Contents

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What Are DCF And WACC?

A DCF takes a cash flow occurring in the future and calculates how much would be paid for it today.

Imagine investing 100.0 today with a 10.0% return.

Time	0	1	2	3
Cash flow	100.0	110.0	121.0	133.1

x (1+10.0%) x (1+10.0%) x (1+10.0%)

But what if it happened in reverse? You are offered 133.1 in 3 years time, and you require a 10.0% return. How much should you pay *now* ?

Time	0	1	2	3
Cash flow	100.0	110.0	121.0	133.1

/ (1+10.0%) / (1+10.0%) / (1+10.0%)

The 100.0 represents the present value of a 133.1 future cash flow.

The investor's 10.0% *required return* also represents a *cost of capital* of 10.0% for the company being invested in.

When the company sources cash from a variety of places, a *weighted average cost of capital* (or WACC) is calculated.

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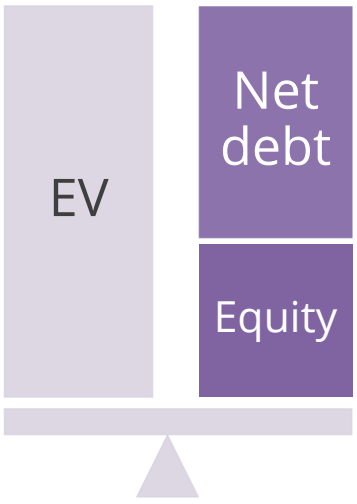
What is Discounted Cash Flow?

Normally called DCF

A cash flow forecast discounted to "today's" value

An "intrinsic" not relative valuation tool

Is the modeler's view of value



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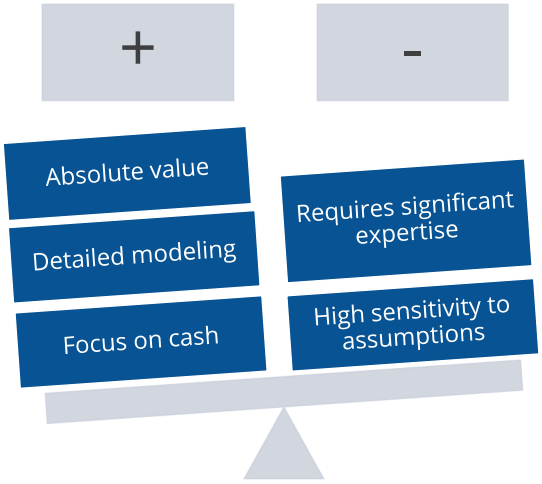
What is Discounted Cash Flow?



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DCF Steps

1. Forecast free cash flows to steady state (normally 5 or 10 years)
2. Calculate weighted average cost of capital (WACC)
3. Calculate terminal value
4. Discount cash flows to today
5. Walk from enterprise value to implied share price using the bridge

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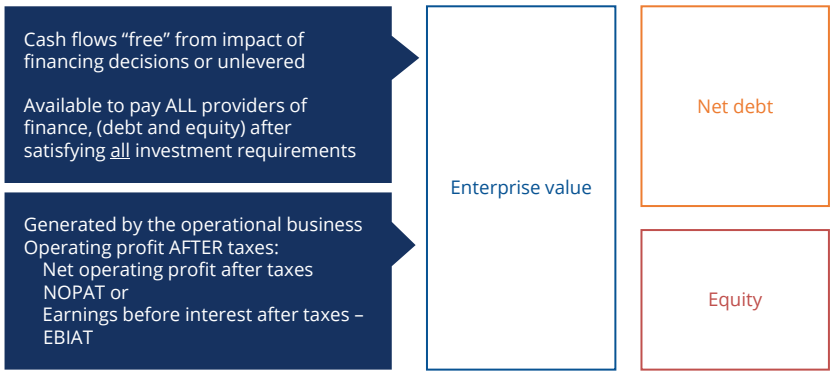
Forecast Free Cash Flow



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Forecast Free Cash Flow

	Free cash flow	
	EBIT	Adjusted operating profit
-	Tax on EBIT	EBIT * long run tax rate
=	NOPAT / EBIAT	Net operating profit after taxes
+	D&A	A non cash item
-	Capex	Investment in PP&E
+/-	Change in OWC	Cash used by extra investment in OWC
+/-	Other	Changes in other operating assets / liabilities
=	Free Cash Flow	Cash flow produced by operations

