Overview

The intrinsic value of a business ('Enterprise Value') can be estimated using techniques that consider future cash flows or income. A value estimated by discounting future cash flows at a 'Discount Rate' to their 'Present Value' ('PV') ('Discounted Cash Flow' / 'DCF' valuation), represents the value expected to be received from the business in the future, expressed in economically equivalent terms as if received today. A DCF requires cash flows to be estimated over a forecast period, usually 5 – 10 years, at the end of which a single formula (a perpetuity formula or a multiple) can be used to capture the PV of remaining cash flows beyond the forecast horizon ('Terminal Value' / 'TV').

This is the first in a series of three articles that discuss DCF. Relative valuation using multiples is discussed in Part 3 (what a comparable business might be worth if it was quoted or acquired). This Part discusses the general DCF methodology, including basic PV formulae (Appendix 1), forecast period cash flows, 'steady state' assumptions and TV formulae (Appendix 2), with a simplified example (Appendix 3). Part 2 focuses on discount rates and the impact of debt interest tax relief ('Tax Shield'). Part 3 covers DCF methods that are based on other cashflow or profit measures (Economic Profits, Capital Cash Flows, Adjusted Present Value, Free Cashflows to Equity, Residual Income and, lastly, the Dividend Discount Model). A comprehensive DCF example is added as a bonus.

Contents

Notes

1. This is a new version of a paper originally published in September 2025 (now part of a series of three papers). No A.I. used!

Free Cash Flows to the Firm (FCFF)

Under IFRS GAAP, FCFF would be considered a management performance measure and hence is not defined as such. For the purpose of a DCF valuation, FCFF is defined as after-tax cash flows derived from operating activities (ignoring after-tax financing cash flows), including investments required to generate operating income. FCFF can be calculated from the cash flow or income statement (top down or bottom up), shown here with some numbers:

Cash flows from operating activities:		
Profit after tax	2,066.7	
Dividends	(1,760.1)	
Profit retained	306.6	
Add back: dividends and tax	2,449.1	
Profit before tax	2,755.6	
Add back: Finance costs	387.3	1
Less: Finance income	(12.2)	1
Operating profit continuing operations (EBITA)	3,130.7	
Depreciation	631.5	2
Operating cash flows before working capital change (EBITDA)	3,762.2	
Change in inventories	(44.5)	
Change in trade receivables (including long term)	(44.7)	
Change in other receivables and current assets	(54.5)	
Change in trade payables	39.0	
Change in other current liabilities (excl. dividend payable)	21.2	
Change in working capital	(83.5)	2
Change in other current and long term provisions	16.7	
Cash generated from operations	3,695.4	
Income tax paid (net of repayments)	(688.9)	
Net cash generated from operating activities	3,006.5	
Remove: tax relief on financing items	(93.8)	1
Remove: change in non-operating provisions	(16.7)	
Purchases of property, plant and equipment	(1,265.8)	2
Free Cash Flows to the Firm	**1,630.3**	
Add back: New Invested Capital	717.7	2
Net Operating Profit After Taxes (NOPAT)	**2,348.0**	

Note 1: (387.3 - 12.2) x 25.0% = 93.8

Note 2: - 631.5 + 83.5 + 1,265.8 = 717.7

Net cash generated from operating activities	3,006.5
Cash flows from investing activities	
Purchases of property, plant and equipment	(1,265.8)
Interest received	12.2
Net cash used in investing activities	(1,253.5)
Net cash flow before financing activities	1,753.0
Cash flows from financing activities	
Proceeds from borrowings	1,564.7
Repayment of borrowings	(1,158.1)
Interest paid (plus fees)	(387.3)
Dividends paid to company shareholders	(1,760.1)
Net cash from (used in) financing activities	(1,740.8)
Net cash flows	12.2
Opening cash	244.9
Closing cash	257.1

ASSETS	
Intangible assets	116.3
Property, plant and equipment	13,266.8
Investment in associates	1,000.4
Financial Assets	2,480.9
Deferred Tax	119.4
Inventories	936.6
Trade Receivables	939.3
Other receivables	939.3
Prepayments and accrued income	171.4
Tax repayable	34.4
Operating Cash	257.1
ASSETS	**20,261.9**
EQUITY	
Ordinary Share Capital	1,449.4
Share Premium	153.0
Retained Earnings at start	7,023.0
Retained profits	306.6
Other Reserves	164.1
Total Equity	**9,096.1**
LIABILITIES	
Retirement Benefit Obligations	(387.4)
Provisions for Other Liabilities	(344.5)
Deferred Tax	(1,009.1)
Other liabilities	(6.5)
Borrowings	(8,153.0)
Trade Payables	(819.7)
Accruals and deferred income	(342.8)
Other Current Liabilities	(102.8)
Total Liabilities	**(11,165.8)**
EQUITY AND LIABILITIES	**20,261.9**

Profit after tax	2,066.7
add back: Interest expense (net of tax)	290.5
add back: Interest income (net of tax)	(9.2)
NOPAT	2,348.0
Net interest after tax	(281.3)
Purchases of property, plant and equipment	(1,265.8)
Depreciation	631.5
(Incr.)/Decr. in Operating Working Capital	(83.5)
New Invested Capital	(717.7)
Change in non-operating provision	16.7
Debt borrowing	1,564.7
Debt repaymets	(1,158.1)
Change in gross debt	406.7
Change in cash	(12.2)
Free Cash Flows to Equity	**1,760.1**

Net Operating Profits After Tax ('NOPAT')

Operating 'Invested Capital' ('IC') represents operating net assets used to generate FCFF and NOPAT:

Invested Capital - balance	
Inventories	936.6
Trade Receivables	939.3
Other receivables	939.3
Tax repayable, prepayments and accruals	205.9
Operating Current Assets	*3,021.0*
Trade Payables	(819.7)
Accruals and deferred income	(342.8)
Other Current Liabilities and provisions	(102.8)
Operating Current Liabilities	*(1,265.4)*
Operating Working Capital	1,755.6
Intangible Assets (excl. goodwill)	19.3
add back: cumulative amortisation and impairment	30.6
Property, Plant & Equipment	13,266.8
Goodwill	97.0
Cumulative Goodwill Impairments	7.3
Operating Invested Capital (post- Goodwill)	**15,176.6**

Investor Funds - balance	
Borrowings	8,153.0
less: operating cash (if not treated as working capital)	(257.1)
Net debt	*7,895.9*
Retirement Benefit Deficit / (Surplus)	387.4
Long term non-operating liabilities and provisions	351.0
Debt equivalents	*738.3*
Net debt equivalents	*8,634.2*
Equity & Non-Controlling Interests	9,096.1
add back: cumulative amortisation and impairment	37.9
Deferred Tax Liability / (Asset)	889.7
Financial Assets	(2,480.9)
Investment in Associates	(1,000.4)
Net equity equivalents	*6,542.4*
Investor Funds	**15,176.6**

Invested Capital - movement	
Capex	1,265.8
less: depreciation and impairments	(631.5)
Change in net PP&E	*634.3*
Working Capital Investment	83.5
Net change in Invested Capital (pre-Goodwill)	717.7
Opening Invested Capital (pre Goodwill)	14,354.6
Opening Goodwill at cost	104.3
Closing Invested Capital (post- Goodwill)	**15,176.6**

Net Assets	9,096.1
remove: net debt and debt equivalents	8,634.2
remove: financial assets	(2,480.9)
remove: investment in associates	(1,000.4)
remove: deferred tax liability	889.7
remove: cumulative amortisation	37.9
Closing Invested Capital (post- Goodwill)	**15,176.6**

In this example, net cash in excess of the amount estimated as required for daily operations ('operating cash') is paid out in full to shareholders. The dividend equals the Free Cash Flow to Equity (this assumes sufficient distributable profits under company law exist). NOPAT represents operating Earnings Before Interest & Tax (EBIT) after operating taxes paid have been deducted. NOPAT can be used for valuation purposes because of its relationship to FCFF:

NOPAT	x
less: New Invested Capital ('NIC' = capex* – depreciation + increase in working capital)	(x)
FCFF	x

Where NIC is the increase in IC:

Property, Plant & Equipment	x
Working Capital	x
Other operating net assets and intangibles	x
IC at start	x
NIC (capex – depreciation + change in working capital)	x
IC at end	x

* Capex is short for Capital Expenditures

The proportion of NOPAT that is reinvested in NIC is the 'Reinvestment Rate' ('RR"):

$$RR\ \% = \frac{NIC}{NOPAT}$$

$$FCFF = NOPAT\ (1 - RR\ \%)$$

Rates of Return

ROIC

'Return on Invested Capital' ('ROIC') equals NOPAT for the period t ($NOPAT_t$) divided by opening (or average) Invested Capital (IC_{t-1}):

$$ROIC_t = \frac{NOPAT_t}{IC_{t-1}} \quad \therefore \quad NOPAT_t = ROIC_t \times IC_{t-1}$$

$ROIC_t$ can be expressed in terms of a margin and net operating asset turnover ratio:

$$ROIC_t = \frac{NOPAT_t}{Revenue_t} \times \frac{Revenues_t}{IC_{t-1}}$$

$$= \frac{\text{NOPAT margin}}{\frac{\text{Net PP\&E}_{t-1}}{Revenues_t} + \frac{\text{Working Capital}_{t-1}}{Revenues_t}}$$

