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SAIMM
THE SOUTHERN AFRICAN INSTITUTE OF MINING AND METALLURGY

The SAMREC/SAMVAL
Companion Volume Conference

SOME COMMON RISKS TO AVOID IN ESTIMATING AND APPLYING DISCOUNT RATES

Presented by:
J Burger

RESOURCE | RESERVE | VALUE

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- Theory Explained (Discount rate application)
- Theory Example
- Significance of Discount Rates in DCF
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Introduction

Introduction

- Many Corporate investment decisions are largely based on economic evaluation
- Feasibilities - technical and financial detail
- Type of cash flow required for a valuation – report clearly.
- Type of discount rate applied (Don’t mix!).
- Optimal pit shell selection - mineral reserve

Funding for projects

- Equity financing
- Debt financing
- Both funding structures has its own appeal
- Early stage projects find it difficult to obtain loans
- From definitive feasibility stage often easier to make use of a combination of debt and equity financing

Theory Explained

Leveraged Company

Types of Free Cash Flows

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Free cash flow to equity (FCFE)	Free cash flow to the firm (FCFF)
= Cash flow available to	= Cash flow available to
Common stockholders	Debtholders
	Preferred stockholders
	Common stockholders

FCFE discounted at required equity return (CAPM) = FCFF discounted at WACC – debt value

Types of Cash Flows

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FCFE	FCFF
= Revenue	= Revenue
- Cost	- Cost
Profit	**Profit**
- Capital	- Capital
- Loan Repayments	- Tax
- Interest Repayments	
- Tax	
= Profit after tax	= Profit after tax
Shareholders	Shareholders
	+ Loan

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- Tax		- Tax
= Profit after tax	=	= Profit after tax
Shareholders		Shareholders

Types of Discount Rates

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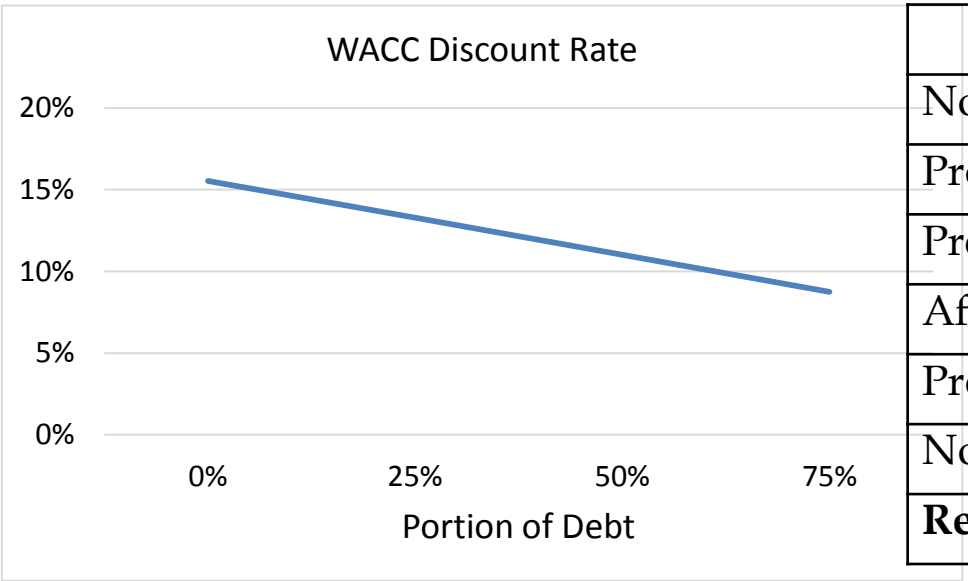
Cost of Equity

Item	FCFE (CAPM)
Risk-free rate	8.4%
Country risk premium	0.0%
Market premium	6.0%
ß	1.19
Nominal Cost of equity	15.5%
Real Cost of equity	**9.0%**

- Cost of equity = risk free rate + (beta x market premium)

Cost of Equity and Debt

- WACC = (cost of equity x proportion equity) + (after tax cost of debt x proportion debt)



Item	FCFF (WACC)
Nominal Cost of equity	15.5%
Proportion of equity	50%
Pre-tax cost of debt	9.0%
After-tax cost of debt	6.7%
Proportion of debt	50%
Nominal WACC	11.0%
Real WACC	**4.7%**