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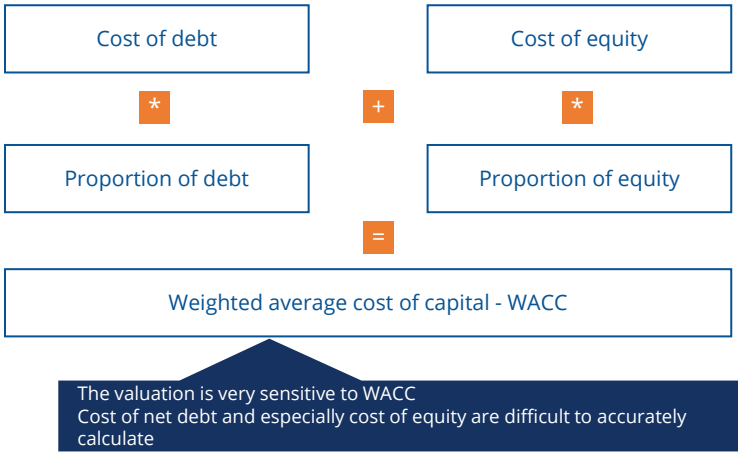
Weighted Average Cost of Capital



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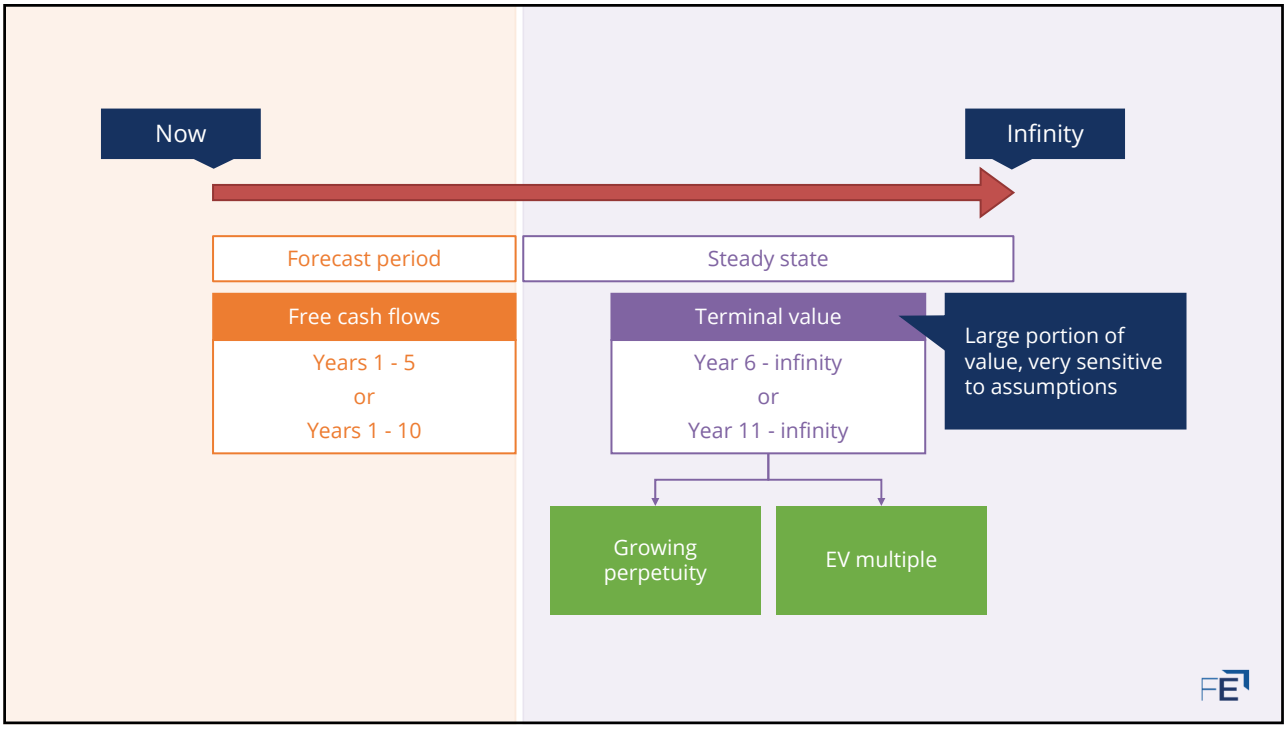

