Capital Costs in Company Valuation: Why WACC Alone Is Not Enough

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Agenda

- **Reality**: How firms really use one corporate WACC
- **Problem & Evidence**: Where one WACC breaks its own assumptions (and the 8% example)
- **Research question** & literature-based approach
- **Methods**: Four valuation tools in practice: WACC, APV, CCF, FTE (mini cases)
- **Decision Rule**: Method choice rule - answer to our research question

Most companies live by one corporate WACC when valuing everything

WACC = blended return required by lenders and shareholders.

- Managers use one house rate: "Our hurdle rate is 8-10%. Everything is checked against that one number
- Textbooks and CFO surveys both push one company WACC as the discount rate. [1]
- This shortcut roughly works in mature, stable firms (utilities, consumer staples)

[1] Graham & Harvey (2001); Miles & Ezzell (1980)

One house WACC breaks its own assumptions and pushes capital into the wrong projects

WACC only really works if:

Project risk ≈ firm's average risk[1]

Leverage (D/V) stays roughly stable[1]

Tax shields (tax savings) are predictable and easy to realize[1]

What's happening in the real world?

Divisions have very different risk (regulated utility vs growth tech vs trading book)

Leverage moves a lot over time (LBOs, fixed amortization loans, recapitalizations)

Tax shields are uncertain (volatile profits, changing debt, changing tax rules)

What happen if use the wrong WACC?

Average-risk fallacy

- Safe projects are killed
- Risky projects look cheap
- Capital is pushed into riskier stuff

Financing blindness

- Value from leverage vs business is hidden inside WACC
- M&A, bidders often overpay risky targets using the bidder's WACC[1]

[1] Miles & Ezzell (1980); Krüger, Malmendier & Stulz (2015)

A single 8% WACC systematically undervalues safe projects and overvalues risky ones

Result: safe projects are undervalued, risky projects overvalued, but everything looks fine at 8%.

Safe: Wastewater infrastructure investment by Stadtwerke

Average: opening another Lidl store in a typical German town

High: building a wind farm in emerging countries, with FX + political risk

Company WACC = 8%

We need clear rules for when WACC is safe and when to switch methods.

Research question: When is a single firm WACC still valid, and when should we use APV/CCF/FTE instead?

Method:
- conceptual paper based on structured literature review, not empirical
- ~20 sources: theory (WACC, APV, CCF, FTE), CFO surveys, M&A evidence

WACC is valid only when leverage and business risk remain stable over time

- Project risk ≈ firm's average risk
- ❶ Leverage is roughly stable around a target ratio
- ❷ Tax shields are boring and reliable

Leveraged Wind Plant

Assume	
Cost of Equity (rE)	10%
Tax rate	30%

Source: Canva

Leverage is not stable

❷ ❶

Year	Debt	Equity	D/V	E/V	Cost of Debt (rD)
0	150 €	30 €	83%	17%	5%
5	120 €	80 €	60%	40%	7%
10	60 €	140 €	30%	70%	7%

Debt gets smaller, interest and tax saving get smaller every year, this is not "boring"

Year	WACC
0	4.6%
5	6.9%
10	8.5%

breaks all WACC assumptions = no single "house WACC" exists

APV dominates WACC when leverage is planned as a fixed debt schedule, not a constant ratio

- Debt is planned as a euro schedule, not a % of value

- Leverage will change a lot over time as you repay

- You want to see "asset value" and "financing bonus" separately

- Typical cases: project finance, LBOs, big one-off refinancing

Property investor with a 90% 10-year mortgage

Source: Canva

House price (assumed) = 100,000 € = unlevered value V_u → unlevered NPV = 0

Step 1: Business value without debt

Value of the house (assumed)	V_U	100,000 €
Unlevered cost of capital		8%

Step 2: Present value of tax shields

Debt amount	90,000 €
Interest r_D	5%
Tax	30%
Discount rate for tax shields	5%

Only this block changes when we change the mortgage (APV isolates financing value)

