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The Basics of Risk

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- investment decision: invest in assets that earn return higher than min Hurdle risk

(H.R)

- Hurdle risk: min Rate of Return to maintain the value of the cost.

$$* HR = \text{Riskless value} + \text{Risk Premium} *$$

- HR should be higher for riskier project than for safer ones

- Risk $\rightarrow$ exposing to danger or hazard
 $\rightarrow$ mix of danger + opportunity.

(You can not have one without the other)

Risk $\rightarrow$ expected return

investor $\rightarrow$ S.H $\rightarrow$ Risk $\rightarrow$ بوجه نظر ال
marginal invest $\rightarrow$ stock prices $\rightarrow$ ال
وليس $\rightarrow$ ال

- Good Risk and Return model should be:

① it should come up with a measure of risk that applies to all assets and not be asset specific

asset $\rightarrow$ Risk $\rightarrow$ Return $\rightarrow$ ال

①

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② should clearly delineate what types of risk are rewarded and what are not (and provide the relationship for the delineation)

③ it should come up with standardized risk measure about whether the asset

above-average risk

below-average risk

④ it should translate the measure of risk into risk or return

⑤ it should work well not only at explaining Post return, in addition → Predicting Future expected returns

Future return هو توقع ال Model لأي

دائماً هدفه ليس فقط ال History لأي Return بل
دائماً إمكانية قياس أرباح المستقبل

* the capital asset Pricing model (CAPM)

← مقياس العلاقة Risk و Return

②

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$$* E(R) = R.F + \beta (R_m - R.P)$$

measure of non-diversifiable risk market return

SD, mean etc ← normally distributed return

- ① Uses variance of actual returns around an expected return as a measure of risk
- ② Portion of variance can be diversified away only the non-diversifiable portion that is rewarded

measuring risk:

Expected Return → The rate of return that investors expect to make over the holding period. (they may be different from each other)

Actual return - effect of uncertainty & risk *

risk free → expected return = actual return

(risk = 0) → No distribution for actual return.

normal distributed return of asset investment
(عند انعدام الريبة يكون العائد طبيعي)

③

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- normal dist يشبهها ال skewness وال kurtosis في الـ returns
وجود الـ mean وال variance

الشركة بتوزع الـ returns هي normal dist (يعني skewness)

right tail = left tail ← two tail



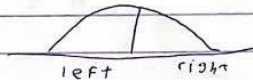
- investors has to consider the following in addition to expected return

- ① the spread of the actual returns around the expected return which is captured by the var. or SD.

SD ↑ Risk ↑ SD الـ Risk بتزيد الـ SD

- ② skewness : captures the bias toward positive or negative returns

إذا عندي # tail أطول من الثاني يكون الـ
1 → post
1 → neg
Skewness



positive → longer upper tail (left skewness)

negative → longer lower tail (right skewness)

- ③ Kurtosis captures Prices Jumps
(the shape of the tails of the dist is measured by the Kurtosis)

④

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→ Fatter tail → higher kurtosis → higher tendency of the price of investment to jump in either directions.

كبر = skewness, kurtosis ← normal dist. *

(not normal ← is also dist.)
dist. من حيث S.D. و mean و S.D. و mean

* calculating standard deviation using historical returns:

$$R = \frac{\text{Price}_{t+1} - \text{Price}_t}{\text{Price}_t} + \text{Div}$$

P_t → ending

P_{t-1} → begining

$$\text{semi variance} = \frac{\sum (R - \bar{R})^2}{n} = b^2$$

S.D = square root of the variance

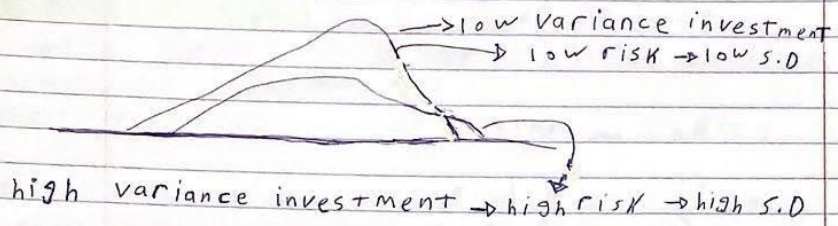
$$b = \text{standard deviation} = \sqrt{\text{semi variance}}$$

$$\bar{R} = \frac{\sum R}{n}$$

(5)

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* Variance of any investment measures $\rightarrow$ the disparity between actual and expected return.



