

Managerial Accounting

Financial acct is for external use. 

Manag acct is for internal use.

There are COST OBJECTS → Product, service, project
(eg. cost of airplane tickets)

What the work? Why determine cost?
Trace to → Net prices
cannot trace to → Reduce manuf. \$ cost
→ Eval. manager performance.

→ Direct and Indirect (common) costs. → Eg. telephone manufacturing.

Worker salary

Utilities for that plant!

President's salary.

~~HR~~ R and D

Market Research.

Think about the "plant" in the overall company

→ Manuf. and Non-Manuf. costs

→ Direct Materials

→ Direct Labor

→ Manuf. overhead

→ Custodial labor

Supervisors, etc

(~~not direct labor~~)

→ Marketing/Sales

→ Administration.

(people who actually put shit together!)

Eg. Salaries for sales

"Operating Expenses"

Everything other than DM and DL

Eg: Electricity / Utilities

Insurance

Depreciation.

Eg. CEO, CFO, HR,

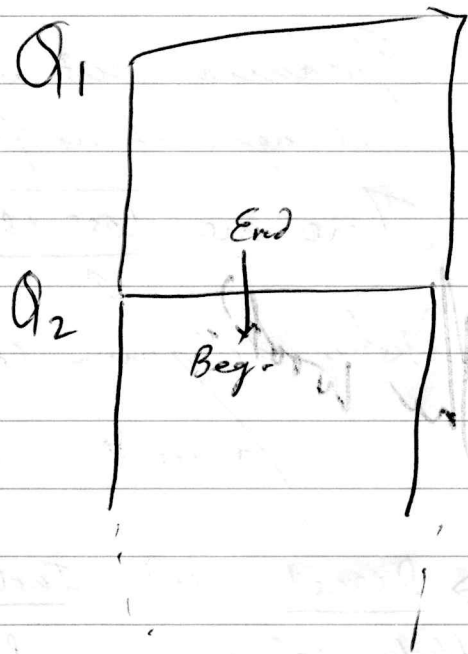
Legal costs

Cost of Admin buildings.

→ Indirect Labor

(eg. Switching machines)

$$\begin{aligned}
 \text{NET INC} &= \text{Sales} \\
 &- \text{COGS} \\
 &\quad \underline{\text{Gross Margin}} \\
 &- \text{Operating Exp} \\
 &\quad \underline{\text{net Inc}}
 \end{aligned}$$



Manuf. $\rightarrow$ Op. Expenses.

Non Manuf $\rightarrow$ Mfg. Overhead

Inventoriable
→ Product ↔ Manuf and

You have to
split stuff properly
across the inventory.

Eg: Heating cost is \$1,000
~~only~~ made 100 things
only 80 sold

So! for that month: \$800 ← COGS

\$200 ← Inventory (Still an asset!
- not used to make things!!)

next month: \$200 ← COGS

Non-inventoriable.

Period ↔ Non-Manuf costs.

* → Expensed immediately
* → Not included in cost of prod!
Why?

↳ far removed from
manuf. cost. (comp.
to manuf overhead)

→ Difference in Mang. acct for MANUF and MERCH companies

Diff in COGS!

(Cost of Goods Made)

$$\text{COGS}_{\text{manuf}} = \text{BI} + \text{CGM} - \text{EI}$$

$$\text{COGS}_{\text{merch}} = \text{BI} + \text{Purchases} - \text{EI}$$

COST OF GOODS MANUF

Buy stuff
make
sell

Buy and resell
(Retail, Wholesale)

THREE Inventories

ONE Inventory

① Raw mat.

