Time Value of Money & WACC

Week 3

Your Pitch

Tell me about yourself. Walk me through your resume.

1. Start with where you are from
2. Education
3. Your value add
4. Involvement
5. Tie back into what you are applying for

Important in standing apart at an information session, in an interview, or in a coffee chat

Accounting 101 Recap

Week 2 Material

The Holy Trinity: 3 Financial Statements

IS: PROFITABILITY.

- Shows the company's revenue, expenses, taxes, and net income
- Reported as a period of time (eg: Q1-Q4 of 2018)

CFS: CASH.

- Shows the real cash generated through operations, and cash inflows/outflows from different activities
- Reported as a period of time (eg: 2017-2018)

BS: SOLVENCY.

- Shows the company's resources (aka assets), and how it got those resources (liabilities or stockholder's equity)
- Reported as a **point** in time (eg: as of Q4 of 2018)

The Bread and Butter: Balance Sheet

- Assets, Liabilities, Stockholder's Equity. Creditors and debtors have a claim to assets
- Current vs. Non-current difference
- Why does A=L+SE?
- Listed in Order of Liquidity!

Example Company
Balance Sheet
December 31, 2018

ASSETS		LIABILITIES	
Current assets		Current liabilities	
Cash	$ 2,100	Notes payable	$ 5,000
Petty cash	100	Accounts payable	35,900
Temporary investments	10,000	Wages payable	8,500
Accounts receivable - net	40,500	Interest payable	2,900
Inventory	31,000	Taxes payable	6,100
Supplies	3,800	Warranty liability	1,100
Prepaid insurance	1,500	Unearned revenues	1,500
Total current assets	89,000	Total current liabilities	61,000
Investments	36,000	Long-term liabilities	
		Notes payable	20,000
Property, plant & equipment		Bonds payable	400,000
Land	5,500	Total long-term liabilities	420,000
Land improvements	6,500		
Buildings	180,000		
Equipment	201,000	Total liabilities	481,000
Less: accum depreciation	(56,000)		
Prop, plant & equip - net	337,000		
Intangible assets		STOCKHOLDERS' EQUITY	
Goodwill	105,000	Common stock	110,000
Trade names	200,000	Retained earnings	220,000
Total intangible assets	305,000	Accum other comprehensive income	9,000
		Less: Treasury stock	(50,000)
Other assets	3,000	Total stockholders' equity	289,000
Total assets	$ 770,000	Total liabilities & stockholders' equity	$ 770,000

The notes to the sample balance sheet have been omitted.

Income Statement

- Main stages: Net Sales, Gross Profit, Operating Income, Income before Tax, Net Income
- When is an item on the income statement? (2 rules)
  - Has an effect on taxes
  - Corresponds to the period of the IS
- Why isn't capex here?
  - Capital expenditures, commonly known as CapEx, are funds used by a company to acquire, upgrade, and maintain physical assets such as property, buildings, an industrial plant, technology, or equipment.

Innovative Products, Inc.
Income Statement
For Year Ending December 31, 2012

Sales		$50,00,000
Cost of Goods Sold		
Materials	8,00,000	
Labor	11,00,000	
Overhead	6,00,000	25,00,000
Gross Margin		**$25,00,000**
Operating Expenses		
Selling Expenses	9,00,000	
Administrative Expenses	6,00,000	
Depreciation and Amortization	5,00,000	2000000
Operating Income		**$5,00,000**
Other Income & Expenses		
Interest Revenue	50000	
Interest Expense	-1,00,000	
Extraordinary items	2,00,000	1,50,000
Income Before Tax		$6,50,000
Income Tax (at 35%)		$2,27,500
Net Income		***$4,22,500***

CFS: Indirect Method

Net working capital

- NWC = noncash CA - CL
- Why is an increase in current assets a decrease in cash?
- Why is an increase in current liabilities an increase in cash?