Amortizing loan

Year	Debt at start	Interest	Tax shield	PV of Tax shield
1	90,000 €	4,500 €	1,350 €	1,286 €
5	54,000 €	2,700 €	810 €	635 €
10	9,000 €	450 €	135 €	83 €
				6,151 €

Bullet loan

Year	Repayment	Interest	Tax shield	PV of Tax shield
1	0 €	4,500 €	1,350 €	1,286 €
5	0 €	4,500 €	1,350 €	1,058 €
10	90,000 €	4,500 €	1,350 €	829 €
				10,424 €

Scenario	V_U	PV(TS)	APV
Amortizing	100,000 €	6,151 €	106,151 €
Bullet	100,000 €	10,424.34 €	110,424 €

Same 100k house → different loans → APV shows +6.1k vs +10.4k from tax shields

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Use CCF when you already model debt and tax shields in cash flows

- Debt, interest and taxes are already forecast year by year

- You can use one constant discount rate (r_a)

- You want the tax shield as a cash-flow line, not hidden in WACC

- Typical cases:

  - LBO of a stable business

  - Regulated utility / infrastructure with scheduled debt pay-down

Long-term contracted project (PPA)

CCF	Year 1	Year 2	Year 3
We already have CCF from our debt, interest and tax schedule			
Capital Cash Flow	€ 58,724	€ 63,246	€ 68,692
Discount rate (Unlevered)	18%	18%	18%
Discount Factor	0.8475	0.7182	0.6086
Present Value of CCFs	€ 49,766	€ 45,422	€ 41,808
Total Enterprise Value	€ 136,996		

Mechanically simple:
Discount rate: 18% every year
Get the same enterprise value as WACC

WACC	Year 1	Year 2	Year 3
We already compute FCF = EBIAT + Non-cash adjustments			
Free Cash Flows	€ 54,500	€ 61,200	€ 67,900
WACC Calculations:			
Debt			
Percent	73%	48.6%	34.4%
Equity			
Percent	27%	51%	65.6%
WACC	**14.9%**	**16.0%**	**16.6%**
Discount Factor	0.8701	0.7500	0.6432
Present Value of FCFs	€ 47,421	€ 45,901	€ 43,673
Total Enterprise Value	€ 136,995		

Mechanically complex:
WACC: 14.9% → 16.0% → 16.6%
Enterprise value: 136,9965 (identical)

Use FTE when the question is purely 'what do shareholders get?'