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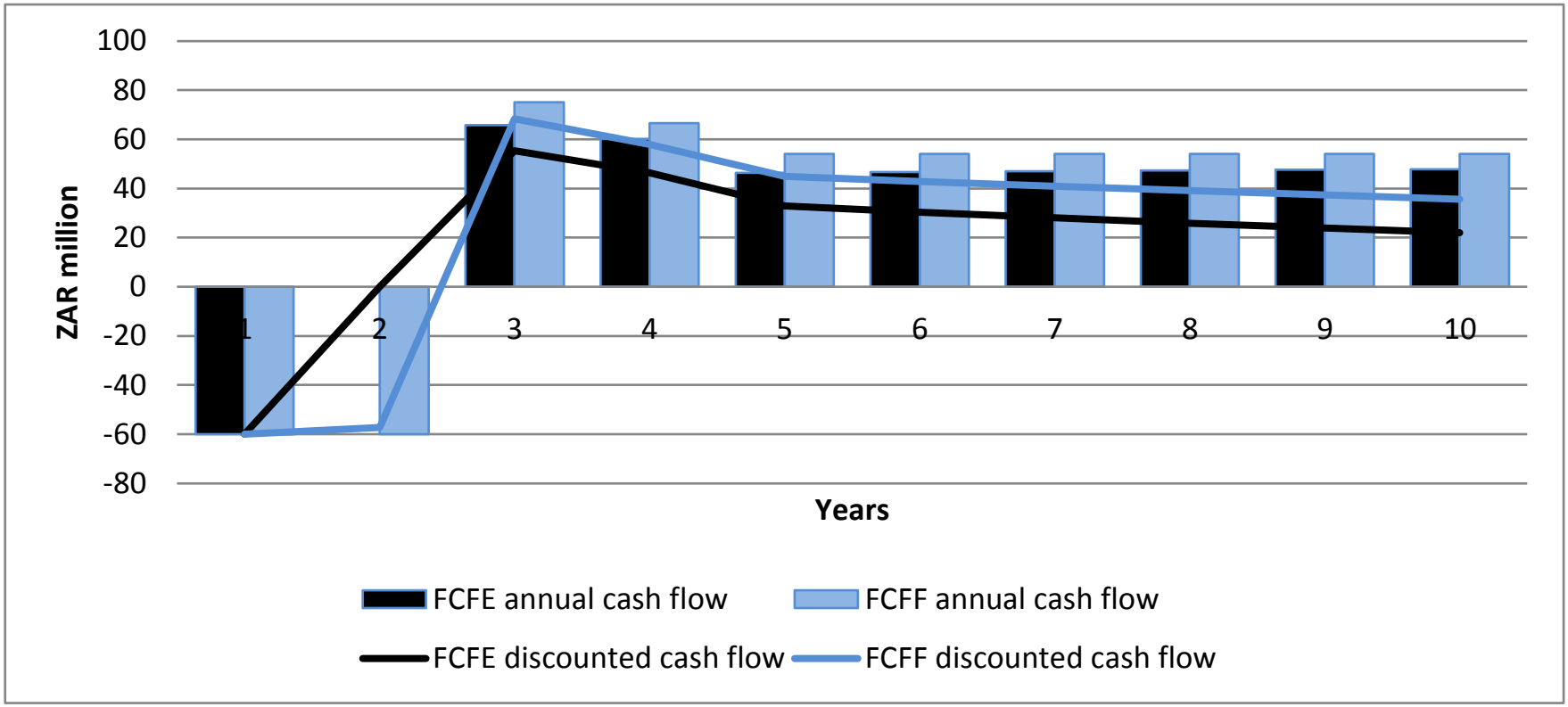
Theory Example

