

Second Exam

Write all answers in your blue book and show all work there. Return your exam and printout(s) in your blue book.

24 pts

1) Consider the printout below.

**Model Summary**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .986 <sup>a</sup> | .971     | .961              | .04589653440752            |

a. Predictors: (Constant), LOGM, LOGF, LOGK, LOGL

**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F      | Sig.              |
|-------|------------|----------------|----|-------------|--------|-------------------|
| 1     | Regression | .786           | 4  | .196        | 93.241 | .000 <sup>a</sup> |
|       | Residual   | .023           | 11 | .002        |        |                   |
|       | Total      | .809           | 15 |             |        |                   |

a. Predictors: (Constant), LOGM, LOGF, LOGK, LOGL

b. Dependent Variable: LOGQ

**Coefficients<sup>a</sup>**

| Model |            | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. | Collinearity Statistics |        |
|-------|------------|-----------------------------|------------|---------------------------|--------|------|-------------------------|--------|
|       |            | B                           | Std. Error | Beta                      |        |      | Tolerance               | VIF    |
| 1     | (Constant) | -.412                       | .180       |                           | -2.289 | .043 |                         |        |
|       | LOGL       | .092                        | .267       | .088                      | .344   | .737 | .040                    | 25.002 |
|       | LOGK       | .677                        | .358       | .220                      | 1.888  | .086 | .192                    | 5.209  |
|       | LOGF       | .742                        | .205       | .726                      | 3.623  | .004 | .065                    | 15.435 |
|       | LOGM       | .024                        | .221       | .015                      | .107   | .917 | .138                    | 7.271  |

a. Dependent Variable: LOGQ

- a) Write the estimated equation first in logs, then in the Cobb Douglas form (base 10 was used).
- b) Predict Q when all the variables are 2.
- c) Which variables are significant? Why?
- d) What evidence do you see of collinearity?

16 pts

- 2) a) Discuss why it is important to control for as many variables as possible when estimating a demand function. Use a diagram to show how an excluded variable can bias the estimates of the effects of included variables.
- b) Continue your discussion in part a with an explanation of simultaneous equation bias.

16 pts

- 3) a) Suppose that you have estimated the following model of sales as a simple trend where  $t$  is time given in quarters and  $t$  is 1 in the first quarter of 2005.

$$S = 100 + 2t$$

You also have the following seasonal indices:

| Quarter | Index |
|---------|-------|
| 1       | 120   |
| 2       | 105   |
| 3       | 80    |
| 4       | 95    |

What sales do you predict for the third quarter of 2008?

- b) Now you have this model to predict your sales:

$$S = 100 + 2t + 20Q_1 + 5Q_2 - 20Q_3$$

Where  $Q_i = 1$  in quarter  $i$  and zero otherwise.

What sales do you predict for the third quarter of 2008?

20 pts

- 4) a) We have the following production function:  $Q = L^{.55}K^{.45}$  and  $K$  is fixed in the short run at 10. If the price of labor is 5 and the price the product is 20, what quantity of  $L$  maximizes profit?
- b) We have the following production function:  $Q = 100L^{.55}K^{.45}$  and the profit maximizing  $Q$  is 10000. If the price of labor is 5 and the price of capital is 2, what quantities of  $L$  and  $K$  are required? What is the total cost?

16 pts

- 5) a) Decide if it seems better to pursue parallel R&D projects or just one given the following information.

Project 1 may cost 2 or 4 million, equally probable.

Project 2 may cost 2.5 or 3.5 million with probabilities of .25 and .75, respectively.

End cost will be known after .5 million has been spent.

- b) Now let's say that you are risk adverse. Reconsider your choice in part a with this in mind.

8 pts

- 6) The shop steward insists that lot sizes should much larger so that set up costs could be reduced. Will this necessarily increase profit? Explain.

I have neither given nor received unfair aid on this test nor am I aware of anyone else who has.

---