- FTE values only equity, not the whole firm
- Use FTE when the decision maker is an equity investor
- Debt policy is known and fixed
- Typical cases:
  - private equity fund, minority shareholder, home buyer with leverage
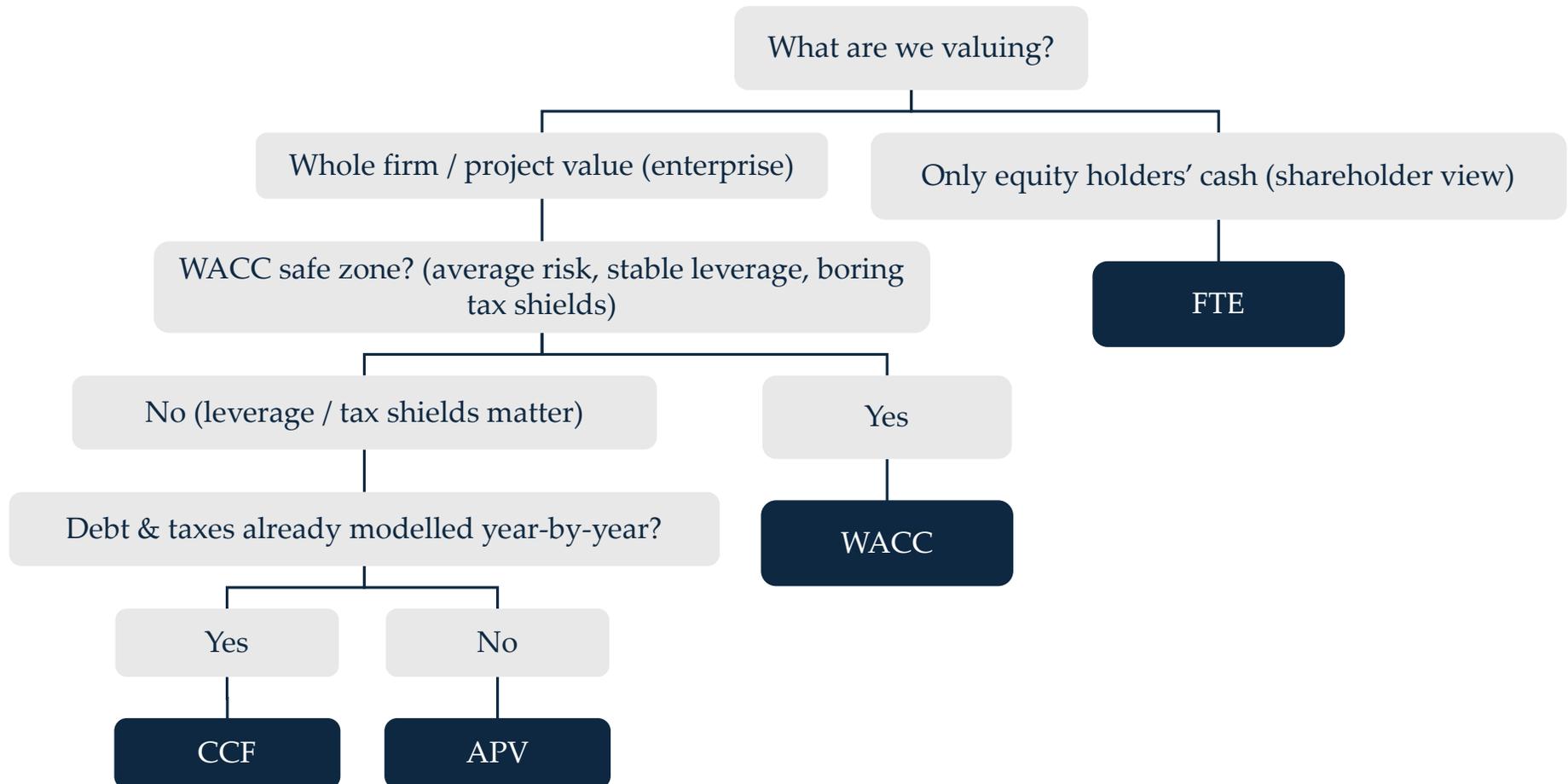
Same 100k house, now only the owner's view (FTE)

Setup	Amount
Market value of house today	100,000 €
Downpayment	10,000 €
Bank mortgage	
Interest-only bullet loan (90k in year 10)	90,000 €
Mortgage rate	5%
Net annual rent	7,000 €
Expected sale price in 10 years (2035)	130,000 €

Year	What happens	Cash flow to equity
0	Paid 10k downpayment, borrowed loan from bank 90k	-10,000 €
1-9	7000€ rent, pay 5% interest on 90k = 4500€	2,500 €
10	same rent year +7000€ - 4500€ = 2500€	2,500 €
	sell the house for 130000€, repay 90000€ principal to the bank	40,000 € to equity
	Cash flow to equity	**42,500 €**

FTE = value of this stream to the owner: –10k now, +2.5k each year, +42.5k in year 10
If that beats my required r_e, the deal is good

Answer to our research questions: method choice is no longer gut feeling - it follows a simple risk- and leverage-based rule

What are we valuing?

- Whole firm / project value (enterprise)
  - WACC safe zone? (average risk, stable leverage, boring tax shields)
    - No (leverage / tax shields matter)
      - Debt & taxes already modelled year-by-year?
        - Yes → **CCF**
        - No → **APV**
    - Yes → **WACC**
- Only equity holders' cash (shareholder view) → **FTE**

Summary: When WACC works and when it fails

When WACC works	When WACC fails	What to do
• Stable leverage • Average risk • Predictable tax shields	• Leverage changes • Risk differs by project • Tax shields uncertain	• WACC → stable firms • APV → changing leverage • CCF/FTE → modeled debt / equity view

Using the wrong discount rate destroys value
method choice is a controllable decision

Thank you!