② Finished Goods

③ Work In Process (WIP)

Direct Materials (Beg. DM + Purchased DM - End. DM)

+ Direct Labor

+ Mfg. Overhead

Mfg. costs incurred

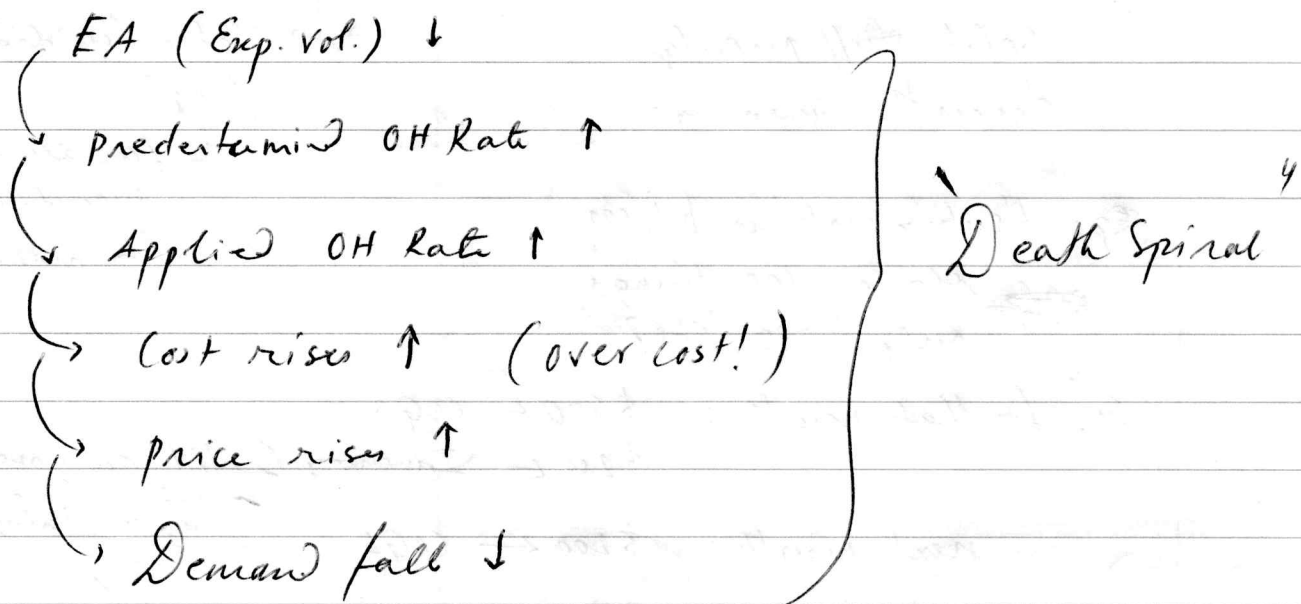
+ Beg WIP

- End WIP ←

COGM

Why? This is stuff that's not finished!
It's not ready yet.

RECESSION! or Demand falls.



MFG

Overhead Allocation

- Direct labor and costs are pretty easy. Not so cut and dry with MFG overhead.
- But hard to determine. If too late, cannot use for decision making.

So, use an Estimated Overhead Cost and Est. Activity.

$$\text{Predetermined OH Rate} = \frac{\text{EOHC}}{\text{EA}}$$

or budgeted

$$\text{Applied OH} = \text{Predetermined OH} \times \text{Actual Activity.}$$

↳ Will always be off!

if $\frac{\text{Budgeted}}{\text{Real/Actual}} > \text{Applied} \rightarrow \text{under applied}$
 $< \rightarrow \text{over applied. (over cost!!)}$

What is the EA? Denominator?

Labor hours (Eg.) (can use others) — NO ONE USES THIS

Capacity — Ideal (eg. Lab. Hours w/ no pee breaks, full force)
 Practical (eg. Lab. Hours w/ sickness, etc)

volume — ~~Fixed~~ Expected (~~Base~~ Activity based on demand)
 Normal (Avg. volume over time period)

TYPICALLY USED.

But in recession, @ when demand falls,

Use Normal Vol
or Prac. Cap.

Anti-Trust

Price a product below cost to drive out competitors

OK ☺

Not OK!

(Overhead)

Cost Allocation w / Activity-Based Costing (ABC)

USE "DIRECT LABOR HOURS"

Traditional Cost Acct.

ABC

→ How are the depts. doing?

→ What activity are they engaged in?