Taking the example in Appendix 3

		Forecast Year				
		1	2	3	4	5
$NOPAT_t$		106.90	80.29	71.80	73.95	76.17
$Revenues_t$		2,121.80	2,229.16	2,296.04	2,364.92	2,435.87
÷	=	*5.04%*	*3.60%*	*3.13%*	*3.13%*	*3.13%*
(Net PP&E $_{t-1}$		400.00	424.36	445.83	459.21	472.98
$Revenues_t$		2,121.80	2,229.16	2,296.04	2,364.92	2,435.87
+	=	*18.85%*	*19.04%*	*19.42%*	*19.42%*	*19.42%*
Working Capital $_{t-1}$		115.00	126.93	133.35	137.35	141.47
$Revenues_t$)		2,121.80	2,229.16	2,296.04	2,364.92	2,435.87
	=	*5.42%*	*5.69%*	*5.81%*	*5.81%*	*5.81%*
	=	*20.76%*	*14.56%*	*12.40%*	*12.40%*	*12.40%*
$NOPAT_t$		106.90	80.29	71.80	73.95	76.17
Invested Capital $_{t-1}$		515.00	551.29	579.18	596.56	614.45
	=	*20.76%*	*14.56%*	*12.40%*	*12.40%*	*12.40%*

RONIC

Part of ROIC will incorporate the return on new invested capital, termed marginal ROIC or 'Return On New Invested Capital' ('RONIC'), which can be calculated on the assumption that the growth in NOPAT in the period is due to NIC made at the end of the prior period:

$$RONIC_t = \frac{\text{Change in NOPAT in year}}{\text{NIC in previous year}}$$

$$= \frac{NOPAT_t - NOPAT_{t-1}}{NIC_{t-1}}$$

$$= \frac{g.\ NOPAT_{t-1}}{NIC_{t-1}}$$

$$\therefore \quad g_t = RONIC_t \times \frac{NIC_{t-1}}{NOPAT_{t-1}}$$

$$= RONIC_t \times RR_{t-1}$$

$$\therefore \quad RR_{t-1} = \frac{Growth_{NOPAT\,t}}{RONIC_t}$$

$$NOPAT_{t-1} = NOPAT_t + \left(RONIC_t \times NIC_{t-1} \right)$$

Taking the example in Appendix 3:

		Forecast Year				
		1	2	3	4	5
$NOPAT_{t-1}$			106.90	80.29	71.80	73.95
+			+	+	+	+
$RONIC_t$			*-73.34%*	*-30.45%*	*12.40%*	*12.40%*
x			*x*	*x*	*x*	*x*
NIC_{t-1}			36.29	27.90	17.38	17.90
			=	=	=	=
$NOPAT_t$	=		80.29	71.80	73.95	76.17

ROIC and RONIC

Average ROIC is the return on all invested capital, including NIC made this year and in prior years, so will incorporate RONIC

$$ROIC_t = \frac{\text{NOPAT prior year} + \text{Change in NOPAT this year}}{\text{Invested Capital at start of last year} + \text{New Invested Capital last year}}$$

$$= \frac{NOPAT_{t-1} + g_{NOPAT\,t} \times NOPAT_{t-1}}{IC_{t-2} + g_{IC\,t-1} \times IC_{t-2}}$$

$$= \frac{NOPAT_{t-1}}{IC_{t-2}} \times \left(\frac{1 + g_{NOPAT\,t}}{1 + g_{Ic\,t-1}} \right)$$

$$= ROIC_{t-1} \times \left(\frac{1 + g_{NOPAT\,t}}{1 + g_{IC\,t-1}} \right)$$

$$= ROIC_{t-1} \times \left(\frac{1 + [\,RR_{t-1} \times RONIC_{t}\,]}{1 + g_{IC\,t-1}} \right)$$

From Appendix 3:

			Forecast Year				
			1	2	3	4	5
	$ROIC_{t-1}$				14.56%	12.40%	12.40%
	x						
	$RONIC_{t}$				-30.45%	12.40%	12.40%
x	RR_{t}-1				34.74%	24.20%	24.20%
=	1 +	a			89.42%	103.00%	103.00%
	IC growth $_{t-1}$				5.06%	3.00%	3.00%
=	1 +	b			105.06%	103.00%	103.00%
	c =	a / b			85.11%	100.00%	100.00%
=	$ROIC_{t}$				12.40%	12.40%	12.40%

Forecasting Cash Flows

General Approach

The length of the forecast period and when cash flows are deemed to arise during the year (usually at the end of the year or mid year) needs to be determined first. The accuracy of any forecast beyond two or three years has to be questioned, meaning a long term forecast period creates more uncertainty. However, if the value of the business calculated at the end of the forecast period is based on a single formula, as is popular for a TV calculation, the components of that formula need to be reasonably justifiable over the long term terminal period.This requires a long enough time period for cash flows and other relevant financial measures to reach some 'Steady State' (when growth in income and net assets is sustainable), which would depend on where the business is in its life cycle, competition in the industry, growth rates, risk profile etc.

Operating profits

A forecast would typically start with revenue, with annual price and volume estimates based on either a top-down (market share) or bottom-up approach (simulation or scenario analysis can also be used to derive expected revenues based on weighted probabilities), growing at various rates over the period. Fixed costs that do not vary with revenue should be treated separately, whilst other operating costs (excluding depreciation and amortisation) can be assumed to be a percentage of revenues. A review of financial statements over the past few years, once adjusted for abnormal items (acquisitions, discontinued operations, restructuring, capitalised expenses, etc), should help forecasting.

Earnings Before Interest Tax Depreciation & Amortisation (EBITDA) can be calculated directly by applying an assumed EBITDA margin to revenues or indirectly by calculating operating expenses (ignoring depreciation and amortisation), as a percentage of revenues.

Non-operating cash flows that are excluded from FCFF are taken into account via an adjustment to the Enterprise Value (capitalised – see end of article) or via the discount rate (tax benefit of debt financing – see Part 2).

Investing for operating profits

Working capital

EBITDA should be adjusted for non-cash items, which, in this simple case, involves deducting the increase in operating working capital ('OWC')(or adding a decrease), calculated as the closing less opening OWC balance. OWC represents net current assets used in the daily operations which are expected to be consumed or converted into cash in the year or operating cycle (inventory + trade receivables – trade payables) and which require financing. Each component can be estimated based on a percentage of sales.

Capital expenditures

Capex (net of disposals) represents the increase in operating Gross Property, Plant & Equipment (PP&E) after adding back asset retirements that have been removed. As the closing book value of PP&E (cost net of accumulative depreciation) equals the opening net PP&E + capex – depreciation charge, capex will be the balancing item if net PP&E and depreciation are assumed (this avoids the need to forecast retirements).

Net PP&E can be based on a percentage of revenues (inverse of the Asset Turnover):

$$\text{Net PP\&E}_n = \text{Assumed \%} \times R_n$$

Depreciation can be estimated as a percentage of opening gross or net PP&E (the latter is preferred to avoid problems with retirements):

$$\text{Depreciation}_n = \text{Assumed \%} \times \text{Net PP\&E}_{n-1}$$

Capex will then be the balancing figure from:

$$\text{Net PP\&E}_n = \text{Net PP\&E}_{n-1} + \text{Capex}_n - \text{Depreciation}_n$$
$$\therefore \quad \text{Capex}_n = \text{Net PP\&E}_n - \text{Net PP\&E}_{n-1} + \text{Depreciation}_n$$

(see Koller et al. (McKinsey) (2025) p.266, p.273)

A more detailed estimate would assume a depreciation profile for PP&E existing at the valuation date balance sheet and would calculate depreciation on capex each year in the forecast period using a 'vintage' approach (straight line depreciation on each year's capex based on average asset lives).

Depreciation could also be a multiple of capex if capex is assumed to be a percentage of revenues rather than as estimated as above. Capex is required to increase the productive capacity ('growth' capex) and maintain existing capacity ('maintenance' capex). The latter would represent true economic depreciation rather than accounting depreciation, which is often used as a proxy. Ignoring OWC, Invested Capital will only grow if capex exceeds accounting depreciation, so the capex / depreciation ratio must exceed 1.0 if growth is assumed. Capex and the increase in OWC represent the gross cash investment in Invested Capital (before depreciation), required to generate the forecast EBITDA.

Leasing

Fixed assets used to generate EBITDA (and hence included in the DCF valuation) can be purchased or leased. The cost of assets purchased is recognised in FCFF as capital expenditures in the year incurred, as reflected in the Statement of Cash Flows. The cost of leased assets that meet the requirements for 'Right-Of-Use' / 'ROU' asset treatment under IFRS 16 *Leases* is recognised on the Statement of Financial Position as ROU assets and lease liabilities (as the PV of Lease Payments – see Appendix 5 for further discussion). The treatment effectively assumes the asset has been purchased with borrowings (hence rentals can be split into hypothetical principal and interest components). Accordingly, the effective purchase price (the amount recognised initially for the ROU asset) should be included in capital expenditures in the FCFF calculation as ROU additions, despite being a non-cash item (similar to employee stock options – discussed in Appendix 4). See The Footnotes Analyst (www.footnotesanalyst.com) for further discussion.

Taxes

The final calculation to arrive at FCFF (in this simple case) is to deduct the operating cash taxes that would be paid on pre-financing operating and investing cash flows. A tax computation based on taxable profits (net of permanent differences to pre-tax profits), incorporating tax relief on capex rather than depreciation (capital allowances in the UK) and adjustments for accumulated tax losses, would be preferred, but the required information is unlikely be available. An estimate of taxable profits from the income statement should be made, excluding financing items, to which the statutory tax rate can be applied before the increase in operating 'Deferred Taxes' is deducted to arrive at taxes paid on operating cash flows (see Koller et al. (McKinsey) (2025) ch.20, Damodaran (2025) ch.10, Bodmer (2015) ch.12).

Towards the Terminal Value: Achieving Steady State

Competition should drive down ROIC (see Appendix 2), so that new investments generate less value (zero value if the returns equal the discount rate) and the returns and growth rates remain constant thereafter. Once the final forecast period has been reached, a steady state should be in place to allow a reasonable long term growth rate to be assumed in the TV calculation (such as the long term economic growth rate in the country where the business operates) and to ensure revenues, net profits and balance sheet items grow at the same rate.

The steady state growth rate g* (usually revenue growth) should be in place by the final year of the forecast period (year n), so that in the first year of the terminal period (n+1) all balance sheet items (including debt and equity) and flows (free cash flows, profit after tax, dividends and 'Residual Income' – discussed in Part 3) also grow at g*. If interest expense is calculated on opening balances, then steady state should apply to year n-1 (so that debt grows at g* in year n-1 and interest grows at g* in year n).

