

Econometrics 2 (Fall 2020)

Homework 5: Duration Models.

Due Wednesday on Oct. 7, 2020.

This code estimates, using maximum likelihood, the duration model where

$$f(t, \theta) = \theta e^{-\theta t},$$

and $\theta_i = e^{\beta_0 + \beta_1 x_i}$. You must modify the code to include incomplete spells.

Set the parameters.

There are 50 simulations with 300 observations per simulation and calendar time stops at $T = 100$. Set $\beta_0 = 0.5$ and $\beta_1 = 3$.

Maximum Likelihood Estimation.

In each simulation, generate the data, X , then draw the durations for each. To include incomplete spells, censor values of t greater than T . Estimate the model using maximum likelihood and record the estimates.

Display the results of the last simulation.

The estimate and standard error (in parenthesis) of β_0 in the last simulation is:

The estimate and standard error (in parenthesis) of β_1 in the last simulation is:

Empirical results.

The average and standard deviation (in parenthesis) of β_0 is:

The average and standard deviation (in parenthesis) of β_1 is:

Plot the estimated coefficients from all simulations.

Plot a histogram of β_0 .

Plot a histogram of β_1 .