

**CALIFORNIA STATE UNIVERSITY, HAYWARD
DEPARTMENT OF STATISTICS**

**ECONOMICS 6400
Seminar in Econometrics
WINTER 2003**

Midterm Review

The midterm next week will cover Chapters 1, 2, 3, and some of the ideas in Ch. 4 that we have covered in Ch. 3. The test will be 2 hours long and will be open book and open notes.

The exam will have problems that will be similar to the homework problems. There will not be problems on the exam that ask you to prove involved formula. However, basic expectation and variance calculations will be included.

The following are suggestions for you to study. The exam may cover any topics beyond the following suggested topics, it will topics covered in class, in the homework or in the assigned reading (Ch 1- 4).

Ch. 1

Be sure to study:

- The difference between population parameters and sample statistics.
- How to formulate a linear model.

Ch. 2

Be sure to study:

- What are random variables? What are probability distribution of random variables?
- Normal distribution.
- Binomial distribution.
- Expectation and Variance of a random variable, and the properties associated with each.
- Correlation.
- What is the definition of a Random Sample? Why do we need to assume our data results from a random sample?
- Central Limit Theorem.
- Estimation: What is the Method of Least Square? How do we show an estimator is Unbiased? What does Efficiency mean? What does Consistency mean?
- How do the derived distribution relate to one another? T, F, Chi-Square distributions.

- What is the distribution of the sample mean? What is the distribution of the sample variance? What is the relationship between the sample mean and sample variance if the sample is from a normal population? What is the relationship if the sample is NOT from a normal population? (See Week 2 handout)
- Hypothesis testing for the population mean(s) and correlation. What is Type I and Type II Error? How do we use the p-value to conduct a hypothesis test?
- Confidence Intervals for the population mean(s).
- What is the relationship between Hypothesis Testing and Confidence Intervals?

Ch. 3

Be sure to study:

- What is the simple linear regression model?
- How are the parameters estimated using Least Squares?
- What are the assumptions of the simple linear regression model? (See page 96)
- Are the estimators of the parameters unbiased?
- Define Homoskedasticity? What problems might this cause when fitting a simple linear regression model?
- Define Serial Independence? What problems might this cause when fitting a simple linear regression model?
- How do we test the statistical significance of a parameter in the linear regression model?
- Confidence intervals for the parameters in the model.
- Confidence intervals and prediction intervals.
- Causality. (See Week 1 Links, [Myths of Murder and Multiple Regression](#))

Ch. 4

Be sure to study:

- Read page 144 and think about how multiple regression models extend the ideas of simple linear regression models.
- Study Applications 4.6, 4.7, and 4.8.