APPLIED FINANCE CENTRE
Faculty of Business and Economics

MACQUARIE University

FTA Webinar
Weighted Average Cost of Capital: Part 2

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Tony is responsible for managing the Corporate Finance stream in the prestigious Master of Applied Finance. Prior to joining the Applied Finance Centre Tony had over 25 years' experience in the manufacturing, resource and agricultural industries. His experience includes all aspects of corporate finance and strategy, including project evaluation, strategic portfolio analysis and restructuring, and the development and execution of growth strategies. He managed a number of large acquisitions and divestments both in Australia and overseas, and a number of large scale balance sheet restructurings.

In the Masters of Applied Finance program, Tony presents the Core Corporate Finance course, and elective subjects including Advanced Valuation, Managing Shareholder Value and Corporate Financial Strategy. He completed his PhD at Macquarie University in 2015.

Agenda

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Part 2

- ✓ Recap of Part 1
- ❑ Challenges in applying WACC (continued)
- ❑ WACC and Financial Strategy
- ❑ Issues in estimating WACC
- ❑ Sources of information for calculating WACC

Recap of Part 1

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WACC measures the returns required by investors in an asset

- ❑ Used in Discounted Cash Flow (DCF) valuations
- ❑ The WACC is determined by the characteristics of the cash flows being valued – primarily risk and debt capacity
- ❑ Operating Free Cash Flows discounted at WACC to give Enterprise (or Asset) Value
- ❑ Enterprise Value = Equity + Debt
- ❑ When using WACC, Equity Value is determined as a Residual i.e. Equity = Enterprise Value – Debt

Recap of Part 1

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WACC measures the returns required by investors in an asset

$$WACC = R_e x(1 - {}^{D}/_{V}) + R_d x(1 - T) x\, {}^{D}/_{V}$$

Where:

R_e is the *Cost of Equity* for the cash flows being valued;

R_d is the *Cost of Debt* usually estimated as current borrowing rate;

T is the *marginal corporate tax rate,* important because interest is tax deductible and equity is not. This means that, for sensible debt levels, WACC reduces due to tax benefit of interest deductions;

D/V is the *target debt capacity* of the cash flows being valued,, where D is Debt is expressed as percentage of Enterprise Value, V. Target gearing is expressed in market value terms

Recap of Part 1

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Cost of Equity is key input into WACC calculation

Cost of equity is estimated using the Capital Asset Pricing Model

$$R_e = R_f + \beta \, x \, MRP$$

Where:

R_e is the *Cost Of Equity*: return required by shareholders allowing for the riskiness of the project;

R_f is the *Risk Free Rate*: usually estimated as current long term government bond yield, ideally to match the term of the investment.

β is the investment's *Beta.* It measures the sensitivity of an investment's returns to changes in the overall market, and is a measure of relative risk. An asset with the same risk as the market has a Beta of 1. This is the risk that cannot be eliminated by diversification;

MRP is the *Market Risk Premium*, an estimate of the additional returns that investors require to invest in the overall market compared to investing in risk free assets (which have a Beta of zero). In Australia, an MRP of 6% is most commonly used.

Recap of Part 1

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Sample Calculation: WACC for NewCrest

Input	Data		Weighted	Input to WACC
Target Gearing	11%			
Cost of Debt x (1 – Tax rate)	6% x (1 – 0.30)	4.20%	4.20% x 11%	0.46%
Cost of Equity	3% + 0.73 x 6.5%	7.75%	7.75% x 89%	6.90%
WACC				7.36%

Recap of Part 1

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WACC based valuations used in wide range of applications

Application	Which means	How used
Capital Allocation		
Equity Valuation		
Impairment Testing		
Performance measurement		
Regulatory Pricing		

Recap of Part 1

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Company wide v divisional cost of capital

Company Wide Cost of Capital	Divisional Cost of Capital
Company wide cost of capital applied to all projects	WACC calculated for each division or project based, on the Beta and D/V of the relevant division – valuations done using the divisional cost of capital
Beta of parent company is used to calculate WACC for company	Beta of each division usually found by using 'comparable' or 'pure plays' – listed companies similar to each division are used to estimate WACC, as if each division was a separate listed entity

