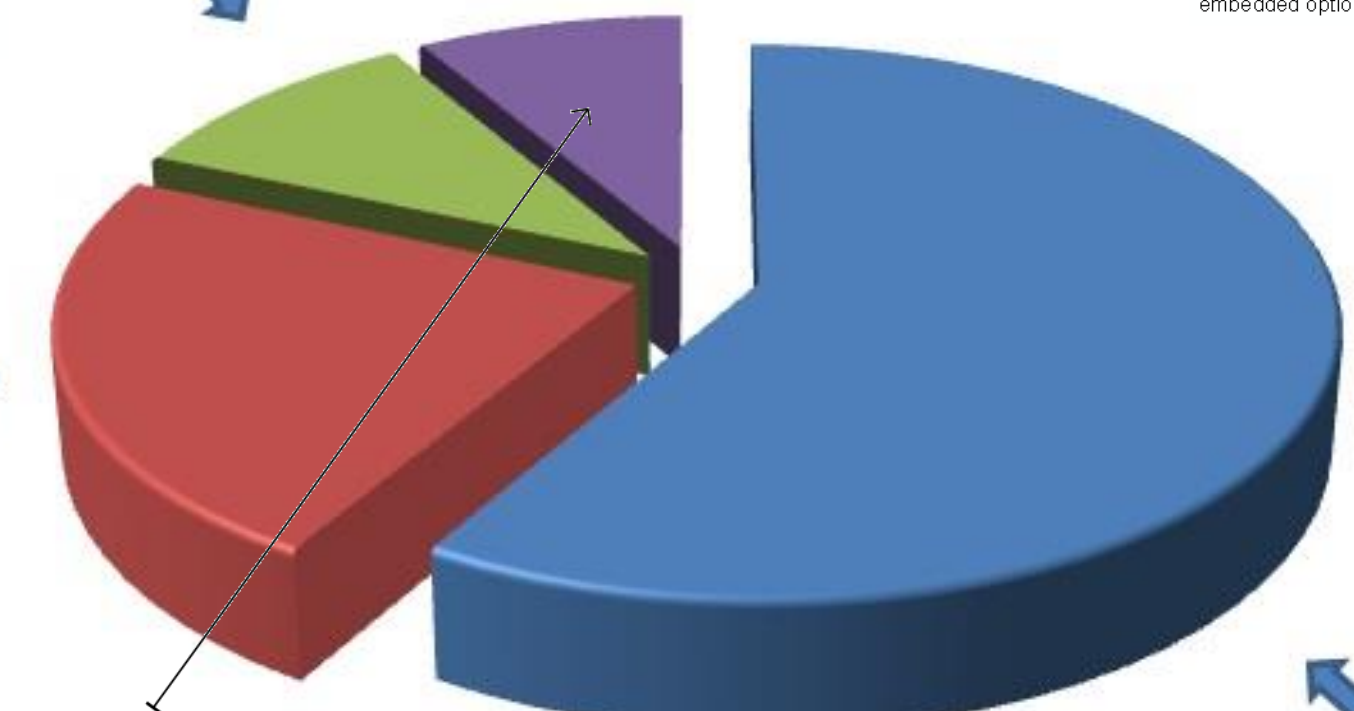
Maximize value through the choice of....

VL11 – Capital Structure

Valuation for Financial Engineers

Prof David Shimko

kinds of liabilities, terms (maturit plus embedded options) of liabilities



Debt

bank loans
bonds
no upside for debtholders

embedded options
convertible debt
callable debt

Other Sources

Crowdfunding - product presales
- company does not have up ownership (equity)

Vendor finance
- suplier provides funds to help company gow and eventually purchase its products

Government grants

Tokens

Preferred Stock

not really stock
hybrid instrument (debt and equity)
fixed coupon (looks like debt)
deferrable by management (no coupon, no bankruptcy caused by lack of payment)
preference in corporate bankruptcy (looks more like debt)
convertible preferred - can convert to equity

Equity Capital

proportional share of assets
your fraction of agreed cash flows every period
always paid last
upside and downside of business

THEMES

Cash flows

- Determining cash flows for a corporation

Pro-formas

- Forecasting and simulating cash flows in the future

Claims

- How the cash flows are split among corporate liabilities

Objectives

- What should management try to achieve?

