

AGEC 643
Homework 1
Due Sept. 16, 2011

1. Use the data in HWK1.XLSX, worksheet Data 1, and answer the steps below.
 - a. Calculate the summary statistics
 - b. Estimate trend regressions
 - c. Forecast variables for 5 years using trend regression
 - d. Calculate the correlation matrix for the variables
 - e. Calculate the covariance matrix for the variables
 - f. Calculate the square root of the correlation matrix; call it R
 - g. Transpose the R matrix
 - h. Calculate the product of RR' , check if it equals the original correlation matrix
 - i. Sort the original data on column 2 carrying along all the other columns
 - j. Convert the matrix of data to a column vector
 - k. Next reverse the steps in j and create a matrix from the column vector
 - l. Create a diagonal matrix (10 x 10) of 1's

2. Use the data in HWK1.XLSX, workbook Data 2.
 - a. Estimate the multiple regression model using the Simetar function
 - b. Estimate the beta coefficients using matrix formulas
 - c. Forecast the dependent variable given these X's:

	X1	X2	X3	X4	X5
Year 1	4.00	74.00	40.00	9.70	3.90
Year 2	3.00	75.00	41.00	9.70	2.90
Year 3	3.50	76.00	42.00	9.70	2.70

- d. Simulate the dependent variables for 3 Years using the Y-hats in step C using the std. dev. of the residuals
- e. Repeat step d using the standard error of prediction, calculated as $\text{std. dev.} * \text{Y-hat} / \text{mean}$.
- f. Report the summary statistics for the 6 simulated variables.
- g. Report the PDF and CDF of the third years value in steps e and f.

3. Develop a simple simulation model to estimate the PDF and CDF of total net returns for a business.

	X1	X2	X3
Production			
Mean	100.0	200.0	400.0
Std Dev	20.0	60.0	100.0
Price			
Mean	6.5	8.5	20.0
Std Dev	1.0	2.3	10.0
Min			14.0
Max			40.0
Variable Cost \$/U	3	6	18
Fixed Costs	75	15	65

KOVs:

Calculate total revenue

Calculate total costs

Calculate total net returns

- Assume the Business allocates its management services to these three enterprises in equal proportion for the Base Scenario. Simulate the model and report summary statistics for all stochastic variables and the KOVs. Present the CDF and PDF for the net returns distribution.
- Simulate the business for six scenarios where the fraction of management time is allocated as indicated in the scenario table below. When the business allocates its management differently for the six scenarios you need to change production accordingly. For example in scenario 2 there will be no production for enterprise 3 when the Report summary statistics and the CDFs of total net returns for the six scenarios.
- Be sure to print your model so I can see how you programmed it. Document your work using VFORMULA() and print the model in expected value mode for the Base scenario (1).

Scenarios	X1	X2	X3
Scen 1	0.333333	0.333333	0.333333
Scen 2	0.5	0.5	0
Scen 3	0.5	0.25	0.25
Scen 4	0.25	0.25	0.5
Scen 5	0	1	0
Scen 6	0	0	1