→ Fewer cost drivers

→ Lots more cost drivers.

↳ Can be diff. in diff. depts

→ Volume-based

→ Activity-based
(makes sense w/
automation).

eg. Direct labor is only
5-10% of overhead here...

How to do this?

- ① Identify activities → COST POOLS ("solder part" _{to boards})
- ② Identify cost drivers ("# of boards soldered")
- ③ Get cost rates per pool and add to get ~~the~~ total OH cost
("\$0.25/board")

- Direct Labor is usually small.

- Eliminate and lump with OH (eg in "\$0.25/board")

See PP - printouts!

Discount terms

Eg: $\frac{2}{10}$, $\frac{n}{30}$

→ Invoice due in 30 days

→ BUT, 2% discount if can do in 10 days!

Standard costs

Two things/components $\left\{ \begin{array}{l} \text{Price} \\ \text{Quantity} \end{array} \right.$

"Std Quantity": Amt of input that should have been used to produce output

"Std price": " " " cost that should have been price

You cannot get both until end of period "

Eg: - 3 lbs of steel for can
- ~~Budgeted~~ Used 1300 lbs
- 400 budgeted
- 450 produced

Actual Quant = ~~400 x 3 = 1200 lbs~~ 1300 lbs
Budget Quant = $400 \times 3 = 1200 \text{ lbs}$
Stand. Quant = $450 \times 3 = 1350 \text{ lbs}$

→ Same thing with Direct Labor!

→ Standard → Actual

$$\text{Std Cost} = \text{Std price} \times \text{Std qty}$$

→ Who sets Standards?

IDEAL
(exactly what
the word means)

Normal
(used
most)

Easily Attainable
(based on history)

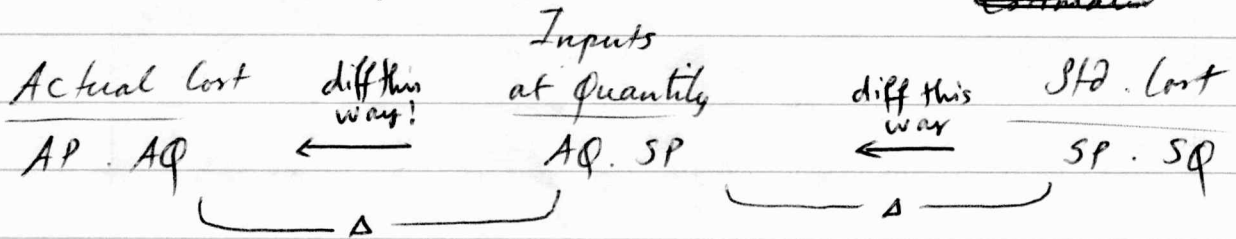
WTF is "Standard"

in SQ, SP, SC???

Variance Analysis

"Actual" = "Expected to"
 "Should have been"
 "~~Estimate~~"

Direct Materials



Materials Price Var. (MPV)
 $= AQ (AP - SP)$

Matl. Quantity Var. (MQV)
 $= SP (SQ - AQ)$

* PURCHASED, NOT USED

* USED, NOT PURCHASED.

if any of MPV, MQV < 0 , (F) for favorable
 > 0 , (U) for unfavorable.

Change due to

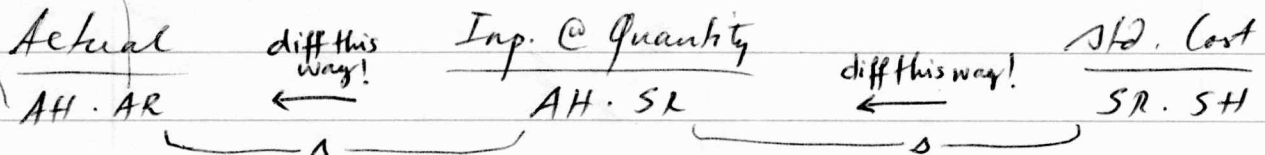
- Vendor change
 - Transportation mode change
 - Inflation
 - diff. material quality
- (EXTERNAL CAUSES)

- Diff. quality of mat.
 - changes in process
 - change machinery
 - change workers
- (INTERNAL)

* Change in output has no effect!

