Quiz #1 (100 points)

The Quiz must be submitted on Canvas. You need to have a paper quiz to complete this quiz on Canvas. It is recommended to complete Quiz on paper and then enter your answers on Canvas. The correct answers will be available in your feedback on Canvas later today.

Canvas shuffles answers: the answers will be presented in a different order on Canvas, as compared to the paper Quiz.

Quiz #1 points (maximum 100 points): 30 base points + up to 70 points for correct answers.

Problem #1 (19 points): A set of individual multiple choice questions

Problem #1 includes Questions 1 - 19

1. (1 pt) Utility represents
a). Consumer preferences
b). Income available for consumption activities

2. (1 pt) Budget constraint represents
a). Consumer preferences
b). Income available for consumption activities

3. (1 pt) The total utility function is a function of
a). quantities of goods consumed
b). prices and income
c). quantities of goods consumed, prices and income

4. (1 pt) The budget constraint includes
a). prices, quantities and income
b). prices and income
c). quantities and prices
d). prices and quantities

5. (1 pt) The economic objective of final consumers is
a). to minimize expenditures
b). to maximize profit
c). to maximize income
d). to maximize total utility

6. (1 pt) Marginal utility is
a). the derivative of the total utility function with respect to product quantity
b). the derivative of the budget constraint with respect to product quantity
c). the derivative of the budget constraint with respect to product price
d). the derivative of the total utility function with respect to product price

Quiz #1 (100 points)

7. (1 pt) A graphical representation of the total utility function is
a). budget line
b). indifference curve

8. (1 pt) A graphical representation of the budget constraint is
a). budget line
b). indifference curve

9. (1 pt) All consumption bundles (baskets) providing the same level of total utility are located on the same indifference curve
a). True
b). False

10. (1 pt) Indifference curves for the same individual are parallel to each other (i.e. do not intersect)
a). True
b). False

11. (1 pt) A higher indifference curve is always better
a). True
b). False

12. (1 pt) If a consumer's income increases, he will move to a higher (level of) indifference curve, assuming prices do not change
a). True
b). False

13. (1 pt) If a consumer's income decreases, he will move to a lower (level of) indifference curve, assuming prices do not change
a). True
b). False

14. (1 pt) The slope of indifference curve is
a). The ratio of marginal utilities
b). The price ratio

15. (1 pt) The slope of budget line is
a). The ratio of marginal utilities
b). The price ratio

16. (1 pt) The tangency condition is
a). Indifference curve slope > Budget line slope
b). Indifference curve slope < Budget line slope
c). Indifference curve slope = Budget line slope

17. (1 pt) A consumption bundle located at the point where indifference curve is tangent to the budget line (on a graph) is
a). optimal consumption bundle
b). a consumption bundle, which is affordable, but not optimal
c). a consumption bundle, which is not affordable, but provides a higher utility level than optimal consumption bundle

18. (1 pt) A consumption bundle located to the left from the budget line (on a graph)
a). optimal consumption bundle
b). a consumption bundle, which is affordable, but not optimal
c). a consumption bundle, which is not affordable, but provides a higher utility level than optimal consumption bundle

19. (1 pt) A consumption bundle located to the right from the budget line (on a graph)
a). optimal consumption bundle
b). a consumption bundle, which is affordable, but not optimal
c). a consumption bundle, which is not affordable, but provides a higher utility level than optimal consumption bundle

Problem #2 (21 points) *Consumer Choice: Optimal Consumption Bundle*

Problem #2 includes Questions 20 - 25

A consumer purchases two goods: **F (food)** and **C (clothing).**
The consumer's total utility function is **TU = F×C+F+C.**
F and C are measured in physical units (quantity of food and quantity of clothing).
Product prices: **Pf = $1 per unit** and **Pc = $2 per unit.**
The available **budget** to spend on food and clothing is **$45.**

20. (3 pts) Select a **correct formulation of the total utility maximization problem** for this consumer.
a). The consumer maximizes the total utility.
b). The consumer minimizes his expenditures on food and clothing to maximize his total utility.
c). The consumer maximizes the total utility subject to a budget constraint.