Recap of Part 1

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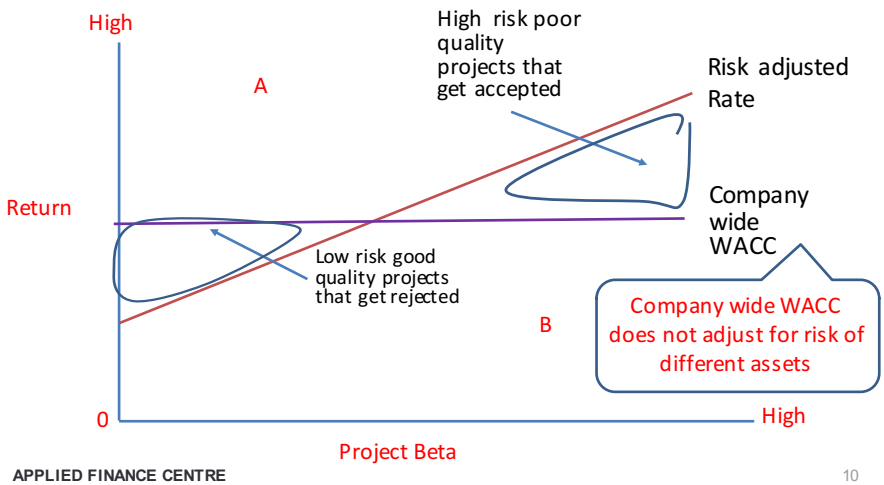
Company wide hurdle leads to decline in quality of portfolio



Recap of Part 1

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Company wide v divisional cost of capital - example

Calculate the cost of capital for a prospective investment in the aquaculture industry. Assume this investment has a target [Debt/Value] ratio of 10%;

Step:	Result
[1] Find comparables	Three good comparables in Australia: Tassal, Huon and Clean Seas
[2] Calculate the 'Ungeared' or 'Asset' Beta	Asset Beta is 0.59 - refer next slide #1. This is the systematic risk of the asset with zero debt
[3] Calculate the "Geared' or 'equity' Beta, uisng the target gearing	Regeared Beta is 0.63 - refer following slide #2. This is an Equity Beta with Debt/Value Ratio equal to 10% [Note: D/E = 10/90]
[4] Calculate WACC of Target Asset	WACC is 6.80% - refer following slide #2

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Challenges in applying WACC (continued)

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Key issues in using WACC to support decision making

#1: Company wide versus divisional cost of capital

#2: Cost of capital and hurdle rates

#3: Cost of Capital and risk

#4: Post tax and pre tax WACC

Challenges in applying WACC: #2

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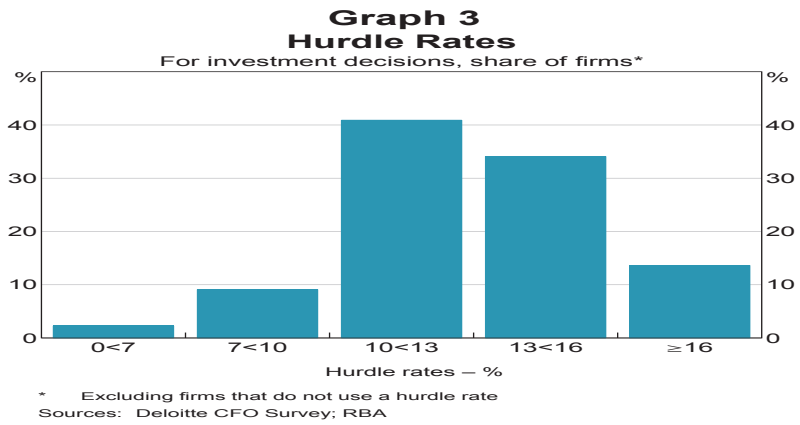
RBA survey (2015) and Deloittes (2014) find that nearly 90% of companies use hurdle rates above 10%



Challenges in applying WACC: #2

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Pervasive role of hurdle rates

- US Federal Reserve (2013) report that a sample of US companies have average hurdle rate of 14.1% (when BBB yields were 4%)
- For US, Jagannathan et al (2013) find hurdle rates exceed WACC by up to 8%
- Hurdle rates has hardly changed in previous 10 years, in spite of interest rate declines – implies it is used as a "rule of thumb" rather than a valuation tool
- Higher growth firms have higher hurdle rates, and are less sensitive to interest rate changes – because marginal returns are relatively attractive
- Investment plans not sensitive to changes in interest rates