Drivers

- What factors drive value?

Implementation

- How to put this in action?

CASH FLOWS

- Which of the numbers in Intel's quarterly financials come the closest to representing its cash flows? net income
- What is the difference between cash flow and earnings? differ because of noncash charges
- What is the impact of accrual accounting on cash flow determination? creates taxable implications from early recognition of future income and expenses
- Terms: EPS, EBITDA, Earnings
  - operating income
  - depreciation, amortization, evaporation
- Next slide: Non-cash charges
  - affect income statement but unrelated to cash expenses

Diluted shares - includes tradedshares plus hidden shares (untraded)
Hidden shares = convertible part of preferred shares, convertible bonds, warrants (call options issued by company), employee stock options ESOP (unvested)

Book value = acquisition cost minus depreciation (formula provided by law)

Intel Corporation is an American multinational corporation and technol
headquartered in Santa Clara, California, in the Silicon Valley. Wikipedia

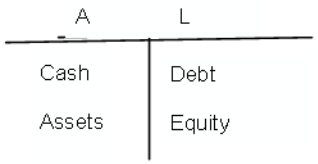
Headquarters: Santa Clara, CA
CEO: Bob Swan (Jun 21, 2018–)
Founded: July 18, 1968, Mountain View, CA
Revenue: 70.8 billion USD (2018)
Founders: Gordon Moore, Robert Noyce
Subsidiaries: Altera, Mobileye, Nervana Systems, Intel Capital, MORE

INTEL CORPORATION

Quarterly financials

SEP 2019	JUN 2019	MAR 2019	DEC 2018

(USD)		Sep 2019	Y/Y
Revenue	Total proceeds of sales; gross income	19.19B	0.14% ↑
Net income	like profit; earnings	5.99B	6.38% ↓
Diluted EPS	earnings divided number of diluted shares	1.35	2.17% ↓
Net profit margin	net income / book value	31.21%	6.53% ↓
Operating income	income after deducting operating costs	6.55B	9.98% ↓
Net change in cash		1.07B	34.68% ↑
Cash on hand		3.94B	15.5% ↑
Cost of revenue	variable costs - how much did we pay to produce revenue? no management overhead or fixed costs	7.9B	16.05% ↑

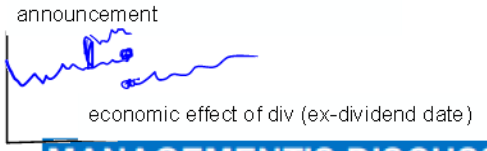


INTEL'S 10-Q

10-Q
10-K annual

- How would you determine cash flow from this more detailed SEC Form 10-Q report?
  remove noncash items
- What is Intel's effective tax rate? 729/6719 about 10%
- What is the benefit of the amortization charge?
  noncash charge creates tax deduction
- What is the impact of interest on cash flow?
  cash charge also creates tax deduction
- What's the difference between dividends and share buybacks?
  similar at aggregate level, buybacks more efficient
- How many shares are outstanding, and what was the dividend per share?
  dilutes shares = 5990/1.35
- What does *diluted* mean?

Dividend - Cash payment to shareholders
Taxable as ordinary income
All shareholders will have to pay this



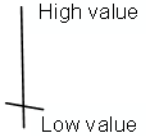
MANAGEMENT'S DISCUSSION AND ANALYSIS (MD&A)

Third quarter revenue was $19.2 billion as our data-centric businesses grew 6% year over year, offset by the PC-centric business decline of 5%. Data-centric revenue was up compared to a year ago, driven by a strong mix of high-performance Intel® Xeon® processors in our DCG business and growth across all businesses. Our PC-centric business was down on lower year over year platform volume, partially offset by a strong mix of higher performance products as the commercial segment of the PC market remained strong. Lower platform unit sales and margin compression on memory products resulted in lower gross margins and operating income, which was partially offset by platform ASP strength and lower investments in modem. In the first nine months we generated $23.3 billion of cash flow from operations and returned $14.3 billion to stockholders, including $4.2 billion in dividends and $10.1 billion in buybacks. For key highlights of the results of our operations, see "A Quarter in Review."

