

SOME COMMON RISKS TO AVOID IN ESTIMATING AND APPLYING DISCOUNT RATES

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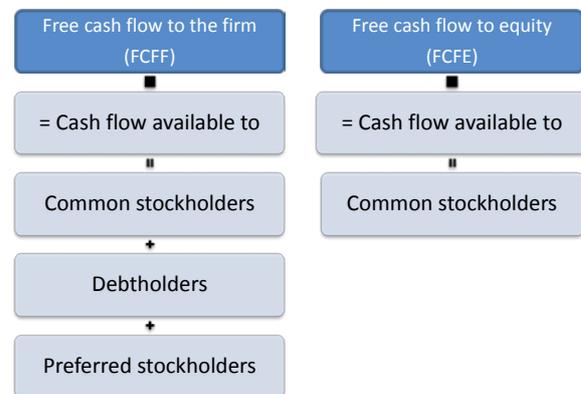
INTRODUCTION

Discounted cash flow (DCF) analysis is one of the most widely-accepted methods of mineral asset valuation. Operational and corporate decisions based on a discount rate, without due process, could increase the risk in decision-making. One of the most critical issues for an investor to consider in a strategic acquisition is to estimate the worth of the mineral asset.

Free cash flow to the firm (FCFF) and free cash flow to equity (FCFE) are the most commonly used cash flow methodologies. The value to shareholders could be shown either in FCFF minus net debt or in FCFE. There are two ways to estimate the equity value using free cash flows:

(1) Cash flows (FCFF) – excluding principal and interest payments - are discounted, with the relevant discount rate being the weighted average cost of capital (WACC) because this rate reflects the firm's cost of capital and tax benefits from interest. The value of the firm's net debt position is then subtracted to calculate the equity value.

(2) The FCFE - including principal and interest payments - are discounted, with the relevant discount rate being the capital asset pricing model (CAPM). This provides a more direct way of estimating equity value.



The calculation of the discount rates are displayed in the table below

Item	FCFE (CAPM)	Item	FCFF (WACC)
Risk-free rate	8.4%	Cost of equity (nominal terms)	15.5%
Country risk premium	0.0%	Proportion of equity to debt	50%
Market premium	6.0%	Pre-tax cost of debt	9.0%
β	1.19	After-tax cost of debt	6.7%
Cost of equity (nominal terms)	15.5%	Proportion of debt to equity	50%
Cost of equity (real terms)	9.0%	WACC (nominal terms)	11.0%
		WACC (real terms)	4.7%

In theory, the FCFF and FCFE approaches should yield the same equity value if the inputs are consistent. Testing this theory reveals interesting detail in the following example:

1. A simplified real-term cash flow model (for a 25-year LoM model) was constructed
2. A loan paid back over a period of 10 years (from start of production in year 3) was considered

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3. The FCFF using WACC based on a debt/equity ratio of 50:50 was calculated (WACC real term - 4.7%)
4. A FCFE with the real discount rate based on the CAPM was applied (9.0%).

For **FCFE** the loan is incorporated into the DCF and the principal and interest payments are paid annually; interest payments are tax-deductible, hence providing a tax advantage. The loan is incurred in year 2 and the first payment is made only in year 3 (1 year's accrued interest). In the **FCFF** model the principal and interest payments are not included because the tax benefits of interest are already taken care of in the WACC calculation.

The 25-year model yields a 41.4% higher NPV for the FCFF. The reason for this is that when WACC is used the same debt-to-equity ratio is assumed to continue over the whole LoM - therefore assuming a loan over the total life of mine, instead of 10 years with no further tax advantage for the remaining life – the longer the LoM the more benefit is generated because of the lower WACC discount rate compared to the FCFE model using a higher rate. The results are displayed in the table below.

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
<i>Variance</i>		<i>+41.4%</i>

The difference in NPVs is substantial and highlights the importance of using the correct assumptions to estimate the value to shareholders when using FCFs. In reality, the FCFE value would be the more realistic in the case of the 25-year plan. If the capital structure is expected to change significantly over the life of the project, an adjusted WACC should be considered as an alternative when the loan period ends. The simplest way of incorporating a change in capital structure is to recalculate the WACC using the new capital structure weightings.

CONCLUSIONS

- Valuers and companies often accept the discount rates provided to them from top management without fully understanding the potential impact on the value of the project.
- It is important for managers and investors to understand the differences between FCFF and FCFE, as this is dependent on the strategy and objective of the valuation.
- The computation of WACC, which is both a sensitive input and surprisingly variable, should be calculated with caution and applied correctly to avoid unrealistically high or low discount rates over the life of an operation.
- Discount rates should allow for changes to the company's debt position in order to avoid impractical discount rates for an operation. The simplest way of incorporating a change is to recalculate the WACC using changed debt : equity ratios when a loan is expected to be repaid