



**Circle Visual Investor**  
**CALCULATIONS MANUAL**  
**Version 2.04**

**Global Real Estate Solutions**  
**for**  
**Investment, Development and Budgeting**

OFFICES IN: UK USA CANADA SOUTH AFRICA EAST ASIA ASIA PACIFIC

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# CHAPTER 1

## Traditional Valuation

### Valuation Methodology

Traditional valuation in Visual Investor follows four standard methods of valuation computation, namely:

- Term and reversion;
- Hardcore;
- Initial Yield;
- Shortcut DCF.

Basic formulae for these valuation methods are set out below, assuming a simple freehold property, let and income-producing with a single reversion to market rental value at a future date.

Years Purchase and Present Value multipliers may be sourced from valuation tables. For leasehold properties Years Purchase dual rate may be used to provide for leasehold sinking fund and tax.

### Term and Reversion

The term and reversion valuation method applies different capitalisation rates to current ('term') and future ('reversion') income flows to reflect the relative security of these income flows. Rental income is valued in period steps, applying the term rate to the current income, which is deemed to be lower risk income, over the period of its duration. A reversion rate is then applied to more uncertain future income likely to be received on rent review or reversion, discounted to a present value.

The basic formula for valuation by the term and reversion method is as follows:

$$GV = [NI \times \text{Years Purchase for term period}] + [NR \times \text{Years Purchase into perpetuity} \times \text{Present Value}]$$

$$GV = \left[ NI \times \left( \frac{1 - (1 + i_t)^{-n}}{i_t} \right) \right] + \left[ NR \times \frac{1}{i_r} \times (1 + i_r)^{-n} \right]$$

where:

GV = gross unrounded capital value

NI = net current rent per annum (net of non-recoverable running costs and ground rent)

NR = net open market rental value (ERV) per annum (net of non-recoverable running costs and ground rent)

$i_t$  = term rate (yield)

$i_r$  = reversion rate (yield)

n = number of years from the valuation date to the reversion to market rent

Example

For example, a property let at £100,000 per annum, with a rent review in four years' time to market rent. Current market rent is £150,000 per annum. Applying a term rate of 8.00% and a reversion rate of 9.00%, the valuation is calculated as follows:

$$GV = \left[ 100,000 \times \left( \frac{1 - (1 + 0.08)^{-4}}{0.08} \right) \right] + \left[ 150,000 \times \frac{1}{0.09} \times (1 + 0.09)^{-4} \right]$$

$$GV = 331,213 + 1,180,708 = 1,511,921$$

**Hardcore**

The Hardcore method values rental income in layers. The lowest risk 'core' income is valued into perpetuity at the hardcore rate and any anticipated future uplifts in income are valued at the same rate (or, if selected in the Assumptions menu in Visual Investor, a layer rate) and discounted to a present value.

The basic formula for valuation by the hardcore method is as follows:

$$GV = [NI \times \text{Years Purchase into perpetuity}] + [(NR - NI) \times \text{Years Purchase into perp.} \times \text{Present Value}]$$

$$GV = \left[ NI \times \frac{1}{i} \right] + \left[ (NR - NI) \times \frac{1}{i} \times (1 + i)^{-n} \right]$$

where:

GV = gross unrounded capital value

NI = net current rent per annum (net of non-recoverable running costs and ground rent)

NR = net open market rental value (ERV) per annum (net of non-recoverable running costs and ground rent)

i = hardcore rate (yield)

n = number of years from the valuation date to the reversion to market rent

Example

As an example, using our sample property set out above with a current rent of £100,000 per annum, a current market rent of £150,000 per annum anticipated at review in four years' time, and adopting a hardcore rate of 8.00%, the valuation is calculated as follows:

$$GV = \left[ 100,000 \times \frac{1}{0.08} \right] + \left[ 50,000 \times \frac{1}{0.08} \times (1 + 0.08)^{-4} \right]$$

$$GV = 1,250,000 + 459,394 = 1,709,394$$

**Initial Yield**

The Initial Yield method applies a capitalisation rate to the current net rental income at the valuation date and values this income into perpetuity. This method effectively ignores future changes in income.

An Initial Yield valuation is therefore calculated as follows:

$$GV = NI \times \text{Years Purchase into perpetuity}$$

$$GV = NI \times \frac{1}{i}$$

where:

GV = gross unrounded capital value

NI = net current rent per annum (net of non-recoverable running costs and ground rent)

i = initial yield

#### Example

For the sample property set out above, the calculation is as follows:

$$GV = 100,000 \times \frac{1}{0.08} = 1,250,000$$

## Shortcut DCF

This is a special method that is used primarily to value over-rented property more accurately than conventional valuation methods and applies All Risks and Target yields.

The Shortcut DCF method considers the actual situation - that income will remain at the level of the current rent passing (assuming upward only rent reviews) until the rental value exceeds the passing rent.

All risks yields often imply rental growth. Visual Investor uses implied rental growth analysis to establish the implied growth rate from comparable yield evidence (assuming a five yearly upwards only rent review pattern).

An all risks yield and a target rate of return must be defined, and from these the implied growth rate for the core rental income (or ERV) can be calculated.