CF from operations: Net Income modified to show real cash generated from running the business
CF from investing: Capex, equipment sales/purchases, etc
CF from financing: anything the company does related to stock, debt

XYZ Company
Cash Flow Statement
For the Year Ended December 31, 2015
(in millions)

Net Income	$12.0
Depreciation and Amortization	4.0
Changes in other accounts affecting operations	
(Increase) / Decrease in Accounts Receivable	(0.5)
(Increase) / Decrease in Inventory	(0.4)
(Increase) / Decrease in Prepaid Expenses	0.3
(Increase) / Decrease in Other Current Assets	(0.1)
Increase / (Decrease) in Accounts Payable	(0.3)
Increase / (Decrease) in Deferred Revenue	1.0
Cash Flow from Operations	**$16.0**
Capital Expenditures	(5.0)
Proceeds from sales of equipment	–
Proceeds from sales of investments	–
Cash Flow from Investing Activities	**($5.0)**
Proceeds from issuance of new debt	10.0
Proceeds from issuance of equity	–
Dividends paid	(2.0)
Cash Flow from Financing Activites	**8.0**
Beginning Cash	$16.0
Change in cash	19.0
Ending Cash	**$35.0**

1. Net Income ⟹ Retained Earnings Link

- Net Income on Income Statement (also Cash Flow Statement) affects Retained Earnings on Balance Sheet (under Stockholder Equity)

Retained Earnings = Starting RE amount + Net Income - Dividends Paid

2. Net Income ⟹ Cash Link

- Net income is the last line item in the *Income Statement*
- Net income is the first line item on the Cash Flow Statement
- Change in NWC on CFS relates to CA and CL line items on BS
- The last line item on the Cash Flow Statement is Change in Cash
- This Change in cash line item is the change in cash year to year on the Balance Sheet

Innovative Products, Inc.
Income Statement
For Year Ending December 31, 2012

Sales		$50,00,000
Cost of Goods Sold		
Materials	8,00,000	
Labor	11,00,000	
Overhead	6,00,000	25,00,000
Gross Margin		**$25,00,000**
Operating Expenses		
Selling Expenses	9,00,000	
Administrative Expenses	6,00,000	
Depreciation and Amortization	5,00,000	2000000
Operating Income		**$5,00,000**
Other Income & Expenses		
Interest Revenue	50000	
Interest Expense	-1,00,000	
Extraordinary items	2,00,000	1,50,000
Income Before Tax		$6,50,000
Income Tax (at 35%)		$2,27,500
Net Income		***$4,22,500***

DELL INC.
Balance Sheet
at February 3, 2012
(dollars in millions)

ASSETS	
Current assets:	
Cash	$13,852
Short-term investments	966
Receivables and other assets	9,803
Inventories	1,404
Other	3,423
Total current assets	**29,448**
Property, plant, and equipment	2,124
Long-term investments	3,404
Other noncurrent assets	9,557
Total assets	**$44,533**
LIABILITIES AND STOCKHOLDERS' EQUITY	
Current Liabilities:	
Accounts payable	$11,656
Other short-term obligations	10,345
Total current liabilities	**22,001**
Long-term liabilities	13,615
Total liabilities	**35,616**
Stockholders' equity:	
Common stock ($0.01 par value)	34
Additional paid-in capital	12,153
Retained earnings	28,236
Other stockholders' equity items	(31,506)
Total stockholders' equity	**8,917**
Total stockholders' equity and liabilities	**$44,533**

XYZ Company
Cash Flow Statement
For the Year Ended December 31, 2015
(in millions)

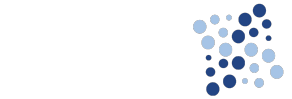
Net Income	$12.0
Depreciation and Amortization	4.0
Changes in other accounts affecting operations	
(Increase) / Decrease in Accounts Receivable	(0.5)
(Increase) / Decrease in Inventory	(0.4)
(Increase) / Decrease in Prepaid Expenses	0.3
(Increase) / Decrease in Other Current Assets	(0.1)
Increase / (Decrease) in Accounts Payable	(0.3)
Increase / (Decrease) in Deferred Revenue	1.0
Cash Flow from Operations	**$16.0**
Capital Expenditures	(5.0)
Proceeds from sales of equipment	–
Proceeds from sales of investments	–
Cash Flow from Investing Activities	**($5.0)**
Proceeds from issuance of new debt	10.0
Proceeds from issuance of equity	–
Dividends paid	(2.0)
Cash Flow from Financing Activites	**8.0**
Beginning Cash	$16.0
Change in cash	19.0
Ending Cash	**$35.0**