Appendx 3 provides a simple illustration of steady state (3.0% growth is achieved in year n-1 or year 4). The following assumptions are made:

- Revenues grow at g* and margins are constant from year 4.

- Other assumptions are made to ensure all income components and balance sheet items grow at g* (including debt and equity):

    - The carrying amount of operating fixed assets (Property, Plant & Equipment 'PP&E') at the year end is calculated as a % of revenues for the year:

$$\text{Net PP\&E}_{n+1} = (\text{Net PP\&E}_n \,/\, \text{Revenue}_n) \times \text{Revenue}_{n+1}$$

$$= \text{Net PP\&E}_n \times (1 + g^*)$$

    - The depreciation expense for the year is calculated a % of opening Net PP&E

$$\text{Depreciation (D)}_{n+1} = \text{Net PP\&E}_n \times \text{assumed depreciation rate \%}$$

    - Capex is implied from the above:

$$\text{Capex}_{n+1} = \text{Net PP\&E}_{n+1} - \text{Net PP\&E}_n + D_{n+1} = g^*.\,\text{Net PP\&E} + D_{n+1}$$

    - The carrying amount of working capital at the year end is calculated as a % of revenues for the year:

$$\text{Working capital (WC)}_{n+1} = (WC_n \,/\, R_n) \times R_{n+1}$$

$$= WC_n \times (1 + g^*)$$

$$\therefore \quad \text{Change in WC}_{n+1} = g^* .\, WC_n$$

- As a result RONIC and the Reinvestment Rate are constant and equal to the final forecast year (the average ROIC is also constant)

Integrated Forecast Financial Statements

Once the main components of FCFF have been forecasted (revenues, operating costs, changes in invested capital, tax), non-operating forecasts can be made, principally debt and equity cash flows (after tax), which allows forecast financial statements to be prepared. Although a DCF using FCFF to estimate the EntV does not require financial statements for each forecast period, it is useful to produce them for a number of reasons:

- to identify risk and return measures: credit risk ratios can indicate financial strain, whilst return measures are an important 'value driver'
- to calculate net profits and equity cash flows for other calculation methods (discussed in Part 3): residual net income and equity cash flow methods that should give similar equity values as under the traditional FCFF valuation method (after debt is deducted from Enterprise Value)
- to compare capital structure to assumptions used in the discount rate: the discount rate is calculated based on capital structure assumptions that may or may not be consistent with forecast leverage ratios

Terminal Value

TV based on FCFF

The TV can be determined using a growing perpetuity model:

$$TV_n = \frac{FCFF_{n+1}}{r - g^*}$$

Where n is the last year of the forecast period, $FCFF_{n+1}$ the steady state FCFF in the first year of the terminal period, r the discount rate and g* the steady state growth rate. This would then be discounted back over the forecast period to the valuation date:

$$\text{PV at valuation date} = \frac{TV_n}{(1 + r)^n}$$

TV based on 'NOPAT'

We can replace the FCFF growing perpetuity formula with the following:

$$TV_n = \frac{NOPAT_{n+1} \times (1 - RR)}{r - g^*}$$

$$= \frac{NOPAT_{n+1} \times \left(1 - \frac{g^*}{RONIC_{n+1}}\right)}{r - g^*}$$

In the presence of inflation, g* and RONIC should be expressed in real terms (see Appendix 2).

TV based on multiples

An alternative would be to calculate the TV based on a multiple applied to $FCFF_{n+1}$ (the equivalent to 1 / (r – g*)) or some other measure such as EBITDA, so long as the multiple was suitable for enterprise value (i.e. a Price / Earnings multiple could not be used):

$$TV_n = EBITDA_{n+1} \times \text{multiple}$$

A perpetuity approach would be more traditional, although this could be used to derive the implied multiple as a reasonableness check.

Scenarios

The assumptions that significantly affect the DCF value should be identified so that scenarios can be modelled to indicate a valuation range. Typical 'value drivers' would be revenue growth (including the TV growth rate), EBITDA margins, investments and the discount rate. In the simple case, a best and worst case scenario would be shown in addition to the base case.

Enterprise Value and the 'Bridge'

The sum of the PV of FCFF over the forecast period (n years) and the PV of the TV represents the operating DCF Enterprise Value ('DCF EntV'):

Stready state FCFF

$$\text{Enterprise Value}_0 = \frac{FCFF_1}{(1+r)^1} + \frac{FCFF_2}{(1+r)^2} + \ldots\ldots\ldots + \frac{FCFF_{n-1}}{(1+r)^{n-1}} + \frac{FCFF_n}{(1+r)^n} + \frac{FCFF_{n+1}}{(1+r)^n}$$

Forecast FCFF PV

TV PV

This assumes the discount rate is constant and FCFF is received at the end of the year.

The market value of non-operating assets should be added to the DCF EntV to produce the total EntV. These will include assets that do not generate FCFF, such as surplus cash, head office properties, investments in associates and joint ventures, equity investments, deferred tax assets. The market value of non-operating (i.e. financial) liabilities can be classified as debt (e.g. loans, bonds, preference shares, capitalised leases) or 'debt-equivalent' (e.g. pension deficits). These are deducted off the EntV to arrive at the Equity Value ('EqV'). They will also affect the discount rate (see Part 2).

Cash (whether 'excess cash' or total cash) can be netted off gross debt or kept separate and treated as a non-operating asset. If cash is netted off debt, then income on cash balances should be included in the cost of debt (or rather cost of net debt). If cash is added as a non-operating asset, any related income should be ignored as it is non-operating.

The EqV is shared between current equity investors (ordinary shareholders) and 'equity equivalents', such as Employee Stock Options ('ESOs').

Appendix 4 discusses deferred tax, pension deficits and employee stock options in the context of a DCF valuation.

Other articles will discuss the valuation of some of these financial liabilities (convertible bonds, preferred shares with different rights, leases).

Suggested reading

Books:

Amembal, S.P. & Halladay, S. (1995) *The Handbook of Equipment Leasing Vols 1 + 2* . Publishers Press, Salt Lake City, Utah

Arzac, E.R. (2008) *Valuation for Mergers, Buyouts and Restructurings* (2nd ed.) Wiley.

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Finite Period

If an amount invested (capital or principle) is certain to be recovered at some future date, together with income (investment or interest income based on some rate of return), we can say the investment is risk free as to the amount and timing of the cash flow. The risk free rate of return should apply, meaning the investor is rewarded for the 'time value of money'.

An investment or deposit of PV would, in this case, grow to C at the risk free rate, such that after 1 year C = PV x (1 + r), where C = the cash flow received at the end of the year or the Future Value, PV = Present Value and r = the risk free rate (effective annual rate). The risk free rate is the rate required by the investor for the zero risk investment. Of course, business cash flows are risky and investors will expect a risk premium to be added to the risk free rate.

If C is received after more than 1 year, PV will be compounded if interest is retained on deposit: interest (assumed in this case to be paid annually at the end of each year) will accrue on the opening balance (interest on interest). The future value will equal the present value when the income return has been factored out (discounted, the reverse of compounding):

$$PV = \frac{C}{(1+r)}$$ C received after 1 year

$$PV = \frac{C}{(1+r)(1+r)(1+r)\ldots} = \frac{C}{(1+r)^n}$$ C received after n years

The present value of multiple cash flows received over a specified forecast period can be estimated from:

$$PV = \frac{C}{(1+r)^1} + \frac{C}{(1+r)^2} + \frac{C}{(1+r)^3} + \ldots\ldots\ldots\ldots \frac{C}{(1+r)^n}$$

This can be simplified to:

$$PV = C \times \frac{1}{r} \times \left(1 - \frac{1}{(1+r)^n}\right)$$

PV of constant cash flow received annually for n years

$$= £1.00 \times \frac{1}{r} \times \left(1 - \frac{1}{(1+r)^n}\right)$$

$$= £1.00 \times \frac{1}{0.10} \times \left(1 - \frac{1}{(1+0.1)\verb|^|3}\right)$$

$$= £2.49$$

C	Cash Flow received at period n	£1
r	Discount rate p.a.	10.00%
n	Time in years	3

	1	2	3	
	1.00	1.00	1.00	Cash Flow
2.49	0.91	0.83	0.75	PV

If PV is already known (the fair price in the market), the rate r* that discounts cash flows to PV is the 'Internal Rate of Return' or 'IRR' (if the IRR is greater than the required return r, making the investment and paying PV for it would be worthwhile). The IRR can be calculated in Excel using the XIRR function or determined using trial and error (goal seek). Problems arise (i.e. multiple IRR can result) if there is more than one change in the sign of the cash flow, although this can be avoided using another method to calculate IRR (as when calculating the effective interest rate for measuring amortised cost or the implicit rate for a lease).

If C grows at a rate g over the finite period n:

$$PV = C\frac{(1+g)^1}{(1+r)^1} + C\frac{(1+g)^2}{(1+r)^2} + C\frac{(1+g)^3}{(1+r)^3} + \ldots\ldots\ldots\ldots C\frac{(1+g)^n}{(1+r)^n}$$

This can be simplified to:

$$PV = C \times \frac{1}{r-g} \times \left(1 - \frac{(1+g)^n}{(1+r)^n}\right)$$

PV of growing cash flow received annually for n years

$$= £1.00 \times \frac{(1+0.03)}{r-g} \times \left(1 - \frac{(1+g)^n}{(1+r)^n}\right)$$

$$= £1.00 \times \frac{1.03}{0.1-0.03} \times \left(1 - \frac{(1+0.03)^\wedge 3}{(1+0.1)^\wedge 3}\right)$$

$$= £2.63$$

C	Cash Flow received at period n	£1
r	Discount rate p.a.	10.00%
n	Time in years	3
g	Growth rate p.a.	3.00%

	1	2	3	
	1.03	1.06	1.09	Cash Flow
2.63	0.94	0.88	0.82	PV

If C varies each year, as one would expect in a DCF, we have to discount each period, using the long formulae, until such time as we assume it is constant or growing at a constant rate.