	Three Months Ended				Nine Months Ended			
	Q3 2019		Q3 2018		YTD 2019		YTD 2018	
(Dollars in Millions, Except Per Share Amounts)	Amount	% of Net Revenue	Amount	% of Net Revenue	Amount	% of Net Revenue	Amount	% of Net Revenue
Net revenue	$ 19,190	100.0 %	$ 19,163	100.0 %	$ 51,756	100.0 %	$ 52,191	100.0 %
Cost of sales VC		41.1 %	6,803	35.5 %	21,494	41.5 %	19,681	37.7 %
Gross margin	11,295	58.9 %	12,360	64.5 %	30,262	58.5 %	32,510	62.3 %
Research and development FC	3,208	16.7 %	3,428	17.9 %	9,978	19.3 %	10,110	19.4 %
Marketing, general and administrative MG&A	1,486	7.7 %	1,605	8.4 %	4,608	8.9 %	5,230	10.0 %
Restructuring and other charges	104	0.5 %	(72)	(0.4)%	288	0.6 %	(72)	(0.1)%
Amortization of acquisition-related intangibles	50	0.3 %	50	0.3 %	150	0.3 %	150	0.3 %
Operating income	6,447	33.6 %	7,349	38.3 %	15,238	29.4 %	17,092	32.7 %
Gains (losses) on equity investments, net	318	1.7 %	(75)	(0.4)%	922	1.8 %	365	0.7 %
Interest and other, net deductible		0.2)%	(132)	(0.7)%	(170)	(0.3)%	225	0.4 %
Income before taxes	6,719	35.0 %	7,142	37.3 %	15,990	30.9 %	17,682	33.9 %
Provision for taxes	729	3.8 %	744	3.9 %	1,847	3.6 %	1,824	3.5 %
Net income	$ 5,990	31.2 %	$ 6,398	33.4 %	$ 14,143	27.3 %	$ 15,858	30.4 %
Earnings per share – diluted	$ 1.35		$ 1.38		$ 3.14		$ 3.35	

Buyback - company makes tender offer to repurchase block of shares from investors
- Voluntary, therefore not taxable for those who don't sell
- Those who sell face tax at capital gains rate

MOST PEOPLE believe share buybacks better



Buybacks reduces low value investors, causes the price of stock to increase even tho value of the stock is the same

HOW IS INTEL VALUED?

Gordon growth value

$$V_0 = \frac{D_1}{r - g}$$ (or EPS, CF)

Note: Intel's share price was $51.53 on Sep 30 2019.

Price-earnings ratio (PE or P/E ratio)

- P/E = 51.53/(1.35 × 4) = 9.54 or TTM; value of $1 of earnings = P/E
- Using a growing perpetuity model, E/P = $\boxed{r - g}$ = 10.48%

ex. r(INTEL) = 7% --> g = -3.5%

Price-cashflow ratio (P/CF)

- P/CF = 9.79
- Using a growing perpetuity model, CF/P = 10.21%

Questions

- Is this a pre-tax or a post-tax rate?
- What do these numbers say about Intel's expected growth?

Sept 2019 financials

INTC - Nasdaq		Earnings	"Cash Flow"
Net revenue		19,190	19,190
Cost of sales		7,895	7,895
Gross margin		11,295	11,295
R&D		3,208	3,208
Marketing, G&A		1,486	1,486
Restructuring, other charges		104	
Amort		50	-5
Oper Inc		6,447	6,606
P/L on equity		318	
Interest		-46	5
Income before taxes		6,719	6,565
Provison for taxes		729	729
Net income		5,990	5,836
EPS - diluted		1.35	
# shares (mm)		4,437	
effective tax rate		10.85%	
Share price 9/30/19			51.53
P/E and E/P ratio		9.54	10.48%
CF per share	pretax		1.48
	after tax		1.32
P/CF and CF/P ratio		9.79	10.21%

CAN YOU DEVISE A BETTER VALUATION MODEL?