Example Questions

- What are the 3 financial statements?
- If depreciation increases, what happens to net change in cash on the CFS?
- Why is interest expense on the income statement, and dividends not?
- How do you get from Net Income to CF from operations?
- If accounts receivable increases, how does this affect the statements?
- If accounts receivable decreases, how does this affect the statements?

Summary

	Income Statement	Balance Sheet	Cash Flow
Time	Period of time	A point in time	Period of time
Purpose	Profitability	Financial position	Cash movements
Measures	Revenue, expenses, profitability	Assets, liabilities, shareholders' equity	Increases and decreases in cash
Starting Point	Revenue	Cash balance	Net income
Ending Point	Net income	Retained earnings	Cash balance



Time Value of Money &WACC

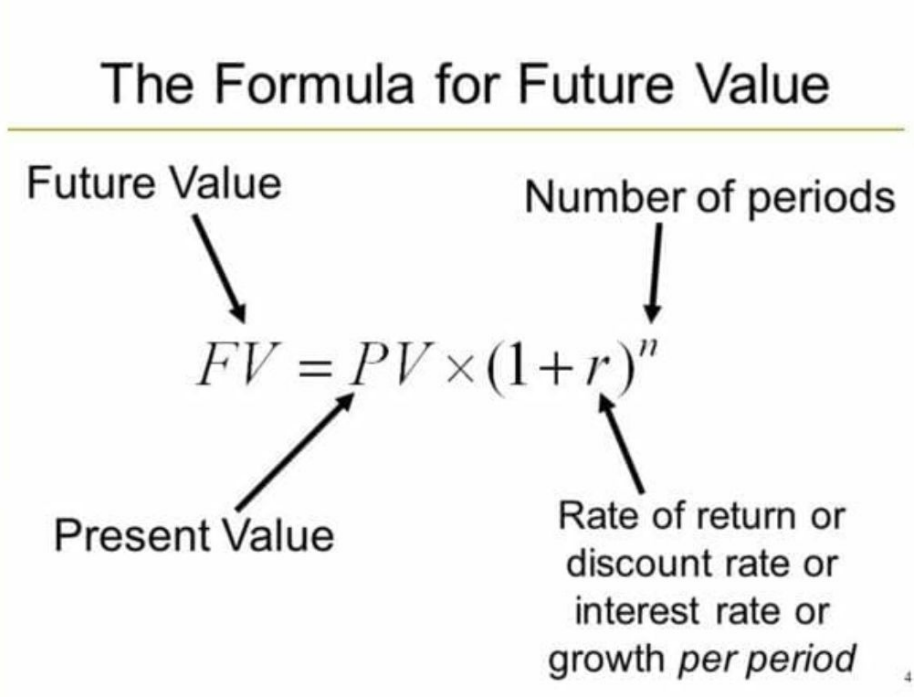
Week 3

A dollar today...

A dollar today...

$$FV=PV(1+r)^n$$

A dollar today...



PV: how much money you have today

FV: what your money will be worth in the future (answer)

A $ today is worth more than a $ tomorrow because of:

$FV=PV(1+r)^n$

Reasons:

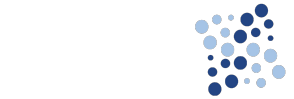
- Return
  - Compound Interest
- Risk
  - More risk, more return
  - Inflation (Prices go up)
- Opportunity Cost
  - Bank v. Stocks
  - College v. Work

Practice

How much money would I have in 20 years if I have $1,000 today, assuming 7% growth after inflation?