Perpetuity

If C is received in perpetuity (infinite period) without growing (an annuity):

$$PV = C \times \frac{1}{r}$$

If F is received in perpetuity growing at g each year:

$$PV = C \times \frac{1}{r-g}$$

This is the Gordon Growth Model, used in the Dividend Discount Model (discussed in Part 3 of this series) (Gordon & Shapiro (1956), Gordon (1959))

The constant growth perpetuity formula can be adjusted to allow for g to reduce or 'fade' at a linear rate 'f' over time (Holland (2016)):

$$PV = C \times \frac{1}{r - g + f}$$

One Finite Period + Perpetuity ('2-Stage Model')

The 2-stage model combines the equations for finite (time 0 to n) and infinite (time n+1 on) cash flows, allowing for different growth rates (for example an initial high rate g_H followed by a low rate g_L):

$$PV = \underbrace{C_1 \times \frac{1}{r - g_H} \times \left(1 - \frac{(1+g_H)^n}{(1+r)^n}\right)}_{\text{PV today of stage 1}} + \underbrace{\underbrace{C_{n+1} \times \frac{1}{r - g_L}}_{\text{PV at } t_n \text{ of stage 2}} \times \frac{1}{(1+r)^n}}_{\text{PV today of stage 2}}$$

where

C_{n+1} is the cash flow at the end of the first period after the finite period (n + 1). As C_1 is the cash flow received at the end of year 1, $C_{n+1} = C_1 \times (1 + g_H)^{n-1} \times (1 + g_L)$

If we assume a cash flow received today (C_0) grows at g_H to C_1 after one year, then the above formula becomes:

$$PV = C_0 \times \left\{ \frac{1+g_H}{r - g_H} \times \left(1 - \frac{(1+g_H)^n}{(1+r)^n}\right) + \frac{(1+g_H)^n(1+g_L)}{r - g_L} \times \frac{1}{(1+r)^n} \right\}$$

PV of growing cash flow received annually for n years at a high growth followed by a low rate in perpetuity

$$= £1.00 \times \left\{ \frac{(1+5.0\%)}{(10.0\% - 5.0\%)} \times \left(1 - \frac{(1+5.0\%)^\wedge 3}{(1+10.0\%)^\wedge 3}\right) + \left(\frac{(1+5.0\%)^\wedge 3}{(10.0\% - 3.0\%)} \times \frac{(1+3.0\%)}{(1+10.0\%)^\wedge 3}\right) \right\}$$

$$= £1.00 \times \left\{ \frac{1.05}{5.00\%} \times \left(1 - \frac{1.1576}{1.3310}\right) + \left(\frac{1.1576}{7.00\%} \times \frac{1.03}{1.3310}\right) \right\}$$

$$= £1.00 \times \left\{ \left(21.00 \times 0.1303\right) + \left(16.5375 \times 0.7739\right) \right\}$$

$$= £1.00 \times \left(2.7354 + 12.7976 \right)$$

$$= £15.5331$$

			PV	1	2	3	4	
C	Cash Flow received at period n	£1		5.00%	5.00%	5.00%	3.00%	Growth
r	Discount rate p.a.	10.00%		1.05	1.10	1.16	1.19	Cash Flows
n	Time in years	3	2.7354	0.95	0.91	0.87		
gH	High growth	5.00%					17.03	Perpetuity PV
gL	Low growth (perpetuity	3.00%	12.7976				12.80	
			15.5331					

If there is an immediate linear decrease in the growth rate from g_H to g_L over period 2H followed by a constant growing perpetuity at g_L, the 'H' fade model can be used (Fuller and Hsia 1984):

$$\text{PV at time 0} = C_0\left(\frac{1+g_L}{r-g_L}\right) + C_0\left(\frac{H(g_H-g_L)}{r-g_L}\right)$$

$$\text{PV with H Model} = £1.00 \times \left(\frac{(1+3.0\%)}{(10.0\%-3.0\%)} + \frac{(5.0\%-3.0\%)}{(10.0\%-3.0\%)}\ H=1.5\right)$$

$$= £1.00 \times \left(\underset{\textit{Low g}}{14.7143} + \underset{\textit{Fading high g}}{0.4286}\right)$$

$$= £15.1429$$

C	Cash Flow received at period 0		£1
r	Discount rate p.a.		10.00%
n	Time in years	2H	3
H	Time in years	H	1.5
gH	High growth		5.00%
gL	Low growth (perpetuity		3.00%

(see Damodaran (2025) ch.14 for further discussion on the H model)

Two Finite Periods + Perpetuity ('3-Stage Model')

The 3-stage model shows cash flows growing at three different rates, an initial phase (with growth g_1), an interim phase (with growth g_2) and a perpetuity phase (with growth g_3). Growth rates would typically reduce from g_1 to g_3, although the transition period can incorporate a reducing growth rate that 'fades' over the period from g_1 to g_3, following the H model above.

The 3-stage model can be shown as:

$$PV = C_1 \times \frac{1}{r-g_1} \times \left(1 - \frac{(1+g_1)^{n1}}{(1+r)^{n1}}\right) \quad \text{1}^{\text{st}} \text{ stage}$$

$$+ \; C_{n1+1} \times \frac{1}{r-g_2} \times \left(1 - \frac{(1+g_2)^{n2}}{(1+r)^{n2}}\right) \quad \text{2}^{\text{nd}} \text{ stage (Typically modelled as a 'fade' period)}$$

$$+ \; C_{n2+1} \times \frac{1}{r-g_3} \times \frac{1}{(1+r)^{n2}} \quad \text{3}^{\text{rd}} \text{ stage}$$

The main growing perpetuity TV formula that decomposes FCF into NOPAT, g and RONIC is:

$$TV_n = \frac{NOPAT_{n+1} \times \left(1 - \frac{g^*}{RONIC_{n+1}}\right)}{r - g^*}$$

where:

NOPAT = Free Cash Flows to the Firm (FCFF) + New Invested Capital (NIC)
NIC = (Capital expenditures – Depreciation) + Increase / (decrease) in working capital
RONIC = Return On New Invested Capital
g^* = Steady state (sustainable) growth rate of NOPAT (and Invested Capital)

Replacing NOPAT with $ROIC_{n+1} \times IC_n$:

$$TV_n = \frac{ROIC_{n+1} \times IC_n \times \left(1 - \frac{g^*}{RONIC_{n+1}}\right)}{r - g^*} \qquad \text{A2.1}$$

The TV in Appendix 3 can be shown as:

$$\frac{12.40\% \times 632.89 \left(1 - \frac{3.00\%}{12.40\%}\right)}{10.00\% - 3.00\%}$$

$$= \frac{78.45 \left(1 - 24.20\%\right)}{7.00\%}$$

$$= \frac{59.47}{7.00\%}$$

$$= 849.52$$

As Invested Capital grows at the steady state rate of g^* and NIC = growth x Invested Capital at the start of the period:

$$NIC_{n+1} = g^* \times IC_n$$

We can replace these expression in the FCFF – NOPAT equation:

$$FCFF_{n+1} = NOPAT_{n+1} - NIC_{n+1}$$

$$= (ROIC_{n+1} \times IC_n) - (g^* \times IC_n)$$

$$= IC_n \times (ROIC_{n+1} - g^*)$$

$$TV_n = IC_n \times \left(\frac{ROIC_{n+1} - g^*}{r - g^*} \right) \quad \text{A2.2}$$

The TV in Appendix 3 can be shown as:

$$632.89 \times \left(\frac{12.40\% - 3.00\%}{10.00\% - 3.00\%} \right)$$

$$= 849.52$$

This TV formula can be rewritten in a number of ways:

(see Koller et al. (McKinsey) 2025 p.866, p288)

$$TV_n = IC_n + IC_n \left(\frac{ROIC_{n+1} - r}{r - g^*} \right) \quad \text{A2.3}$$

$$632.89 + 632.89 \left(\frac{12.40\% - 10.00\%}{10.00\% - 3.00\%} \right)$$

$$= 632.89 + 216.63$$

$$= 849.52$$

This formula will be mentioned again when alternative DCF methods are covered in Part 3 of this series. The formula shows the TV as the value of net operating assets (Invested Capital) existing at the start of the terminal period (IC_n) and the value derived from future investments (NIC) made in perpetuity. Value will be created if the expected return on assets (ROIC) exceeds the required return ('excess returns'). The average return on all assets (ROIC) is used here as it is being calculated on total net operating assets (IC).

The second term $IC_n \left(\frac{ROIC_{n+1} - r}{r - g^*} \right)$ can also be shown as follows:

(see Koller et al. (McKinsey) 2025 p.288)

$$= \frac{IC_n \left(ROIC_{n+1} - r \right)}{r} + \frac{\left\{ \frac{NOPAT_{n+1} \left(\frac{g^*}{RONIC_{n+1}} \right) \left(RONIC_{n+1} - r \right)}{r} \right\}}{r - g^*} \quad \text{A2.4}$$

$$= 632.89 \left(\frac{12.40\% - 10.00\%}{10.00\%} \right) + \frac{\left[\frac{78.45 \left(\frac{3.00\%}{12.40\%} \right) \left(12.40\% - 10.00\% \right)}{10.00\%} \right]}{10.00\% - 3.00\%}$$

$$= \frac{15.16}{10.00\%} + \frac{4.55}{10.00\% - 3.00\%}$$

$$= 151.64 + 64.99$$

$$= 216.63$$

This breaks the return on all assets down into a constant perpetuity value (first terminal year excess returns on all assets received in perpetuity) and a growing perpetuity value (second terminal year excess returns on new investments growing in perpetuity). If RONIC = r the second term is zero as new investments will not create value (until RONIC is greater than r).