Desired qualities in a model:

1. Account for expected changes in cash flows in the future
2. Allow different cash flow streams to be discounted at their appropriate discount rates
3. Allow management to use the model to make financial decisions:
   - Investment
   - Acquisition/divestiture
   - Capital structure
   - Risk management next week
4. Value all assets and liabilities separately

THE ECONOMIC BALANCE SHEET

Valuation of corporate balance sheet
B/S components analogous to CDOs

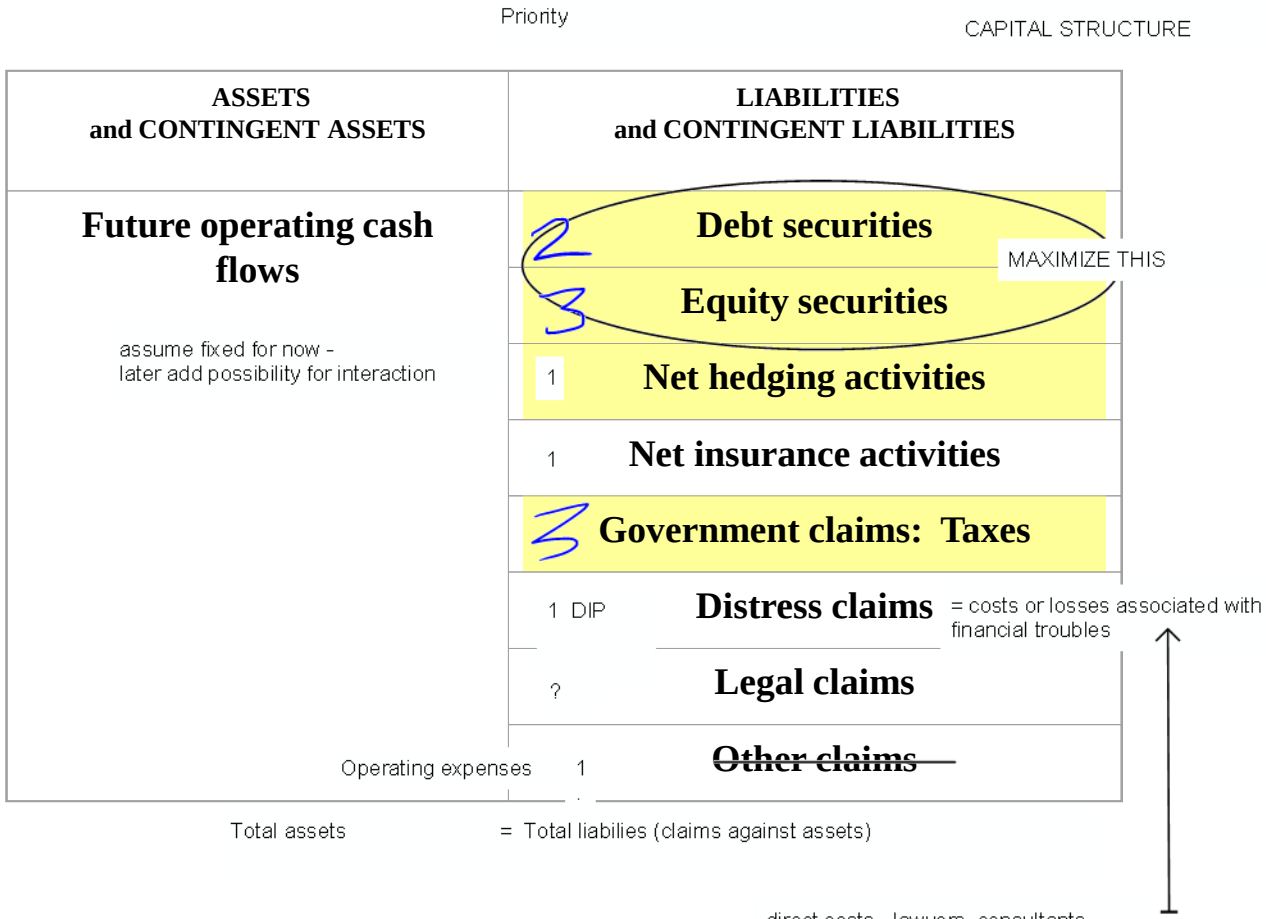
Simulate future operating cash flows

Determine who gets paid in each scenario

- Taxes
- Interest
- Hedge counterparts
- Dividends

Determine the present value of each liability

Choose the financial policies that maximize the value of equity, or equity + debt



