

Investment Valuation

(Evaluating a wide range of Investment and Business Case Proposals)

The **Investment Valuation** model is designed with the flexibility to be able to value a wide range of investment and business case scenarios. While it is based on the traditional discounted cash flow method of valuation, it also provides ability to evaluate Economic Value Added (EVA) valuation, accounting impact, and a range of other evaluation parameters.

Setting the Assumptions

The Assumptions sheet lists the key assumptions necessary for the model to evaluate the particular investment proposal. Default values have been input here with help icons to detail the purpose and functionality of each input. Input cells on this sheet, and the rest of the workbook, are identified with a light blue colour.

The Investment Details section allows the identification of a New or Existing investment. Choosing the New option hides the existing investment name input and will require only new investment input data to be entered in the subsequent sheets. Alternatively, the Existing option can be used requiring both new and existing investment names and two sets of input data to be entered in subsequent sheets. This option is useful under several different analytical scenarios:

- To evaluate the difference between the current business operating model and a modified business model incorporating a new strategy, process, supply chain etc.
- To evaluate the difference between two new investment proposals. A common example would be to evaluate whether to lease or buy a new asset.
- To evaluate the impact of a change in assumptions to an investment proposal already evaluated and undertaken. Here the new assumptions can be evaluated against the old ones.

The first year of valuation and denomination of input values, also entered in this section, are used for display purposes in subsequent sheets.

The Taxation and Amortisation section is used for corresponding calculations in the model. The company or business tax rate should be the legal rate, as opposed to the calculated rate actually paid by the company. Checking the box to carry forward tax credits on operational losses simply nets negative tax expenses on losses against taxable profit. The goodwill amortisation period represents the period over which the company writes off goodwill arising from assets purchased for more than their book value.

The Capital and Cost of Capital section is used to calculate initial discount rates and capital employed for EVA analysis. The cost and levels of debt and equity are used to calculate the weighted average cost of capital for the analysis. A calculation tool is provided to assist in the calculation of the cost of equity under the Capital Asset Pricing Model. Required inputs for this include:

- The Risk-Free rate. The equivalent 1-year government bond rate can be used here.
- The Market Risk Premium. This represents the return that investors expect over and above the risk-free rate to compensate for the increased risk of holding equity. Essentially the risk-free rate plus the market risk premium represents the expected return from the equity market. This information can be obtained from historical market return data, or from estimations made by third party data and analysis providers.
- The Equity Beta. This represents the ratio of company or industry specific risk compared to the overall market risk. Essentially, an equity beta under 1 indicates less risk than the market and vice-versa. It is calculated by the company or industry price volatility correlation to the market and can be obtained from historical equity price data or third party data providers.

Cash flows can be discounted with the cost of capital either at the end of each year, or mid year where the beginning and end cash flow levels are averaged. Mid year discounting has the benefit of averaging out large cash flow fluctuations at the beginning or end of any year.

The capital charge for EVA can be calculated with capital employed taken at either the beginning of the year or the average of the beginning and end year levels. Calculating the capital charge with

capital as at the beginning of the year is more appropriate for EVA remuneration systems as this way management cannot simply reduce the capital charge by reducing the amount of capital employed throughout the year.

The final option in this section is whether to include existing asset capital in the EVA capital charge. This box should be checked when analysing the difference between two different asset structures. However, when this option is chosen, it should be noted that it creates a discrepancy between cash flow where there is no impact of existing assets (no purchases or sale of assets) and EVA where the asset incurs an ongoing capital charge.

The Terminal Value section allows customisation to the values and calculation method of the investments terminal value after the 5-year explicit forecasting period. If it is decided to include a terminal value in the overall evaluation, the calculation can be made using one of two alternative methods:

- Infinite. This is the traditional perpetuity calculation utilising the cost of capital and required growth rate to infinity. The growth rate can be entered in the cell provided or left blank for which the cash flow growth rate from year 4 to 5 will be utilised.
- Finite: This unique alternative can be used when it is unreasonable to expect cash flows to grow at a prescribed rate to infinity. This is especially useful for new economy or highly competitive environments where product life cycles are short. This method requires a growth rate after year 5, like the Infinite method, and also the year that the investment reaches maturity (0 cash flow growth rate) and the year that the investment terminates (0 net cash flow). The calculation uses parabolic functions to smooth cash flow from year 6 to maturity and down to the terminal date.