Terminal Value –Two Approaches

	Growing perpetuity	Terminal EV multiple
Formula	$\text{TV}_\text{n} = \frac{\text{FCF}_\text{n} * (1 + \text{g})}{(\text{w} - \text{g})}$	$\text{TV}_\text{n} = \text{LTM EBITDA}_\text{n} * \text{Multiple}$
Sense check	$\text{EV multiple} = \frac{\text{TV}_\text{n}}{\text{LTM EBITDA}_\text{n}}$	$\text{LT growth rate} = \frac{(\text{w} * \text{TV}_\text{n} - \text{FCF}_\text{n})}{\text{FCF}_\text{n} + \text{TV}_\text{n}}$

TV	= Terminal value
FCF_n	= FCF in final year of forecasting
w	= WACC
g	= growth rate in perpetuity

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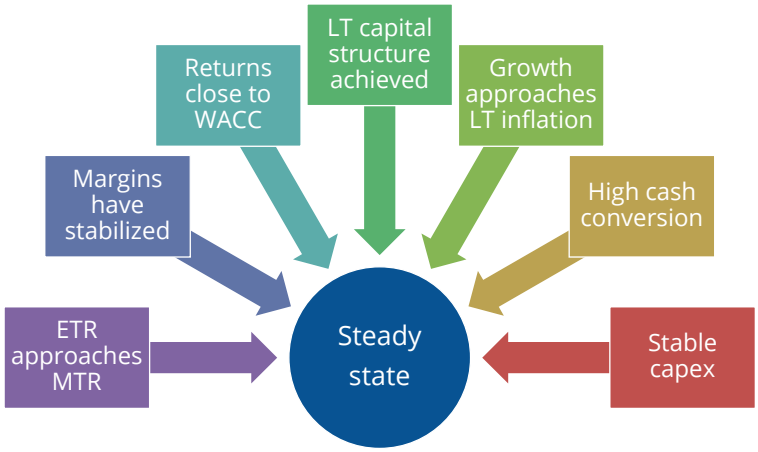
Terminal Value – Company Characteristics



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Discounting

	Period 1	Period 2	Period 3	Period 4	Period 5
Cash flow	FCF 1	FCF 2	FCF 3	FCF 4	FCF 5
Terminal value					TV
Discount factor	$\frac{1}{(1+WACC)^1}$	$\frac{1}{(1+WACC)^2}$	$\frac{1}{(1+WACC)^3}$	$\frac{1}{(1+WACC)^4}$	$\frac{1}{(1+WACC)^5}$
Present value	FCF * discount factor				
Sum of PV of FCFs	(FCFs 1 – 5) * discount factor (1 – 5)				
PV of TV	TV * discount factor 5				
Enterprise value	Sum of PV of FCFs + PV of TV				

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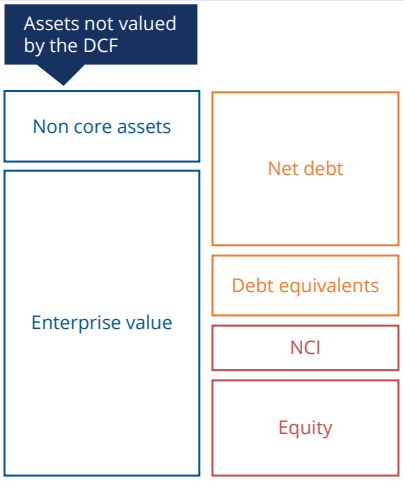
EV to Implied Share Price via Bridge



	The Bridge
	Enterprise value
+	Non core assets
-	Net debt
-	Debt like items
=	Equity value
/	No shares outstanding
=	Share price