Determine (calculate) the optimal consumption bundle for this consumer.
Proceed by answering questions 21 - 25.

21. (3 pts) **Marginal Utility** the consumer receives **from consuming food** is
a). $MU_F = C + 1$ b). $MU_F = C$ c). $MU_F = F \times C + 1$

22. (3 pts) **Marginal Utility** the consumer receives from **consuming clothing** is
a). $MU_C = F + 1$ b). $MU_C = F$ c). $MU_C = F \times C + 1$

23. (4 pts) The **tangency condition** is

a). $\frac{C+1}{F+1} = \frac{1}{2}$ b). $\frac{C}{F} = \frac{1}{2}$ c). $\frac{C}{F} = \frac{2}{1}$

24. (4 pts) The **budget constraint** is

a). $F \times C + F + C = 45$ b). $2 \times F + 1 \times C = 45$ c). $1 \times F + 2 \times C = 45$

25. (4 pts) Use the tangency condition and budget constraint to **calculate the optimal consumption bundle** for this consumer.

Show your work here:

a). F = 11 units and C = 23 units
b). F = 23 units and C = 11 units
c). F = 45 units and C = 22.5 units
d). F = 45 units and C = 90 units

Problem #3 (30 points) *Consumer Demand Analysis:* Retail Demand for *Rice*

Problem #3 includes Questions 26 - 35

You have estimated the following demand function for *rice* at the retail level. Note that this is a *linear* multivariate function. *Potatoes* and *pasta* are products-substitutes for *rice*.

$$Q_{rice} = 10 - 15 \times P_{rice} + 12 \times P_{potatoes} + 10 \times P_{pasta} + 0.025 \times I$$

Q rice is the quantity of rice demanded (purchased) per person per year (pounds)
P rice is retail price of rice ($ per pound)
P potatoes is retail price of potatoes ($ per pound)
P pasta is retail price of pasta ($ per pound)
I is income available to spend on food ($ per year)

26. (3 pts) Interpret the ***coefficient*** *for* ***price of rice***.
a). If rice price decreases by 1%, then rice quantity increases by 15% per person per year
b). If rice price increases by $1 per pound, then rice quantity decreases by 15 pounds
c). If rice price decreases by $1 per pound, then rice quantity decreases by 15 pounds

27. (3 pts) Interpret the ***coefficient*** *for* ***price of potatoes***.
a). If potato price increases by $1 per pound, then rice quantity increases by 12 pounds
b). If potato price decreases by $1 per pound, then rice quantity increases by 12 pounds
c). If potato price increases by 1%, then rice quantity increases by 12% per person per year

28. (3 pts) Interpret the ***coefficient*** *for* ***price of pasta***.
a). If pasta price increases by $1 per pound, then rice quantity decreases by 10 pounds
b). If pasta price decreases by $1 per pound, then rice quantity decreases by 10 pounds
c). If pasta price decreases by 1%, then rice quantity decreases by 10% per person per year

29. (3 pts) Interpret the ***coefficient*** *for* ***income.***
a). If income increases by 1%, then rice quantity increases by 0.025% per person per year
b). If income increases by $1, then rice quantity increases by 0.025 pounds per person per year
c). If income increases by $1, then rice quantity decreases by 0.025 pounds per person per year

Use the coefficients from the demand function to predict changes in the demand for rice: questions 30-33.

30. (3 pts) If ***price of rice increases by $2 per pound***, predict **the change in quantity of rice** demanded

a). Quantity of rice decreases by 15 pounds
b). Quantity of rice decreases by 30 pounds
c). Quantity of rice increases by 30 pounds
d). Quantity of rice decreases by 30%

31. (3 pts) If *price of potatoes decreases by $2 per pound*, predict **the change in quantity of rice** demanded

a). Quantity of rice decreases by 12 pounds
b). Quantity of rice decreases by 24 pounds
c). Quantity of rice increases by 24 pounds
d). Quantity of rice decreases by 24%

32. (3 pts) If *price of pasta increases by $3 per pound*, predict **the change in quantity of rice** demanded

a). Quantity of rice increases by 10 pounds
b). Quantity of rice increases by 10%
c). Quantity of rice decreases by 30 pounds
d). Quantity of rice increases by 30 pounds

33. (3 pts) *If income decreases by $1,000*, predict **the change in quantity of rice** demanded

a). Quantity decreases by 25 pounds
b). Quantity decreases by 25%
c). Quantity increases by 25 pounds
d). Quantity decreases by 0.025 pounds

Use the demand function for rice to *predict quantity of rice demanded* in two market scenarios differing due to the demand determinants: questions 34 and 35.

