FINANCIAL MARKETS

WEEK (1)

VaR

Variance, measure of variability of a portfolio

Value at Risk, quantify risk

Value at Risk → quoted in terms of $ for a given probability & time horizon

Stress Test

- another measure of risk
- check vulnerabilities of a portfolio to various crises.
- ordered by govt to see how an org will withstand a crisis vs fin regulation – stress tests prescribed

S&P500

Standard & Poor 500 (an index) used as a benchmark for returns

* what if you invested in the whole stock market.

Each individual stock overreacts to what happens to the "aggregate" stock market" (index) + additionally there is company specific noise.

Beta (β)

measure of how a stock relates to the stock market (index)

if $\beta = 1$, the asset tends to move one-for-one in terms of returns w/ the index.

market risk = risk of the whole stock market (i.e. how an asset reacts to changes on the aggregated stock market)

idiosyncratic risk = stock specific risks.

Variance of the return of a stock:

$$\beta^2 + (\text{Variance of systematic risk}) + (\text{Variance of idiosyncratic risk})$$

y = return on specific stock

x = return on index.

Slope $m = \beta$ (systematic risk)

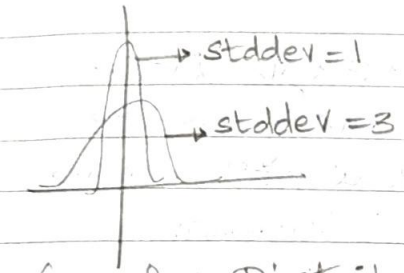
intercept $c = \alpha$.

Distribution & Outliers

Normal Distr: typical distr for random variables in nature

2 params: Mean & stddev

mean = 1



fin tends not to follow random distributions

Cauchy Distribution

- fat tailed - does not trail to 0

Central Limit Theorem

Avgs of a large number of independent identically distributed shocks are approx. normally distributed

S&P 500 returns: -6 to 6% return on avg

Covariance

$$\text{CoV} = 0.2(0.5 \times 0.5) + 0.25(-0.5 \times -0.5) + 0.5(-0.5 \times +0.5)$$

$$= 0$$

if 2 entities are independent, covariance = 0.

Risk is determined by covariance, with the broader market.

$$\beta_i = \frac{\text{cov}(\text{stock return}, \text{index return})}{\text{var}(\text{index return})}$$

the market demands high returns from high beta stock. (high beta stock = high cov w/ index)

(Capital Asset Pricing Model)

⇒ "CAPM model", though it is fundamental it may not be applicable in the real world since probabilities are not known.

independent risks are OK.

shutting down, not its value going up or down.

Lesson #3

Insurance

Insurance Fundamentals

* policyholders have a contract w/ the insurance co. to protect them against certain well-defined risks & for that they pay a regular premium.

RISK POOLING → by the law of large nos., the no. of unfavourable outcomes is predictably low. Acc. to the law of large numbers, the avg. of the results obtained from a large no. of trials should be close to the expected value

① Moral hazard: people take more risks knowing that its insured

② Selection Bias: eg. health insurance tends to attract sick people than healthy people.

Crop insurance — insurance against crop failure. But this can be easily manipulated (moral hazard)

⟹ insure the weather instead

Milestones in Insurance

1600's → lifetables (probability of dying @ age n) → life insurance & fire insurance.

1840 → insurance salesmen.

1880 → insurance w/ large cash value once you stop paying premium you lose the cash capital.

* several insurance marketing innovations (regulated federally)

*$insurance is a local phenomenon in the US - insurance guarantee if the insurance company fails.

Obamacare - makes health insurance mandatory.

An Alternative to Insurance is Portfolio Mgmt (Diversification of Assets)

Given the same market conditions for all players, w/ optimum output & uniform appetite for risk, the optimum portfolio must be the same for everybody.

