ECON 546: Themes in Econometrics

Lab Exercises #7
(3 March, 2010)

In this lab. class we are going to get some practice in estimating a "count" data model, using Poisson regression and estimating the model by MLE.

The data that we will be using are on the server in the Excel workbook that is titled, **S:\Social Sciences\Economics\ECON546\LAB7.XLS**. The data relate to crimes committed in 1986. The definitions of the data are given at the very bottom of the Excel file, and are also reproduced overleaf for your convenience.

(a) Create an EViews workfile and import all of the data into this file.

(b) Look at a histogram of the data for the number of arrests in 1986. Do you think that the data may follow a Poisson distribution?

(c) Now estimate a Poisson regression model that explains the expected number of arrests in 1986 as a function of all of the variables that you think may be relevant.

(d) Simplify the model until you have one in which all of the covariates are significant (at the 10% significance level) when using the Huber/White estimator of the covariance matrix.

(e) Check that you have really maximized the log-likelihood function.

(f) As an aside, compare your results with those obtained by applying OLS.

(g) Interpret the "LR Statistic" that is provided as part of the Poisson regression output.

(h) Using your preferred Poisson regression model, calculate the marginal effects associated with Legal Income in 1986. Interpret what this marginal effect means.

(i) Use the Likelihood Ratio test to test the hypothesis that race has no impact on the number of arrests.

(j) Do you come to the same conclusion if you test this hypothesis using the Wald test?

(k) How "successful" is your model at predicting the number of arrests?

Data Definitions

narr86	# times arrested, 1986
nfarr86	# felony arrests, 1986
nparr86	# property crime arrests, 1986
pcnv	proportion of prior convictions
avgsen	avgerage sentence length, months
tottime	time in prison since 18 (months)
ptime86	months in prison during 1986
qemp86	# quarters employed, 1986
inc86	legal income, 1986, $100's
durat	recent unemployment duration
black	= 1 if black; = 0, otherwise
hispan	= 1 if Hispanic; = 0, otherwise
born60	= 1 if born in 1960; = 0, otherwise