Second Exam: Economics 388, Econometrics   Spring 2003 in R. Butler's section
YOUR NAME:____
Section I (30 points) Questions 1-10 (3 points each)
Section II (40 points) Questions 11-14 (10 points each)
Section III (30 points) Questions 15, 16 (15 points each)

Section I. Define or explain the following terms (3 points each)

1. log-likelihood ratio test-

2. dummy variable trap-

3. law of large numbers-

4. logit-

5. maximum likelihood estimation--

6. non-nested models-

7. prediction intervals--

8. standardized beta coefficients--

9. self selection--

10. plim vs. Expected Value (of an estimator)-

II. Some Fun Stuff: True, False or Uncertain Questions (11-14); you are graded on your explanation and not on whether you guessed T or F correctly.

11. T,F or U: "To do a LM test of a restriction in the standard OLS model, you follow this procedure: 1) regress Y on the restricted (say "q" restrictions, or q-coefficients forced to be zero, for example) set of regressors, then 2) take the residuals from step 1 and regress them on all of the regressors (including those restricted from the first stage), then 3) take n (the sample size) and multiply it by the adjusted R-square from the second regression. This last statistic (n*adj. R-square) will be distributed as chi-square distribution with q-degrees of freedom under the null hypothesis."

12. T,F or U: "Instrumental variable estimators are always more efficient that OLS estimators."

13. T, F or U: “The constant in a regression is interpreted if and only it is theoretically meaningful to the model that is being estimated.”

14. T, F, or U: “The 95 percent confidence interval is a fixed interval such that the random (true) parameter will fall inside it 95 percent of the time.”

III. Really Fun Stuff

15. Some Applications--Describe what the following Shazam program does (in a), and indicate what the F-test statistic means (in "b") for a sample of a very big economics department, where the model relates the following variables: age, family size, whether or not the economist is a "labor economist." Here are the variables:

age=age of faculty member (in years)
agesq=age squared
famsize=size of the faculty member's family (including the number of wives and children)
labor=dummy variable =1 if the faculty member is a labor economist, 0 otherwise (so it would be zero for the usual economists: macro, history, econometricans, finance, mathematical theorists, etc.)
labage=labor*age
labagesq=labor*agesq

A. Describe as much as you can about what this model does:

```
ols famsize age agesq labor labage labagesq / predict=predsize
test
        test labor=0
        test labage=0
        test labagesq=0
end
test
        test labage=0
        test labagesq=0
end
plot predsize age
stop
end
```

B. Suppose that the first test statistic came back significant, but the second did not. What would that indicate?

16. a. Derive the variance of the error in the linear probability model (where y is a vector of dummy variables):

$$y = X\beta + \mu .$$

b. Besides the errors, are there any other features of the linear probability model that present a problem for the econometrican?