DCF Inputs

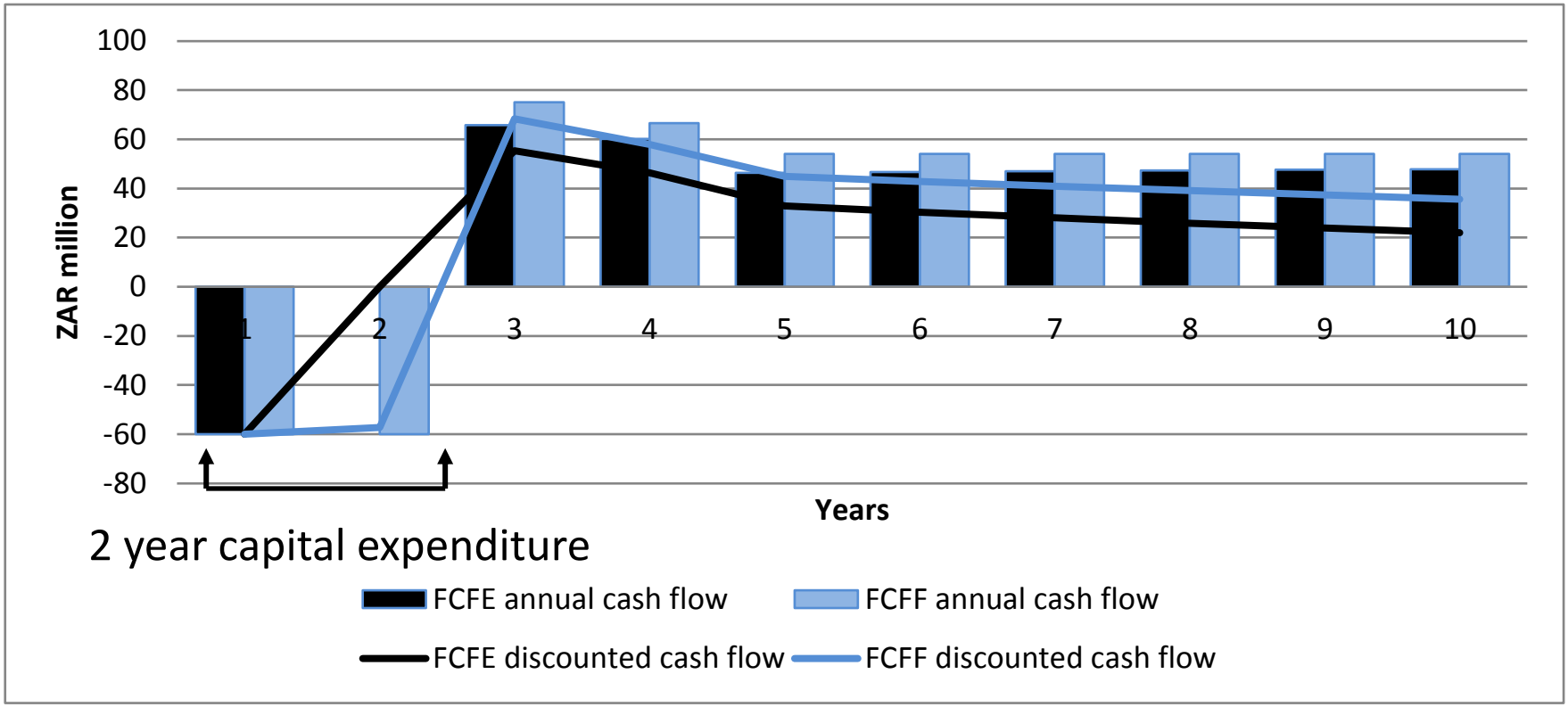
- Constructed a 10 year LoM model as well as 25 year LoM model
- Assumed ZAR120 million Capex
- Debt/Equity ratio 50:50
- Production start in year 3 (2 year construction phase)
- Loan incurred in year 2 (1 years accrued interest)
- Loan payback of 10 years