Use:

$$FV=PV(1+r)^n$$



Answer

How much money would I have in 20 years if I have $1,000 today, assuming 7% growth after inflation?

$$FV=PV(1+r)^n$$

PV= 1,000

r=.07

n=20

FV=1000(1+.07)^20

FV=$ 3869.68

A $ Today Forever...

(the cash flow is growing/declining in perpetuity)

$$\mathbf{PV=CF/\ (r-g)}$$

- r=discount rate (interest rate)
- g=growth
- cf=cash flows

So what?

A $ Today Forever...

The intrinsic value of a company is the cash flows of all the money it can generate in perpetuity discounted to the present.

So what “r” do you use for a company?

Factors:

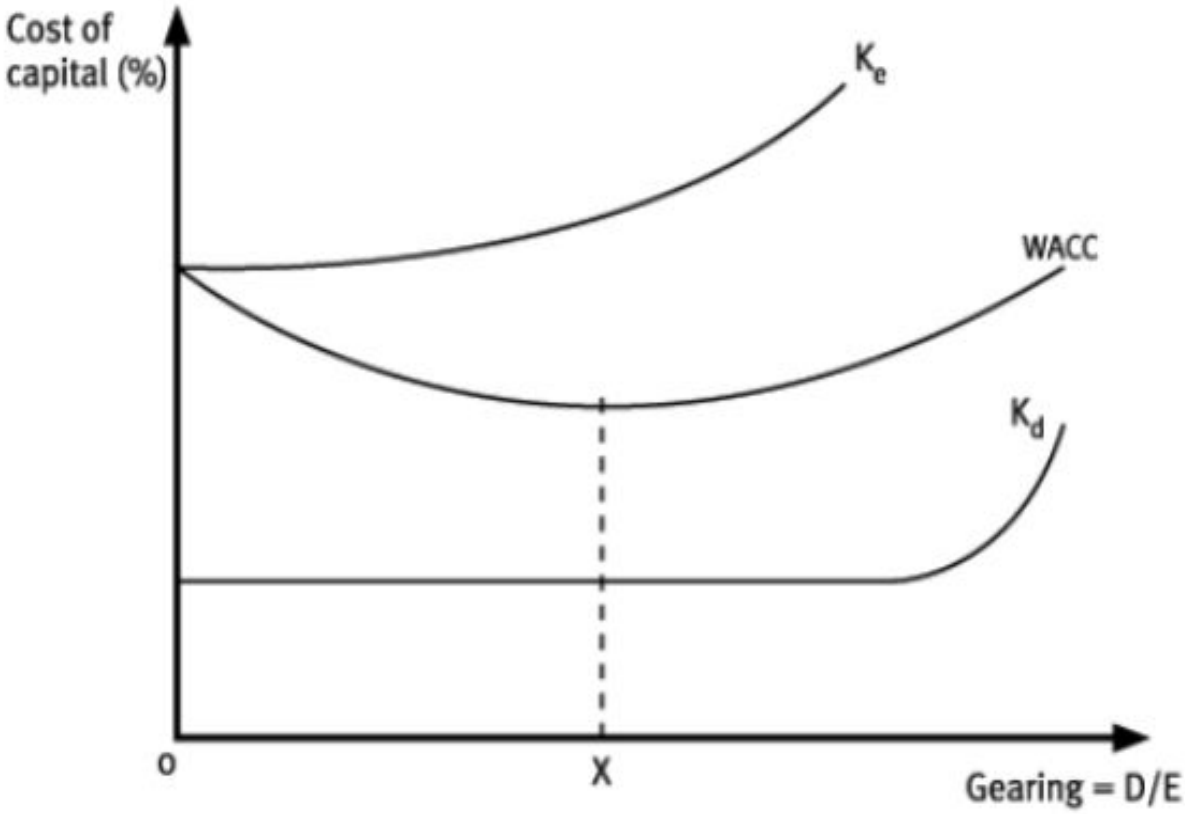
- Return
- Risk
- Opportunity Cost

Plus another level of complexity…..

