

## FIN-511 Chapter 12

- Portfolio Statistics & Diversification
  - Statistical Measures
  - Diversification
  - Portfolio Risk & Return

## Statistics

- Expected value: measure of return, weighted average of all possible outcomes
- Variance & Standard Deviation: measures of risk, measure of the size of the potential deviations from the mean
- Coefficient of Variation: scaled measure of risk, divides the standard deviation by the mean

## Using Excel for Statistics

- **Expected Value**
- =AVERAGE(number1,number2, ...)  
Returns the average of the numbers, for expected values assumes the probabilities for each number are equal.
- Fame\_ExpValues(Values,Probabilities)  
Calculates the expected value based on the specified probabilities for each value

## More Excel Statistics - Variance

- Variance:
- VARP(number1,number2,...)  
Calculates the variance based upon the entire population, historical, does not use probabilities
- VAR(number1,number2,...)  
Estimates variance based on a sample, also historical & doesn't use probabilities
- The difference is "N" and "N - 1"

## More Excel Statistics - Standard Deviation

- Standard Deviation:
- STDEVP(number1,number2,...)  
Calculates standard deviation based upon the entire population, historical, doesn't use probabilities
- STDEV(number1,number2,...)  
Estimates standard deviation based upon a sample, does not use probabilities

## Statistical Macros

- Fame\_Var(Values, Probabilities)  
Calculates the variance based on the specified probabilities for each value
- Fame\_Stdev(Values, Probabilities)  
Calculates the standard deviation based on the specified probabilities for each value
- Fame\_CV(Values, Probabilities)  
Calculates the coefficient of variation based on the probabilities for each value

### Portfolio Risk & Return

- Expected Portfolio Return: weighted average of the expected returns for each individual security

$$E(R_p) = \sum w_t E(R_p)$$

- Portfolio Variance (2 securities):

$$\sigma_p^2 = w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2w_1 w_2 r_{1,2} \sigma_1 \sigma_2$$

where  $r_{1,2}$  is the correlation coefficient

- CORREL(array1,array2)

Returns the correlation coefficient of the array1 and array2 cell ranges.

### Other Macros

- Calculates the portfolio variance:  
Fame\_PortVar1(VarCovMat, Weights)
- Calculates the portfolio variance:  
Fame\_PortVar2(CorrMat, Weights)
- Calculates the portfolio standard deviation:  
Fame\_PortStdev1(VarCovMat, Weights)
- Calculates the portfolio standard deviation:  
Fame\_PortStdev2(CorrMat,Weights)

- **Assignment:**

- Do all of the work in the chapter, final result should look like **Exhibits 13-3 & 4 and all graphs on 3 and 4**. Format exactly like in the text.
- Remember Columns/Rows/Gridlines
- Each person will turn in one set of information: print out of spreadsheet and print out of cell formulas
- Work is individual.
- Due at the beginning of class