Challenges in applying WACC: #2

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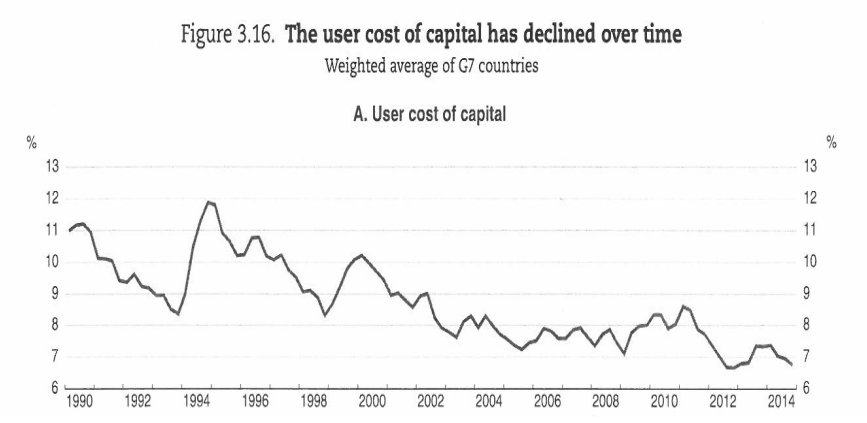
Pervasive role of hurdle rates – OECD find a decline in User Cost of Capital has not driven uptick in G7 capital investment



Source: OECD Economic Outlook, Vol 2015, Issue 1, Chapter 3 "Lifting Investment for Higher Sustainable Growth"

Challenges in applying WACC: #2

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(Dubious) Rationales for hurdle rates

- Allowance for optimism:
  - Builds in gaming
  - Biases against long term projects
  - Not supported by evidence
  - Does it ix the issue?
- Allowance for risk:
  - No basis for adjustment
  - Loses Transparency
- Desire to earn greater than WACC
  - Value maximised by maximising value creation (i.e. accept all positive NPV projects. Trying to maximise ROIC or other ratios does not maximise VALUE CREATION
- Rule of thumb that has worked

Challenges in applying WACC: #2

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(Justifiable) Rationales for hurdle rates

- Preserve financial flexibility by avoiding going to capital markets, especially for marginal projects:
  - Cost of accessing markets easily adds 1% - 1.5% to required return
  - US survey finds financially constrained companies tend to have lower hurdle rates
- Allowance for optionality:
  - Decision rules for options gross up required return for volatility, so only very in the money projects get accepted, others delayed
  - Decision rules incorporating options justify premium of 2% - 4% over WACC
- Allowance for operational constraints – ***I.E. IT IS PRIMARILY A MANAGERIAL DEVICE RATHER THAN A VALUATION TOOL***
  - US survey finds this to be most significant explanation

Challenges in applying WACC: #2

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Framework for thinking about firm size, hurdle rates and funding requirements – potential role for Corporate Treasurer

Term on Graph	Meaning
NPV/Cost	NPV of each project calculated at it's risk adjusted cost of capital, and using Expected Cash Flows – so the NPV is already risk adjusted
Project Supply Schedule	Projects ranked from highest NPV/Cost to lowest, and then cumulated. You can then work out what the marginal NPV/Cost is at various capital budget levels
NPV/Cost after flotation costs	Projects which require external funding will have a lower NPV because of transactions costs involved in raising new external funds
WACC	Projects which have an NPV/Cost = 0 are just earning their WACC. They have a zero NPV – neither value creating or destroying
Hurdle Rate #1	The hurdle rate [expressed as minimum NPV/Cost ratio], which accepts all +ve NPV projects up to the limit of the hurdle rate. That hurdle rate could be set on basis of the availability of internal funding, or an assumed amount of external equity or debt raising.

Challenges in applying WACC: #2

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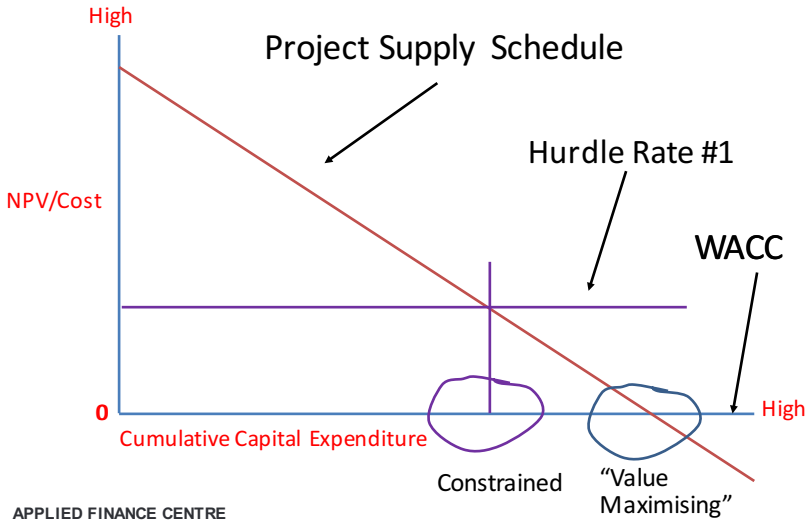
Framework for thinking about hurdle rates