The implied growth rate is calculated as follows:

$$(1 + g)^r = \frac{(\text{YP into perp @ all risks yield}) - (\text{YP for } r \text{ years @ target yield})}{(\text{YP into perp @ all risks yield}) \times (\text{Present Value for } r \text{ years @ target yield})}$$

$$(1 + g)^r = \frac{\frac{1}{i_a} - \left( \frac{1 - (1 + i_t)^{-r}}{i_t} \right)}{\frac{1}{i_a} \times (1 + i_t)^{-r}} = X$$

So the implied growth rate per annum is:

$$g = X^{\left[\frac{1}{r}\right]} - 1$$

where:

r = rent review cycle (in years) of comparable (i.e. 5 years)

g = implied rental growth rate (pa)

i<sub>a</sub> = all risks yield of comparable

i<sub>t</sub> = target rate of return

The ERV is inflated at the implied growth rate on a compound basis to calculate its growth at rent review dates during the lease term, to determine at which rent review date the inflated ERV will exceed the rent passing. This is known as the breakthrough rent review date.

This is determined by inflating the ERV at the implied growth rate for the period of years to the next review date, to establish whether the inflated ERV will exceed the rent passing at each future rent review until this event occurs. The ERV (pa) is inflated by the implied growth rate as follows:

$$\text{ERV at review} = \text{ERV} \times (1 + g)^n$$

where:

$n$  = years to next rent review from the valuation date

$g$  = implied rental growth rate (pa)

The passing rent is then capitalised until the breakthrough rent review at the target yield. The reversion is capitalised at an all risks yield and deferred at the target rate. The basic formula for this calculation is as follows:

$GV = (NI \times \text{Years Purchase single rate}) + (\text{Inflated NR} \times \text{Years purchase into perpetuity} \times \text{Present Value})$

$$GV = \left[ NI \times \left( \frac{1 - (1 + i_t)^{-n}}{i_t} \right) \right] + \left[ NR \times (1 + g)^n \times \frac{1}{i_a} \times (1 + i_t)^{-n} \right]$$

where:

$GV$  = gross unrounded capital value

$NI$  = net current rent per annum (net of non-recoverable running costs and ground rent)

$NR$  = net open market rental value (ERV) per annum (net of non-recoverable running costs and ground rent)

$n$  = number of years to the breakthrough rent review from the valuation date

$g$  = implied rental growth rate (pa)

$i_a$  = all risks yield

$i_t$  = target yield

#### Example

Assuming a single let freehold property, let for 25 years from 1 January 2000 with five yearly upward only rent reviews at a passing rent of £200,000 per annum. The current ERV is £100,000 per annum.

The valuation date is 1 January 2002. The next review is in three years' time. An all risks yield of 6% and a target rate of 11% are defined.

From the above rates, Visual Investor calculates the implied growth rate as follows:

$$(1 + g)^5 = \frac{\frac{1}{0.06} - \left( \frac{1 - (1 + 0.11)^{-5}}{0.11} \right)}{\frac{1}{0.11} \times (1 + 0.11)^{-5}} = 1.3114$$

So the implied growth rate per annum is:

$$g = (1.3114)^{\frac{1}{5}} - 1 = 0.05571$$

The implied growth rate is therefore 5.571%.

Using this implied growth rate Visual Investor calculates the breakthrough rent review date - the first review at which the rental value, inflated by the implied growth rate, will exceed the passing rent. This is done by testing whether the ERV, inflated at the implied growth rate, will exceed the rent passing of £200,000 per annum at each future rent review until this event occurs.

in 2005       $ERV * (1 + 0.05571)^3 = 117,663$

in 2010       $ERV * (1 + 0.05571)^8 = 154,302$

in 2015       $ERV * (1 + 0.05571)^{13} = 202,350$

in 2020  $ERV * (1+0.05571)^{18} = 265,360$

In this case, therefore, the ERV will exceed the current rent at review in 2015, i.e. 13 years from the valuation date.

The valuation can now be calculated as follows:

$$GV = \left[ 200000 \times \left( \frac{1 - (1 + 0.11)^{-13}}{0.11} \right) \right] + \left[ 202350 \times \frac{1}{0.06} \times (1 + 0.11)^{-13} \right]$$

$$GV = 1349974 + 868466 = 2218440$$

## Gross Value

This is the capitalisation of net income before deduction of acquisition fees and any capital expenditure, and excluding any capital receipts.

Traditional Valuation screen in Visual Investor

## Net Value

The gross value less capital expenditure, plus capital receipts, and net of purchaser's costs.

$$V = GV - (a + c) + d$$

where:

$V$  = net unrounded capital value

$GV$  = gross unrounded capital value

$a$  = acquisition costs (also referred to as purchaser's costs)

$c$  = capital expenditure

$d$  = capital receipts

## Purchaser's Costs

Purchaser's costs, or acquisition costs, are calculated on the price paid for an investment, i.e. on the net value.

Purchaser's costs comprise stamp duty, sale agents fees and sale legal fees, totalled to give a single percentage figure.

Costs are residualised on the net unrounded value (or locked 'Say Value' if selected in Assumptions), which may be calculated by the following formula:

$$V = \left( \frac{(GV - c + d)}{(1 + a)} \right)$$

Once the net capital value is known, then acquisition costs can be calculated as follows:

$$A = V \times a$$

where

- $GV$  = gross unrounded capital value
- $V$  = net unrounded capital value
- $a$  = purchaser's costs, expressed as a percentage
- $c$  = capital expenditure
- $d$  = capital receipts
- $A$  = purchaser's costs, expressed as an amount

## Net Initial Yield (NIY)

The initial net income expressed as a percentage of the gross capital value.

$$NIY = \left( \frac{NI}{GV} \right) \times 100$$

where:

- $NI$  = net current rent per annum (net of non-recoverable running costs and ground rent)
- $GV$  = gross unrounded capital value<sup>1</sup>

## Reversionary Yield (RY)

The net rental income on final reversion expressed as a percentage of the gross capital value.

$$RY = \left( \frac{NR}{GV} \right) \times 100$$

where:

- $NR$  = net market rental value (ERV) per annum (net of non-recoverable running costs and ground rent)  
payable on final reversion date
- $GV$  = gross unrounded capital value<sup>1</sup>

## Equivalent Yield (EY)

The equivalent yield is the discount rate applied to the income flow from a property or portfolio, expected during the life of the investment, so that the total income discounted at this rate equals the initial capital outlay, or gross value<sup>1</sup>. The equivalent yield is growth implicit.