Both methods allow the input of ongoing annual capital expenditure, which is deducted from the cash flow for each year of the terminal value calculation.

The Comparable Investment Score section allows for the unique setting of scoring parameters so that competing, subsequent, or previous investment proposals can be quickly compared and prioritised. Optimal value and weighting parameters should be set at the corporate level based on the organisations specific environment, strategy and priorities. Parameters should then be held constant so that investment and business case proposals can be evaluated quickly and efficiently on an even playing field.

The parameters included in the score are:

- Return on Invested Capital, as a percentage over and above the WACC.
- The Net Present Value of cash flows, as an amount in input denominations.
- The Cost/Benefit ratio, as a ratio of 5-year net cash flows generated to cash invested up front.
- The Payback period, as the number of years needed cumulative cash flow to breakeven.
- The Free cash flow after 2 years, as an amount in input denominations.

Company wide optimal values can be entered into the input cells next to each parameter. Overall score weightings can be altered to suit the current operating environment using the slide bars. Alternatively, one of two preset weighting systems can be selected from the dropdown box. The Capital Constrained weighting option is useful for companies with scarce resources wishing to maximise the percentage return on Invested Capital. Conversely, the No Capital Constraint option is useful 'cash rich' companies without capital constraints wishing to maximise the nominal return amounts or NPV of cash flows.

Financial Data Input

After setting the assumptions for the valuation, clicking the Next button in the Assumptions sheet will take you either to the Before sheet, if you have chosen the 'existing investment' option, or directly to the After sheet for new investment valuations. The Before and After sheets are identical requiring the same input, and the Results simply calculates the difference between the two. The following information, therefore applies to both sheets. Like the Assumptions sheet, all input cells are identified with a light blue colour.

The Taxable Revenue section allows for the input of revenue items that are deemed assessable for taxation purposes. While two lines of input are immediately available, more can be added by clicking

the Plus icon to the left. In a similar fashion, lines can be removed by clicking the Minus icon whereby any input data in the bottom input line will be deleted. This functionality also applies to the Non-Taxable Revenue and Operating Expenses sections below.

Input data for taxable revenue can be linked from supplementary spreadsheets and may typically include sales revenue calculated from forecast sales volume and price data. The Regression Forecasting model serves as an excellent tool for producing such forecast data and can be downloaded directly using the link provided to the right.

It should be noted that unlike the following sections input for taxable revenue is only available in years 1 to 5, and not in year 0. This is on the basis that costs may be incurred up-front (in year 0), but resulting revenues will not be received until the first year of the forecast period.

The Non-Taxable Revenue section should be used to input revenues that are not assessable for tax purposes, and expenses that are non-deductible for tax purposes (entered as negatives for positive expenses). A further input for this section is any change in Working Capital that may be applicable to the analysis. Working capital is the difference between Current Assets and Current Liabilities and often arises from differences in the cash flow timing of payments to trade creditors for raw materials and inventories (liabilities) and customers settling of accounts receivable (assets). This information is typically obtained from using historical average days for settlement of creditor accounts payable and accounts receivable applied to forecast raw material purchase and forecast sales respectively. The correct calculation for the change in working capital in year t is:

$$- ([\text{current assets}(t) - \text{current liabilities}(t)] - [\text{current assets}(t-1) - \text{current liabilities}(t-1)])$$

The Operating Expenses section should be used for tax deductible expenses required for the ongoing operation of the business and resulting revenue generation. Typically, operating expenses include costs such as raw materials, transport, personnel, marketing, office supplies, legal and administration costs. Specifically, operating expenses entered here should not be investments for future revenue generation or cost savings as outlined in the Investment Expenses section below. While including such 'investment' expenses here will not have any effect on cash flow, it will effect the calculation of Economic Value Added by excluding them from the capital employed.