Challenges in applying WACC: #3

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Cost of Capital and Project Specific Risk – the big dilemma

- WACC, which is based on CAPM, incorporates an asset's systematic (or Beta) risk – this is risk that cannot be diversified away by investors and, under the CAPM model, requires compensation
- What about project specific risk – technically known as idiosyncratic risk?
- Two 'competing' solutions:
  - (i) adjust the discount rate to incorporate project specific risk
  - (ii) incorporate project specific risk into cash flows
- Potential role for Corporate Treasurer, who can bring risk modelling skills

Challenges in applying WACC: #3

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Cost of Capital and Project Specific Risk – the big dilemma

	Adjust Discount Rate	Incorporate into Cash flows
How	Increase discount rate to allow for project – higher discount rate automatically lowers value – so there is a 'risk charge'	Calculate alternative scenarios, and weight be probabiliteis to estimate 'Expected Value'
Advantages	*Simple* – just increase discount rate	*Correctly* incorporates project specific risk into valuation – allows for different risk profiles; *Transparent* – the process of thinking through risk scenarios enhances understanding of project dynamics
Disadvantages	Adjustment is *arbitrary* – no real basis for adjusting rate	*More effort* required

Challenges in applying WACC: #3

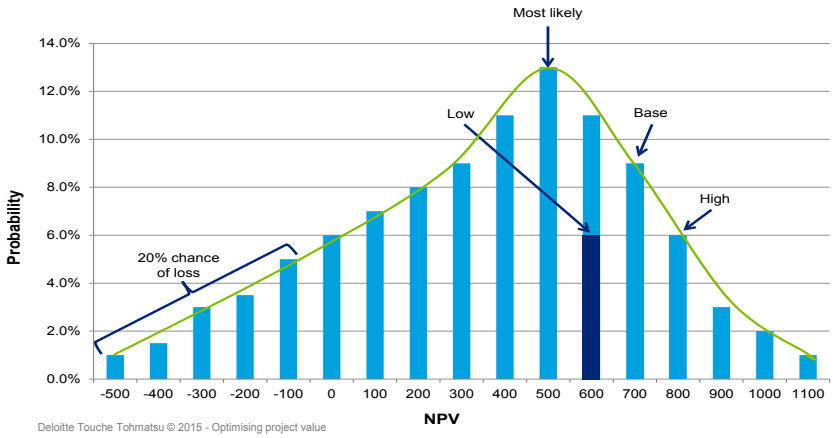
Risk and valuation: need to build more transparency into how we think about risk, value and decision making

- Discount Rate adjustments are an imperfect way to adjust for risk
- Incorporating into cash flows is achievable – optimistic & pessimistic cases are a start; distinguishing between most likely and optimistic case is also important
- Monte Carlo simulation is helpful tool to generate risk profile, expected cash flows and risk metrics
- Why don't we develop risk metrics for asset valuations?
- Suggestions for incorporating risk profile into valuations and pricing

Challenges in applying WACC: #3

Decision makers need to use the risk profile

NPV's are typically skewed and too optimistic



Challenges in applying WACC: #3

Most require use of probability distribution of value, and therefore some risk modelling

Suggestions	Definition
Sharpe style ratio	Enterprise Value/σ_{EV}
Morgan Stanley Bull & Bear price	Base Case is probability weighted, using Residual Income valuation; Downside & Upside scenarios published
Ruback	Incorporates downside scenario into forecasts
Bancel & Tierney [Cash Flow @ Risk]	Value Minimum Cash Flow @ debt rate + Excess cash flows @ Cost of Economic Capital
Deduct Economic Capital from Value	Determine Economic Capital to cover specific downside and deduct from value; Downside can be measured in terms of value or 'x' years ahead

Challenges in applying WACC: #4

Pre Tax v Post Tax Valuation

- Pre tax valuation should use pre tax cash flows at a pre tax discount rate, and still give the same result
- Grossing up is difficult. Simply dividing by (1-T) is rarely correct:
  - Tax paid rarely equals statutory tax rate at 30%;
  - Need to do a gross up for each year;
  - Cash Flow different basis to profit anyway, so grossing up Cash Flow does not make sense.