The equivalent yield is calculated by solving the following expression iteratively for the term 'r':

$$GV_t = \left( \frac{NI_{(t+1)}}{(1+r)^1} \right) + \left( \frac{NI_{(t+2)}}{(1+r)^2} \right) + \dots + \left( \frac{NI_{(t+(n-1))}}{(1+r)^{(n-1)}} \right) + \left( \frac{NR}{r(1+r)^n} \right)$$

where:

$r$  = equivalent yield

$GV$  = gross unrounded capital value<sup>1</sup>

$NI_t$  = net annual rental income (net of non-recoverable running costs and ground rent) at a given date 't'

$NR$  = net market rental value (ERV) per annum (net of non-recoverable running costs and ground rent)

$n$  = the number of years that must elapse from year  $t$  before all tenancies have been reviewed to full market rent

Note that in Visual Investor future capital expenditure may be discounted at a rate specified in the discount rates section of the Cost Schedule. In the Assumptions form there is an option to allow the equivalent yield to iterate either using this specified discount rate for capital expenditure or by using trial equivalent yield rates until the desired target capital value has been found (EY - Cap. Costs Option).

The display of the equivalent yield in Visual Investor varies depending on the Valuation Tables selected in Assumptions. If Annually in Arrears tables are selected, then the Nominal Equivalent Yield is shown, with the True Equivalent Yield displayed below. If Quarterly in Advance tables are selected, then only the True Equivalent Yield is displayed.

## Running Yield

The present net rental income from a property or portfolio expressed as a percentage of the gross value.

$$\text{Running Yield} = \left( \frac{NI_t}{GV} \right) \times 100$$

where:

$NI_t$  = net annual rent passing (net of running costs, ground rent and non-recoverable expenditure) at a given date 't'

$GV$  = gross unrounded capital value<sup>1</sup>

In Visual Investor running yields can be selected to display Annual in Arrears return yields or Quarterly in Advance.

<sup>1</sup> In Circle Visual Investor, the default target basis for running yields is gross unrounded value.

This may be changed in the Assumptions form to net unrounded value, rounded value, or Say Value, including or excluding acquisition costs and capital expenditure.



# CHAPTER 2

## Discounted Cash Flow

### Internal Rate of Return and Net Present Value

Discounted Cash Flows in Circle Visual Investor and Circle Visual Developer follow the standard formulae for computation of the Internal Rate of Return and Net Present Value.

Basically, this is the sum of discounted successive positive and negative amounts.

The primary difference for Circle is that the discount periods can be based on the actual dates for future events as well as the monthly assumption.

The standard formula applied in the mathematics is:

$$V_0 = \left( \frac{R_{x1}}{1+a} \right) + \left( \frac{R_{x2}}{(1+a)^{x2}} \right) + \dots + \left( \frac{R_{x(n-1)}}{(1+a)^{x(n-1)}} \right) + \left( \frac{R_{xn} + V_{xn}}{(1+a)^{xn}} \right)$$

where:

$V_0$  = Initial value as a manual figure, or residual through iteration mathematics.

$a$  = the discount rate

$n$  = number of periods

$x$  = measure standard for the period (monthly or daily)

$R$  = Net Operating Income after operating costs

$V_{xn}$  = Valuation net of associated costs

The Cash Flow works through for each period resulting in the accumulation by:

$$V_0 = \sum_{i=1}^{xn} \frac{R_i}{(1+a)^i} + \frac{V_{xn}}{(1+a)^{xn}}$$

where:

$R_i$  = Recurring periodic net revenue

Any capital sums (costs or revenues) after the discount period can be included or ignored. If included, then the user has the choice of discounting at any required rate.

The practical effects of  $x$  and  $n$  are illustrated below.

Visual Investor Discounted Cash Flow offers several options for calculating results.

There are two primary modes:

- Calculation of the Internal Rate of Return (IRR)
- Calculation of the Present Value (PV)

The standard principles for discounting are applied so that the NET PRESENT VALUE is zero.

For mode 1, calculation of the internal rate of return, the program finds the IRR by iterating (*produces multiple calculated guess rates*) over the time based series of costs and revenues in the

cash flow spreadsheet until the difference between the sum of the discounted receipts and the sum of the discounted costs is zero.

For mode 2, calculation of the present value, a single pass is made through the cash flow on all future items discounting at the selected IRR to find the resulting difference between the sum of discounted receipts and the sum of the discounted costs. This result is the Present Value.

The accuracy of the result depends on the timing basis chosen for the calculation.

## Monthly Discounting

Visual Investor offers monthly discounting where all future figures are assumed to be timed at the start of each month. The aggregate figure for each month is discounted from the first of the month. Therefore total expenditure in month 4 of the cash flow is discounted from the 1st of the 4th month back to the valuation date in the spreadsheet.

