

## MIDTERM EXAMINATION #3 ANSWER KEY

### VERSION A

#### I. MULTIPLE CHOICE

- (1)a.           (2)b.           (3)a.           (4)a.           (5)f.           (6)e.  
 (7)b.           (8)b.

#### II. SHORT ANSWER

- (1)           a. false       b. true       c. true  
 (2)           a. yes         b. no         c. no         d. yes  
 (3)           a. decreases   b. increases   c. decreases   d. increases  
 (4)           a. either      b. either      c. decrease   d. increase   e. either

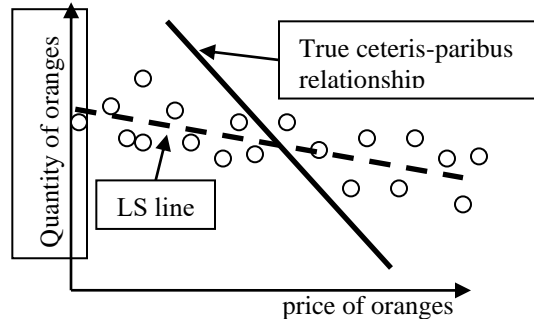
#### III. PROBLEMS

- (1) [Analysis of variance table,  $R^2$ , F-test]  
 a. 50           b. 4           c. 2           d. 0.75       e. 0.734  
 f. DOF in numerator=3, DOF in denominator=46, F-statistic=46,  
 critical point=about 2.84, Yes reject null hypothesis.
- (2) [Dummy variables and structural change]  
 a. 18           b. 24           c. 0.5         d. [1]         e. [4]  
 f. DOF in numerator=2, DOF in denominator=40, F-statistic=12.5,  
 critical point=3.23, Yes reject null hypothesis.
- (3) [Heteroskedasticity]  
 a. yes           b. no           c. positively   d. 2.8         e. 3.84  
 f. No cannot reject null hypothesis
- (4) [Weighted least squares]

Transformed data		
$y_i$	Intercept	$x_i$
15	$1/5=0.2$	6
14	$1/4=0.25$	5

#### IV. CRITICAL THINKING

The least-squares estimate of  $b_2$  is **biased up (closer to zero)**. High prices for oranges tend to occur with high prices of grapefruits, because the prices are given as positively correlated. Because the goods are substitutes, high prices of grapefruits will tend to increase the quantity demanded of oranges. Thus for high prices of oranges, observations will tend to be above the ceteris paribus relationship. Conversely, for low prices of oranges, observations will tend to be below the ceteris paribus relationship. Since least-squares finds a line through the middle of the data, the least squares line will be too flat.



**VERSION B**

**I. MULTIPLE CHOICE**

- (1)b.            (2)d.            (3)b.            (4)c.            (5)c.            (6)d.  
 (7)e.            (8)c.

**II. SHORT ANSWER**

- (1)            a. true            b. false            c. true  
 (2)            a. yes            b. yes            c. no            d. no  
 (3)            a. increases    b. increases    c. decreases    d. increases  
 (4)            a. increase    b. either            c. either            d. either            e. decrease

**III. PROBLEMS**

- (1) [Analysis of variance table,  $R^2$ , F-test]  
 a. 49            b. 5            c. 2            d. 0.6            e. 0.564  
 f. DOF in numerator=4, DOF in denominator=44, F-statistic=16.5, critical point=about 2.61, Yes reject null hypothesis.
- (2) [Dummy variables and structural change]  
 a. 24            b. 18            c. 0.8            d. [2]            e. [4]  
 f. DOF in numerator=1, DOF in denominator=40, F-statistic=20, critical point=4.08, Yes reject null hypothesis.
- (3) [Heteroskedasticity]  
 a. yes            b. no            c. negatively    d. 4.65            e. 3.84  
 f. Yes reject null hypothesis
- (4) [Weighted least squares]

Transformed data		
$y_i$	Intercept	$x_i$
18	$1/4=0.25$	8
17	$1/3=0.333$	7

**IV. CRITICAL THINKING**

Same as Version A.

**VERSION C**

**I. MULTIPLE CHOICE**

- (1)c.           (2)c.           (3)c.           (4)c.           (5)f.           (6)f.  
(7)d.           (8)d.

**II. SHORT ANSWER**

- (1)           a. false       b. false       c. true  
(2)           a. no           b. yes         c. yes         d. no  
(3)           a. increases   b. decreases   c. increases   d. decreases  
(4)           a. either       b. decrease    c. increase    d. either       e. either

**III. PROBLEMS**

- (1) [Analysis of variance table,  $R^2$ , F-test]  
a. 68           b. 7           c. 2           d. 0.8         e. 0.780  
f. DOF in numerator=6, DOF in denominator=61, F-statistic=40.5, critical point=about 2.25, Yes reject null hypothesis.
- (2) [Dummy variables and structural change]  
a. 0.8           b. 0.5         c. 24         d. [1]         e. [2]  
f. DOF in numerator=1, DOF in denominator=59, F-statistic=4.917, critical point=4, Yes reject null hypothesis.
- (3) [Heteroskedasticity]  
a. no           b. yes         c. negatively   d. 3.9         e. 3.84  
f. Yes reject null hypothesis (barely)
- (4) [Weighted least squares]

Transformed data		
$y_i$	Intercept	$x_i$
25	$1/3=0.333$	10
28	$1/2=0.5$	11

**IV. CRITICAL THINKING**

Same as Version A.

[end of answer key]