Assignment No 1:

Demand Curve Estimation

1. Assignment Description

Demand for each product is affected by several factors. The main factors are the seasonality, the product quality and the target region. The assignment's purpose is to estimate the demand curve for a single product with a given quality in a given region.

The main assumption is that seasonality shifts the whole demand curve up or down. It is also assumed that each region has a different elasticity for the demand curve.

The student is asked to estimate the demand curve for a single product for a selected region. As a first step, data for this estimation should ignore seasonality (thus, run data from first quarter only). Price range should cover the entire price range for products in The Green State. At the second stage, seasonality should be added through using plug variables.

2. Background Theory

The demand curve may be of the following structure (run separate session for each demand curve):

$$P = \alpha + \beta Q$$

$$Ln(P) = \alpha + \beta Ln(Q)$$

Where the symbols mean:

P = Product price

Q = Product quantity

b = Slope of the demand curve..

Estimation should be by using OLS standard procedure.

Demand curve which includes seasonality should be of the following structure:

$$P = \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + \beta Q$$

Where Di are the dummy variables for each quarter.

Example for a reference:

http://en.wikipedia.org/wiki/Linear_regression

3. Data Source

- Build single firm with average technology.
- Generate production of 30,000 units.
- Send the products to the target region.
- Set the price for the product in the target region.
- Run simulations.
- Records the quantity of product sold in the region.
- Repeat the last three steps several times. Covering the relevant price range. On each run record the quantity sold. Make sure some quantity is left unsold to ensure that physical limitations do not affect sales.

4. Analysis required

a. Run linear regression using the two functional forms as describes is section 2.
b. Discuss the quality of the regression results by comparing the R^2, F values and the P values of the repressors' coefficients.
c. Calculate the elasticity of each of the demand curves. What do the results mean?
d. Given the estimated demand curves and assuming marginal cost of production is fixed what is the optimal price for the product in the target region?