E.g. \$100,000 in month 4 @ 12% = PV of \$1 for 4 months.

To be precise, it is discounted by the number of days from the first of the month back to the valuation date.

$$(1+i)^{0.3342} \text{ [where } i = \text{IRR and } 0.3342 \text{ is the fractional number of days (122 / 365)]} = 1.03860$$

\$100,000 divided by 1.03860

= **\$96,283**

## Daily Discounting

In this case all costs and revenues are handled on an accurate daily basis. This means each item in the cash flow is discounted to that anticipated date of payment or receipt.

Visual Investor stores all DCF items with dates, and each monthly cell of the cash flow can contain unlimited dated items, several even being on the same date. This, where a cost of \$50,000 is to be paid on the 7th of June 2010 and \$25,000 is to be paid on 11th June 2010, the program will handle this by discounting over the number of days between the valuation date and the payment dates.

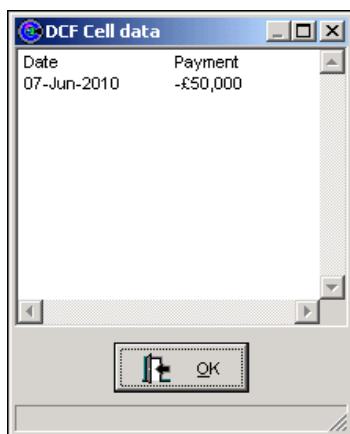
Example: Assuming a valuation date of 1st January 2000 for the above figures @ 12% IRR:

PV of \$50,000 @ 12% over 3,810 days

$$(1+i)^{10.4383} \text{ [where } i = \text{IRR and } 10.4383 \text{ is the fractional number of days (3810 / 365)]} = 3.2640$$

\$50,000 divided by 3.2640

= **\$15,318**



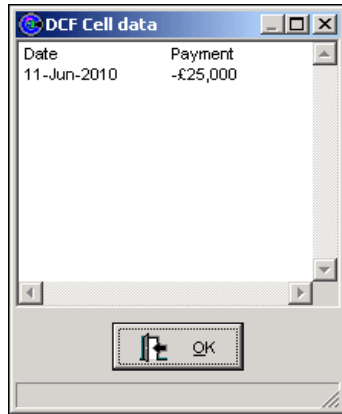
Cell content

PV of \$25,000 @ 12% over 3,814 days

$$(1+i)^{10.4493} \text{ [where } i = \text{IRR and } 10.4493 \text{ is the fractional number of days (3814 / 365)]} = 3.2680$$

$$\text{\$25,000 divided by } 3.2680$$

$$= \text{\$7,650}$$



Cell content

The total of these discounted figures is:

$$\text{\$15,318} + \text{\$7,650} = \text{\$22,968}$$

	Start date 01/01/2000	Months 1 - 60 Jan '00-Dec '04	Months 61 - 120 Jan '05-Dec '09	Months 121 - 180 Jan '10-Dec '14	Month 181 Jan '15
<b>Example Property</b>					
ABC plc	0	604,630	731,463	847,985	-41,742
ABC plc Exit Value	0	0	0	0	1,919,649
Works - external	0	0	0	-25,000	0
Works - common parts	0	0	0	-50,000	0
<b>Overall data</b>					
Exit Sale fees	0	0	0	0	0
Exit Purchasers fees	0	0	0	0	-95,971
<b>ACQUISITION</b>	<b>-1,199,014</b>	0	0	0	0
Price / Value	-1,199,014	0	0	0	0
Acquisition fee @ 5.7625%	-69,093	0	0	0	0
Total Rental income	0	604,630	731,463	847,985	-41,742
Total LH Ground Rent payments	0	0	0	0	0
Repairs/works	0	0	0	-75,000	0
Total Operating revenues	0	0	0	0	0
Total Capital receipts	0	0	0	0	1,919,649
Total Operating costs	0	0	0	0	0
Total Capital expenditure	-1,268,107	0	0	-75,000	-95,971
<b>SUMMARY</b>					
Interest/service	0	0	0	0	0
Total Debt/Equity	0	0	0	0	0
Net Cash Flow	-1,268,107	604,630	731,463	772,985	1,781,936
Net Cash Balance	-1,268,107	-663,477	68,005	840,990	2,622,926

DCF showing future costs and discounted result.



