

TOPIC 2: Statistics for Business and Finance

Seminar Date/Time: (4 hours)

- **August 8, 2009, 9.00 – 11.00, Room P. 25**, Huamak campus
- **August 15, 2009, 9.00 – 11.00, Room P. 25**, Huamak campus

Trainer:

- **A. Peerawich**
 - **Education:** MA in Statistics, Columbia University and MBA in finance, at Dalhousie University
 - **Statistic and Business Applications:** Mathematica, R, SAS Enterprise Miner, Minitab, Simply Accounting, Retail ICE
 - **Teaching Experience:** Finance, Corporate Finance
 - **Working papers:** “Law of Market Dominance”, “Notes of Covariance Matrix Theory”, “Optimal Selection Problem: Covariance Matrix”, “An Overview of Bank Deposits in Thailand”

Note:

- **Letter of achievement** in the seminar will be provided to the students given that:
 - The students show high level of participation and attention in class,
 - The students attend both sessions for 4 hours, and
 - The students take the exam at the end of the seminar.

Topics include:

Probability and Business

- A. Some example of probability in business and finance
 - Conditional probability and marketing strategy
- B. Expectation or Expect Value, Mean, Weight Average
- C. Different Types of Distribution and Moment Generating Function (MGF)
 - Present Different Distributions both Discrete and Continuous
 - Explain what is Moment Generating Function (MGF)
- D. Interest in finance
 - What is the distribution of multiple variables combine?
 - An example is the distribution of the entire portfolio of stocks. Each stock has a distribution, what happen when you combine many stocks? Does the distribution change?
 - Memoryless and Markov Chain**

Point Estimation: (Mathmatical Statistics)

- A. Property of an Ideal Estimate (how good is the estimator?):

1. Unbiasness
 - a. Why is unbiased important?
 - b. What does it mean to be unbiased?
 - i. Illustrate using Property of expectation
 - ii. Introduce “Weak Law of Large Number” (x-bar converge to population mean = consistence)
2. Smallest Variance
 - a. Why is variance important?
 - b. Asymptotic Efficient – small variance when sample size is large (introduce Cramer-Rao Lower Bound)

B. Techniques used to determine point estimates:

- Basic- the mean, variance, and standard deviation
 - use property of expectation and variance
- Method of Moments
- Maximum Likelihood Estimate (M.L.E)
 - use partial derivatives

C. Example of Linear Regression

- a. The Least Square approach to estimate the parameters, intercept (B_0) and slope (B_1).
- b. The MLE approach to estimate the parameters, intercept (B_0) and slope (B_1).

D. Example of problem in Finance that is related to statistics

- a. Estimating Covariance Matrix for Portfolio Selection
 - i. Ledoit and Wolf Shrinkage Method