Debt v. Equity

- Capital Structure Definition: Sources of capital a company has (D&E)
- Debt and equity demand different costs. Why?
  - Cost = a % return that an investor demands
- What is cheaper? Debt or Equity?
  - Effects of interest tax shield: interest payments on certain debts are a tax-deductible expense, so taking on qualifying debts can act as tax shields (interest paid decreases after-tax income)
  - Governments provide interest tax shields in order to encourage more investments for companies and firms, as well as for individuals
- So how do you combine the two costs into a single “r”?

A Wacky Concept: Weighted Average Cost of Capital



WACC, Traditional Position:

the discount rate; the blended mix of a company's debt and equity and the required return based on those proportions;
the rate that a company is expected to pay on average to all its security holders to finance its assets

WACC

$$WACC = \frac{E}{D+E}(r_e) + \frac{D}{D+E}(r_d)(1-t)$$

Where:

E = market value of equity

D = market value of debt

r_e = cost of equity

r_d = cost of debt

t = corporate tax rate

Important notes:

- According to traditional position, there IS an optimal capital structure, different for each company
- Debt is cheaper than equity

Ke & CAPM & Kd

Cost of equity (**Ke**) can be found by using the Capital Asset Pricing Model (CAPM):

Formula:

Risk-free rate + beta * (market return - risk-free rate)

- The 10 yr treasury rate can be used as the risk-free rate and the expected market return is generally estimated to be 7%
- The 10 yr treasury rate is usually 1.5-2% (now lower at 0.76%, why?)

Note: WACC increases if beta and rate of return on equity increase bc an increase in wacc denotes a decrease in valuation and an increase in risk

More Wacky Concepts

- Lenders and equity holders will expect to receive certain returns on the funds or capital they have provided
- Since the cost of capital is the return that equity owners (or shareholders) and debt holders will expect, WACC indicates the return that both kinds of stakeholders (equity owners and lenders) can expect to receive
- WACC is an investor's opportunity cost of taking on the risk of investing money in a company.
- In a DCF, one may apply WACC as the discount rate for future cash flows in order to derive a business's net present value

Practice

A company has $75 of equity and $50 of debt through a single bond offering. This bond pays an interest rate of 7%. Assume a cost of equity of 10%, and a corporate tax rate of 20%.

- What is the WACC?
- The company is growing at a rate of 1%, and generates $100 at time 1. What is the PV at time 0 (aka: now)?

$$WACC = \frac{E}{D+E}(r_e) + \frac{D}{D+E}(r_d)(1-t)$$

Solution

$$WACC = \frac{E}{D+E}(r_e) + \frac{D}{D+E}(r_d)(1-t)$$

A company has $75 of equity and $50 of debt through a single bond offering. This bond pays an interest rate of 7%. Assume a cost of equity of 10%, and a corporate tax rate of 20%.

- What is the WACC?
- The company is growing at a rate of 1%, and generates $100 at time 1. What is the PV at time 0 (aka: now)?

