

Portfolio Selection

Harry Markowitz

Averages And Expected Values

p.48 “The expected outcome of an uncertain event is defined exactly like the expected outcome of a random variable, except that probability beliefs are used instead of objective probabilities.”

p.49 Average = mean of a past series

Expected Value = mean of a probability distribution

Averages and expected values measure central tendency—where the center of a distribution is located

p.65 Expected value of weighted sum of two random variables

$$Avg\ Portfolio\ Return = (\%A) \cdot Avg(A) + (\%B) \cdot Avg(B)$$

p.89 Variance of a weighted sum of two variables

$$\begin{aligned} var(Portfolio) &= (\%A)^2 \cdot var(A) + (\%B)^2 \cdot var(B) \\ &+ 2(\%A)(\%B) \cdot correl(A, B) \cdot stdev(A) \cdot stdev(B) \end{aligned}$$

$$Std\ Dev(Portfolio) = \sqrt{var(Portfolio)}$$

Return In The Long Run

p.116 Geometric mean = compounded growth rate

p.122 Variance drag using quadratic approximations (difference between arithmetic mean and geometric mean is related to variance)

Geometric Analysis of Efficient Sets

p.129 “A portfolio is inefficient if it is possible to obtain higher expected (or average) return with no greater variability of return, or obtain greater certainty of return with no less average or expected return.”