Challenges in applying WACC: #4

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Pre Tax v Post Tax Valuation

Refer to original example

Post Tax Valuation

Years	0	1	2	3
Operating Free Cash Flow		3,887	12,324	16,273
Terminal Value				248,448
WACC	**8.55%**			
Target Value	**221,006**			

Value of Post Tax Cash Flows discounted at WACC

Challenges in applying WACC: #4

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Pre Tax v Post Tax Valuation

For a pre tax valuation, need to discount *pre tax* cash flows at a *pre tax* discount rate:

The "wrong" way:

Use a "Grossed up" WACC:

Grossed up WACC = WACC / (1 – Tax Rate)

= 8.55% / (1 – 0.3)

= 12.21%

Challenges in applying WACC: #4

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Pre Tax Valuation – the wrong way

Pre Tax Valuation

Years	0	1	2	3
Operating Free Cash Flow		3,887	12,324	16,273
Tax Paid		1,507	582	(307)
Pre Tax Operating Free Cash Flow		5,394	12,906	15,966
Pre Tax Terminal Value				253,140
Pre Tax Cash Flows for discounting		5,394	12,906	269,106

Grossed Up WACC	12.21%
Value at Grossed up WACC	205,505
Error	-7.0%

Challenges in applying WACC: #4

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Pre Tax Valuation – correct pre tax rate can be backsolved – but why bother?

Pre Tax Valuation

Years	0	1	2	3
Operating Free Cash Flow		3,887	12,324	16,273
Tax Paid		1,507	582	(307)
Pre Tax Operating Free Cash Flow		5,394	12,906	15,966
Pre Tax Terminal Value				253,140
Pre Tax Cash Flows for discounting		5,394	12,906	269,106

Correct Pre Tax Rate	9.44%
Value at Grossed up WACC	221,006

Backsolved – finding the rate that gives the original value. Will vary with project characteristics

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WACC and Financial Structure

WACC makes very specific assumptions about underlying financial strategy

- ❑ *Underlying financial strategy specified by the WACC* - a fixed Debt/Value ratio, and a Residual Dividend Policy which assumes payout of cash flows to maintain target D/V
- ❑ WACC not helpful to determine financial structure
- ❑ WACC and asset based financing
- ❑ Situations where WACC not appropriate

Underlying Financial Strategy

$ amount of debt always adjusts to maintain the Target D/V ratio over the forecast period

Refer to original example

Financial Strategy Underlying WACC Valuation

Years	0	1	2	3
Assumed Target Debt/Value ratio	25%	25%	25%	25%
Estimated Enterprise Value @ Year end	221,006	236,016	243,870	248,448
Assumed Debt Balance [EV x Target D/V]	55,252	59,004	60,968	62,112
Assumed Equity Value [EV - Debt Balance]	165,755	177,012	182,903	186,336

Underlying Financial Strategy

So the debt schedule and interest payments are pre determined

Refer to original example

Debt Profile

Years		0	1	2	3
	Opening Balance	-	55,252	59,004	60,968
Plus	Drawdown / (Repayment)	55,252	3,752	1,964	1,144
Equals	Closing Balance	55,252	59,004	60,968	62,112
	Interest Payments		3,315	3,540	3,658
Less:	Interest Tax Shelter [Interest x Tax Rate]		995	1,062	1,097
Equals	After Tax Interest Payment	-	2,321	2,478	2,561

Underlying Financial Strategy

as is the dividend policy. Any surplus cash distributed to shareholders

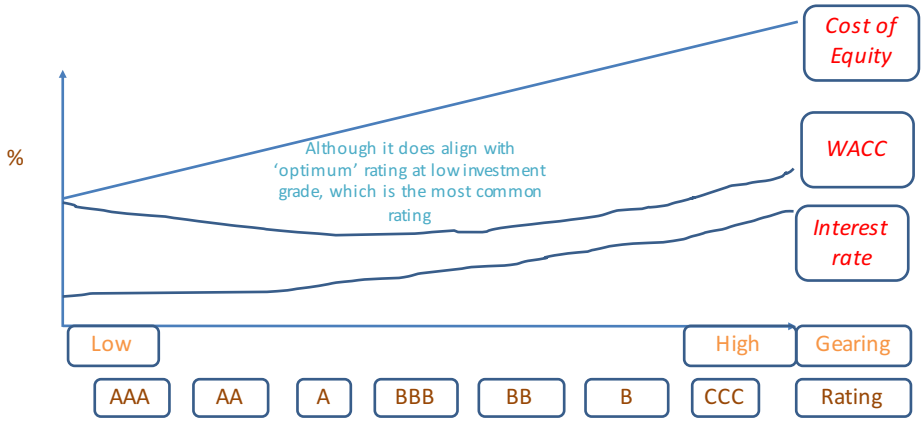
Refer to original example

Cash Flows to Equity [Based on EV]