NOTE: A hedge may be negative NPV while still increasing equity value

A CLOSER LOOK AT CAPITAL STRUCTURE

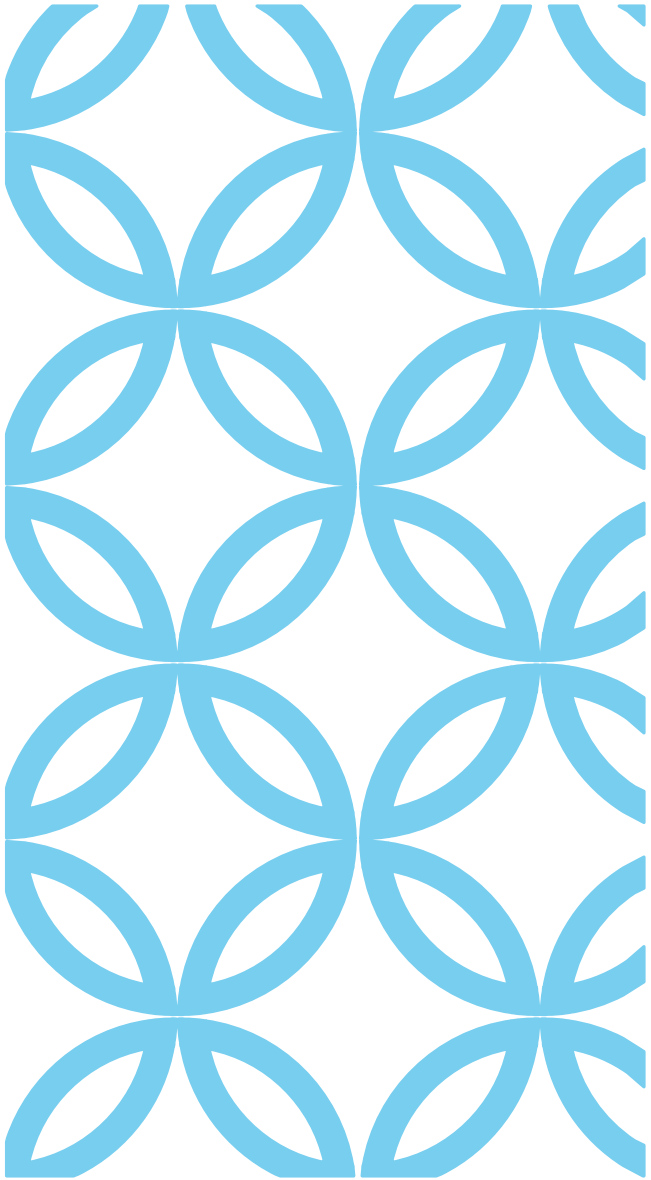
What choices are made when determining capital structure?

- Amount of debt
- Type of debt/Composition of debt
- Term of debt
- Dynamic debt management
- Alternative capital sources
- Bonds vs bank loans

- What arguments favor more debt?
  - Tax deductibility
  - Costly or constrained equity
  - "Cheaper" than equity

- What arguments favor less debt?
  - Costs of financial distress
    - Direct and indirect
  - Loss of financial flexibility
  - Disclosure of sensitive financial and business information

Tech companies - What if you think the equity is overvalued?



no transaction costs, no info differences, no cost of bankruptcy.

Modigliani-Miller: In *perfect* capital markets, with no interaction between assets and liabilities on the balance sheet, capital structure is irrelevant.

Miller: If corporate debt interest is tax deductible, and there are no other market imperfections, you should issue as much debt as possible.

weak argument

DeAngelo-Masulis: If corporate debt interest is tax deductible, and increasing debt levels increase the expected cost of financial distress, then there is an optimal capital structure balance.

Choose

WACC: Chose the types and levels of debt and equity to obtain the lowest possible weighted average cost of capital.

ex. $10 bank debt cost 6%, 3.6% a.t. $30 conv debt costs 9% a.t. 7% $60 equity cost 12%

Pecking order: Issue the lowest cost debt first, and keep going to riskier debt up to a corporate limit.

ROE: Maximize the ROE, or return on equity.