"Actual hrs"
 "Actual Rate"

Direct Labor
 (Same deal)



Labor Rate Variance (LRV)
 (EXTERNAL)

Labor efficiency var. (LEV)
 (INTERNAL)

For Problems: Write down all! AC \$- | AQ ??
 AP \$-

ORDER of DIFF/ Δ is important!!!

$LEV = SR (SH - AH)$
 $LRV = AH (SR - AR)$

SC \$- | SQ -
 SP -

MQV \$-

MPV \$-

Decision - Making

Cost behaviour: How costs fluctuate when business activity changes

<u>Fixed</u>	versus	<u>Variable</u>	costs
Salary		Wages	(more produced, more demand, more needs)
R and D			

Market Research

Can manager control? Manager $\Rightarrow$ "Plant Manager"

<u>Controllable</u>	versus	<u>Non-controllable</u>	costs
Utilities in plant		Salary	
Wages		R and D	

<u>Opportunity</u>	versus	<u>Sunk</u>	costs
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Incremental (Diff.) cost: Cost of one alter. over another

	Cost	Price	
Eg: X :	\$10/unit	\$17/unit	- Inc. Cost
			- Inc. Revenue
			- Inc. Profit
(Can turn to Y			
Y :	+\$6/unit (EXTRA!)	\$18/unit	

Sunk cost : \$10 (already making)

Opp. cost : \$17 (what we're giving up)

Inc. Cost : \$6

Inc. Rev : \$11

Inc Profit : \$11 - \$6 = \$5

Relevance for Decision Making :

Inc. Costs, Revenues
are Relevant (mostly)

FINANCIAL MGMT

- "Cost of Capital": 15% means that company would earn at least 15% on every new investment to break even from a shareholder's perspective.

- Two decisions a CFO makes
 - Investment ("When to make another store?")
↑ cash, profit
 - Value Financing ("Ask shareholders for \$\$\$?")
Which mix of debt and equity capital?
"Capital Structure Decision"

CREATE VALUE FOR SHAREHOLDERS (not bond or debt holders)

→ Market value of Equity @ Market Cap =
of Shares outstanding $\times$ share price.

→ Capital Investment / Budgeting / Expenditure

- Identification
- Evaluation (Cash flow, discount rate)
- Selection (NPV, IRR, PI, PP)
- Implementation

→ Time value of money, opportunity cost of capital.

What was sacrificed on the alternative.

10.5% vs 9%

⇒ opp. cost is 9%

Initial Investment
is negative!!

① ✓ Future Value $P_t = (\text{Present Value}) (1+r)^t$
 "Compounding" ↓
opp. cost. of capital

② ✓ Present Value = $\frac{FV_t}{(1+r)^t}$ → yearly, account for semi-annual!

① Net Present Value (NPV)

② ✓ $NPV = C_0 + \frac{C_1}{1+r} + \frac{C_2}{1+r^2} + \dots + \frac{C_n}{1+r^n}$
 (Annotations: C_0 is initial investment; $C_1, C_2, \dots, C_n$ are cash flows per year; r is cost of capital)

if $NPV > 0$: increases sh. hold. value **ACCEPT**
 if $NPV < 0$: **REJECT**

Independent and Mutually Exclusive

↳ anything goes!

↳ one or many or none

A or B or C or none.

If Mutually Exclusive, Rank and pick highest NPV

If Independent, pick all (?)

② Payback Period (PP) Time (years) it takes to recover initial investment

* Ignores time value of money!

* CUMULATIVE!

		t_1	t_2	t_3
PP=1	A	-200	250	100
	B	-100	50	50
PP=2	C	-300	0	0
PP=3				500

compute PV of each period's cash flow!

If $PP > \text{cut-off}$ **REJECT**
 If $PP < \text{cut-off}$ **ACCEPT**

* Discounted (vs) Undiscounted!

