Exercise for MATLAB Handout # 5

The purpose of this exercise is to give you practice using the GMM toolbox.

Suppose that it is desired to estimate the following supply equation for pork:

\[ q_t = \beta_0 p_t + u_t \]

where \( q_t \) is the quantity supplied in year \( t \), \( p_t \) is the price of hogs in that year. The estimation is based on the population moment condition:

\[ E[z_t(q_t - \beta_0 p_t)] = 0 \quad (1) \]

where \( z_t \) is a vector of instruments.

The file pork.dat (which can be downloaded from the class web page) contains information on the following six variables:

- **YR**: the year.
- **EXP**: per capita consumption expenditure.
- **BEEFQ**: per capita beef production in pounds per person.
- **PORKQ**: per capita pork production in pounds per person.
- **PORKP**: price of pork in cents per pound (constant 1982 $).
- **BEEFP**: price of pork in cents per pound (constant 1982 $).

The data are annual figures and span 1970-1994; note the data are not in logs.

Perform all calculations using the data in logs.

Use the GMM toolbox to answer the following questions:

1. Calculate the GMM estimator of \( \beta_0 \) based on (1) using two choices of \( z_t \): (i) EXP; (ii) BEEFP. Contrast the estimates and the associated 95% confidence intervals for \( \beta_0 \).
2. Calculate the two step GMM estimators of $\beta_0$ based (1) using $z_t$ set equal to $(\text{EXP, BEEFP})'$ with two different choices of first step weighting matrix: (i) $W_T = I_2$; (ii) $W_T = (T^{-1}Z'Z)^{-1}$. Contrast the estimates and the associated 95% confidence intervals for $\beta_0$.

3. Calculate the overidentifying restrictions test statistic. Does the model appear consistent with the data?