- * investors would like to invest in asset
 → low variance, positive skewness, lower kurtosis

* أنا سأتحدث عن 2 assets بدرى أقرارت بينهم - وكنت ال mean
 - بتتوزل var وبتختار ال varian الأقل لأنو أقله مخاطرة

* Total Risk = diversifiable risk + non diversifiable risk

ال Risk بالمعادلة يتم قياسه بال SD $\sqrt{\text{var}}$

* سوال Non-dV يتعمق فيها لال B

Diversification minimizes risk

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Types of risks:

(1) Firm-specific risks $\rightarrow$ diversifiable risk.

a) Project risk: on individual project may have higher or lower c.f than expected because of misestimating.

(Project risk $\rightarrow$ خطأ تقدير Error in estim. c.f. $\rightarrow$ خطأ تقدير المخاطر Project risk)

(the risk can be diversified away if the firm invests in a number of projects)

يخفف المخاطر عن طريق التوزيع والاستثمار بأكثر من Project

b) competitive risk: where by earning and cash flows on a project are affected positively or negatively by the competitors actions.

(this risk can be diversified away)

$\rightarrow$ if the firm invest (buys) its competitors
or $\rightarrow$ if the S.H. of the firm hold stock in the competitors.)

(يتم السيطرة عليها إذا اشترت الشركة أسواق S.H. أو استحوذوا بهم)

المنافسين بشركة أخرى)

* الأفضل أن ال S.H. يستثمروا ويشتروا Astock لأنه يكلف

أقل من أن الشركة تشتري شركة ثانية

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types of risks:

c) industry-specific risk : includes → legal risk
technological risk and commodity risk
قانوني / تقني / سلع

this risk can be diversified away, if the firm
diversifies across → industries → or if the S.H
hold stock, from different industries

S.H لا يستطيع أن يملك الأسهم في كل الشركات لأن ذلك مكلف جداً
حفظه استثمارية بتحمل أرباح من مختلف الصناعات
(different Industries)

d) international risk : includes → Political risk
and currency exchange risk.

companies can reduce their exposure to
currency exchange rate risk by borrowing in
the local currency to fund projects.

investors can reduce this international risk
by investing across countries

(Political risk is sometime correlated
across countries and cannot be diversified
away) [just reduce]

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② market risk $\rightarrow$ non-diversifiable risk

market cannot be diversified away:

- a) inflation
- b) interest rate changes
- c) Risk preference of investors.
- d) Economic growth

* the Role of the marginal investor .

مستثمر الحد Risk يتم بوجوه نظر ال

$\rightarrow$ is the investor who is most likely to be buyer or seller on the next trade and to the stock price.

$\rightarrow$ has to own a lot of stock and also trade that stock on a regular basis.

مستثمر الحد marginal يجب تواجده شرط

① own stock

② trade to stock

(the largest investor may not be the marginal investor)

(marginal investor is well diversified)

④

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أصح القوانين

$$* \text{Return} = \frac{\text{Price}_t + \text{Price}_{t-1} + \text{Dividend}_t}{\text{Price}_{t-1}} = \frac{P_t + P_{t-1} + D_t}{P_{t-1}}$$

لما يكون عندك
في السؤال

* change monthly to annual:

$$\text{annual } R = (1 + r)^{12} - 1$$

$$\text{annual SD} = \text{SD} \times \sqrt{12}$$

$$* \text{Return} = \frac{(\text{Price}_t + \text{Price}_{t-1}) + \text{Dividend}_t}{\text{Price}_{t-1}}$$

في حال كان في السؤال
Dividend

$$* \text{semi variance} = \frac{\sum (R - \bar{R})^2}{n}$$

$$* \text{arithmetic mean} = \frac{\sum R}{n} = \bar{R}$$

$$* \sigma = \text{standard deviation} = \sqrt{\text{semi variance}}$$

$$* \text{expected return} = \underbrace{R_F}_{\text{Risk free rate}} + \underbrace{B(R_M - R_F)}_{\text{Risk Premium}}$$

$K \leftarrow$

$$\text{geometric mean} = \left[(1+R_1)(1+R_2)(1+R_3) \dots \right]^{\frac{1}{n}}$$