~~Don't~~ don't apply (r)
 use head ratio!

Cost of Capital $\leftrightarrow r \leftrightarrow$ Discount Rate.

$\left\{ \begin{array}{l} \text{If Ind: NPV, IRR consistent!} \\ \text{If MUT EX: Use NPV not consistent!} \end{array} \right.$

→ If fixed budget and independent,
 $\text{Max} \left[\sum_n (\text{NPV}) \right]$ wins. ???

③ Internal Rate of Return (IRR) → negative!

$$NPV = C_0 + \sum_{t=1}^n \frac{C_t}{(1+r)^t} = 0$$

If $IRR > \text{Cost of Capital } (r)$
 $IRR < r$

	ACCEPT	IRR
A		25%
B		23.4%
C		18.5%

If Mutually Excl., pick highest IRR

If Independent, pick all w/ $IRR > r$ (Cost of capital)

④ Profitability Index (PI) a ~~cost/benefit~~ Benefit/Cost ratio

$$PI = \frac{PV}{\text{Initial Cost}}$$

$$= \frac{NPV + \text{Initial}}{\text{Initial}} \quad \text{eg } \frac{100 + 19.7}{100}$$

If $PI > 1$, accept
 $PI < 1$, reject

$$= 1.19$$

+ \$1, you get \$1.19

If Independent, accept all w/ $PI > 1$

If M.E., rank and accept highest PI

+ve! ~~can be!~~

ADD ALL! ALL!

$$Do \quad NPV_A = \sum_n \frac{C_x}{(1+r)^n}$$

$$NPV_B = \sum_n \frac{C_y}{(1+r)^n}$$

if switching, $(-Cost of \downarrow) + (Sale of \downarrow) + NPV_y$
 $x \rightarrow y$ current mv

ACTF = Gross + Profit after tax
 profit.

	A	B
Gross Profit/Margin		
- Depreciation		
Profit bef. taxes (annual tax-income)		
- tax		
Profit after tax + Dep.		
	C_x	C_y

must be same!!

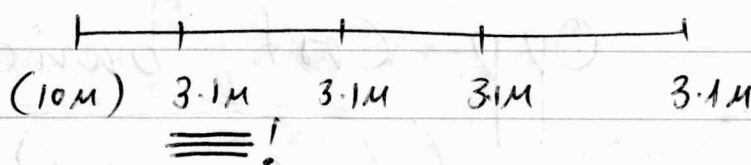
Cash Flow Computation

Finance and acc't. people do this differently.

↳ when \$\$\$ comes in to company.

Eg. Company can invest \$10M and get \$100k after 5 yrs.
 (or) lose \$3M in 5 yrs.

⇒ This means that Cash flows look like this



WITH/WITHOUT
PRINCIPLE!!

- Sunk Cost: Already spent, irrelevant.
- Erosion Cost: Cash "moves" from location A → B
 project A → B } income rate!
- Opp. Cost: lost cash from alt. uses

~~★~~ Depreciation: After Tax Cash Flow

$$ACTF = \underbrace{\left(\overbrace{\text{Rev.} - \text{Cost}}^{\text{profit before taxes}} - \text{Depreciation} \right)}_{\text{profit after taxes}} (1 - \text{tax rate}) + \text{Depreciation}$$

Why add back depreciation? It's not a cash expense.
not a tax expense.

