The Department of Agriculture is currently looking at the nation’s consumption of chicken. Data have been gathered dating back to 1970, in hopes of finding variables that are closely correlated with chicken consumption so that the consumption can be predicted. In the spreadsheet you will find 36 observations…one for each year from 1970 – 2005. The variables are:

Year = Year

Y = per capita consumption of chicken (lbs.)

X1 = Real disposable income per capita ($)

X2 = Real retail price of chicken per lb (cents)

X3 = Real retail price of pork per lb. (cents)

X4 = Real retail price of beef per lb. (cents)

X5 = Composite real price of chicken substitutes per lb., which is a weighted average of the real retail prices per lb of pork and beef, the weights being the relative consumption of beef and pork in total beef and pork consumption.

(The actual data is in the Excel worksheet that is attached.)

Deliverables

1. Create regression models (four of them) to predict the consumption of chicken using the following independent variables. Create a table (Table example is attached) with the coefficients and their related statistics:
   1. Real retail price of chicken and real per capita disposable income
   2. Real retail price of chicken, real per capita disposable income, and the real retail price of pork.
   3. Real retail price of chicken, real per capita disposable income, the real retail price of pork, and the real retail price of beef.
   4. Real retail price of chicken, real per capita disposable income, and the composite real price for chicken substitutes.

II. Calculate the following elasticities, using the means of the variables, obtaining separate estimates from each of the above 4 regressions.

1. Own price elasticity of chicken
2. Income elasticity
3. Cross price elasticity with pork
4. Cross price elasticity with beef
5. Cross price elasticity with chicken substitutes

III. a. Compare the regression models from question I. What are the strengths and weaknesses of each model?

b. Consider the model in part c…what may this model, reasonably, be used for, and what does it leave out?

c. If you were going to do a retail level demand study for one particular company’s chicken products (for example, Tyson), what would you do differently from the above?

Supplement: For clarification on above questions:

**Supplement**

To clarify and simplify Question II, first estimate the following regression model:

QChick = β0 + βPchick XPchick+ βIncomeXIncome + βPPorkXPPork + βPBeefXPBeef

Where:

Qchick represents the predicted quantity of chicken consumed

βPchick represents the coefficient for the Price of chicken

XPchick represents the value of the Price of chicken variable

And so on…

To calculate each elasticity, remember that



Which can be re-written as:  (See the elasticity notes below for more explanation.)

For the demand function (or the regression equation) above, you can calculate the price elasticity, income elasticity, and so on:

 ,  ,  ,

You need to choose the Qchick and Pchick, Income, Ppork, etc at which to calculate the elasticity estimate; quite often the mean of the data is used to do this, but you may think another value is more sensible. Please calculate the elasticities at the mean, and interpret the elasticity estimates. If you think another value is more sensible, calculate the elasticity there, and explain why it is more appropriate.

Demand Elasticity Calc. Notes – Own Price Elasticity - Єp

 or 

This measure is called the ‘own-price’ elasticity of demand.

For the demand curve represented by: Q = a – bP (in regression, we might write this equation as Y = β0 – β1 x, where β0 is the y-intercept and β1 is the slope).

In simple terms, the slope, β1, represents the “rise over the run”, or “change-in-Y over the change-in-X. In this specific case, it represents the “change-in-Q/change-in-P”. In our equation above it is written as “*dQ/dP”*

So, if we have the regression equation: Q = 10 – 3 P, then β1= -3.

If  then 

If we were to calculate Q when P =1, then

Q = 10 - 3(1) = 7

Thus,  *inelastic*

If we were to calculate Q when P = 2, then Q = 10 – 3(2) = 4

Thus,  *elastic*

If we were to calculate Q when P = 3, then Q = 10 – 3(3) = 9

Thus,  *more elastic*

Interpretation:

when Єp > 1, demand is elastic: the quantity change is greater than the price change

when Єp < 1, demand is inelastic: the quantity change is less than the price change

when Єp = 1, demand is said to be unit elastic: the quantity change is equal to the price change

‘Cross price’ elasticity is a related concept, measuring the percentage change in quantity resulting from a percentage change in the price of a different variable or good.

Optimal Price Mark-up rule – also known as Ramsey Pricing Rule

 Applies only to elastic demand. Keep negative (-) sign on Єp when plugging in the numbers to do the calculations.