10 Year LoM Cash Flow

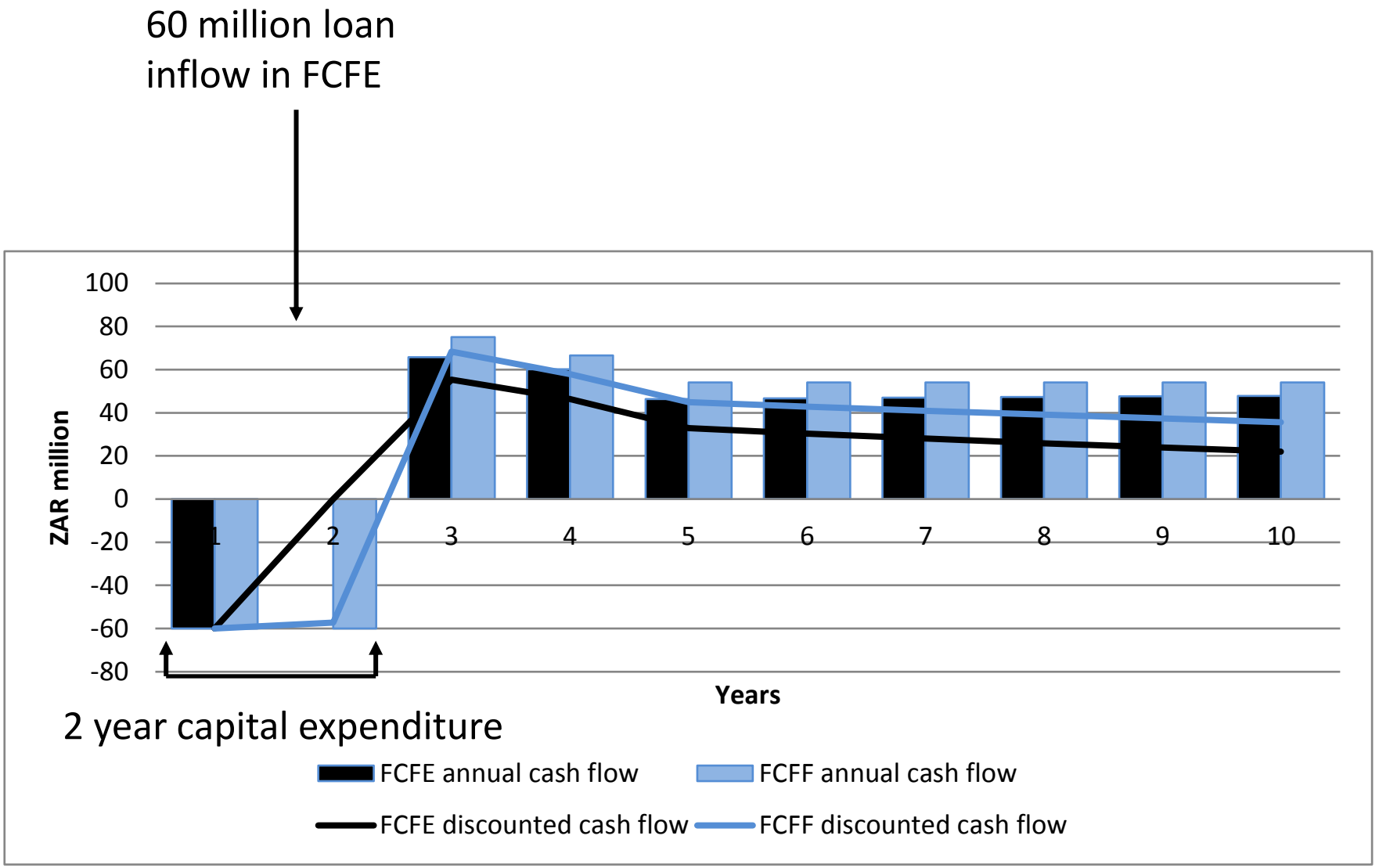
- FCFE and FCFF annual cash flows compared as well as discounted cash flows