((75/125)(.1)) +
((50/125)(.07))*(1-.2) = .0824

pv=cf/r-g

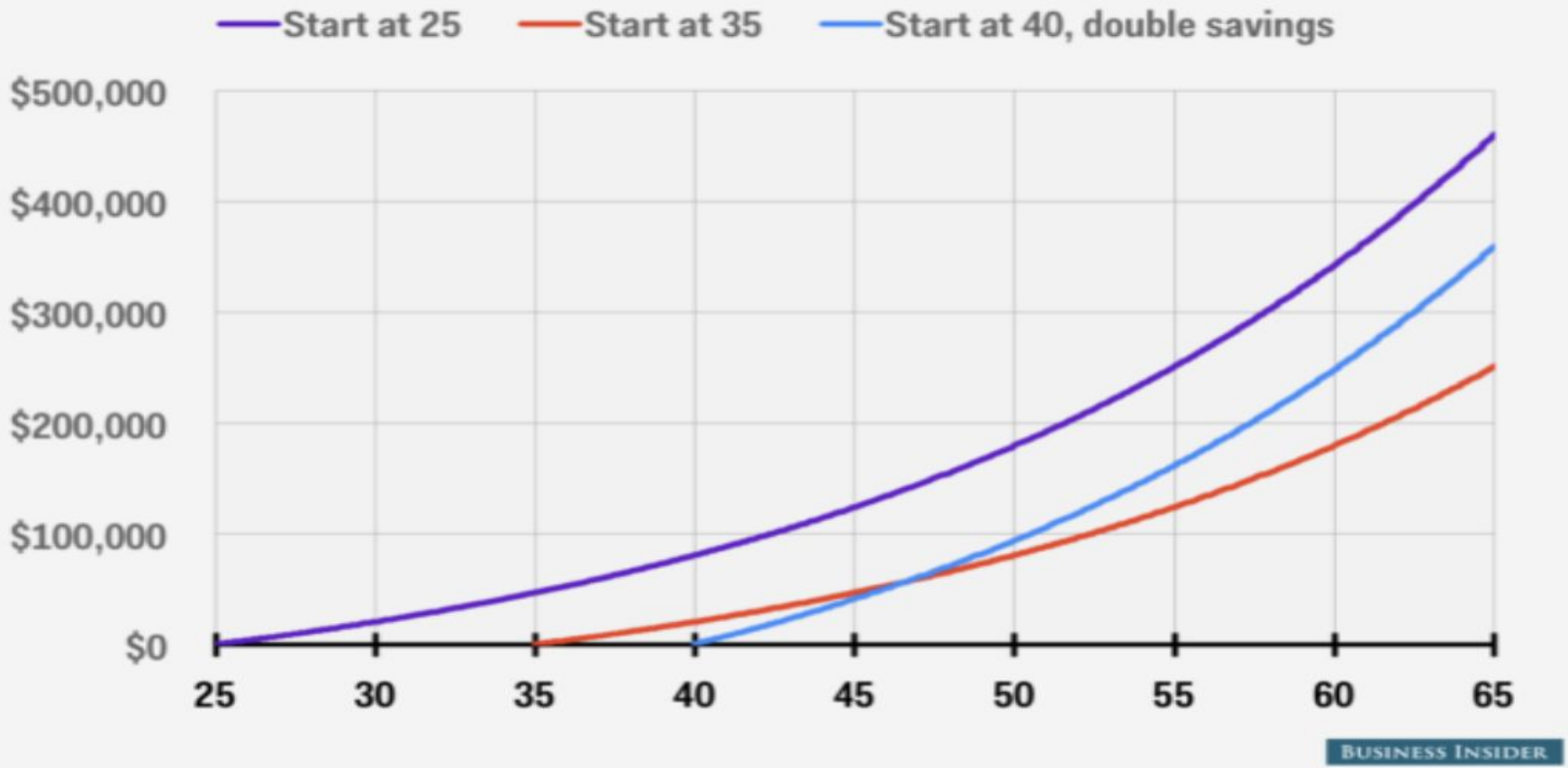
pv=(100)/(.0824-.01) =
1,381.2154696133

Takeaway

It's better to invest early because of the TVM concept. Each dollar that you invest now has a time period to grow, but the reason that it's important to invest that dollar instead of sitting on it is that if it doesn't grow and outpace inflation, you will *lose* purchasing power over time.

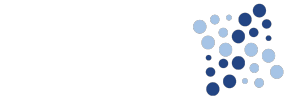
Gas, movie tickets, and food used to cost less and a $50,000 salary used to mean a lot more.

Start saving in your 20s



Recap

- Time Value of Money
- Intrinsic Value of Company: All the cash the company is going to generate into the future discounted to the present
- Capital Structure
- K_e and K_d
- WACC



Things to do/remember

1. Send the rest of your coffee chat emails this week (mark green the ones you have finished on the spreadsheet)
2. Week 3 Homework **must** be submitted by 11:59PM EDT on Friday (10/23)
3. Make a groupchat with your stock pitch group and set up a time after Wednesday to meet on Zoom to discuss stock pitch
4. First G-Body on Saturday (10/24) at 12PM EDT
5. Come to Office Hours if needed (Mon, Tues, & Thurs)

Thank you!

(Make sure you signed in)