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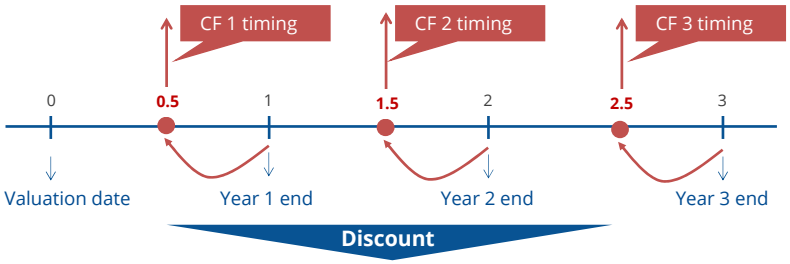
Mid Year Adjustment – FCF Forecast

In reality cash flows happen evenly throughout the year, not the end of the year



Now	Period 1	Period 2	Period 3	Period 4	Period 5
	FCF 1	FCF 2	FCF 3	FCF 4	FCF 5
Discount factor	$\frac{1}{(1+WACC)^{0.5}}$	$\frac{1}{(1+WACC)^{1.5}}$	$\frac{1}{(1+WACC)^{2.5}}$	$\frac{1}{(1+WACC)^{3.5}}$	$\frac{1}{(1+WACC)^{4.5}}$

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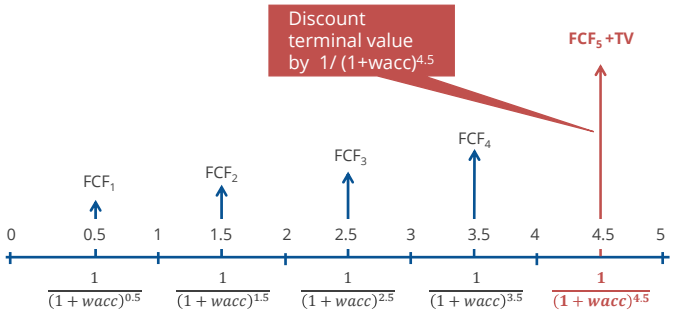
Mid Year Adjustment – TV Using Growth Perpetuity

Terminal value calculation using growth perpetuity implies that cash flows continue falling in the middle of the year for eternity and beyond



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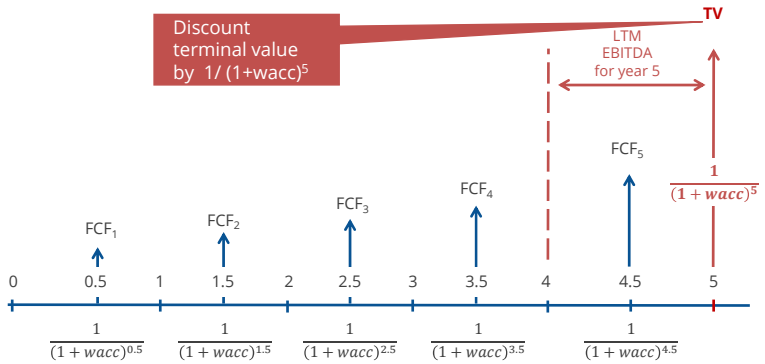
Mid Year Adjustment – TV Using Exit Multiple

Terminal value calculation using an exit multiple assumes that the company is valued on the basis of LTM EBITDA at the end of the forecast period



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Terminal Value - Two Approaches With Mid Year Adjustment

	Growing perpetuity	Terminal EV multiple
Formula	$\text{TV}_{\text{n(GP)}} = \frac{\text{FCF}_\text{n} * (1+\text{g})}{(\text{w}-\text{g})}$	$\text{TV}_{\text{n(MM)}} = \text{LTM EBITDA}_\text{n} * \text{Multiple}$
Sense check	$\text{EV multiple} = \frac{\text{TV}_{\text{n(GP)}} * (1+\text{w})^{0.5}}{\text{LTM EBITDA}_\text{n}}$	$\text{LT growth rate} = \frac{(\text{w} * \frac{\text{TV}_{\text{n(MM)}}}{(1+\text{w})^{0.5}} - \text{FCF}_\text{n})}{\text{FCF}_\text{n} + \frac{\text{TV}_{\text{n(MM)}}}{(1+w)^{0.5}}}$

TV	= Terminal value
FCF_n	= FCF in final year of forecasting
w	= WACC
g	= growth rate in perpetuity
MM	= Multiple method
GP	= Growing perpetuity method

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