Stochastic Frontier Models and Economic Efficiency Estimation
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Lab Session 6 Assignment
Stochastic Frontier Model for Swiss Railways

The Swiss railway data set contains a panel of data on production costs for 51 Swiss railway companies. The data were used in “Efficiency measurement in network industries: Application to the swiss railway companies” by Mehdi Farsi, Massimo Filippini and William Greene. The variables of interest for your study (there are a number of variables we will not use) are

- **ID** = firm ID
- **NI** = number of periods observed. Repeated
- **T** = time period, begins at 0
- **LNCT** = log of total cost/electricity price
- **LNPK** = log of capital price/electricity price
- **LNPL** = log of labor price/electricity price
- **MLNPK** = railway mean of LNPK – repeated for each year
- **MLNPL** = railway mean of LNPL – repeated for each year
- **LNQ2** = log of passenger output
- **LNQ3** = log of freight (goods) output
- **MLNQ1,2,3** = railway means of logs of outputs. Q1 is total output. for Mundlak formulation, use LNQ2, LNQ3, MLNQ1 and MLNQ3 (not MLNQ2)
- **NARROW_T** = dummy variable for narrow track
- **RACK** = dummy variable for a network type. See SwissRailways.lim
- **VIRAGE** = dummy variable for curvature. See SwissRailways.lim
- **TUNNEL** = dummy variable for network with long tunnels
- **LNSTOP** = log of number of stations
- **MLNSTOP** = railway mean of log of number of stops – repeated for each year
- **LNNET** = log of network length
- **MLNNET** = railway mean of log of network length – repeated for each year

Using these data, build a stochastic cost frontier model for swiss railways. Estimate technical efficiency, E[exp(-ui)] either by railroad if you are using a panel model with time invariant inefficiency, or by railway-year if you are using a model with time varying inefficiency. Report your results for your model estimation and estimates of efficiency.