Not widely used

Flexibility: Make sure you have enough capital to take advantage of exceptional opportunities that may arise for the firm. "Keep your tinder dry."

BEST

ACADEMIC CAPITAL STRUCTURE THEORIES

WACC problem - assumes liability value unaffected by debt composition

HARDER PROBLEMS WITH DEBT

Defined benefit pension plans
Defined contribution plan
PBGC

Moral hazard – corporate behavior changes after debt is issued

Asset substitution – Company has incentive to increase risks after debt is issued

Underinvestment/Debt overhang – if there is too much debt, equityholders may not undertake actions that primarily benefit debtholders

Reluctance to liquidate

Cash management

Too much cash can make management sloppy

But, monitoring from debtholders may be beneficial (or detrimental)

Product strategy – higher debt forces more aggressive sales

WHAT DO CORPORATE CFO'S SAY?

Tax deductibility has very little value, especially in a low interest rate environment.

Distress costs are not something they care about, but they want to avoid bankruptcy.

CFOs think it is important to maintain financial flexibility.

CFOs want to get high ROEs for several reasons: (1) personal net worth (2) ability to deploy scarce equity capital elsewhere

For some CFOs, it is important to set a target credit rating. (Why?) Popular: BBB-

Max risk capacity s.t. staying investment grade

For most companies, the debt strategy links to the overall financial strategy:

- E.g. Tech companies issue little debt because development costs are low, they don't want bankers to approve their actions, and equity provides cheap funding.
- Manufacturing companies issue as much debt as they can, since they have assets to back the debt, making it cheap. Subject to needing cash for opportunities, they maximize their debt in order to get the best possible ROE for shareholders.

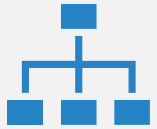
Also, corporations that are constrained in either cash or risk capital will tend to prefer more debt

includes Venture Capital firms or Private Equity

PROBLEMS WITH CAPITAL STRUCTURE MODELS

- Assumed non-interaction of assets and liabilities
- Poor handling of risk
- Inability to integrate risk management
- Inability to optimize the term structure of debt
- Inability to determine the best types of debt to issue
  - What kinds are there?
  - Fixed rate, floating rate, short term, long term, preferred stock, indexed debt, convertible debt
- Failure to consider market pricing of debt
- Poorly specified objectives

WHAT DO YOU THINK?



How should a company determine its best capital structure?

Does your solution solve the problems mentioned before?

SAMPLE PROBLEM

A company's annual cash flow is assumed to follow an Arithmetic random walk:

- $C_0 = 100, \alpha = 0, \sigma = 10$

A fixed rate bank loan is issued with a balloon payment after 10 years secured by collateral.

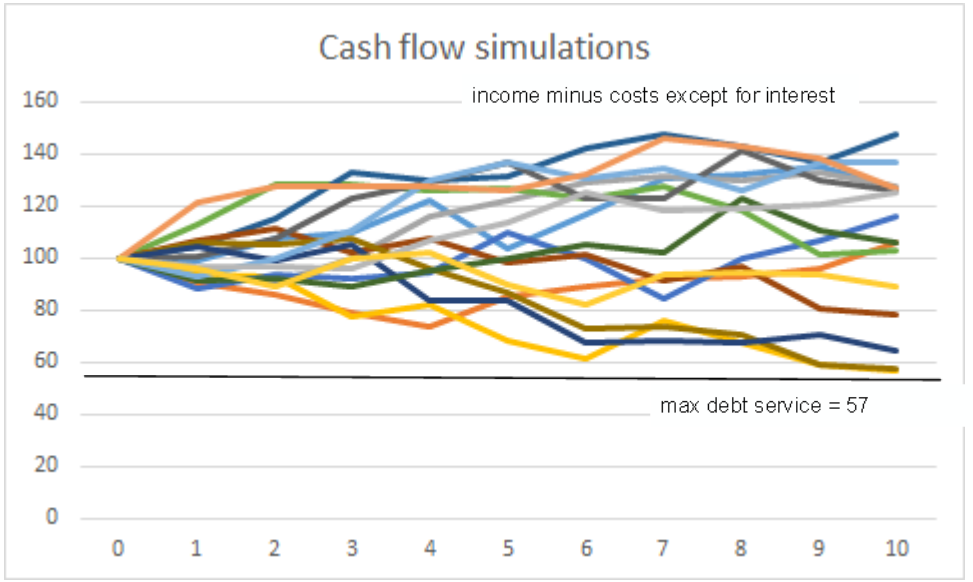
Default is triggered if cash flow falls below debt service in any year.