We can also write the TV as a no growth value (NOPAT / r) plus the value of future growth:

(see Arzac 2008 p.90)

A2.5

$$TV_n = \frac{NOPAT_{n+1}}{r} + \frac{NOPAT_{n+1}}{r} \left(\frac{ROIC_{n+1} - r}{ROIC_{n+1}} \right) \left(\frac{g^*}{r - g^*} \right)$$

$$\frac{78.45}{10.00\%} + \frac{78.45}{10.00\%} \left(\frac{12.40\% - 10.00\%}{12.40\%} \right) \left(\frac{3.00\%}{10\% - 3\%} \right)$$

$$= 784.53 + 784.53 \left(19.33\% \times 42.86\% \right)$$

$$= 784.53 + 64.99$$

$$= 849.52$$

Inflation

In a high inflation environment growth, rates and returns should be expressed in real terms to account for inflation:

$$TV_n = \frac{NOPAT_{n+1} \times \left(1 - \frac{g^{*real}}{RONIC_{n+1}^{real}} \right)}{(r^{real} - g^{*real})(1 + i)}$$

where

i = the inflation rate

g^{*real} = $(1 + g^{*nominal}) / (1 + i) - 1 = (g^{*nominal} - i) / (1 + i)$

$RONIC_{n+1}^{real}$ = reinvestment rax x g^{*real}

The real RONIC is here implied from the fixed reinvestment rate, so that the implied $RONIC_{n+1}^{nominal}$ will differ when ignoring inflation. From Appendix 3, if we assume inflation is 1.98% so the real growth rate is 1.0%, the implied nominal RONIC drops from 12.40% if inflation is zero to 6.19% taking into account inflation (this is based on Arzac 2005 p.17 - see Koller et al. (McKinsey) 2025 p.502 for a discussion about converting all figures, including NOPAT, into real terms).

Inflation	1.98%			
RR	24.20%			
		Nominal	Real	
Growth		3.00%	1.00%	= (1 + 3.00%) / (1 + 1.98%) - 1
r		10.00%	7.86%	= (1 + 10.00%) / (1 + 1.98%) - 1
Implied Real RONIC			4.13%	= 1.00% / 24.20%
Implied Nominal RONIC		6.19%		= (1 + 4.13%) x (1 + 1.98%) - 1
RONIC (ignoring inflation)		12.40%		

$$\frac{78.45\left(1 - \frac{1.00\%}{4.13\%}\right)}{\left(7.86\% - 1.00\%\right) \times 101.98\%}$$

$$= \frac{78.45\left(1 - 24.20\%\right)}{6.86\% \times 101.98\%}$$

$$= \frac{59.47}{7.00\%}$$

$$= 849.52$$

This simplified example illustrates the basic principles of DCF Enterprise Valuation ('EntV'), particularly the requirement for a steady state towards the end of the forecast period. A detailed discussion of steady state cash flows, along with a DCF model can be found in Jennergren (2011). To simplify things, deferred tax and adjustments to the EntV to arrive at Equity Value ('EqV') have been ignored.

In the base case, revenues have reached the long term sustainable growth rate used in the perpetuity (3.0%) by year 3, and by year 4 all flows and balances in the financial statements grow at this rate. ROIC and RONIC are both constant and equal at 12.40% (and will remain this way happily forever), since the proportion of NOPAT reinvested as New Invested Capital (NIC) is fixed at the year 5 level[1]. Discounting the year 5 TV and forecast period cash flows at a constant 10.0% gives a base case EnV of 750.00 and EqV of 600.00.

If revenue growth, operating expenses / revenues and the discount rate are changed by 1.0% increase / decrease, 0.5% decrease / increase and 1.0% decrease / increase respectively, the EntV ranges from 1,120.87 to 544.69. Over 85% of the variation is due to the TV, because the based case growth adjusted perpetuity discount rate ranges 7.0% +/- 2.0%. Also RONIC in the worst case scenario has decreased below the discount rate, meaning new investments are value destructive.

It is assumed the book value of debt equals market value ('MV') and all 'excess cash' is paid out to shareholders. This valuation illustrates the approach of some experts by assuming cash required to operate the business ('Operating Cash') approximates 2.0% of annual revenue (see Koller et al. (McKinsey) 2025 p.213, p.336). Some argue that cash should not be separated into operating and excess cash (see Caness & Jarrell (2022)), but is shown in this example. Some also question whether operating cash should be included in working capital rather than treated separately as cash. It is treated here as part of working capital, so the increase in working capital includes the increase in operating cash. How cash is treated in general will be discussed in Part 2 of this Series.

Calculation of the discount rate assumes the MV of debt as a percentage of the MV of debt and equity (the EntV) is constant at 20%, and debt levels have been set to ensure this occurs. This requires circularity and a 'recursive' procedure, where the EntV Terminal Value ('TV') is first calculated in order to set the debt at the end of the forecast period. The EntV at the prior period (year 4) equals the TV plus the year 5 Free Cash Flow to the Firm (FCFF) both discounted back one period, which allows year 4 debt to be calculated. This procedures is carried on back to the valuation date, at which time interest can be calculated (going forward) and net income determined (allowing for tax relief).

1 If, instead, RR were to increase to 30% and growth rates remain at 3.0%, RONIC would reduce to 10.0% (ROIC reduces to 10.0% very slowly over some 200 years) since more investment would be required to generate the same growth (RONIC = g / RR). As this equals the discount rate, the NIC will not add any value.

		Forecast Year				
		1	2	3	4	5
PROFIT & LOSS						
Revenues		2,121.80	2,229.16	2,296.04	2,364.92	2,435.87
Operating expenses		(1,909.62)	(2,048.22)	(2,122.69)	(2,186.37)	(2,251.96)
EBITDA		212.18	180.94	173.35	178.55	183.91
Depreciation		(69.64)	(73.89)	(77.62)	(79.95)	(82.35)
EBIT		142.54	107.05	95.73	98.60	101.56
Interest		(10.50)	(10.56)	(10.88)	(11.21)	(11.55)
Pre-tax profits		132.04	96.49	84.84	87.39	90.01
Tax		(33.01)	(24.12)	(21.21)	(21.85)	(22.50)
Post-tax profits		99.03	72.37	63.63	65.54	67.51
Dividends		(63.62)	(49.08)	(50.92)	(52.45)	(54.02)
Retained profits		35.41	23.29	12.71	13.09	13.48
CASH FLOWS						
EBITDA		212.18	180.94	173.35	178.55	183.91
less: capital expenditures		(94.00)	(95.36)	(91.00)	(93.73)	(96.54)
less: increase in working capital		(11.93)	(6.42)	(4.00)	(4.12)	(4.24)
less: taxes paid (excluding financing)		(35.63)	(26.76)	(23.93)	(24.65)	(25.39)
Free Cash Flows to the Firm	FCFF	**70.62**	**52.39**	**54.42**	**56.05**	**57.73**
Debt cash flows (after tax relief on interest)		(7.00)	(3.31)	(3.50)	(3.60)	(3.71)
Dividends paid to ordinary shareholders		(63.62)	(49.08)	(50.92)	(52.45)	(54.02)
Net cash flows		-	-	-	-	-
Opening cash		-	-	-	-	-
Closing cash		-	-	-	-	-
EBITDA		212.18	180.94	173.35	178.55	183.91
Depreciation		(69.64)	(73.89)	(77.62)	(79.95)	(82.35)
EBIT		142.54	107.05	95.73	98.60	101.56
less: taxes paid (excluding financing)		(35.63)	(26.76)	(23.93)	(24.65)	(25.39)
Net Operating Profits After Taxes	NOPAT	**106.90**	**80.29**	**71.80**	**73.95**	**76.17**
Capital expenditures ('capex')		94.00	95.36	91.00	93.73	96.54
less: replacement capex (depreciation)		(69.64)	(73.89)	(77.62)	(79.95)	(82.35)
Growth capex		24.36	21.47	13.37	13.78	14.19
Increase in working capital		11.93	6.42	4.00	4.12	4.24
New Invested Capital	NIC	36.29	27.90	17.38	17.90	18.43
Free Cash Flows	FCFF	70.62	52.39	54.42	56.05	57.73

BALANCE SHEET	Opening	1	2	3	4	5
At cost	500.00	533.25	564.16	587.45	611.43	636.14
Accumulated depreciation	(100.00)	(108.89)	(118.33)	(128.24)	(138.45)	(148.97)
Fixed assets	400.00	424.36	445.83	459.21	472.98	487.17
Working capital (including operating cash)	115.00	126.93	133.35	137.35	141.47	145.71
Invested Capital	**515.00**	**551.29**	**579.18**	**596.56**	**614.45**	**632.89**
Opening Invested Capital	515.00	515.00	551.29	579.18	596.56	614.45
New Invested Capital	-	36.29	27.90	17.38	17.90	18.43
Closing Invested Capital	515.00	551.29	579.18	596.56	614.45	632.89
Gross debt	150.00	150.88	155.49	160.15	164.95	169.90
Excess cash	-	-	-	-	-	-
Net debt	150.00	150.88	155.49	160.15	164.95	169.90
Share Capital	100.00	100.00	100.00	100.00	100.00	100.00
Reserves	265.00	300.41	323.69	336.41	349.50	362.98
Equity	365.00	400.41	423.69	436.41	449.50	462.98
Financial Capital	**515.00**	**551.29**	**579.18**	**596.56**	**614.45**	**632.89**

ASSUMPTIONS

	Forecast Year				
	1	2	3	4	5
Revenue growth rate	6.09%	5.06%	3.00%	3.00%	3.00%
Operating expenses / revenues	90.00%	91.88%	92.45%	92.45%	92.45%
Operating cash / revenues	1.90%	1.90%	1.90%	1.90%	1.90%
Working capital / Revenues	4.08%	4.08%	4.08%	4.08%	4.08%
Depreciation / Opening Net PP&E	17.41%	17.41%	17.41%	17.41%	17.41%
Retirements / Opening Net PP&E	15.19%	15.19%	15.19%	15.19%	15.19%
Net PP&E / Revenues	20.00%	20.00%	20.00%	20.00%	20.00%
Tax rate	25.0%	25.0%	25.0%	25.0%	25.0%

