expected-returns has multiple tunetions ⇒ (1) returns_ from - prices function - purpose: gives information on returns on the basis of calculated as > return = price-(price-1) price -1

gives lage change from one period to next. Here, preriod is set as one day (i.e. daily).

Log returns are useful for their time -additivity.

MYPP

Dlog returns can be summed over time, which isn't the case with simple returns, when cleating with multiple time periods.

Dinancial calculations often involve multiplication, which can be simplified, as log returns can be added. Other reasons which are imp but not specifically relevant to our case

Normality Assumption: In finance, it's often assumed that log returns are more normally distributed than simple returns, especially for longer time horizons. This assumption is crucial for various statistical models and risk management techniques.

Volatility Clustering: Log returns can better handle the phenomenon of volatility clustering, a common occurrence in financial markets where periods of high volatility are followed by more high volatility and vice versa.

Jog returns here =>

log return = log (price) - log (price-1)

= log (2+return)

Dirpose: converts return data back into prices.

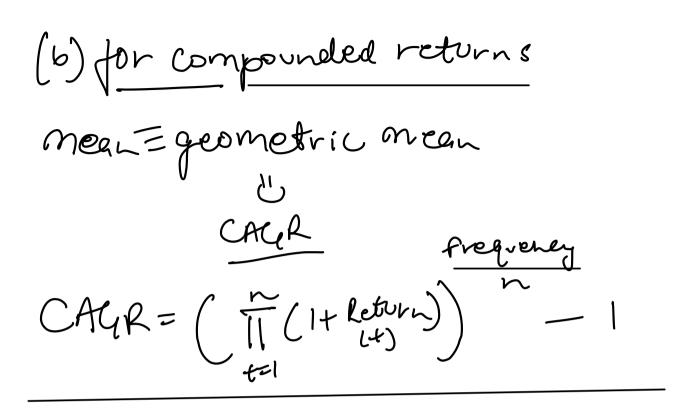
price = (price - 1) (1+ return)
log return = price = (price - 1) efecturn

why: useful for reconstructing price into from data, which is often weeded for analysis/visualisation.

(3) mean_historical-return on purpose: gives clata on future returns based on historical returns clata. 2 ways = (a) for simple returns (Am) Mean => arithmetic mean = Theturn
t=1 (t)

There h= no. of observations Annalized mean return

mean x frequency of period



CACIR is better than AM as it takes into account effect of return volatility over time.

Ourpose: gives predictions on future returns on the basis of the concept of exponentially weighted mean

(which means giving more value to)
recent returns to account for trends)
be changing market forces EMA (for a centain time period) => EMA= a. Returns + [(1-2) (EMA-1)] where I d = Smoothing factor b X= 2 Spanti where span defines degree of weighting decrease span & weight of older data (directly propostional)

Annalized EMA (compounded)

=

(I+EMA) requerey

-1

Annualized EMA (simple)

(EMA) x (frequency)

WHYPP

Other than accounting for trends & market forces, the smoothing effect also smoothers out short term fluctuations, to cussing on longer-term trends

(5) Capm_return function CAPITAL ASSET PRICING MODEL

formula => Ri=Rf+Bix(hm-Rf)

Li=expected RoT

Rf=risk free rate

Bi= bette of investment

Rn= expected returns from market

- =) he is typically the yield from fort bonds/gold as they tend to be hisk-free irrespective of market climate.
 - The benchmarking for the same is often alone through metrics of Stocks like the NIF 1750.

B helps measure the risk/security of a partfolio in comparison to the rest of the market.

Bi= Covariance (Ri, Rm)
variance (Rm)

now, the CAPM can be annualized like the other functions above.

M4 27

provides an industry-accepted framework to calculate the relation by hisk & expected return ever time, and can also be used to carry out a review analysis on current/past portpolio.