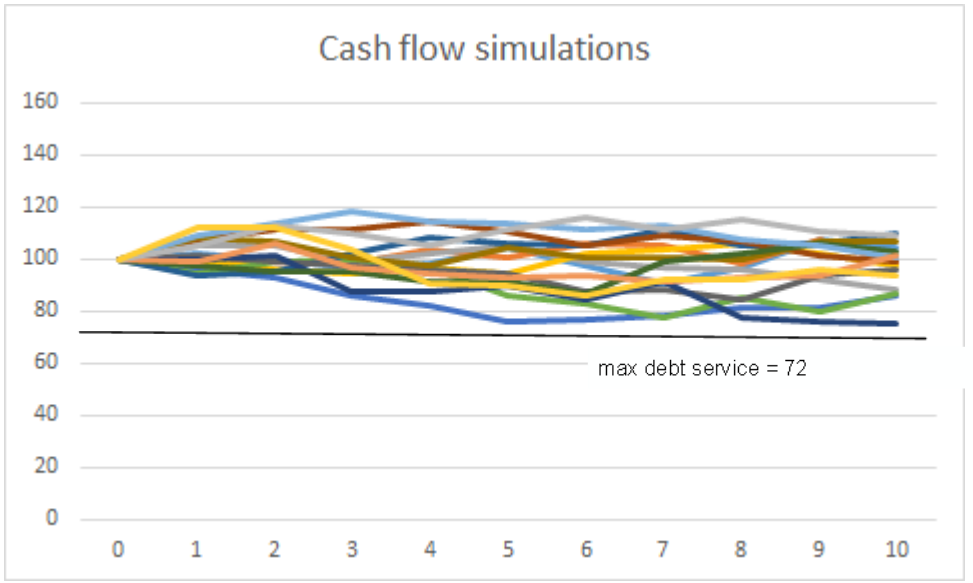
The company wants to maintain its BBB+ rating, so it can finance its debt at a 4% rate and retain some financial flexibility.
(Hint: The historical default rate of BBB bonds is 0.3% per year)

How much money can the company raise?

How does your answer change if the company can cut the risk in half? (i.e. $\sigma = 5$)

What can you say about the relationship between risk management and leverage?





REVIEW KEY POINTS OF THIS LECTURE

Corporate cash flows (vs earnings)

Simulating Proformas (you have already been doing this)

Corporate Liabilities (Claims) and the Economic Balance Sheet

Corporate Objectives

Value drivers for debt and risk management

Implementation

RECITATION QUESTIONS

What is the difference between cash flow and earnings?

What is accrual accounting, and why do we care?

What is a pro-forma?

Define EPS, EBITDA, Earnings and Net Income (NI).

RECITATION QUESTIONS – B

What are noncash items and why are they important?

Why are share buybacks compared to dividends? Which is better?

How do interest payments affect cash flows of a corporation?

What does *diluted* mean in corporate finance?

RECITATION QUESTIONS – C

What is the P/E ratio, and what is it used for?

What is the E/P ratio and what is it used for?

What is the economic balance sheet and its components?

What is the objective of the company, stated in terms of the economic balance sheet?

RECITATION QUESTIONS – D

What are the major types of debt a company might issue?

What are *alternative capital sources*?

What is the tax argument for debt?

How do financial distress costs affect debt issuance strategy?

RECITATION QUESTIONS – E

How do capital constraints and opportunity costs affect debt issuance strategy?

What is meant by financial flexibility in the debt context?

What are these theories? M&M, Miller, DeAngelo & Masulis

How does WACC work? Why is it flawed?

What is the pecking order theory?

RECITATION QUESTIONS – F

How might moral hazard affect debt choice?

How about underinvestment?

How might product strategy relate to debt choice?

Why do CFO's care about target ratings?

Why do tech companies often have less debt than manufacturing firms?