The Investment Expenses section is used for inputting tax deductible costs that essentially represent investments in future revenue generation or cost savings. Typically, such costs include restructuring and redundancy costs and enhancements to existing assets. In order to determine whether an expense is an 'investment' expense one should ask, "Is this cost required for the current ongoing operation of the business?" (It is an operation expense), or "Will the benefits of making this cost not be realised until subsequent years?" (It is an investment expense).

These costs are treated differently to operating expenses under the Economic Value Added calculation due to their quasi capital type nature. Instead of being expensed when incurred, in the EVA calculation they are capitalised and amortised over the period in which the benefits from the investment are expected to be realised. Up to three different types of Investment Expense can be entered here with different amortisation periods ranging between 1 and 10 years.

The Existing Assets section allows for the input of any existing assets that need to be taken into account for the valuation. This is useful for valuing current versus proposed asset structures or lease versus ownership scenarios. Up to five existing assets can be entered here with input parameters provided across the columns.

The first category of parameters deals with asset life and disposal:

- Life (Yrs). The original useful life of the asset until disposal. This is used to calculate the disposal date and book values at disposal.
- Age (Yrs). The current age of the asset since purchase date, in years or part thereof.
- Disposal. The disposal value of the asset at the end of its useful life, as a percentage of the original purchase price. This is used to calculate cash flow and any accounting or tax gain or loss on disposal.

It should be noted that any forecast sale of assets can be input here by manipulating the Life to equal the current Age plus remaining time to sale, and the Disposal value as a percentage of the expected sale price to original purchase price.

The next category of parameters deals with accounting depreciation conventions:

- Current BV. The current accounting book value of the asset (original purchase price less accumulated accounting depreciation).
- Rate. The accounting depreciation rate for the asset, as a percentage.
- Method. The accounting depreciation method for the asset. This can be either Straight-Line or Diminishing value (otherwise known as Declining Balance) and can be selected from the dropdown box provided in the cell.

The next category of parameters deals with tax depreciation conventions:

- Current BV. The current tax book value of the asset (original purchase price less accumulated tax depreciation).
- Rate. The tax depreciation rate for the asset, as a percentage.
- Method. The tax depreciation method for the asset. This can be either Straight-Line or Diminishing value (otherwise known as Declining Balance).

The final parameter is for any unamortized portion of goodwill for the asset. Goodwill arises when an asset is purchased for more than its book value. The difference is amortised over a specified period.

The Capital Expenditure section allows for input of expected purchases of new assets. It should be noted that any capital commitments (from asset purchases or capitalised investment expenses) remaining after year 5 are taken into account to properly capture the impact of the capital investment activities undertaken during the explicit forecast period. This is accomplished by calculating the present value of such remaining commitments as at the end of year 5. Up to five new asset purchases can be entered here with input parameters provided across the columns.

The first category of parameters deals with the asset purchase, life and disposal:

- Life (Yrs). The useful life of the new asset until disposal. This is used to calculate the disposal date and book values at disposal.
- Yr of Acq. The year that the new asset is expected to be purchased. The calculation assumes that the asset is purchased at the beginning of this year.
- Acq Price. The expected purchase price of the new asset.
- Actg BV. The accounting book value of the new asset at the acquisition date. If lower than the acquisition price, this is used to calculate goodwill.
- Disposal. The disposal value of the asset at the end of its useful life, as a percentage of the original purchase date. This is used to calculate cash flow and any accounting or tax gain or loss on disposal.

It should be noted that, like the Existing Asset section, any forecast sale of new assets can be input here by manipulating the Life to equal the time to sale, and the Disposal value as a percentage of the expected sale price to original purchase price.