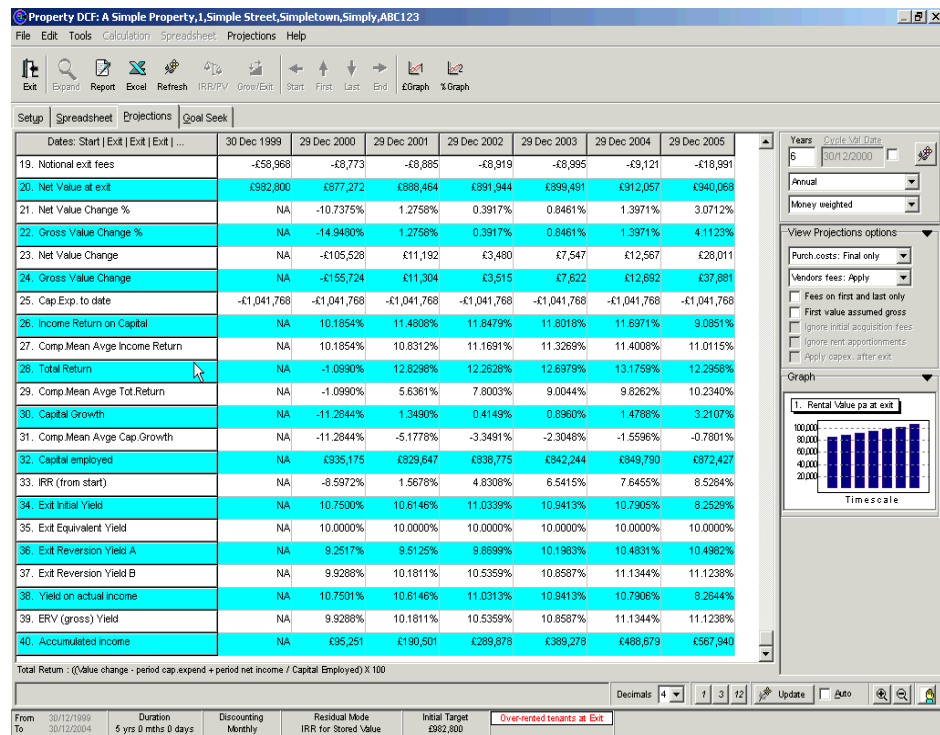
# CHAPTER 3

## Performance Measures

Performance measures are used to calculate both property, portfolio and market returns.

When portfolio returns are calculated these typically include all investment properties within the portfolio, including those bought and sold part way through the period. In comparison, market returns are based on screened standing investments only to reflect underlying market movements. Performance measures therefore allow comparison of property/portfolio investment returns relative to the performance of the market.

Performance measures are generated in the DCF Projections Analysis screen in Visual Investor.



Projections screen

## Rental Value Growth in period

The increase in the market rental value of the property or portfolio during the period measured, expressed as a percentage of the rental value at the beginning of the period.

$$RVG = \left[ \left( \frac{NR_t}{NR_{(t-1)}} \right)^n - 1 \right] \times 100$$

where:

$RVG$  = rental value growth, expressed as a percentage

$NR_t$  = net market rental value in period  $t$

$n$  = number of periods per year (so, for example, for monthly results,  $n$  would be 12)

## Total Return

An annual return measurement which applies changes in value and income over the period, less capital expenditure during the period, divided by capital employed.

In Visual Investor both money weighted and time weighted returns are calculated. With effect from December 2004 IPD introduced a standardised method of calculating annual investment returns, with a new annual time-weighted return calculation. This has been incorporated into Visual Investor, and the formulae for the calculations are set out below.

### Money weighted Total Return

$$TR = \frac{(V_t - V_{(t-1)} - C_t + NI_t)}{\left( V_{(t-1)} + \frac{1}{2}C_t - \frac{1}{2}NI_t \right)}$$

where:

$TR$  = Total Return

$V$  = net unrounded capital value

$NI_t$  = net annual rental income (net of non-recoverable running costs and ground rent) in period  $t$

$C_t$  = total capital expenditure less capital receipts in period  $t$

### Time weighted Total Return

$$TR = \frac{(V_t - V_{(t-1)} - C_t + NI_t)}{(V_{(t-1)} + C_t)}$$

where:

$TR$  = Total Return

$V$  = net unrounded capital value

$NI_t$  = net annual rental income (net of non-recoverable running costs and ground rent) in period  $t$

$C_t$  = total capital expenditure less capital receipts in period  $t$

Returns are calculated for each individual month and then chain-linked over twelve months to calculate the annual return. Equal weight is given to each month's return, whatever the period over which returns are calculated.

### Time weighted Total Return (old)

Prior to December 2004 annual time weighted returns were calculated by compounding monthly money weighted returns. This assumed that capital expenditure and income were weighted to the mid point of the month.

## Capital Employed

The initial value of the property or portfolio plus any ongoing net investment (weighted to reflect an even distribution throughout the period) less half the net rental income over the period.

$$CE = \sum \left( V_{(t-1)} + \frac{1}{2}C_t - \frac{1}{2}NI_t \right)$$

where:

$CE$  = Capital Employed

$V$  = net unrounded capital value

$NI_t$  = net annual rental income (net of non-recoverable running costs and ground rent) in period  $t$

$C_t$  = total capital expenditure less capital receipts in period  $t$

## Capital Growth

The increase in value of the property or portfolio throughout the period, net of any capital expenditure, expressed as a percentage of capital employed over the period.

### Money weighted Capital Growth

$$CG = \frac{(V_t - V_{(t-1)} - C_t)}{\left(V_{(t-1)} + \frac{1}{2}C_t - \frac{1}{2}NI_t\right)}$$

where:

$CG$  = Capital Growth

$V$  = net unrounded capital value

$NI_t$  = net annual rental income (net of non-recoverable running costs and ground rent) in period  $t$

$C_t$  = total capital expenditure less capital receipts in period  $t$

### Time weighted Capital Growth

$$CG = \frac{(V_t - V_{(t-1)} - C_t)}{(V_{(t-1)} + C_t)}$$

where:

$CG$  = Capital Growth

$V$  = net unrounded capital value

$C_t$  = total capital expenditure less capital receipts in period  $t$

Returns are calculated for each individual month and then chain-linked over twelve months to calculate the annual return. Equal weight is given to each month's return. Calculated in this way, the Capital Growth and Income Return for a period longer than one month may not sum exactly to the Total Return.

## Income Return

The net rental income from the property or portfolio for the year, expressed as a percentage of the capital employed over the period.