METRICS

	1	2	3	4	5
Growth rates					
Revenue growth		5.06%	3.00%	3.00%	3.00%
EBITDA growth		-14.72%	-4.19%	3.00%	3.00%
Depreciation growth		6.09%	5.06%	3.00%	3.00%
EBIT growth		-24.89%	-10.58%	3.00%	3.00%
NOPAT growth		-24.89%	-10.58%	3.00%	3.00%
Capex growth		1.44%	-4.57%	3.00%	3.00%
Working capital growth		5.06%	3.00%	3.00%	3.00%
Free Cash Flow growth		-25.80%	3.87%	3.00%	3.00%
Fixed Assets growth		5.06%	3.00%	3.00%	3.00%
Invested Capital growth		5.06%	3.00%	3.00%	3.00%
Interest growth		0.58%	3.05%	3.00%	3.00%
Net Profit growth		-26.92%	-12.07%	3.00%	3.00%
Net debt growth		3.05%	3.00%	3.00%	3.00%
Equity growth		5.82%	3.00%	3.00%	3.00%
Ratios					
EBIT margin	6.72%	4.80%	4.17%	4.17%	4.17%
Capex / depreciation	x 1.35	x 1.29	x 1.17	x 1.17	x 1.17
Capex / revenue	4.43%	4.28%	3.96%	3.96%	3.96%
Change Working Capital / Revenues	0.56%	0.29%	0.17%	0.17%	0.17%
Invested Capital / Revenues	25.98%	25.98%	25.98%	25.98%	25.98%
Reinvestment Rate	33.94%	34.74%	24.20%	24.20%	24.20%
Return On Invested Capital (ROIC)	20.76%	14.56%	12.40%	12.40%	12.40%
Return on New Invested Capital (RONIC)		-73.34%	-30.45%	12.40%	12.40%
Discount rate	10.00%	10.00%	10.00%	10.00%	10.00%

WACC is the discount rate, or the ‘Weighted Average Cost of Capital’, which is the subject of Part 2 of this Business Valuation Series.

DCF VALUATION		Forecast Year				
		1	2	3	4	5
Free Cash Flows to the Firm		70.62	52.39	54.42	56.05	57.73
Terminal Value		-	-	-	-	849.52
Post-Tax WACC at start of year		10.00%	10.00%	10.00%	10.00%	10.00%
Discount factor		0.9091	0.8264	0.7513	0.6830	0.6209
PV of cash flows today	**750.00**	64.20	43.30	40.89	38.28	563.33
less: market value of debt at valuation date	(150.00)					
Equity Value	**600.00**					
Enterprise value at year end	750.00	754.38	777.43	800.75	824.77	849.52
Debt	(150.00)	(150.88)	(155.49)	(160.15)	(164.95)	(169.90)
Equity	600.00	603.51	621.94	640.60	659.82	679.61
Debt / Enterprise Value		20.00%	20.00%	20.00%	20.00%	20.00%

FCFF Perpetuity TV

Final year FCFF	57.73
Growth rate	3.00%
Discount rate	10.00%
TV = 57.73 x (1 + 3.00%) / (10.00% - 3.00%)	849.52

Final year NOPAT	76.17		
Reinvestment Rate	24.20%	g	3.00%
FCFF	57.73	RONIC	12.40%
First terminal period EBITDA			189.43
Implied Forward EBITDA x			x 4.5

BEST CASE

			Forecast Year				
			1	2	3	4	5
EBITDA			224.70	195.47	189.91	197.51	205.41
Depreciation			(69.64)	(74.52)	(78.99)	(82.15)	(85.44)
EBIT			155.06	120.95	110.92	115.36	119.97
less: taxes paid (excluding financing)			(38.76)	(30.24)	(27.73)	(28.84)	(29.99)
Net Operating Profits After Taxes	NOPAT		**116.29**	**90.71**	**83.19**	**86.52**	**89.98**
Capital expenditures ('capex')			97.64	100.20	97.14	101.02	105.06
less: replacement capex (depreciation)			(69.64)	(74.52)	(78.99)	(82.15)	(85.44)
Growth capex			28.00	25.68	18.15	18.87	19.63
Increase in working capital			13.01	7.68	5.43	5.64	5.87
New Invested Capital	NIC		41.01	33.36	23.57	24.52	25.50
Free Cash Flows	**FCFF**		**75.28**	**57.35**	**59.62**	**62.00**	**64.48**
Revenue growth rate		+ 1.00%	7.00%	6.00%	4.00%	4.00%	4.00%
Op. expenses / revenues		- 0.50%	89.50%	91.38%	91.95%	91.95%	91.95%
EBIT growth				-22.00%	-8.29%	4.00%	4.00%
Free Cash Flow growth				-23.82%	3.95%	4.00%	4.00%
Invested Capital growth				6.00%	4.00%	4.00%	4.00%
Net debt growth				4.00%	4.00%	4.00%	4.00%
Equity growth				7.41%	4.00%	4.00%	4.00%
Free Cash Flows to the Firm			75.28	57.35	59.62	62.00	64.48
Terminal Value			-	-	-	-	1,341.18
Post-Tax WACC at start		- 1.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Discount factor			0.9174	0.8417	0.7722	0.7084	0.6499
PV of cash flows today		**1,120.87**	69.06	48.27	46.03	43.92	913.58

Final year FCFF	64.48
Growth rate	4.00%
Discount rate	9.00%
TV = 64.48 x (1 + 4.00%) / (9.00% - 4.00%)	1,341.18

Final year NOPAT	89.98		
Reinvestment Rate	28.34%	g	4.00%
FCFF	64.48	RONIC	14.11%
First terminal period EBITDA			213.62
Implied Forward EBITDA x			x 6.3

WORST CASE

		Forecast Year				
		1	2	3	4	5
EBITDA		199.50	166.35	157.05	160.19	163.40
Depreciation		(69.64)	(73.13)	(76.05)	(77.57)	(79.12)
EBIT		129.86	93.23	81.00	82.62	84.27
less: taxes paid (excluding financing)		(32.46)	(23.31)	(20.25)	(20.66)	(21.07)
Net Operating Profits After Taxes		**97.39**	**69.92**	**60.75**	**61.97**	**63.20**
Capital expenditures ('capex')		89.64	89.93	84.79	86.48	88.21
less: replacement capex (depreciation)		(69.64)	(73.13)	(76.05)	(77.57)	(79.12)
Growth capex		20.00	16.80	8.74	8.91	9.09
Increase in working capital		10.62	5.02	2.61	2.67	2.72
New Invested Capital		30.62	21.82	11.35	11.58	11.81
Free Cash Flows		**66.77**	**48.09**	**49.40**	**50.39**	**51.40**
Revenue growth rate	- 1.00%	5.00%	4.00%	2.00%	2.00%	2.00%
Op. expenses / revenues	+ 0.50%	90.50%	92.38%	92.95%	92.95%	92.95%
EBIT growth			-28.21%	-13.11%	2.00%	2.00%
Free Cash Flow growth			-27.97%	2.72%	2.00%	2.00%
Invested Capital growth			4.00%	2.00%	2.00%	2.00%
Net debt growth			2.06%	2.00%	2.00%	2.00%
Equity growth			4.48%	2.00%	2.00%	2.00%
Free Cash Flows to the Firm		66.77	48.09	49.40	50.39	51.40
Terminal Value		-	-	-	-	582.50
Post-Tax WACC at start	+ 1.00%	11.00%	11.00%	11.00%	11.00%	11.00%
Discount factor		0.9009	0.8116	0.7312	0.6587	0.5935
PV of cash flows today	**544.69**	60.15	39.03	36.12	33.19	376.19

Final year FCFF	51.40
Growth rate	2.00%
Discount rate	11.00%
TV = 51.40 x (1 + 2.00%) / (11.00% - 2.00%)	582.50

Final year NOPAT	63.20		
Reinvestment Rate	18.68%	g	2.00%
FCFF	51.40	RONIC	10.71%
First terminal period EBITDA			166.66
Implied Forward EBITDA x			x 3.5

Deferred Tax

General principles

A fundamental principle of accruals based financial reporting ('Generally Accepted Accounting Practice' / 'GAAP', such as IAS and IFRS financial reporting standards issued by the International Accounting Standards Board) is that expenditure is matched with related income and both are accrued for in the same period (booked according to the period they relate to rather than when the cash effect arises). For example, the upfront cost of acquiring an asset should be matched over time in the income statement against the periodic revenue and profits arising from the use of the asset (including its sale). This is achieved via depreciation (tangible assets) and amortisation (intangible assets). The deduction for tax purposes in respect of the cost of the asset may not equal the expense for accounting purposes due to permanent differences (amounts that are disallowed for tax purposes, just as some income might be exempt) and 'temporary' differences (mainly due to timing differences that arise when the expense is included in the accounting profit in one period but in the taxable profit in another, but can arise in other cases, such as when assets are revalued for accounting purposes but not for tax purposes). Such differences also arise for income and gains.

In the UK, a tax deduction for the cost of a tangible asset might be accelerated and arise in full in the year of acquisition or be allocated on a reducing balancing basis. Depreciation in the income statement is usually based on a straight-line allocation of the 'Depreciable Amount' (qualifying cost less 'residual value' at the end of its useful life – IAS 16 para.6) over the period during which the asset is available for use by the business ('Useful Life'). This difference is only temporary, however, as whilst in early years 'tax depreciation' is greater than accounting depreciation (taxable profit is less than accounting profit) a reversal occurs later on (taxable profit is more than accounting profit). Over the life of the asset, tax depreciation will equal accounting depreciation.