The next two categories of parameters deal with accounting and tax depreciation conventions:

- Rate. The accounting or tax depreciation rate for the asset, as a percentage.
- Method. The accounting or tax depreciation method for the asset. This can be either Straight-Line or Diminishing value (otherwise known as Declining Balance) and can be selected from the dropdown box provided in the cell.

The final parameter specifies the expected mix of funding for the purchase of the new asset. This is input as a percentage of Equity to total (debt plus equity) funding for the purchase. The default value here is the equity to total capital ration as specified in the Assumptions sheet. This is used for calculating the ongoing capital and cost of capital.

The Financial Analysis section summarises the financial impact of the input data, in three formats:

- The Accounting Impact displays the impact on the accounting statement of financial performance.
- The Cash Flow Analysis displays the annual net cash flows and discounts them at the weighted average cost of capital to calculate the net present value.
- The Economic Value Added displays the economic profit less a capital charge for each year by making adjustments for changes in asset structure and 'investment expenses'. Annual EVA is then discounted at the weighted average cost of capital to calculate the present value.

The Cash Flow Analysis and Economic Value Added include an additional calculation for the PV of capital commitments after 5 years. This is to ensure that any remaining impacts of capital structure changes (made during the forecast period) are taken into account in the present value calculation.

Detailed calculations for components of these analyses can be viewed by checking the View boxes below to unhide the calculation categories.

Analysing and Utilising the Results

The Results sheet outputs the valuation parameters of the analysis into several categories. The complete Results sheet can be export to a new book using the button provided so that sections can be copied and embedded into other media such as business case proposals.

The Accounting Impact displays the main components and calculation of Net Profit. This information is the least accurate in terms of economic reality, but is useful to determine the impact of the investment on accounting results. Such analysis is useful evaluating possible credit rating and/or shareholder reporting and disclosure implications.

The Cash Flow Analysis displays the main components of cash flow and calculates the Net Present Value (NPV) of cash flows at the discount rate. The 5-yr NPV of Cash Flow includes the PV of remaining capital commitments after year 5, as displayed to the right. The terminal value is also calculated here (if applicable) to calculate the total NPV of cash flows and therefore the overall Valuation of the investment represented by the expected future cash flows. The cash flow analysis is also useful for evaluating the timing impact of cash received and required by the business, and its corresponding impact on the cash flow statement.

The Economic Value Added shows main components of the EVA calculation and the NPV of EVA at the discount rate. Like the cash flow analysis, the 5-yr PV of EVA for the 5 years includes the remaining capital commitments after year 5, as displayed to the right. The EVA terminal value is also calculated here (if applicable) to calculate the Total PV of EVA. If an Infinite terminal value is employed, the Total PV of EVA will be equal to the total PV of cash flows. This is because EVA and Cash Flow are equal to infinity, with the only difference being the timing as capitalised items are spread out over future years under EVA. The Economic Value Added analysis is the most accurate in terms of economic reality and is useful for measuring shareholder value creation and link management incentives to shareholder interests.

The Comparable Investment Score section utilizes the parameters in the Assumptions sheet to apply a weighted average score to the investment. Each component of the score is displayed here to sum to the total Comparable Investment Score. This can be used to benchmark the overall investments attributes against competing, alternative or future proposals. While the overall score provides a quick solution to determine the viability of the investment, the components of the score should also be analysed to understand its strengths and weaknesses.

The Additional Analysis section provides some further useful analytics for the investment. Implicit annual growth rates are calculated using the 5 year input data for total revenues, total expenses, operating cash flow, net cash flow, economic profit, and EVA. The change in the business's gearing ratio (total debt to total capital), form year 0 to year 5 is also calculated and displayed here. Finally, The Modified Internal Rate of Return (MIRR) is displayed. The MIRR represents the hypothetical investment return if the NPV of cash flow is zero, taking into account both the cost of the investment and the interest received on reinvestment of cash.

The Charts section displays graphical representations of both Net Cash Flow and EVA. Charts provided for each include annual and cumulative for the 5-year forecast, and annual with the terminal value displayed until year 100.