### Money weighted Income Return

$$IR = \frac{NI_t}{\left(V_{(t-1)} + \frac{1}{2}C_t - \frac{1}{2}NI_t\right)}$$

where:

$IR$  = Income Return

$V$  = net unrounded capital value

$NI_t$  = net annual rental income (net of non-recoverable running costs and ground rent) in period  $t$

$C_t$  = total capital expenditure less capital receipts in period  $t$

### **Time weighted Income Return**

$$IR = \frac{NI_t}{(V_{(t-1)} + C_t)}$$

where:

$IR$  = Income Return

$V$  = net unrounded capital value

$NI_t$  = net annual rental income (net of non-recoverable running costs and ground rent) in period  $t$

$C_t$  = total capital expenditure less capital receipts in period  $t$

Returns are calculated for each individual month and then compounded over twelve months to calculate the annual return. Calculated in this way, the Capital Growth and Income Return for a period longer than one month may not sum exactly to the Total Return.

# CHAPTER 4

## Finance

### Loans, Mortgages and Equity

Debt can be included in cash flows in Visual Investor using the Finance module. This module allows users to input an unlimited number of debt arrangements at property and portfolio levels, choosing from Loans, Mortgages and Equity deals. Loans can be set up to finance the purchase of a property or portfolio or non-purchase items of capital expenditure, such as refurbishment costs.

#### Interest Rate Type

An **Effective** rate, or APR, is the final rate achieved at the end of the year including compounding.

This is calculated as follows:

$$\left(1 + \frac{i}{p}\right)^p - 1$$

where:

$i$  = nominal annual rate of interest

$p$  = number of compounding periods per year

For example, an interest rate of 10% per annum compounded quarterly would produce:

$$\left[\left(1 + \frac{0.1}{4}\right)^4 - 1\right] \times 100 = 10.38\% \text{ Effective rate}$$

A **Nominal** rate is the 10% which produces the 10.38% effective rate above.

The **debit** rate is the rate of interest charged by the lender on the loan amount and represents an outflow from the cash flow. The **credit** rate is the rate at which interest is earned when the finance arrangement is in credit. It represents an inflow of money to the cash flow.

#### Finance Type

In Visual Investor, four types of finance are available:

- Interest only loan (or simple loan)
- Mortgage (interest & capital)
- Equity investor
- Auto-regulating loan.

### Simple/Interest Only Loan

A standard loan based on straight sums with interest and future repayment of the loan at the end of the loan term.

For example, assuming a loan of £500,000 at an effective rate of 10.38% with monthly payments, the formula to calculate a monthly interest payment is as follows:

$$\frac{L \times (1 + i)^p - 1}{p}$$

where:

- $i$  = effective rate of interest
- $p$  = number of payment periods per year
- $L$  = loan amount

Therefore, using the example outlined above:

$$\frac{500,000 \times ((1 + 0.1038)^1 - 1)}{12} = 4,325$$

	Start date	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9
	09/09/2002	Sep '02	Oct '02	Nov '02	Dec '02	Jan '03	Feb '03	Mar '03	Apr '03	May '03
IRR: 7.2788 % PV: £1,000,000										
finance, 1, A, 1, 1, 1, 1										
Standard UK Tenant	0	30,479	0	0	25,000	0	0	25,000	0	0
Standard UK Tenant Exit Value	0	0	0	0	0	0	0	0	0	0
<b>Overall data</b>										
Exit Sale fees	0	0	0	0	0	0	0	0	0	0
Exit Purchasers fees	0	0	0	0	0	0	0	0	0	0
<b>ACQUISITION</b>										
Finance: interest only simple	-500,000	0	0	0	0	0	0	0	0	0
Residual Value	-500,000	0	0	0	0	0	0	0	0	0
Acquisition fee @ 5.7625%	-57,625	0	0	0	0	0	0	0	0	0
Total Rental income	0	30,479	0	0	25,000	0	0	25,000	0	0
Total LH Ground Rent payments	0	0	0	0	0	0	0	0	0	0
Total Operating revenues	0	0	0	0	0	0	0	0	0	0
Total Capital receipts	0	0	0	0	0	0	0	0	0	0
Total Operating costs	0	0	0	0	0	0	0	0	0	0
Total Capital expenditure	-1,057,625	0	0	0	0	0	0	0	0	0
<b>Finance: interest only simple IRR: 11.0099%</b>										
Capital Borrowed	500,000	0	0	0	0	0	0	0	0	0
Debt Rates %	0.00 %	10.00 %	10.00 %	10.00 %	10.00 %	10.00 %	10.00 %	10.00 %	10.00 %	10.00 %
Credit Rates %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %
Net Interest	0	-4,326	-4,326	-4,326	-4,326	-4,326	-4,326	-4,326	-4,326	-4,326
B/Y Debt balance	-500,000	-500,000	-500,000	-500,000	-500,000	-500,000	-500,000	-500,000	-500,000	-500,000
Cap Repayments	0	0	0	0	0	0	0	0	0	0
<b>SUMMARY</b>										
Interest/Service	0	-4,326	-4,326	-4,326	-4,326	-4,326	-4,326	-4,326	-4,326	-4,326
Total Debt/Equity	500,000	0	0	0	0	0	0	0	0	0
Net Cash Flow	-557,625	26,154	-4,326	-4,326	20,674	-4,326	-4,326	20,674	-4,326	-4,326
Net Cash Balance	-557,625	-531,471	-535,797	-540,122	-519,448	-523,773	-528,099	-507,424	-511,750	-516,076

Simple/interest only loan

## Interest rolled up

Interest may be rolled up in which case no payments are made during the course of the loan.

