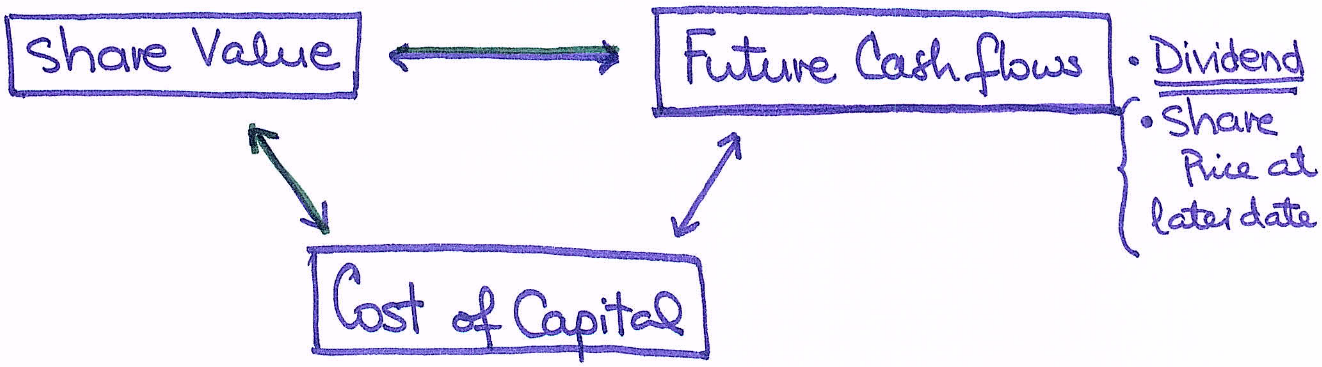
# Section 9.5. Information, competition & stock prices.

## * Information in Stock Prices *

"The Valuation Triad"




**Example.** "Dividend discount model"

Say a company pays dividends annually w/ the first dividend equal to D and every subsequent divididend payment by a factor of g greater. Its $\underbrace{\text{equity cost of capital}}$ is $r_E$.

i.e., the expected return (on the effective basis) of other investments available in the market which have EQUIVALENT RISK to the firms shares
???

The the current stock price should be estimated as:

$$P_0 := \frac{D}{r_E - g}$$

↑

observeable! in the market

Q: What if you observe a different stock price?

Maybe one (or more) of your "ingredients" are "misestimated" THE OTHER INVESTORS - AS A COLLECTIVE - ARE USING PARAMETERS YIELDING A DIFFERENT PRICE.

## * Competition & Efficient Market *

### EFFICIENT MARKET HYPOTHESIS !!!

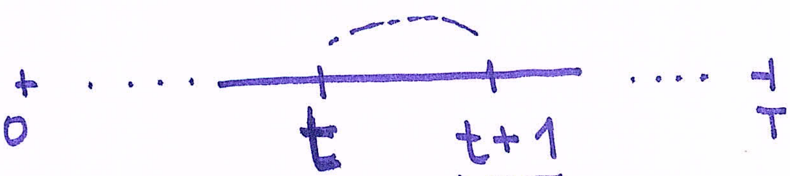
- weak : { THE PRICES ARE REFLECTIVE OF ALL PUBLICALLY AVAILABLE INFORMATION.
- semi-strong ← { THE ABOVE & THE PRICES ADJUST INSTANTANEOUSLY TO THE NEW INFORMATION.
- strong : { EVEN PRIVATE (maybe INSIDER, maybe difficult to obtain and analyse) IS IN THE PRICE.

# Section 10.3. Historical Returns on Stocks (& Bonds)

## *Realized Returns*

1°* Here, we look @ "effective" returns.

2°* Realized Returns (rnd vars) => Procedures, <u>estimators</u>.




$\underbrace{P_t}$ stock price @ time $t$

$\underbrace{P_{t+1}}$ stock price @ time $(t+1)$ : imagine that the stock is sold

$\underbrace{D_{t+1}}$ dividend paid @ time $(t+1)$ : just prior to the imagined sale

$R_{t+1}$ ... the return from $t$ to $(t+1)$.

$$\Rightarrow \quad (1+R_{t+1}) \cdot P_t = P_{t+1} + D_{t+1}$$

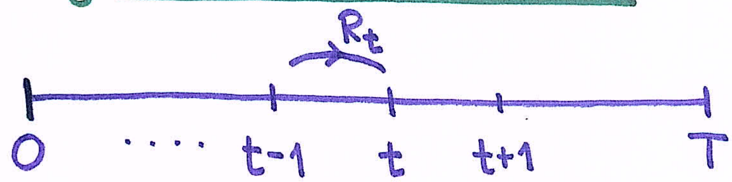
$$\Rightarrow \quad R_{t+1} = \frac{P_{t+1}+D_{t+1}}{P_t} - 1 = \frac{P_{t+1}-P_t + D_{t+1}}{P_t}$$

$\frac{P_{t+1}-P_t}{P_t}$ ... capital "gain" rate

$\frac{D_{t+1}}{P_t}$ ... dividend "yield"

**Convention:** Assume all dividends are immediately reinvested in the same stock (or security).

## * Average annual Returns *




Assume:
$R_t$ ; $t = 1..T$
are independent, identically distributed.

Sample : consists of the returns $\{R_t ; t = 1..T\}$

⇒ Average annual return of the security is:

$$\bar{R} = \frac{1}{T} \sum_{t=1}^{T} R_t$$

⇒ Variance of the Realized Returns has this estimator:

$$S_R^2 = \frac{1}{T-1} \sum_{t=1}^{T} (R_t - \bar{R})^2 .$$

unbiased!

$$\underbrace{S_R}_{\text{Estimator of (historical) volatility}} = \sqrt{\frac{1}{T-1} \sum_{t=1}^{T} (R_t - \bar{R})^2}$$

Goal: · Estimation procedure for the mean parameter of the annual return distribution.

→ Point estimator is $\bar{R}$.

→ Neighborhood around $\bar{R}$ ?

• Imagine that $R$ has the mean parameter $\mu_R$ and the std deviation parameter $\sigma_R$.

$$\Rightarrow \quad T \cdot \bar{R} = \sum_{t=1}^{T} R_t$$

⋮

CLT

⋮

[ conf. intervals ] !