10 Year LoM Cash Flow



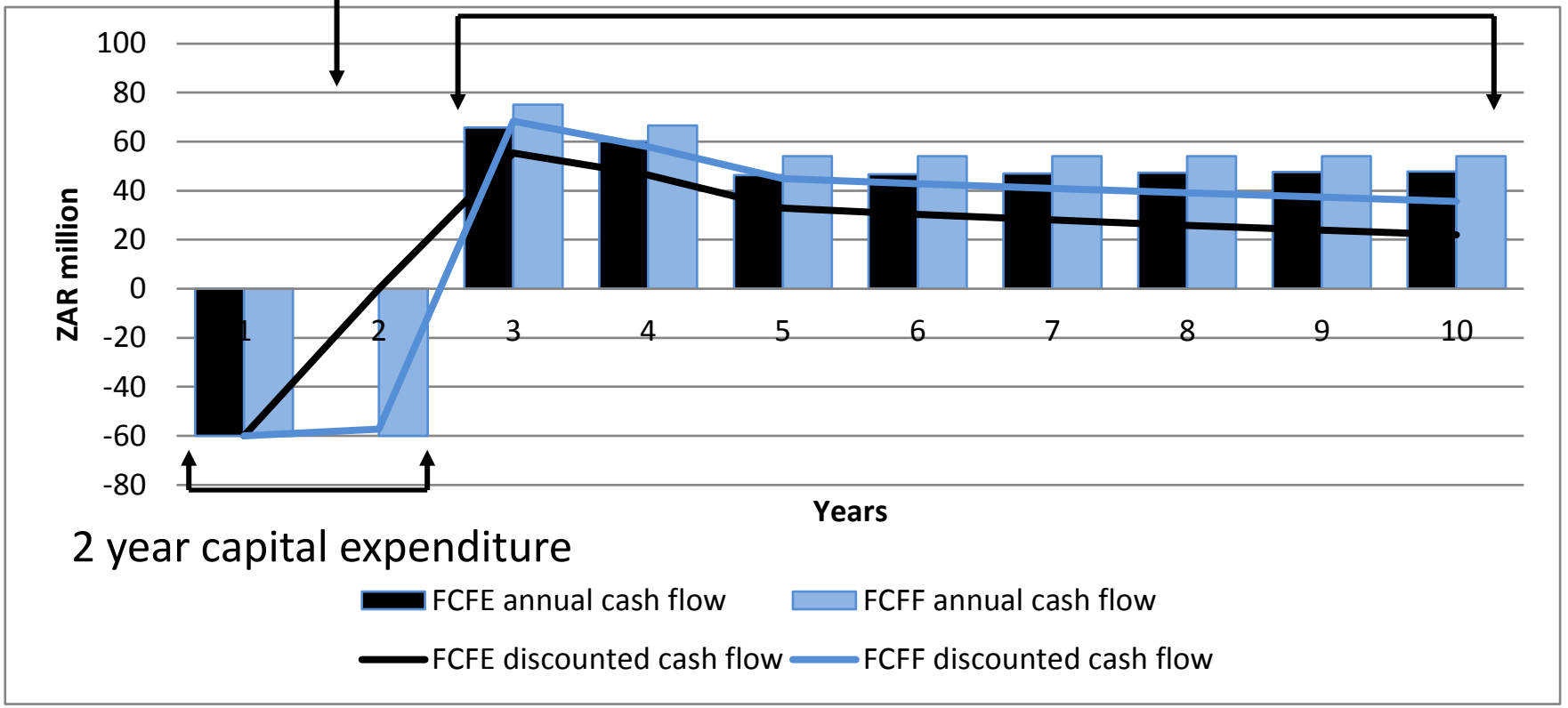
10 Year LoM Cash Flow



10 Year LoM Cash Flow

60 million loan
included in FCFE

FCFE lower annual CF because of principal and interest payments in CF



Significance of Discount Rates

Significance of Discount Rates in DCF

- 10 year LoM DCF
- In FCFE model the cash inflow and outflow ito real term principal and interest payments of loan included
- In FCFF model the principal and interest payments of loan is not included (considered in WACC calculation)