Instead, interest is compounded each period during the term of the loan and is payable as a lump sum at the end of the loan.

## Interest & Capital Repayment (Mortgage)

In this finance type, both interest and capital repayments are made during the term of the loan.

Capital repayments are made to repay the total loan amount by the end of the loan period.

In Visual Investor, the Net Interest row in the cash flow represents the interest payments made (see figure below). The Mortgage Repayments row shows the capital payments made to offset the amount borrowed.

Options for both payment periods and compounding periods in Visual Investor are: monthly, quarterly and annually.

	Start date	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month
	09/09/2002	Sep '02	Oct '02	Nov '02	Dec '02	Jan '03	Feb '03	Mar '03	Apr '03	May '03
<b>finance,1,1,1,1,1,1,1</b>										
Standard UK Tenant	0	30,479	0	0	25,000	0	0	25,000	0	
ERV pas for Standard UK Tenant	0	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1
Standard UK Tenant Exit Value	0	0	0	0	0	0	0	0	0	
<b>Overall data</b>										
Exit Sale fees	0	0	0	0	0	0	0	0	0	
Exit Purchasers fees	0	0	0	0	0	0	0	0	0	
<b>ACQUISITION</b>										
Finance: mortgage	-500,000	0	0	0	0	0	0	0	0	
Residual Value	-500,000	0	0	0	0	0	0	0	0	
Acquisition fee @ 5.7625%	-57,625	0	0	0	0	0	0	0	0	
Total Rental income	0	30,479	0	0	25,000	0	0	25,000	0	
Total LH Ground Rent payments	0	0	0	0	0	0	0	0	0	
Total Operating revenues	0	0	0	0	0	0	0	0	0	
Total Capital receipts	0	0	0	0	0	0	0	0	0	
Total Operating costs	0	0	0	0	0	0	0	0	0	
Total Capital expenditure	-1,057,625	0	0	0	0	0	0	0	0	
<b>Finance: mortgage IRR: 6.2522%</b>										
Capital Borrowed	500,000	0	0	0	0	0	0	0	0	
Debt Rates%	0.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %
Credit Rates%	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %
Net interest	0	-2,083	-2,083	-2,083	-2,083	-2,083	-2,083	-2,083	-2,083	
Mort Repayments	0	-7,541	-7,541	-7,541	-7,541	-7,541	-7,541	-7,541	-7,541	
Total payments	0	-9,624	-9,624	-9,624	-9,624	-9,624	-9,624	-9,624	-9,624	
<b>SUMMARY</b>										
Interest/service	0	-2,083	-2,083	-2,083	-2,083	-2,083	-2,083	-2,083	-2,083	
Total Debt/Equity	500,000	-7,541	-7,541	-7,541	-7,541	-7,541	-7,541	-7,541	-7,541	
Net Cash Flow	-557,625	20,856	-9,624	-9,624	15,376	-9,624	-9,624	15,376	-9,624	
Net Cash Balance	-557,625	-536,769	-546,393	-556,017	-540,641	-550,265	-559,889	-544,513	-554,137	

Mortgage loan

The multiplier for mortgage instalments (which calculates the total payment: interest plus capital repayment) may be sourced from Valuation Tables.

Parrys Tables use annual compounding and monthly payment periods, for which the formulae are as follows:

Monthly mortgage instalment:

$$\frac{(i + s) \times L}{12}$$

where:

$$s = \frac{i}{(1 + i)^n - 1}$$

*i* = interest rate

*L* = loan amount

*n* = loan term

This monthly mortgage instalment comprises interest plus capital repayment.

Interest may be calculated as follows:

$$\left( \left( 1 + \frac{i}{12} \right)^1 - 1 \right) \times L$$

The capital repayment is then calculated:

Capital repayment = Mortgage instalment - Interest payment

## Equity Finance

This represents cash injections made by parties or consortia into the acquisition of a property or portfolio.

In return for this loan, interest is paid to the equity investor on the amount invested. This interest is calculated as for a simple loan.

The equity investor is also entitled to an agreed share of net income during the period of the loan. This is defined in Visual Investor as the Equity % on monthly balance. This share of net income will be reduced if there are insufficient funds in the cash flow in any period. In certain circumstances equity investors may be required to make further capital injections into the cash flow if there are insufficient funds to meet financial obligations under superior finance agreements.

The basic formula for the calculation of the 'priority share' of net income payable to the equity investor is:

$$(NI_t - x_t) \times E$$

where:

$NI_t$  = total net income receivable during period  $t$

$x_t$  = interest payable on loan for period  $t$  (calculated as for a simple loan)

$E$  = agreed priority share (%)

In addition, the equity investor receives a final settlement at the end of the equity arrangement: a percentage share of the exit value.