Years		0	1	2	3
	Operating Free Cash Flow*	(221,006)	3,887	12,324	16,273
Plus	Debt Drawdown / (Repayment)	55,252	3,752	1,964	1,144
Less	After Tax Interest Payment		2,321	2,478	2,561
Equals	Cash Flow to Equity	(165,754)	5,319	11,810	14,857
Plus	Value at end of forecast period				186,336

WACC not helpful for determining capital structure

Deciding the target mix of debt and equity – tempting to calculate WACC at different gearing levels



WACC not helpful for determining capital structure

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But WACC is a blunt instrument for this decision, as it cannot incorporate all of the key inputs required

Input into Debt v Equity Decision	Does WACC incorporate this effect?
Higher interest rate as Debt Increases	Yes
Tax Benefit of Interest Deductions	Yes, although in presence of tax losses it overstates the benefit
Costs of Financial Distress	No, as this is usually reflected in lower cash flows
Risk of Loss of Growth Options as Debt Increases	No, as this is usually reflected in lower cash flows

WACC not helpful for determining capital structure

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But WACC is a blunt instrument for this decision, as it cannot incorporate all of the key inputs required (continued)

Input into Debt v Equity Decision	Does WACC incorporate this effect?
Reduced Agency Costs from Higher Debt	No, this is usually reflected in improved cash flows
Accessibility to market	No, this is usually driven by target rating

Better to focus on analysis of cash flows, funding requirements, need for flexibility, target risk profile and target rating – but that is another topic!

WACC and Asset Based Financings

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WACC usually assumes a weighting of Debt & Equity – what about asset specific financings or, indeed, other structured financings?

- Safest approach – evaluate each separately and add to the basic valuation using a simple WACC:
- Evaluating a lease – depends on exact nature of lease: finance, operating or fully maintained operating lease;
- Key Insight – lease cash flows are an alternative to debt therefore evaluate at after tax debt rate

WACC and Asset Based Financings

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Lease evaluation is driven by evaluating lease cash flows at Cost of Debt

CASH FLOW SPECIFICATION FOR THE LEASE V BUY DECISION

Assume:

3 year **financing lease** with annual rental of $1000

Capital cost: $3400 with straight line tax depreciation assumed

Cost of debt is 7% and Tax rate is 30%

Note inclusion of tax shelter and debt rate

Year	0	1	2	3
Lease payment		1000	1000	1000
Tax deduction on lease payment		-300	-300	-300
Depreciation tax benefit foregone		340	340	340
After tax cash outflow for lease		1040	1040	1040
PV at Post tax debt rate	2837			
Capex saved by leasing	3400			
Net Advantage to leasing	563	POSITIVE VALUE IMPLIES LEASE IS BEST		

WACC and Asset Based Financings

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CASH FLOW SPECIFICATION FOR THE LEASE V BUY DECISION

Assume:

Same deal except it is an **operating lease**

Expected salvage value is $600. WACC is 10%

Salvage value discounted at WACC

Year	0	1	2	3
Lease payment		1000	1000	1000
Tax deduction on lease payment		-300	-300	-300
Depreciation tax benefit foregone		340	340	340
After tax cash outflow for lease		1040	1040	1040
PV at Post tax debt rate	2837			
Salvage Value (after tax)				420
PV of salvage value	316			
Capex saved by leasing	3400			
Net Advantage to leasing	247	POSITIVE VALUE IMPLIES LEASE IS BEST		

WACC and Asset Based Financings

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Evaluation of leases depends on nature of lease – formulae given in Appendix

Finance Lease:

NET ADVANTAGE TO (Finance) LEASING =

Investment Outlay	-	Present value of After Tax Lease Payments @ After Tax Cost of Debt	-	Depreciation Tax Shelter Foregone @ After Tax Cost of Debt

Operating lease:

