



**BUSS 230: Managerial Economics**  
**Fall 2011-2012**  
**Midterm Review Questions**  
**Sections 1 to 6**

**Question 1**

The estimated market demand for good  $X$  is:

$$\hat{Q} = 8000 - 25P - 0.12M - 30P_G$$

where  $\hat{Q}$  is the estimated number of units of good  $X$  demanded,  $P$  is the price of good  $X$ ,  $M$  is income, and  $P_G$  is the price of related good  $G$ . (All parameter estimates are statistically significant at the 1 percent level of significance.)

- a. Is the sign of the coefficient associated with the price consistent with theory? Why or why not?
- b. Given the above equation, is good  $X$  a normal or inferior good?
- c. Are goods  $X$  and  $G$  complements or substitutes?
- d. At  $P = \$12$ ,  $M = \$30,000$ , and  $P_G = \$50$ , what is the predicted quantity of good  $X$ ?
- e. At the values in part (d), compute the following elasticities:
  - (1) Own Price elasticity  $E_P$ .
  - (2) Cross-price elasticity  $E_{XG}$ .
  - (3) Income elasticity  $E_M$ .
- f. The  $R^2$  from this regression is 0.65. What proportion of the variation in the demand for  $X$  is explained by the above regression? What proportion of variation in demand remains *unexplained*?
- g. Given a sample size  $n=25$ , compute the  $F$ -statistic for this demand equation.
- h. Test the joint significance of all the variables included in the regression.
- i. All else constant, what would be the effect (in percentage terms) of a 20% increase in income?
- j. All else constant, what would the effect (in percentage terms) of 15% increase in the price of the related product  $P_G$ ?

## Question 2

Rubax, a U.S. manufacturer of athletic shoes, estimates the following linear trend model for shoe sales:

$$Q_t = a + bt + c_1D_1 + c_2D_2 + c_3D_3$$

Where

$Q_t$  = sales of athletic shoes in the  $t$ th quarter

$t = 1, 2, \dots, 28$  [2001Q1, 2001Q2, ..., 2007Q4]

$D_1 = 1$  if  $t$  is quarter 1 (winter); 0 otherwise

$D_2 = 1$  if  $t$  is quarter 2 (spring); 0 otherwise

$D_3 = 1$  if  $t$  is quarter 3 (summer); 0 otherwise

The regression analysis produces the following results:

<b>Dependent Variable:</b> QT		<b>R-Square</b>	<b>F-Ratio</b>	<b>P-Value on F</b>
<b>Observations:</b> 28		0.9651	159.01	0.0001
<b>Variable</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>T-Ratio</b>	<b>P-Value</b>
Intercept	184500	10310		0.0001
T	2100	340		0.0001
D1	3280	1510		0.0404
D2	6250	2220		0.0098
D3	7010	1580		0.0002

- Is there sufficient statistical evidence of an upward trend in shoe sales?
- Do these data indicate a statistically significant seasonal pattern of sales for Rubax shoes? If so, what is the seasonal pattern exhibited by the data? Carefully state the seasonal pattern, if any, and justify your answer.
- Using the estimated forecast equation, forecast sales of Rubax shoes for 2008Q3 and 2009Q2.
- How would you improve this forecast equation?