$$AC = (R - C)(1 - TR) + D(TR)$$

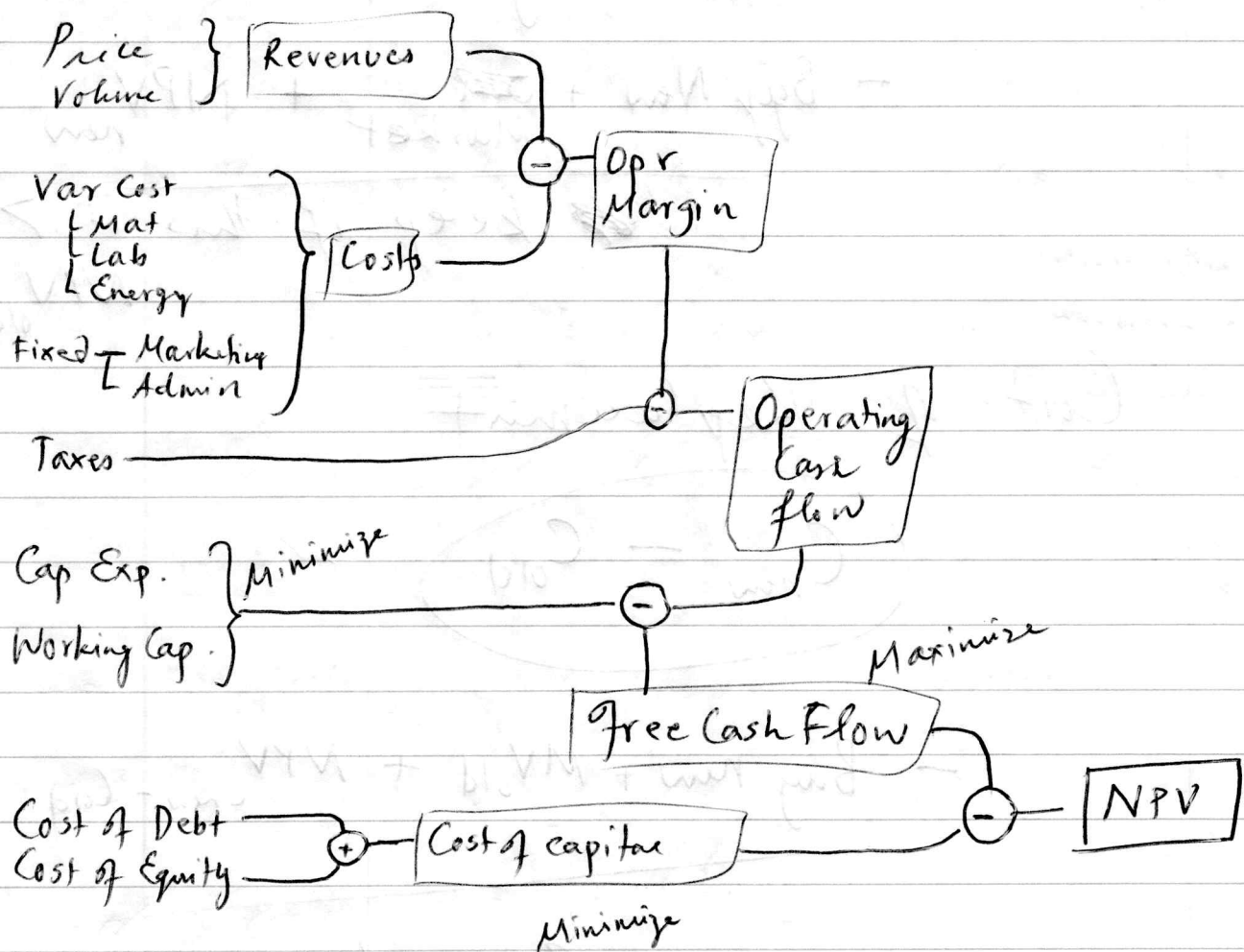
Cash Flows

↳ with/without principle!!!

Opp. Cost, basically!
(also erosion cost)

Working Capital Investments : This is -ve cash flow.
(Eg. stocking up on inventory)

Factors ~~have volume~~



$$\begin{aligned}
 \text{NPV} &= \text{Free Cash flows} - \text{Cost of Capital} \\
 &\begin{aligned}
 &\text{Op. CF} \quad (-) \quad \text{CapEx} \\
 &\quad \text{Op. Mar} \quad (-) \quad \text{taxes} \\
 &\quad \quad \text{Rev} \quad (-) \quad \text{costs}
 \end{aligned}
 \end{aligned}
 \qquad
 \begin{aligned}
 &\text{Debt} \quad (+) \quad \text{Equity}
 \end{aligned}$$