NET ADVANTAGE TO (Operating) LEASING =

Investment Outlay	-	Present value of After Tax Lease Payments @ After Tax Cost of Debt	-	Depreciation Tax Shelter Foregone @ After Tax Cost of Debt	-	Present Value of Foregone After Tax Salvage Value at end of lease: Salvage Value @ WACC; Book Value x T @ $R_d(1-T)$

WACC and Asset Based Financings

Evaluation of leases depends on nature of lease (cont)

Fully maintained operating lease

NET ADVANTAGE TO (Fully Maintained Operating) LEASING =

Investment Outlay	-	Present value of After Tax Lease Payments @ After Tax Cost of Debt	-	Depreciation Tax Shelter Foregone @ After Tax Cost of Debt	-	Present Value of Foregone After Tax Salvage Value at end of lease: Salvage Value @ WACC; Book Value x T @ $R_d(1-T)$
			+	Present Value of After Tax cash flows saved from maintenance etc, @ WACC		

When is WACC not appropriate?

Situations where the underlying assumption about financial strategy does not match requires an alternative to WACC

Violation of WACC Assumption	Response
Private Equity investments do not use a constant Debt/Value ratio, but usually negotiate a fixed debt schedule	Use *Flow to Equity,* method where cash flows are discounted at Cost of Equity
International investments, structures complicated by multiple tax rates, and debt structuring	Use *Adjusted Present Value* method, which directly calculates costs & benefits of financing structures. WACC has the financing benefits embedded in the $R_d(1-T)$ term
Infrastructrue & Property Investments –tend not to use a constant Debt/Value ratio, but usually negotiate a fixed debt schedule	Use *Flow to Equity* method, where cash flows are discounted at Cost of Equity

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Issues in estimating WACC

Uncertainty about each component of WACC means there is a range of uncertainty in the result

- ❑ Market Risk Premium debate – history v implied forward
  - Range in Australia is between 5% - 7%
- ❑ Estimating Beta – especially for thinly traded stocks, and limited number of comparables, esp in Australia
  - Justify by fundamentals, not statistics
  - Fundamentals imply cyclicality of revenues, level of fixed costs, duration of assets, degree of growth options

Issues in estimating WACC

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Uncertainty about each component of WACC means there is a range of uncertainty in the result

- If and how to incorporate imputation credits into WACC, and valuation generally:
  - Most companies do not formally incorporate franking credits into valuation;
  - Like risk, generally better to incorporate into cash flows, where the timing of tax payments can be better calibrated
  - For those that do include, an allowance is that imputation credits are worth approximately 50% of corporate tax actually paid

Issues in estimating WACC

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Example demonstrating imputation adjusted valuation

WACC		Imputation adjusted
Gamma		0.5
Cost of Equity	10%	10%
Cost of Debt	6%	6%
Tax Rate	0.3	0.15
After Tax Cost of Debt	4.2%	5.1%
Target D/V	25%	25%
WACC	**8.55%**	**8.78%**

Issues in estimating WACC

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Example demonstrating imputation adjusted valuation

Reworked for Imputation

	Operating Free cash Flow		5,394	12,906	269,106
Add	Imputation Credit Value		(753)	(291)	154
	Terminal Value				2,346
	Imputation adjusted OFCF		**4,640**	**12,615**	**271,605**
	Imputation adjusted EV	$225,961			
	Original E.V.	$221,006			

Issues in estimating WACC

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Uncertainty about each component of WACC means there is a range of uncertainty in the result

- How to allow for changes in gearing between projects – deleveraging & releveraging:
  - Refer to example in Part 1 for expressions for deleveraging and releveraging
  - Technical issue about whether an assumption of Debt Beta = 0 – very common, but incorrect, assumption
- Is there a small stock premium – premium in cost of equity for small cap stocks will result in lower valuations
  - Small cap stocks commonly attract a higher discount rate, called small cap premium – in order of 5%;
  - Relevant for valuing listed small caps and private businesses, not used in project evaluation

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Sources of Information for WACC

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Wide range of sources of information available

Information	Source
Useful general sources of information on WACC	KPMG Annual Valuation Practices Survey;
	Independent Expert reports on M&A transactions
	Australian Energy Regulator
Integrated sources provide an overall WACC result	Bloomberg;
Market Risk premium	Australian Energy Regulator
	Independent Expert Reports

Sources of Information for WACC

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Wide range of sources of information available