For these assets, the carrying amount in the balance sheet equals cost less accumulated depreciation, whilst the 'tax base' (on which capital allowances are based) equals cost less accumulated tax allowances. If the carrying amount exceeds the tax base, the accumulated deductions for tax purposes given so far have been greater than those for accounting purposes. When the temporary difference reverses, more tax will be payable and this should be provided for via a deferred tax liability. Under IFRS, a liability is a present obligation arising from past 'obligating' events that will, in all probability, lead to an outflow of economic benefits and is provided for (non-current) if it can be measured reliably (IAS 37). Discounting is not permitted under IAS 12 (para.53).

Deferred tax liabilities

A deferred tax liability on 'taxable temporary differences' will arise on the excess of the carrying amount of an asset over its 'tax base' (tax rate applicable for the period x (A_{IFRS} - A_{TAX})) and vice versa for a liability (tax rate x (L_{TAX} - L_{IFRS})). The deferred tax charge is the increase in the liability over the period. When calculating NOPAT or FCFF, deferred tax needs to be determined for operating assets and liabilities and only the increase in operating deferred tax liabilities is deducted from the statutory tax that applies to taxable operating EBITA (Koller at al. (McKinsey) (2025) p.220 and ch.20).

Deferred tax assets

A deferred tax asset arises where there are 'deductible temporary differences' (A_{TAX} - A_{IFRS} for assets and L_{IFRS} - L_{TAX} for liabilities) and where tax losses carried forward from prior periods are available to reduce taxable profits (s45- s45D Corporation Tax Act 2010 in the UK, subject to carry forward restrictions under part 7ZA of that Act). A deferred tax asset can only be recognised if its recovery is probable and sufficient taxable profits will be available in the future to utilise the deductible temporary differences [para. 25, 27 IAS 12].

Valuation treatment

Deferred tax liability balances are ignored when adjusting the Enterprise Value for net non-operating assets (Holthausen & Zmijewski (2020) p.117). Deferred tax assets should be treated as non-operating assets and valued separately (Koller at al. (McKinsey) (2025) p.216).

Pension Deficits (Defined Benefit)

General Principles

In a funded Defined Benefit Plan the company agrees to provide future benefits from a fund of investments built up over the years with contributions by the employer (and possibly the employees). The present value of the Defined Benefit obligations (DBO) may be more than the market value of the fund assets, meaning a shortfall ('deficit'), for which the company is liable, has arisen (a 'surplus' arises if plan assets are valued in excess of the obligations). The fund accumulates from ongoing contributions and a return on investment (dividends, interest) which are reinvested. Whilst the plan assets are easily measured, the liability requires actuarial techniques to forecast future benefit payments. In simplistic terms:

- the fair value of the fund assets will change over the period n to n + 1 as follows:

$$Assets_{n+1} = Assets_n + \text{contributions paid in} + \text{interest income} - \text{benefits paid out} + A_{G/L}$$

- the PV of the DBO will change as follows:

$$DBO_{n+1} = DBO_n + \text{service cost} + \text{interest costs} - \text{benefits paid out} + DBO_{G/L}$$

Where:

- Service cost (P&L operating profits) = increase in PV of DBO from employee service in the current period ('current service cost') + prior periods (amendments and curtailments)

- Net Interest income and costs (P&L non-operating) = the discount rate applied to the opening value of plan assets and DBO (the difference between the discount rate and actual return on assets is included in $A_{G/L}$). The discount rate must reflect the end of period yield on high quality corporate bonds.

- $A_{G/L}$ and $DBO_{G/L}$ (Other Comprehensive Income) = the gain / loss on re-measurement of plan assets at year end market prices and obligations at revised actuarial assumptions.

A surplus is recognised on the balance sheet as an asset subject to an 'asset ceiling' that reflects the surplus recoverable amount (the PV of future refunds and reductions in future contributions resulting from there being a surplus).

Operating EBITA should include the service cost and no adjustment is made for valuation purposes (it is part of NOPAT). If FCFF or NOPAT is calculated from net income, the defined benefit cost excluding the service cost needs to be added back, net of tax.

A DBO net liability for valuation purposes should be treated as a debt equivalent and deducted off the Enterprise Value. If contributions required to eliminate the deficit are fully tax deductible, the amount deducted is DBO x (1 – marginal tax rate). Any related interest costs (net of tax) should be excluded from FCFF (and included in the discount rate as they relate to the pension deficit debt-equivalent). Adjustments may also be made when de-levering and levering betas under CAPM for the cost of equity estimate, to factor in additional risk borne by shareholders if appropriate (betas would need to be estimated for pension liabilities and assets)

(See Koller at al. (McKinsey) (2025) p.455-464, 881; Jin, Merton & Bodie 2006; https://www.footnotesanalyst.com/dcf-and-pensions-enterprise-or-equity-cash-flow/)

Employee Stock Options

General principles

A company which has granted employee stock options (ESOs) that remain unexercised at the valuation date has created a future claim (or 'contingent' claim) over the equity value, triggered when the options are exercised (assuming exercised at a price below market price). The cost for the company of repurchasing stock to give as options (number of options x share price) less the proceeds received on exercise (number of options x exercise price), reflects the loss of value (the Treasury method assumes exercise proceeds are used to repurchase shares at the share price with the excess shares required to top up to the number of options being new diluting shares). Similarly, if options are granted after the valuation date, a further claim on equity will arise via a reduction in expected future cash flows to which existing equity investors are entitled.

Valuation treatment

One approach to valuation is as follows:

- Options granted before the valuation date (deduct from value) - The Fair Value ('FV') of options outstanding at the valuation date can be estimated using an option pricing model and deducted from the equity DCF value (option pricing methods will be discussed in another article). The equity value per share should be based on outstanding shares (issued shares less treasury shares) and not increased to reflect dilution arising on option exercise (the effect is already taken into account by reduching equity value).

- Options granted after the valuation date (deduct from cash flows) - Rather that attempt to forecast future option grants and exercise behaviour, the FV of option grants can be based on a percentage applied to revenues (Damodaran (2005)) or a growth rate applied to the previous period amount (Li and Wong (2004)). This would then be deducted this from earnings and cash flows (despite being a non-cash item). Deducting from Free Cash Flows estimated cash outflows arising from the granting of options over the forecast period would require a forecast of DCF share prices (equity DCF value per share at each period), exercise prices (which could be the grant date DCF share price), option grants and exercise behaviour, making the calculation tricky (see Barenbaum & Schubert (2019)). Using an option pricing model to measure the FV charge each period would need more assumptions for the risk free rate, volatility and dividend yield, adding more complexity.

Lease Characteristics

Under a lease agreement, one party (the 'lessor') grants another (the 'lessee') full use of an asset for a period ('primary lease term') in return for a rental, subject to certain terms and conditions. The lessor may have legal title to the asset, or lease it from its legal owner (the 'head lessor'); the lessee may be entitled to 'sub-lease' the asset to a 'sub-lessee'. There may, therefore, be more than one lease agreement relating to a single asset. The lessee would normally return the asset to the lessor at the end of the primary lease term, having maintained it and restored it to the minimum condition stated in the lease agreement; however, it may be granted the right to extend the lease into a 'Secondary' term at a stipulated rent ('Renewal Option') or to purchase the asset ('Purchase option'). A significant risk for the lessor is the uncertainty associated with the value of the asset at the end of the lease term ('Residual Value').

If the lessor can earn its required rate of return from cash flows that the lessee has contracted to pay or guarantee over a non-cancellable term ('Minimum Lease Payments' / 'MLP,' being rentals and any guaranteed payments for all or part of the Residual Value), the lease would be termed a 'Full Payout' lease. The lessor has effectively sold its economic interest in the asset to the lessee, and its required return would be achieved whatever the Residual Value: any proceeds from the sale of the asset at the end of the lease could be returned to the lessee as a rebate of rentals (if the asset had a nil Residual Value, the lease term would represent 100% of the asset's remaining economic life at the start of the lease). The PV of the MLP, as a percentage of the asset fair value is an indication of how much effective economic ownership has been transferred to the lessee.

Lease Recognition under IFRS

Prior to the introduction of IFRS 16 *Leases* (effective from 2019), under IAS 17, leases classified as Finance Leases ('FL') (substantially all the risks and rewards associated with ownership transferred to the lessee) were capitalised by lessees at the PV of MLP. By contrast, where the lessor retained enough risk, the lease was classified as an Operating Lease ('OL') with lessee rentals charged to the P&L and no requirement for lessee to capitalise lease payments (a form of off-balance sheet financing). The PV of future lease payments under a FL effectively represent debt servicing on borrowings used to purchase the asset (payments of principal and interest added into the lease rental), which would be treated separately (a liability for future rentals, a depreciated asset and interest and depreciation expenses in the P&L). An OL required only the rental charge to be shown as an expense.

Under IFRS 16, if an agreement that qualifies as a lease contract conveys the right to the lessee to control the use of an identified asset for a period of time in return for consideration, it should be classified as a lease and capitalised as a 'Right-Of-Use' asset ('ROUA'), even if it would have been classified as an OL under the old rules (the lessee can opt out if the lease is for 12 months or less and does not contain a purchase option, or if the lease is deemed to be of low value).

On initial recognition, the cost of the ROUA is recognised as an asset and the PV of the Lease Payments ('LP') as a liability discounted at the interest rate implicit in the lease. LP are the enforceable payments over the lease term (actual and 'in-substance' fixed payments, variable payments that depend on an index or rate, the exercise price of any purchase option that the lessee is reasonably certain to exercise and amounts payable by the lessee under any RV guarantees).

The term starts on the date the asset is made available for use by the lessee and ends when the lease is no longer enforceable.This includes the non-cancellable period and any period covered by an option granted to the lessee to extend the lease (where it is reasonably certain the extension option will be exercised) or terminate the lease (where it is reasonably certain the termination option will not be exercised). If the lessee has the right to purchase the ROUA, and exercising the right was reasonably certain, that would be considered as well. When the lessor and lessee can terminate the lease for an insignificant penalty and without permission from the other party, the lease is no longer enforceable and has come to an end.