Item	FCFE (CAPM)	FCFF (WACC)
Real discount rate	9.0%	4.7%
NPV (R million)	205	250
Debt (R million)	-	-60
Equity value (R million)	205	190
Variance		*-7.3%*

Significance of Discount Rates in DCF

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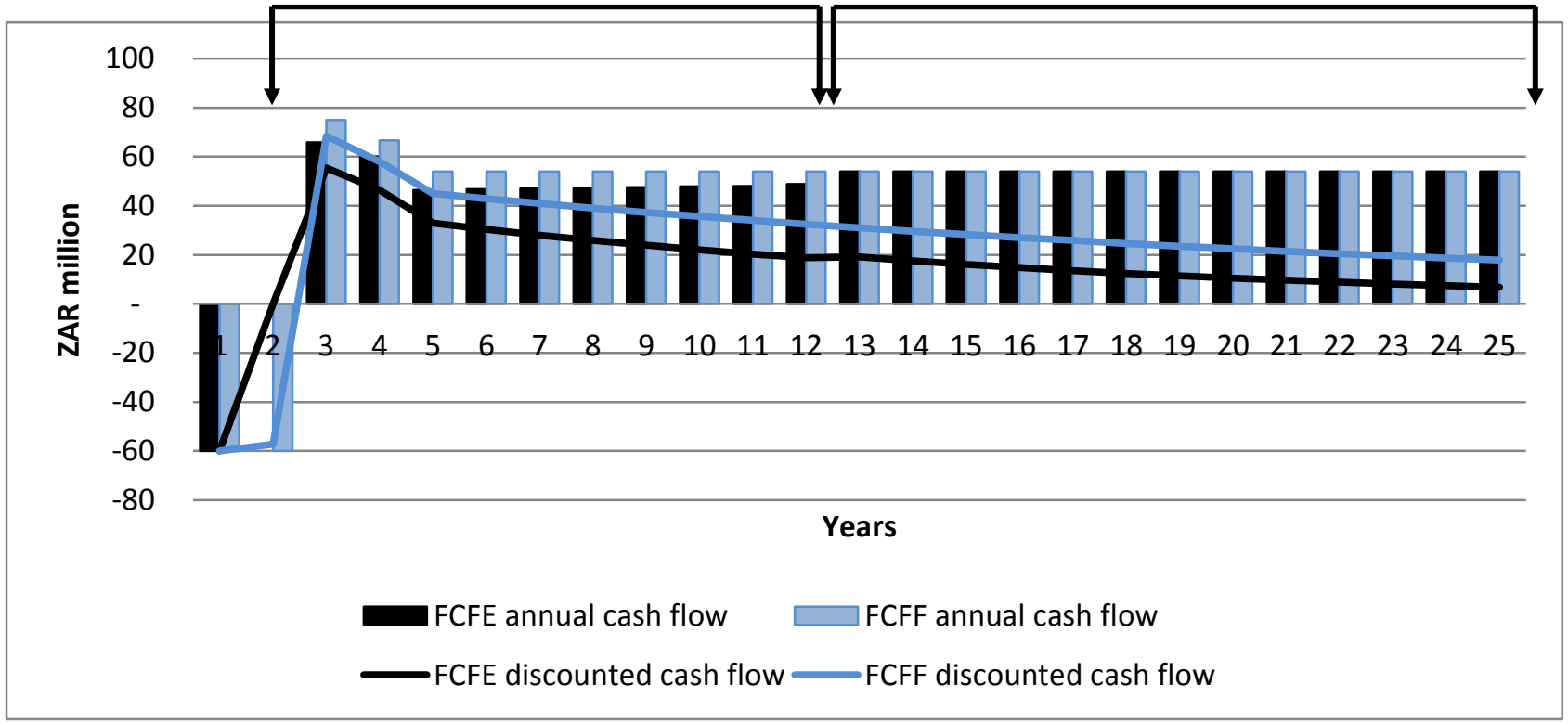
- 25 year LoM DCF
- In FCFE model the principal and interest payments of loan included
- In FCFF model the principal and interest payments of loan is not included (considered in WACC calculation)