Sources for Individual building blocks	Source
Risk Free Rate	RBA: https://www.rba.gov.au/statistics/tables/
Betas	Bloomberg
	AGSM Risk Measurement Service
	Direct calculation using CapIQ
	Datastream
	Yahoo Finance

Conclusions

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WACC is a key metric in corporate finance, but still many issues, with scope for contribution by Coprorate Treasurer

- Primarily used in a wide variety of valuation applications
- WACC should be based on asset specific charactistics, especially (systematic) risk and debt capacity, but company wide WACC commonly used (incorrectly)
- It also competes against the use of a hurdle rate – more a tool for rationing capital and resources
- Incorporating project specific risk – many add an (arbitrary) premium to discount rate. Better way --- incorporate project specific risks into cash flows
- Generally not appropriate for making financial strategy decisions
- A number of estimation & application issues suggest handle with care

Appendix

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Summary of relevant valuation formulae

Modelling for Valuation

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Three ways for modelling valuations, often a combination is used

1. Direct calculation

Step #1: Calculate PV of Cash Flow for each year:

A single cash flow in 'n' years is worth:

$PV = CF_n/(1+\text{Discount Rate})^n$

OR $PV = CF_n \times \text{PV Discount Factor}$

WHERE $\text{Discount Factor} = 1/(1+\text{Discount Rate})^n$

Discount Rate is commonly WACC

Step #2: Then sum each year to get the total PV – this what we did in Example 3:

Modelling for Valuation

MACQUARIE University

Three ways for modelling valuations, often a combination is used

2. Excel formulae

NPV(rate,values….) for a series of (changing) values over a fixed period

- Rate = Discount Rate or WACC
- Values is cell references for cash flows:
  - Assumes no blank cells;
  - Exclude the Time =0 Cash Flow [Excel assumes cash flows at end of each period];
  - Assumes equal periods

PV(rate,nper,pmt) for a *fixed term level annuity*

- Nper is number of (equal) periods
- Pmt is the (equal) amount of the annuity

Modelling for Valuation

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Three ways for modelling valuations, often a combination is used

3. "Short cut" formulae

Common formulae for perpetuities [PART #1]:

Level perpetuity:		PV = CF_t / WACC
	OR	PV = CF_t x Multiple
	WHERE	Multiple = 1/WACC
Growing perpetuity:		PV = CF_{t+1}/(WACC – g)
	OR	PV = CF_{t+1} x Multiple
	WHERE	Multiple = 1/ (WACC – g)
	AND	g is growth rate in perpetuity

Modelling for Valuation

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Three ways for modelling valuations, often a combination is used

3. "Short cut" formulae

Common formulae for fixed term annuities [PART #2]:

Fixed Term (Level) Annuity:

$$PV = CF_t \left(\frac{1}{WACC} - \frac{1}{WACC x\ (1+WACC)^T} \right)$$

Fixed Term Growing Annuity:

$$PV = CF_{t+1} \left(\frac{1}{(WACC - g)} - \frac{1}{(WACC - g)} x \frac{(1+g)^T}{(1+WACC)^T} \right)$$

WHERE

'T' is the number of years for which the annuity operates, after which cash flows are zero.

Lease Evaluation Formulae

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For those that like formulae!!!

Finance Lease:

NET ADVANTAGE TO (Finance) LEASING =

$$+I_0 - \sum_{t=0}^{N} \frac{L_t - T_c L_t + T_c Dep_t}{[1 + R_d(1 - T_c)]^t}$$

Operating lease:

NET ADVANTAGE TO (Operating) LEASING =

$$+I_0 - \sum_{t=0}^{N} \frac{L_t - T_c L_t + T_c Dep_t}{[1 + R_d(1 - T_c)]^t} - \frac{EMV_N(1 - T_c)}{[1 + WACC]^N} - \frac{BV_N T_c}{[1 + R_d(1 - T_c)]^N}$$

Note: these formula work when there are no tax losses. They need adjustment in the presence of tax losses

Lease Evaluation Formulae

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For those that like formulae!!!

Fully maintained operating lease

NET ADVANTAGE TO (Fully Maintained Operating) LEASING =

$$+I_0 - \sum_{t=0}^{N} \frac{L_t - T_c L_t + T_c Dep_t}{[1 + R_d(1 - T_c)]^t} - \frac{EMV_N(1 - T_c)}{[1 + WACC]^N} - \frac{BV_N T_c}{[(1 + R_d(1 - T_c)]^N}$$
$$+ \sum_{t=0}^{N} \frac{O_t(1 - T_c)}{(1 + WACC)^t}$$