34. (3 pts) In the analyzed market: **P rice is $3.00 per pound, P potatoes is $2.00 per pound, P pasta is $1.00 per pound and the average income spent on food is $5,000 per year.** ***Predict rice quantity.***
a). Quantity of rice demanded (purchased) is 135 pounds per year
b). Quantity of rice demanded (purchased) is 125 pounds per year
c). Quantity of rice demanded (purchased) is 124 pounds per year

35. (3 pts) In the analyzed market: **P rice is $1.00 per pound, P potatoes is $2.00 per pound, P pasta is $3.00 per pound and the average income spent on food is $5,000 per year.** ***Predict rice quantity.***

a). Quantity of rice demanded (purchased) is 135 pounds per year
b). Quantity of rice demanded (purchased) is 125 pounds per year
c). Quantity of rice demanded (purchased) is 174 pounds per year

********** BASE POINTS QUESTION**********

36. (30 pts) To get your base points, confirm the following statement: "I am a student taking AGRB 4560 in Spring 2020".
a). True b). False

Quiz #2 (100 points)

NAME_____

Canvas Score (points) _____

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Quiz #2 points (maximum 100 points): 22 base points + up to 78 points for correct answers.

Problem #1 (12 points) **Consumer Demand for *Rice***
Formulating Economic Model and Econometric Model

Problem 1 includes Questions 1-6 (each correct answer is 2 points)

A grain distributor (wholesaler) hired you as a consultant to perform a demand analysis for rice sold at the retail level in the U.S. Using the United States Department of Agriculture (USDA) database, you compiled a data set, which included variables that could be potentially used in a rice demand analysis at the retail level. The variables are summarized in a table below.

Variable		**Unit of measurement**
Price of rice	P rice	$ per pound
Quantity of rice purchased (demanded)	Q rice	pounds per person per year
Price of potatoes	P potatoes	$ per pound
Quantity of potatoes purchased (demanded)	Q potatoes	pounds per person per year
Price of beans	P beans	$ per pound
Quantity of beans	Q beans	pounds per person per year
Income	Income	$ per person per year

Assume potatoes and beans are products-substitutes for rice.

1. Formulate a **theoretical (economic) model** explaining consumer demand for rice at the retail level.

a). P rice = f (Q rice, P potatoes, P beans, Income)
b). P rice = f (Q rice, Q potatoes, Q beans, Income)
c). Q rice = f (P rice, Q potatoes, Q beans, Income)
d). Q rice = f (P rice, P potatoes, P beans, Income)

Quiz #2 (100 points)

2. Formulate **an econometric model to be estimated** ("a" is alpha, "b's" are betas and "e" is error term)

a) P rice = a - b1 * Q rice + b2 *P potatoes + b3* P beans + b4 * Income + e
b) Q rice = a – b1 * P rice + b2 * P potatoes + b3 * P beans + b4 * Income + e
c) Q rice = a + b1 * P rice + b2 * P potatoes + b3 * P beans + b4 * Income +e
d) P rice = a + b1 * Q rice + b2 *P potatoes + b3* P beans + b4 * Income + e

Using consumer demand theory, formulate a set of testable hypotheses: Questions 3-6

3. The relationship between Q rice and P rice: the estimated coefficient characterizing the relationship between these two variables is expected to be
a). Negative: the own price effect on quantity demanded
b). Positive: the cross-price effect on quantity demanded (assuming the price is for product – substitute)
c). Positive: the own price effect on quantity demanded
d). Negative: the cross-price effect on quantity demanded (assuming the price is for product – substitute)

