

## Elasticity and Hypothesis Test Questions from Managerial Economics

### Spring 2011

You own and manage a company that produces a line of gourmet cheeses. Over the past several years, you have operated successfully in Minnesota and Wisconsin. Now you are considering marketing through a small broker in the Pacific Northwest. You have been working with that broker to test-market your product in a range of retail outlets, and you have used the data you have collected to estimate the parameters of the following demand function:

$$Q = e^{b_0} P^{b_1} e^u$$

where **Q** is quantity demanded (measured in pounds of cheese sold per week), **P** is price (measured in \$/pound), and **u** is a random error term. Taking the natural log of both sides of this expression makes it linear in the parameters, so the parameters can be estimated with linear regression. Your regression results follow:

Variable	Parameter <u>Estimate</u>	Standard <u>Error</u>	t <u>Statistic</u>
Constant	12.6	0.437	28.8
ln(P)	-3.31	0.431	-7.69

R-Squared: 0.855

Number of Observations: 12

Based on your experience in Minnesota and Wisconsin, the elasticity of demand with respect to price is -2.0. It appears demand is more elastic in the Pacific Northwest. If that is the case, you may want to price your product differently in that area.

- (12) a. Use a one-tailed test with a 95% confidence level to determine whether demand in the Pacific Northwest market is significantly more price elastic than in the Minnesota-Wisconsin market where the elasticity is -2.0. (Remember that “more” elastic means more negative.) Be sure to state your null and alternative hypotheses and to show your calculations. The critical t value is 1.812.
- (4) b. In both markets, your price elasticity estimate indicates that demand is elastic. Would you expect total revenue to increase or decrease if you increased the price you charge for your cheese?

Scores: 25<sup>th</sup> percentile 13

Median 16

75<sup>th</sup> percentile 16

N=45

### Spring 2014

Demand for organic products is growing rapidly in the U.S. You are a produce category manager for a major supermarket chain and have recently conducted a study of demand for organic lettuce based on scanner data for a 24 week period. You've estimated a demand function of the form:

$$Q = e^{b_0} P^{b_1} PC^{b_2} A^{b_3} e^u$$

where **Q** is quantity demanded (measured in cases of lettuce sold per week), **P** is the price of organic lettuce (measured in \$/package), **PC** is the price of conventional (i.e., non-organic) lettuce (measured in \$/package), **A** is advertising expenditure for organic lettuce (\$/week), and **u** is a random error term.

Taking the natural log of both sides of this expression makes it linear in the parameters, so the parameters can be estimated with linear regression. Your regression results follow:

	Parameter	Standard	t
<u>Variable</u>	<u>Estimate</u>	<u>Error</u>	<u>Statistic</u>
Intercept	1.56	0.91	1.71
ln(P)	-1.95	0.52	-3.75
ln(PC)	0.21	0.17	1.24
ln(A)	0.67	0.16	4.19

R-Squared: 0.752    Number of Observations: 24

- (4) a. It appears that the own price elasticity of demand for organic lettuce is less than -1.0 (or greater in absolute value than 1.0). If this is true, will revenue from organic lettuce increase or decrease if you increase the price of organic lettuce, holding everything else constant?
- (12) b. Your estimate of the coefficient for ln(P) implies that demand is own price elastic. Use a one-tailed test with a 0.05 significance level to determine whether this demand relationship is statistically significant. Be sure to state your null and alternative hypotheses and to show your calculations. The critical t value is 1.725.

Scores: 25<sup>th</sup> percentile 11

Median 14

75<sup>th</sup> percentile 16

N=51