- Since interest expense is tax deductible, the after-tax cost of debt is most often used. To get the after-tax cost of debt, the before-tax rate is multiplied by one minus the tax rate.

After Tax Cost of Debt = Before Tax Cost of Debt X (1 – Tax Rate)

## Cost of Equity

**Cost of Equity (K<sub>e</sub>):** Cost of equity is the return a firm theoretically pays to its equity investors.

- It is the compensation that the equity investor demands in exchange for owning the asset and bearing the risk of ownership.
- Alternatively cost of equity is the rate of return that should have been earned by putting the money in to a different investment with equal risk.
- Cost of equity is difficult to calculate as share capital charges no explicit cost.
- Debt is cheaper than equity because of followings:
  - Extra compensation to equity holder for risk
  - Tax advantage on debt
  - The cost of equity is calculated from the Capital Asset Pricing Model (CAPM) as follows:
    - $R_e = R_f + b (R_m - R_f)$ , where
      - $R_e$  = Cost of Equity
      - $R_f$  = Risk-free rate of return
      - $R_m$  = The historical return of the stock market / equity market
      - $b$  = is a number describing the correlated volatility of an asset in relation to the volatility of the benchmark that said asset is being compared to.

## Weighted Average Cost of Capital (WACC)

The cost of total invested capital is a blending of the costs of each component (debt and equity), called the weighted average cost of capital (WACC).

In other words, WACC is the average of costs of debt and equity capital, weighted according to the company's gearing ratio.

- Cost of equity is higher than the debt capital.
- Debt capital is cheaper due to the tax benefit accruing to the company, and because it is preferred / secured debt and interest pay outs are made ahead of any dividend distribution debt is less risky, therefore investors require lower return compared to returns on equity. As debt capital is cheaper, due to weighting effect WACC will be lower than the cost of equity.
- The appropriate rate for discounting the company's cash flow stream is the WACC, which is the discount rate that reflects:
  - The operating risks of the project,
  - The project's proportional debt and equity financing with attendant financial risks
  - The effect of interest deductibility for the debt-financed portion of the project

**Example:** A real estate company wants to fund a \$ 100M project with 30% equity and 60% debt, the cost of capital will be calculated as follows:

$$\text{WACC} = E/(E+D)*R_e + D/(E+D)*R_d*(1-t)$$

Where,

E = Amount of Equity, \$ 30M

D = Amount of Debt, \$ 70M

t = Tax rate, 5%

R<sub>f</sub> = risk free rate, 3%

R<sub>d</sub> = Cost of Debt, 6%

R<sub>m</sub> = Market return, 12%

b = of a similar listed company, 1.12

R<sub>e</sub> = Cost of equity,  $R_e = R_f + b (R_m - R_f)$

$$\text{Cost of Equity} = 4.5\% + 1.12 \times (12\% - 3\%) = 14.58\%$$

$$\begin{aligned}\text{WACC} &= (30/100) \times 14.58\% + (60/100) \times 6\% \times (1 - 5\%) \\ &= 7.8 \%\end{aligned}$$

## Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model (CAPM) is one method of determining the appropriate discount rate in business valuations.

The CAPM method derives the discount rate by adding a risk premium to the risk-free rate. In this instance, however, the risk premium is derived by multiplying the equity risk premium times “beta,” which is a measure of stock price volatility. Beta is associated with the systematic risks of an investment.

Beta is derived from the volatility of prices of publicly-traded companies, which are likely to differ from private.

$$\text{Discount Rate} = \text{Risk free Rate } (R_f) + \text{Risk Premium } (R_m - R_f) \times \text{Beta } (b)$$

The weighted average cost of capital is an approach to determining a discount rate. The WACC method determines the company’s actual cost of capital by calculating the weighted average of the company’s cost of debt and cost of equity.

$$\text{Discount Rate} = \text{Weighted average cost of capital (WACC)}$$

$$\text{WACC} = E/(E+D) \times R_e + D/(E+D) \times R_d \times (1-t)$$

$$R_e = R_f + b (R_m - R_f)$$

$$\text{Cost of Equity} = R_f + b (R_m - R_f)$$

$$\text{WACC} = E/(E+D) \times R_e + D/(E+D) \times R_d \times (1-t)$$

## Risk Adjusted Discount Rate

Risk adjusted discount rate is calculated by adding a risk premium to the risk-free rate of return.

There are several types of risk such as:

- Inflation
- Liquidity
- Political & Economical
- Company risk
- Project risk

Investors want additional return on their investment to compensate them for the risk.

**Risk-adjusted discount rate** = Risk free rate + Risk premium

## Capitalization Rate

Capitalization rate (or "cap rate") is the ratio between the net operating income produced by an real estate asset and its cost (or current market value).

In capitalization, instead of projecting all future returns on the investment, only the return of one single period is taken into consideration, which is divided by the divisor called capitalization rate.

$$\text{Cap Rate} = \text{Net Operating Income} / \text{Value (or cost)}$$

Where as the earnings before interest and taxes (EBIT), is called the net operating income. Or  
Net Operating Income (NOI) = Net income + depreciation + interest expenses.

### Example:

If a building is purchased for \$ 1,000,000 and generates \$ 100,000 in net operating income in a year, then:

$$\text{Cap Rate} = 100,000 / 1,000,000 = 0.10 = 10\%$$

### Use in Real Estate Valuation:

In real estate investment, property is often valued according to projected capitalization rates used as investment criteria. This is done by algebraic manipulation of the formula below:

$$\text{Capital Cost (asset price)} = \text{Net Operating Income} / \text{Capitalization Rate}$$

**Example:** Consider a property

$$\text{Net Operating Income (NOI)} = \$ 200,000$$

$$\text{Cap Rate} = 7\%$$

$$\text{Capital Cost} = \text{NOI} / \text{Cap Rate} = 200,000 / 0.07 = \$ 2,857,143$$

### Interpretation

- Lower cap rates means higher property value. It may be because of unanticipated increases in demand relative to supply
- Higher cap rates means lower property value. This may happen due to unanticipated increases in supply relative to demand.

## Return on Investment (ROI)

A performance measure used to evaluate the efficiency of an investment . It is calculated by dividing the net profit of an investment by the cost of the investment.

$$\text{ROI} = (\text{gain from investment} - \text{cost of investment}) / \text{cost of investment}$$

OR

$$\text{ROI} = \text{Net Profit} / \text{Investment} \times 100$$

For example, if a building is purchased for \$ 1,000,000 and it produces \$ 100,000 in positive net operating income during one year. And next year the building is sold for \$ 1,200,000.

$$\text{Income} = 100,000$$

$$\text{Gain from Sale} = 1,200,000 - 1,000,000 = 200,000$$

$$\text{Total Net Income} = 100,000 + 200,000 = 300,000$$

$$\text{ROI} = 300,000 / 1,000,000 = 0.3 = 30\%$$

### Limitation:

- ROI calculation does not take time value of money or risk into consideration.
- ROI focuses on maximizing the return-investment ratio. ROI fails to guide towards the profit maximization.

## Working Capital

It represents the operating liquidity available to a business.

**Working capital** = current assets – current liability

Current asset = accounts receivable + cash + inventory + short-term investment + pre-payments

Current liability = accounts payable + short-term debt + accruals

### Interpretation:

- If current assets are less than current liabilities, an entity has a working capital deficiency.
- If a company's current assets do not exceed its current liabilities, then it may run into trouble paying back creditors in the short term.
- An increase in working capital indicates that the business has either increased current assets (that it has increased its receivables, or other current assets) or has decreased current liabilities—for example has paid off some short-term creditors.