

1. In January of 1992, Dr. Dan (D²) was asked to testify at public hearings on the Massachusetts dairy industry. The price received by dairy producers had fallen dramatically and producers argued they would soon be out of business without state intervention. The question posed to D² was: How many dairy producers would go out of business in the near future without some form of assistance?

a. In words, how is a decline in the price of milk (*milkp*) expected to affect the number of producers (*nfarms*)?

b. D² enlisted the help of two students, and developed a model to forecast the numbers of dairy farms (*nfarms*) that would remain under alternative price scenarios.

$$nfarms = \beta_o + \beta_{milkp}milkp + \beta_{Feedp}Feedp + \beta_{Machp}Machp + \varepsilon$$

where *Feedp* is the price index for feeds and *Machp* is the price index for machinery.

Based on your answer in a. above, will β_{milkp} be positive or negative ? _____

Will β_{Machp} be positive or negative ? _____ Why?

| Source | df |
|--------|----|
| | |
| | |

c Assuming 30 cases (30 years of data), fill out the first two columns of the ANOVA table

2 A General Linear Model assumes normal errors while the Generalized Linear Model allows one to use non-normal errors. Generalized Linear models are written as follows.

Identity Link: $Response = \mu + \varepsilon$

Log Link: $Response = e^{\mu} + \varepsilon$

Logit Link: $\frac{p}{1-p} = e^{\mu} + \varepsilon$

where ε is the error and μ is the systematic or structural model ($\beta_o + \beta_1X_1 + \beta_2X_2 \dots etc$)

What is the link for the *nfarms* model ? _____

3 Write a Generalized Linear Model to evaluate whether the odds ($p/(1-p)$) of a farm going out of business depend only on milk prices. The proportion of farms going out of business in any one year is p .