Cost of Recovery

$$- \text{Buy New} + \cancel{\text{Sal}}_{\text{Market}} + \text{NPV}_{\text{new}}$$

~~keep~~ keep if this is $>$
 NPV_{old}

Cost of Replacement

$$C_{\text{new}} - C_{\text{old}}$$

$$- \text{Buy New} + \text{MV}_{\text{old}} + \text{NPV}_{\text{Cnew} - \text{Cold}}$$

keep if +ve

GOD Help Me

Inflation & Returns

Depreciation always measured w/ this!!

(r) Real Returns : things change.

(n) Nominal Returns : \$\$\$ change

(h) Inflation

FISHER EFFECT :

$$(1+R) = (1+r) \times (1+h)$$

$$\approx R = r+h$$

* Always convert from Real $\rightarrow$ Nominal!

EVA (Economic Profit)

opp. Cost of Capital : Same as RoK on Securities!

Capital Charge : $r \times \text{Tot. Capital}$
 $\downarrow$
opp. cost of capital

$$\left(\begin{array}{c} \text{Econ. Profit} \\ \text{EVA} \end{array} \right) = \left(\begin{array}{c} \text{Acct. Profit} \\ \text{NOPAT} \end{array} \right) - \left(\begin{array}{c} \text{Cap. Charge} \\ \text{opp. cost!} \end{array} \right)$$

r^*
Return on Tot. Cap.

$$\cancel{r^*} = \cancel{\frac{\text{NOPAT}}{\text{Tot. Cap.}}} = \underbrace{(r^* - r)}_{\text{"spread"}} (\text{Capital Tot.})$$

Financial Performance

$$\begin{aligned} & \text{EBIT} - \text{Taxes} \\ & \text{Acct. Profit.} \end{aligned}$$

$$\text{Return on Sales (ROS)} = \frac{\text{Net Op profit After Tax (NOPAT)}}{\text{Sales}}$$

or operating Margin

$$\text{Net Assets} = \text{Total Capital (TC)}$$

└ Debt
└ SE Equity

$$\text{Capital Turnover (CT)} = \frac{\text{Sales}}{\text{Tot. Cap (TC)}}$$

③ Total Eff. measured by Return on Tot. Cap (ROTC)

$$\text{ROTC} = \frac{\text{NOPAT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Tot. Cap (TC)}}$$

All this is Econ. Value Added (EVA)

This is IMPORTANT!

$$\text{EVA} = \text{NOPAT} - \text{Cap. Charge}$$

Acct Profit (r x Tot. Cap.)

NPV is also $\sum_n \frac{EVA_n}{(1+r)^n}$ → Compute for each period!

Shareholders gave this

Market Value Added (MVA) "Market Cap"

✓ $MVA = \underbrace{\text{Market Value of Equity}}_{\substack{\uparrow \\ \text{Stock Price} \times (\# \text{ of Shares out})}} - \underbrace{\text{Book Value of Equity}}_{\substack{\downarrow \\ \text{Stockholders Equity}}}$

→ Tot. Wealth created for Shareholders!

On Balance Sheet: $MVA = (\text{Share price} - \text{Book value of share}) \times \# \text{ of Shares.}$

Spread: $(r^* - r)$

→ Cost of Cap / opp. cost

→ NOPAT / acct. profits

Manage	:	↑ $(r^* - r)$	Efficiency inc.
Build	:	↑ $(r^* - r)$	Invest in r^*
harvest	:	$(r^* - r)$	

└ withdraw / move Capital from r^* to r

Cost of Capital

Debt
Equity, So...

$$\begin{aligned} \text{WACC} &= (\text{Cost of deb})(1 - \text{TR}) \left[\frac{\text{Debt}}{\text{Debt} + \text{Equity}} \right] \\ &+ (\text{Cost of Equity}) \left[\frac{\text{Equity}}{\text{Debt} + \text{Equity}} \right] \end{aligned}$$

weight Avg.
Cost of Capital

How to do Cost of Debt?