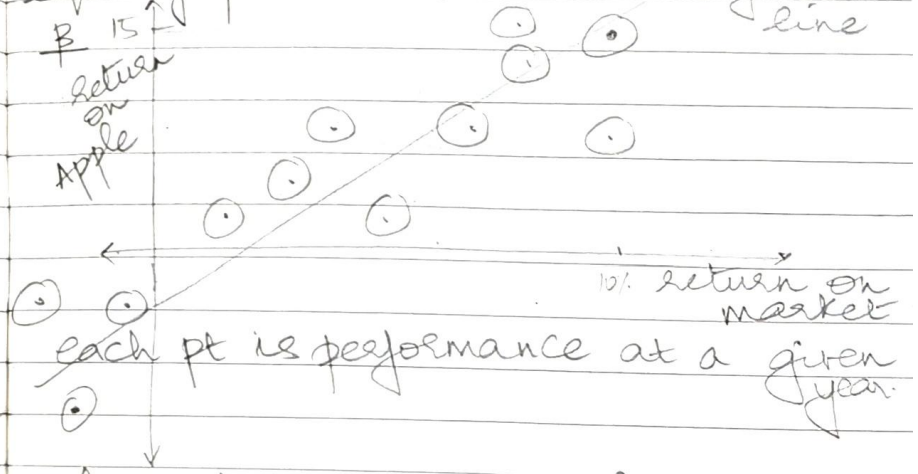
Capital Asset Pricing Model

* everyone has the same optimum portfolio

Diversification is hard for individual investors (fractional shares) → mutual funds.

Avg return of (A) stock mkt > avg real short-term govts return (B)

equity premium = B − A. regression line



each pt is performance at a given year.

slope of the regression line is β.

if the company borrows a lot of money, β ↑

eg of a negative β stock is Gold.

Security Market line

relationship b/w expected return on an asset & its β.

$$r_i = r_{free} + \beta_i (r_{market} - r_{free})$$

risk free rate

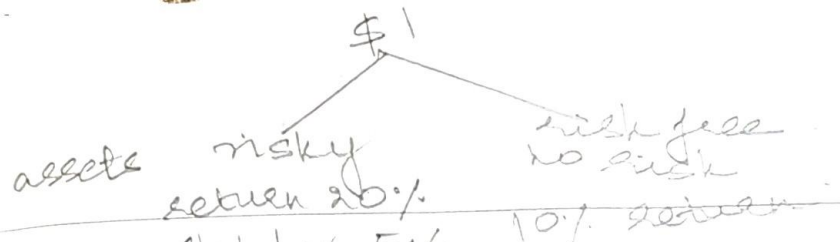
According to this, the best possible investment would be to invest in everything!
But, this does not hold irl.

negative β stocks are like insurance against market risk since they move in the opp direction when there's a market crash of the like.

Short Sales

- you can hold negative quantities of a stock in the US (naked short selling is not permitted in India)

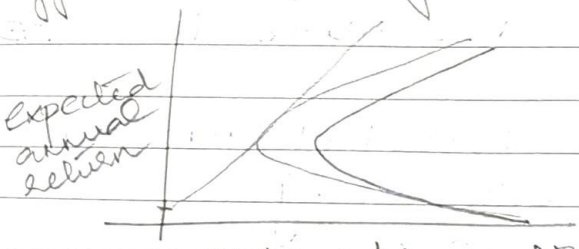
acc CAPM, all investors will have the same optimal course of action.
So if one person's optimal option is shorting, so is everyone else's ⇒ who's providing the stock to short? hence, not possible that shorting is the optimal move.
the optimum portfolio is on the "efficient portfolio frontier"



① short $8 from risk free asset
② invest $9 on risky asset
20% return
⇒ portfolio has $10.80
payback $8 \times 1.1 = \$8.80$
left w/ $2
⇒ doubled portfolio

8:1 ⇒ leverage ratio (debt/asset)
stddev of return = 9×5 = 45%

Efficient Portfolio Frontier



Gordon Growth Model

	x	x(1+g)	x(1+g)²	growth g
t	0	1	2	3

what is the value at time 0

present value $= \frac{x}{r-g}$

$= \frac{x}{1+r} + \frac{x(1+g)}{(1+r)^2} + \frac{x(1+g)^2}{(1+r)^3} + \ldots$

(higher)