Item	FCFE (CAPM)	FCFF (WACC)
Real discount rate	9.0%	4.7%
NPV (R million)	401	627
Debt (R million)	-	-60
Equity value (R million)	401	567
Variance		**+41.4%**

25 Year LoM Cash Flow

Principal and interest payments in FCFE

Annual cash flows equal because loan paid off
Discounted cash flow not equal

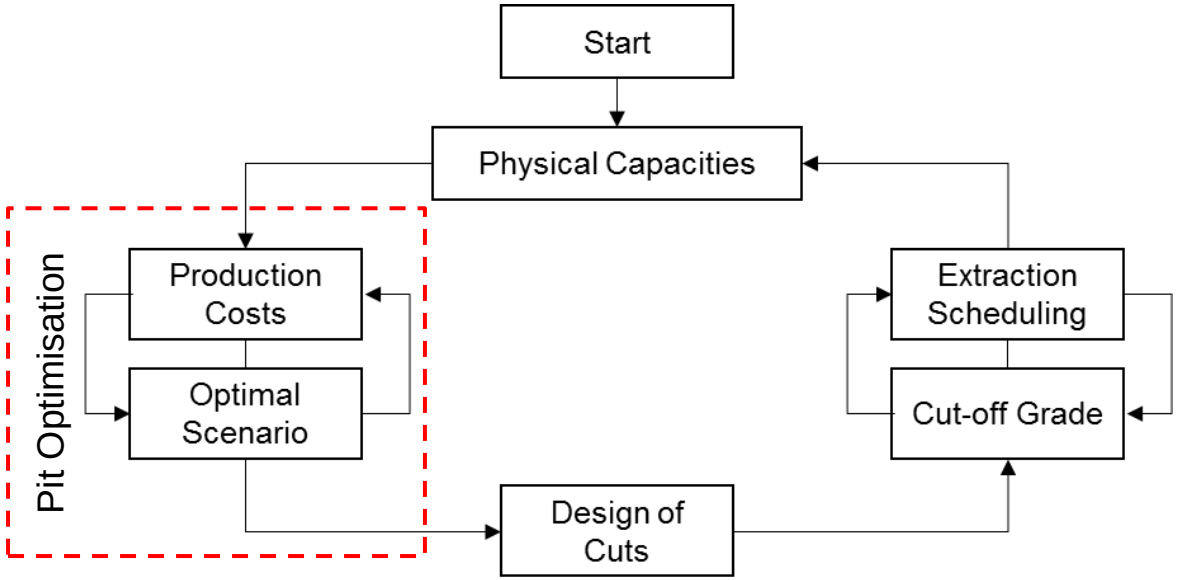


Further Practical Application

Outside of Valuation

Pit Optimisation

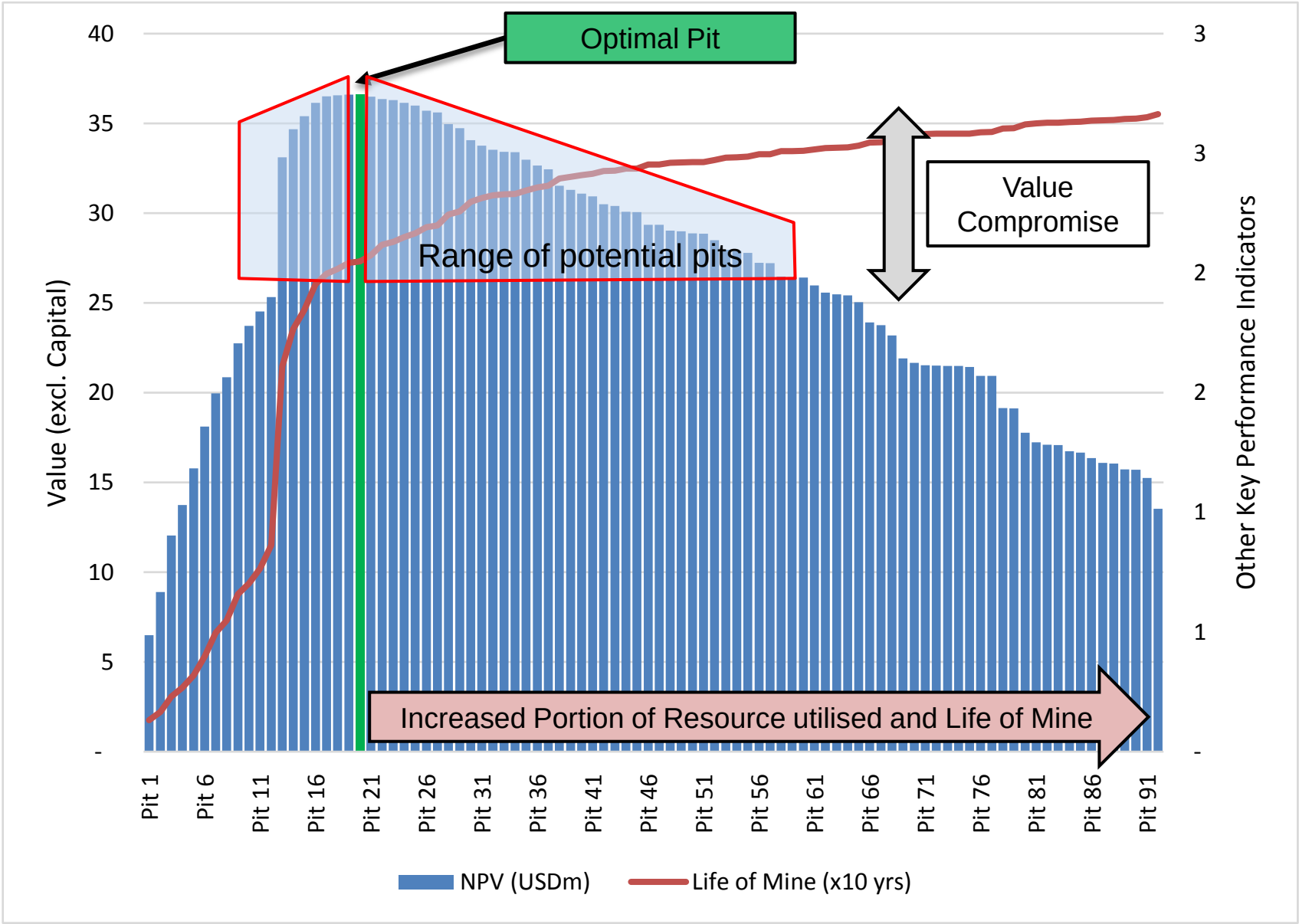
- The objective is to determine the best value from an open pittable resource
  - One of the methods used by mining companies are commercially available software packages based on the Lerchs and Grossmann algorithm