$$\text{Cost of Debt} = \text{Treasury Bond Rate} + \text{Default Premium}$$

(pre-tax)

Moody's and S&P rate this.
anything (Baa) (Bbb) and above are
investment Grade (else Junk)
correspond to "~~Bond Rate~~"
Basis Points (TURN TO 2's!)
100 BP = 1%

So if Issuing 30yr, ~~Bbb~~ bond, and Aaa rated
@ 65 BP,

$$\text{Investor will demand } (3.55 + 0.65) = 4.2\%$$

↓
Treasury Bond rate.

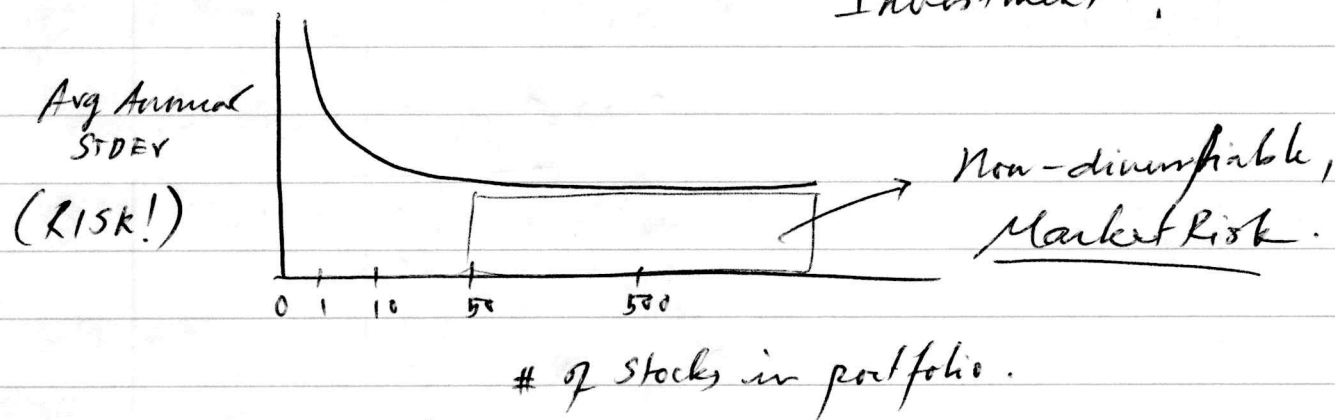
"Why should I invest when I can get 3.55% safely?"

(Market Risk Prem $\times$ Beta)

Cost of Equity : Treasury Bond Rate + Risk Premium

✓ Expected Cash Flow (ECF) = (Prob. of CF) (Cash Flow)

✓ Expected Return = $\frac{ECF - \text{Investment}}{\text{Investment}}$



DIVERSIFY!

Market Risk is measured by "Beta"

* You cannot Eliminate this!!

RISK ——— Firm-specific (CEO dies
product launch fails)

————— Market-Specific (Elections,
Beta! Trump tweet)

Beta of S&P 500 = 1.0

$\beta > 1 \Rightarrow$ more volatile

$\beta < 1 \Rightarrow$ less volatile

Eg. Stock has $\beta = 2$ (volatile)

if S&P $\uparrow 10\%$, Stock up by 20% .
 $\downarrow 20\%$, Stock down by 40% !

Stock has $\beta = 0.5$

if S&P $\uparrow 5\%$, Stock up by only 2.5% !!

???

① Tot. Portfolio Risk = (Avg β) (Market STDDEV)

① COST of EQUITY = $\overset{\text{lookup}}{\text{Treas. Rate}} + \underbrace{(\overset{\text{lookup}}{\text{Market Risk prem}}) \times \text{Beta}}_{???}$

① This is approx 6.25%

So you just have to know β risk....

S&P Avg risk minus Treasury rate

→ In WACC, Equity = Market Cap (NOT MVA!)

This is the "Capital Asset Pricing Model"