

1. Assume you have to analyze the following data provided to you from the Accounting Department.

(A) TOTAL Quantity*	(B) TOTAL Quantity*	(D) TOTAL Quantity** ( when the price of another company is \$250 more than our price)	(E)  Our price	(F) TOTAL COST  (when average income equals \$40,000)
0	1.5	0	1,750	\$1,000
1	2.5	0.75	1,700	\$2,000
2	3.5	1.75	1,650	\$2,800
3	4.5	2.75	1,600	\$3,500
4	5.5	3.75	1,550	\$4,000
5	6.5	4.75	1,500	\$4,500
6	7.5	5.75	1,450	\$5,200
7	8.5	6.75	1,400	\$6,000
8	9.5	7.75	1,350	\$7,000
9	10.5	8.75	1,300	\$8,000
10	11.5	9.75	1,250	\$12,000

\* assume the price of ~~other~~ another company is \$100 more than ours

\*\* assume average income equals \$40,000

a) From Column A and E in the demand schedule above, what is the price elasticity of demand when our price is between \$1600 and \$1450 per unit, average income equals \$40,000, and another company charges a price that is \$100 higher than ours? Tells me what this coefficient means.

b) From Column A and D in the demand schedule above, what is cross-price elasticity of demand when our price is \$1500 per unit and average income equals \$40,000? Tells me what this coefficient means.

c) From Column A and B in the demand schedule above, what is income elasticity of demand when our price is \$1500 per unit and the price of another company is \$100 more than ours? Interpret the coefficient.

d) From Column A and F what is the average cost per unit when our price is \$1500 per unit and average income equals \$40,000? In addition, what are total fixed and variable costs at this price?

e) Take the data that you used in (a) above and estimate a demand equation. Interpret the results of the regression with as much detail as you can. (Attach any computer output as you deem necessary).

2 Using cross-sectional data from the annual reports for 25 companies in the industry, a consultant estimates a market demand curve and market supply curve for an industry as follows:

$$Q_d = 10 - 2P$$

(1.3) (-2.6)

$Q_d$  = millions of units sold

$P$  = average revenue per unit of output

$R^2 = 55.1\%$

F- statistic = 5.10

D.W. = 1.61

$n=25$

$$Q_s = -5 + 3P$$

(-1.2) (2.4)

$Q_s$  = millions of units produced

$P$  = average revenue per unit of output

$R^2 = 61.2\%$

F- statistic = 5.30

D.W. = 1.71

$n=25$

A) Interpret the results of these equations and assess their statistical validity

B) What is the market price in this industry?

C) What is the market equilibrium quantity demanded?

D) At market equilibrium, what is the total revenue in this industry?

3. Assume the staff of Market Research Department for the International House of Pancakes (IHOP) has just completed an exhaustive statistical analysis of all IHOP products that included regression analysis to define the demand equation for IHOP Western Omletts. The Market Research Manager has to explain the meaning of this equation to senior management. The equation is written as follows:

$$\ln OMLETT_t = \ln \beta_0 + \beta_1 \ln P_t + \beta_2 \ln A_t + \beta_3 \ln PFT_t + \beta_4 \ln PDO_t + \beta_5 \ln PDFT_t + \beta_6 \ln PCI_t + \beta_7 \ln POP_t + \beta_8 \ln Time_t$$

where:

$OMLETT_t$  = The number of IHOP Western Omletts sold in period t

$P_t$  = The price of an IHOP Western Omlett in period t

$A_t$  = The dollars spent on IHOP advertising in period t

$PFT_t$  = The price of IHOP French Toast in period t

$PDO_t$  = The price of a Denny's Western Omlett in period t

$PDFT_t$  = The price of Denny's French Toast in period t

$PCI_t$  = Local per capita income in period t

$POP_t$  = Local Population in period t

$Time_t$  = time variable

$\ln$  = natural logarithm

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$  = regression coefficients

The summary equation results are:

	<u>Regression Coefficient</u>	<u>Standard Error of Coefficient</u>
<b>Intercept</b>	1.20	.60
$P_t$	-0.85	-.17
$A_t$	0.50	.33
$PFT_t$	-0.50	-.16
$PDO_t$	0.60	.24
$PDFT_t$	0.10	.07
$PCI_t$	1.80	.72
$POP_t$	0.75	.27
$Time_t$	1.05	.75
Corrected R-square	88.1%	
F-statistic	58.86	
Durbin-Watson statistic	1.55	
N =	156	

(continued)



4. Assume that you are Business Research Manager for an insurance firm and you are presenting the results of multiple regression analysis to senior management that was prepared by your staff.

a) How would you determine if there is multicollinearity in your data and what impact would this have on your results. In addition, if the last statistics course for anyone in senior management dates about 30 years ago, how would you explain what multicollinearity is to them?

b) How would you determine if there is autocorrelation in your data and what impact would this have on your results. In addition, if the last statistics course for anyone in senior management dates about 30 years ago, how would you explain what autocorrelation is to them?

c) Your staff used dummy variables in their analysis. Assuming the last statistics course for anyone in senior management dates about 30 years ago, how would you explain what a dummy variable is?

d) Discuss the difference between cross-sectional and time series data.