The interest rate implicit in the lease is the IRR that discounts the lessee's LP and any unguaranteed RV that the lessor expects to receive to the asset fair value (plus any 'initial direct costs'). If the lessee cannot readily determine this rate (if it does not know what unguaranteed RV the lessor is expecting), it may use its 'incremental borrowing rate' (the rate the lessee would expect to pay to borrow funds to obtain an asset of similar value to the ROUA, based on a similar term, security and economic environment).

Lease Taxation under UK Rules

For some leases a lessee is able to claim capital allowances in the UK, and thereby accelerate tax deductions compared to relief available for rental payments on other leases. Prior to 2006, the availability of allowances was restricted to legal ownership (and assets under Hire Purchase agreements). Since that date, lessees under Long Funding Leases (LFL) can claim allowances as if they owned the asset (Capital Allowances Act 2001). A LFL is a Funding Lease that is neither a Short Lease (7 years or less) nor an Excluded Lease (including Hire Purchase agreements), and is a lease of qualifying plant and machinery ('P&M') where one of the following tests applies at the inception date (the date the contract is agreed and all conditions have been met): (1 the lease qualifies as finance lease (or loan) under GAAP in the lessee's accounts; or (2) the PV of the MLP is at least 80% of the fair value of the leased P&M, discounted at the implicit rate or, if that cannot be determined, the incremental borrowing rate (as defined under GAAP); or (3) the lease term is more than 65% of the remaining useful economic life of the leased P&M. Capitalised leases that do not meet these tests will be eligible for relief on the rental expense (no accelerated allowances are given), if the lease gross rental charge is consistent with the accruals concept under GAAP. The rental charge will represent the finance charge and depreciation.

Lease Example

This example illustrates a 'leveraged' lease. It is structured to ensure capital allowances remain with the lessor (short funding lease) so that the tax benefits from financing the asset purchased with debt can be obtained and partly passed to the lessee as reduced rentals.The pre-tax implicit rate in the lease is 6.54% (used to capitalise the lessee's rentals).

Lease Assumptions

LEASE	
Asset cost	£1,000,000
Financed by lessor	80.0% debt, 20.0% equity
Lease start date	30 Jun 2025
Primary lease term	6.0 years
Primary lease rental	£48,770 quarterly in arrears
Rental pattern	Fixed
Primary lease term / Asset life	92.3%
Residual Value	£50,000 (5.0% of day 1 value)
Lessee Residual Value guarantee	0%
Lessee renewal and purchase options	Not exercised

LESSEE	
Accounting and tax jurisdiction	UK (IFRS)
First accounting year end	30 Jun 2026
First tax pay date	14 Jan 2026
Tax paid	Quarterly in instalments
Lease Classification for tax	Short Funding Lease
Asset cost allowances?	No
Cost of debt (pre-tax)	Fixed 8.00% nominal
Cost of debt (post-tax)	6.00%
PV of Minimum Lease Payments	£965,818 at Implicit Rate (6.54%)
As a % of asset cost	96.6%
PV of incremental lease cash flows	£961,512

The lessor's post-tax ROE is 6.81% (not shown here).

Lessee lease liability

				LESSEE LEASE LIABILITY						LESSOR IRR		
Date	Time Period	Year	Days	Lease Payments	Discount Factor (lessor IRR)	Present Value	Lease Payments Interest	Lease Payments Capital	Lease Liability	Pre-Tax Lease Cash Flows	Discount Factor	Present Value
Year End					6.54%		6.54%				6.54%	
30 Jun 2025	0	0.00	0		1.0000				965,818	(1,000,000)	1.0000	(1,000,000)
30 Sep 2025	1	0.25	92	(48,770)	0.984150	(47,997)	15,555	33,215	932,602	48,770	0.984150	47,997
31 Dec 2025	2	0.50	92	(48,770)	0.968551	(47,236)	15,020	33,750	898,852	48,770	0.968551	47,236
31 Mar 2026	3	0.75	90	(48,770)	0.953531	(46,504)	14,159	34,611	864,241	48,770	0.953531	46,504
30 Jun 2026	4	1.00	91	(48,770)	0.938581	(45,775)	13,766	35,004	829,237	48,770	0.938581	45,775
30 Sep 2026	5	1.25	92	(48,770)	0.923704	(45,049)	13,355	35,415	793,822	48,770	0.923704	45,049
31 Dec 2026	6	1.50	92	(48,770)	0.909064	(44,335)	12,785	35,985	757,837	48,770	0.909064	44,335
31 Mar 2027	7	1.75	90	(48,770)	0.894966	(43,647)	11,938	36,832	721,005	48,770	0.894966	43,647
30 Jun 2027	8	2.00	91	(48,770)	0.880934	(42,963)	11,485	37,285	683,719	48,770	0.880934	42,963
30 Sep 2027	9	2.25	92	(48,770)	0.866971	(42,282)	11,011	37,759	645,961	48,770	0.866971	42,282
31 Dec 2027	10	2.50	92	(48,770)	0.853230	(41,612)	10,403	38,367	607,594	48,770	0.853230	41,612
31 Mar 2028	11	2.75	91	(48,770)	0.839888	(40,961)	9,652	39,118	568,476	48,770	0.839888	40,961
30 Jun 2028	12	3.00	91	(48,770)	0.826755	(40,321)	9,030	39,740	528,736	48,770	0.826755	40,321
30 Sep 2028	13	3.25	92	(48,770)	0.813687	(39,684)	8,492	40,278	488,458	48,770	0.813687	39,684
31 Dec 2028	14	3.50	92	(48,770)	0.800825	(39,056)	7,845	40,925	447,533	48,770	0.800825	39,056
31 Mar 2029	15	3.75	90	(48,770)	0.788406	(38,451)	7,050	41,720	405,812	48,770	0.788406	38,451
30 Jun 2029	16	4.00	91	(48,770)	0.776045	(37,848)	6,464	42,306	363,506	48,770	0.776045	37,848
30 Sep 2029	17	4.25	92	(48,770)	0.763744	(37,248)	5,854	42,916	320,591	48,770	0.763744	37,248
31 Dec 2029	18	4.50	92	(48,770)	0.751639	(36,657)	5,163	43,607	276,984	48,770	0.751639	36,657
31 Mar 2030	19	4.75	90	(48,770)	0.739983	(36,089)	4,363	44,407	232,577	48,770	0.739983	36,089
30 Jun 2030	20	5.00	91	(48,770)	0.728380	(35,523)	3,705	45,065	187,512	48,770	0.728380	35,523
30 Sep 2030	21	5.25	92	(48,770)	0.716836	(34,960)	3,020	45,750	141,761	48,770	0.716836	34,960
31 Dec 2030	22	5.50	92	(48,770)	0.705474	(34,406)	2,283	46,487	95,275	48,770	0.705474	34,406
31 Mar 2031	23	5.75	90	(48,770)	0.694533	(33,872)	1,501	47,269	48,005	48,770	0.694533	33,872
30 Jun 2031	24	6.00	91	(48,770)	0.683644	(33,341)	765	48,005	0	98,770	0.683644	67,524
			2,191	(1,170,480)		(965,818)	204,662	965,818		220,480		0

Period 1 workings:

Discount Factor (DF) = 1 / [1.065438%^(92/365)] = 0.984150

Interest = 965,818 x [(1 / DF) – 1]* = 15,555

Capital = 48,770 rental – 15,555 interest = 33,215

Liability = 965,818 – 33,215 = 932,602 (calculated using the Effective Interest Method in IFRS 9)

The IRR is calculated using a goal seek or Solver function to ensure the PV of rentals equals the asset cost.

The 50,000 residual value is included in the final lessor cash flow (received from a sale to a third party). It is not paid or guaranteed by the lessee and is therefore excluded from the lessee's Lease Payments. The opening lease liability is less than the asset cost because of this (965,818 + 50,000 x period 46 discount factor 0.683644 = 1,000,000).

Final results

LESSEE ACCOUNTING (IFRS 16)

Year ending 30 Jun	2026	2027	2028	2029	2030	2031	Total
Lease Liability	(829,237)	(683,719)	(528,736)	(363,506)	(187,512)	-	
Finance Charge & Lease Liability							Total
PV of MLP b/f (at 6.54% lessor rate)	965,818	829,237	683,719	528,736	363,506	187,512	
MLP (rentals paid + guaranteed residual)	(195,080)	(195,080)	(195,080)	(195,080)	(195,080)	(195,080)	(1,170,480)
Finance charge	58,500	49,562	40,096	29,851	19,085	7,568	204,662
PV c/f	829,237	683,719	528,736	363,506	187,512	-	
Fixed Assets + Depreciation							
Gross Fixed Asset	965,818	965,818	965,818	965,818	965,818	965,818	
Depreciation on a straight line basis	(160,970)	(160,970)	(161,191)	(160,748)	(160,970)	(160,970)	(965,818)
Net Book Value	804,848	643,879	482,687	321,939	160,970	-	

The finance charge (interest) and depreciation are charged to the P&L.

The effective cost of leasing and economic benefit (cheaper than buying the asset) is shown below:

LESSEE CASH FLOWS

Year ending 00 Jan	2026	2027	2028	2029	2030	2031	Total
Rentals	(195,080)	(195,080)	(195,080)	(195,080)	(195,080)	(195,080)	(1,170,480)
Tax relief on rentals	27,434	53,750	51,477	48,986	46,332	64,641	292,620
Actual Cash Flows	(167,646)	(141,330)	(143,603)	(146,094)	(148,748)	(130,439)	(877,860)
Residual Value foregone	-	-	-	-	-	(50,000)	(50,000)
Capital Allowances foregone	(22,500)	(40,950)	(33,579)	(27,535)	(22,579)	(90,358)	(237,500)
Effective Cost of Leasing	(190,146)	(182,280)	(177,182)	(173,629)	(171,327)	(270,796)	(1,165,360)
Present value of Effective Cost	(183,210)	(165,345)	(151,339)	(139,675)	(129,815)	(192,128)	(961,512)