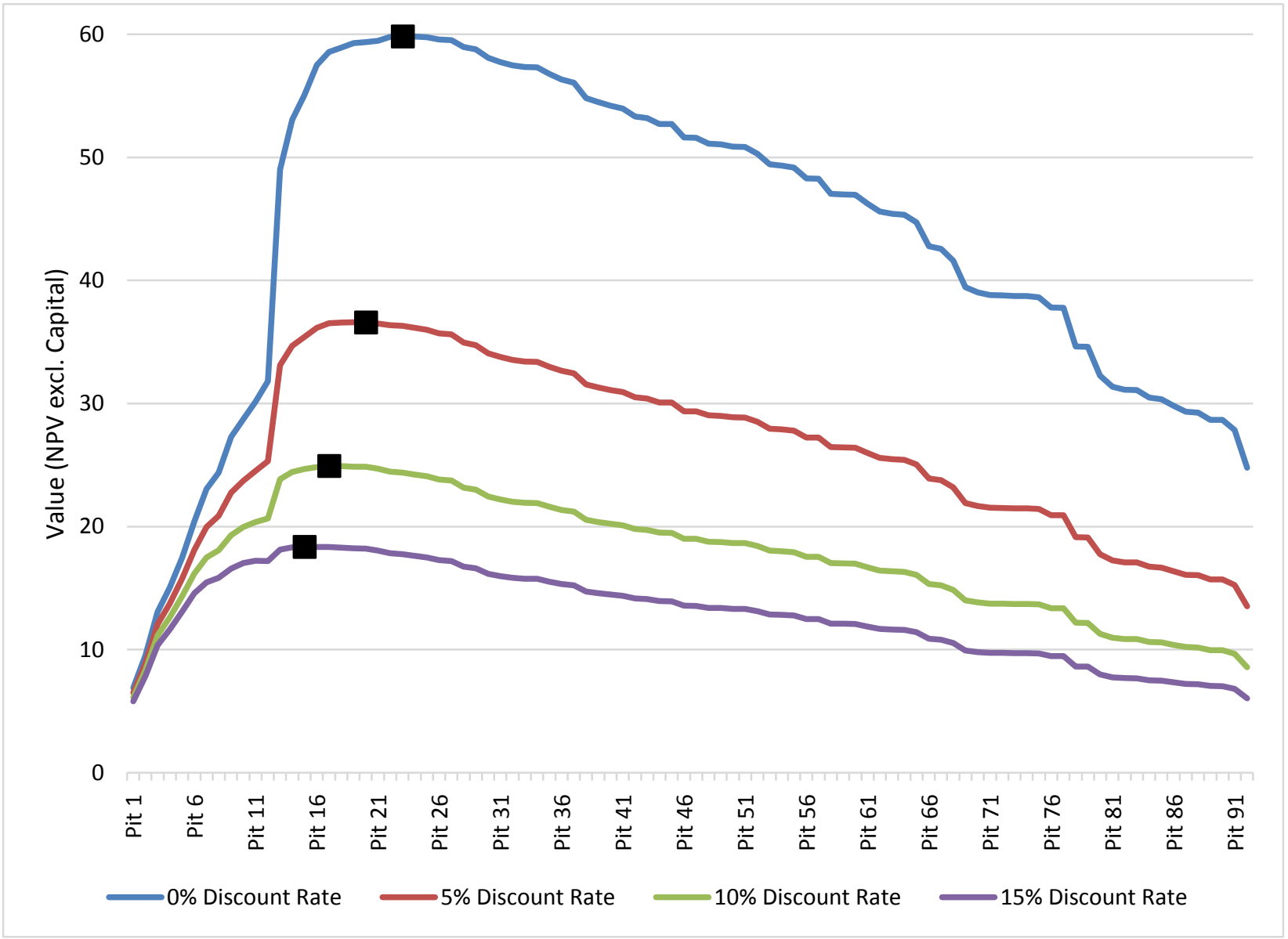
Steps of the traditional open pit mine design process (Dagdelen 2001)

  - Run various scenarios

Pit Selection at Fixed Discount Rate (5%)



Significance of Discount Rate



Conclusions

- Investors and managers should understand the importance and implications of FCFF vs FCFE, as well as the discount rate used in the valuations.
- Discount rates should allow for changes to a company's capital structure.
- The simplest way of incorporating a change in capital structure is to recalculate the WACC using the new capital structure weightings.
- Changes to the optimisation input parameters, specifically the discount rate, without due process may have a significant impact on the pit selection.

Thank You

Minxcon Group

Minxcon Exploration

Minxcon Consulting

Minxcon Projects

c/o Hendrik Potgieter & van Staden Roads
Little Falls. Roodepoort
Tel: +27 11 958 2899
reception@minxcon.co.za
www.minxcon.co.za

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