Start date	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9
09/09/2002	Sep '02	Oct '02	Nov '02	Dec '02	Jan '03	Feb '03	Mar '03	Apr '03	May '03
<b>equity 1,1,1,1,1</b>									
Standard UK Tenant	0	30,479	0	0	25,000	0	0	25,000	0
ERV pa for Standard UK Tenant	0	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Standard UK Tenant Exit Value	0	0	0	0	0	0	0	0	0
<b>Overall data</b>									
Exit Sale fees	0	0	0	0	0	0	0	0	0
Exit Purchasers fees	0	0	0	0	0	0	0	0	0
<b>ACQUISITION</b>	<b>-1,000,000</b>	0	0	0	0	0	0	0	0
Finance: EQUITY	-500,000	0	0	0	0	0	0	0	0
Residual Value	-500,000	0	0	0	0	0	0	0	0
Acquisition fee @ 5.7625%	-57,625	0	0	0	0	0	0	0	0
Total Rental income	0	30,479	0	0	25,000	0	0	25,000	0
Total LH Ground Rent payments	0	0	0	0	0	0	0	0	0
Total Operating revenues	0	0	0	0	0	0	0	0	0
Total Capital receipts	0	0	0	0	0	0	0	0	0
Total Operating costs	0	0	0	0	0	0	0	0	0
Total Capital expenditure	-1,057,625	0	0	0	0	0	0	0	0
<b>Finance: EQUITY IRR: -4.1234%</b>									
Equity Invested	500,000	0	0	0	0	0	0	0	0
Base Int Rate %	0.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %
Interest on debt	0	-2,132	-2,132	-2,132	-2,132	-2,132	-2,132	-2,132	-2,132
Priority income @ 70.00%	0	-19,843	0	0	-16,008	0	0	-16,008	0
Total Equity income	0	-21,975	-2,132	-2,132	-18,140	-2,132	-2,132	-18,140	-2,132
Running Equity	0	-500,000	-500,000	-500,000	-500,000	-500,000	-500,000	-500,000	-500,000
<b>SUMMARY</b>									
Interest/service	0	-21,975	-2,132	-2,132	-18,140	-2,132	-2,132	-18,140	-2,132
Total Debt/Equity	500,000	0	0	0	0	0	0	0	0
Net Cash Flow	-557,625	8,504	-2,132	-2,132	6,860	-2,132	-2,132	6,860	-2,132

Equity finance, showing a 70% priority share of net income

## Auto-Regulating Loan

The auto-regulating loan acts in a similar manner to an overdraft and cannot be used in conjunction with other loan types.

The borrower is able to offset the outstanding debt with all, or a proportion, of the cash flow balance when this is in credit. If the borrower elects to retain a percentage of cash flow credits (defined in the Retained Surplus field in Visual Investor) this proportion will then be retained by the borrower. The balance of cash flow credits, after deduction of the retained surplus, is then offset against the outstanding loan amount.

If the cash flow is in deficit or interest against the loan cannot be met, the loan is extended to make up the difference.

When the entire debt has been repaid and the auto-regulating loan account is in credit, interest is payable to the owner of the investment at the credit rates. The investor has the option of either collecting this interest and taking it out of the loan and the cash flow, or leaving it in the auto-regulating loan to accumulate interest. In Visual Investor, the Interest rolled up to end option should be ticked if the user intends to leave the interest in the loan.

Interest is calculated on the debt balance as for a simple loan.

Start date	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9
09/09/2002	Sep '02	Oct '02	Nov '02	Dec '02	Jan '03	Feb '03	Mar '03	Apr '03	May '03
<b>auto reg,1,A,1,1,1,1</b>									
Standard UK Tenant	0	30,479	0	0	25,000	0	0	25,000	0
Standard UK Tenant Exit Value	0	0	0	0	0	0	0	0	0
<b>Overall data</b>									
Exit Sale fees	0	0	0	0	0	0	0	0	0
Exit Purchasers fees	0	0	0	0	0	0	0	0	0
<b>ACQUISITION</b>									
Finance: auto reg	-500,000	0	0	0	0	0	0	0	0
Residual Value	-500,000	0	0	0	0	0	0	0	0
Acquisition fee @ 5.7625%	-57,825	0	0	0	0	0	0	0	0
Total Rental income	0	30,479	0	0	25,000	0	0	25,000	0
Total LH Ground Rent payments	0	0	0	0	0	0	0	0	0
Total Operating revenues	0	0	0	0	0	0	0	0	0
Total Capital receipts	0	0	0	0	0	0	0	0	0
Total Operating costs	0	0	0	0	0	0	0	0	0
Total Capital expenditure	-1,057,825	0	0	0	0	0	0	0	0
<b>Finance: auto reg IRR: 5.1442%</b>									
Capital Borrowed	500,000	0	0	0	0	0	0	0	0
Debt Rates%	0.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %
Credit Rates%	0.00 %	3.00 %	3.00 %	3.00 %	3.00 %	3.00 %	3.00 %	3.00 %	3.00 %
Net interest	0	-2,083	-2,024	-2,092	-2,062	-2,029	-2,071	-2,054	-2,015
B/F Debt balance	-500,000	-500,000	-485,802	-502,024	-494,959	-487,023	-496,988	-493,041	-483,542
Cap Repayments	0	0	-14,198	16,222	-7,065	-7,936	9,965	-3,947	-9,499
<b>SUMMARY</b>									
Interest/service	0	-2,083	-2,024	-2,092	-2,062	-2,029	-2,071	-2,054	-2,015
Total Debt/Equity	500,000	0	-14,198	16,222	-7,065	-7,936	9,965	-3,947	-9,499
Net Cash Flow	-557,825	28,396	-16,222	14,130	15,872	-9,965	7,895	18,998	-11,514
Retained	-557,825	14,198	0	7,065	7,936	0	3,947	9,499	0
Net Cash Balance	-557,825	-543,427	-543,427	-536,362	-528,425	-528,425	-524,478	-514,979	-514,979

An auto-regulating loan, with 50% retained surplus



# CHAPTER 5

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