4. The relationship between Q rice and P potatoes: the estimated coefficient characterizing the relationship between these two variables is expected to be
a). Negative: the own price effect on quantity demanded
b). Positive: the cross-price effect on quantity demanded (assuming the price is for product – substitute)
c). Positive: the own price effect on quantity demanded
d). Negative: the cross-price effect on quantity demanded (assuming the price is for product – substitute)

5. The relationship between Q rice and P beans: the estimated coefficient characterizing the relationship between these two variables is expected to be
a). Negative: the own price effect on quantity demanded
b). Positive: the cross-price effect on quantity demanded (assuming the price is for product – substitute)
c). Positive: the own price effect on quantity demanded
d). Negative: the cross-price effect on quantity demanded (assuming the price is for product – substitute)

6. The relationship between Q rice and Income: the estimated coefficient characterizing the relationship between these two variables is expected to be
a). Negative: the own price effect on quantity demanded
b). Positive: the cross-price effect on quantity demanded (assuming the price is for product – substitute)
c). Positive: the income effect on quantity demanded
d). Negative: the income effect on quantity demanded

Quiz #2 (100 points)

Problem #2 (33 points) **An Analysis of Consumer Demand for *Rice***
Econometric (Regression) Model of **Retail Demand for *Rice:***
Interpreting the Estimation Results

Problem #2 includes Questions 7-17 (each correct answer is 3 points)

Using a regression analysis technique and a relevant data set, you have estimated a demand function for *rice* at the retail level. This demand function characterizes the final consumer's purchasing (consumption) behavior. *Potatoes* are a product-substitute for *rice*. ***Your estimation results are summarized below.***

$$\ln Q_{rice} = 5 - 1.20 \times \ln P_{rice} + 0.70 \times \ln P_{potatoes} + 1.10 \times \ln I$$

(-2.65) (0.95) (1.75)

T-statistics are reported in the parentheses.
R2 = 0.80 or 80%.

Q rice is the quantity of rice demanded (purchased) per person per year (pounds)
P rice is retail price of rice ($ per pound)
P potatoes is retail price of potatoes ($ per pound)
I is income available to spend on food ($)

7. The estimated demand function is
a). a quantity-dependent demand function b). a price-dependent demand function

8. The estimated demand function is
a). a multivariate demand function b). a univariate demand function

9. The estimated demand function is
a). a linear demand function b). a log-linear demand function

10. A proper interpretation of the **flow of the causation effect** in this demand function is
a). a change in quantity of rice causes price of rice to change (i.e. quantity determines price)
b). a change in price of rice causes quantity of rice to change (i.e. price determines quantity)

11. Interpret R2
a). The variation in price of rice, price of potatoes and income explains 80% of the variation in the quantity of rice
b). The variation in the quantity of rice explains 80% of the variation in price of rice, price of potatoes and income
c). The variation in price of rice, price of potatoes and income explains 20% of the variation in the quantity of rice

Quiz #2 (100 points)

Interpret the *sign* and *magnitude* of the *estimated coefficients (i.e. economic significance)*: Questions 12 – 14

12. *Interpret* the ***estimated coefficient*** *for* ***ln P rice***
a). If price of rice decreases by $1 per pound, then the quantity of rice purchased increases by 1.20 pounds
b). If the quantity of rice purchased increases by 1%, then price of rice decreases by 1.20%.
c). If price of rice decreases by 1%, then the quantity of rice purchased increases by 1.20%

13. *Interpret* the ***estimated coefficient*** *for* ***ln P potatoes***
a). If price of potatoes increases by $1 per pound, then the quantity of rice purchased increases by 0.70 pounds
b). If price of potatoes increases by 1%, then the quantity of potatoes purchased increases by 0.70%
c). If price of potatoes increases by 1%, then the quantity of rice purchased increases by 0.70%

14. *Interpret* the ***estimated coefficient*** *for* ***ln I***
a). If income decreases by $1, then the quantity of rice purchased decreases by 1.10 pounds
b). If income increases by $1, then the quantity of rice purchased increases by 1.10%
c). If income increases by 1%, then the quantity of rice purchased increases by 1.10%

Interpret *statistical significance* of the *estimated coefficients*: Questions 15 – 17.
Use the following significance (alpha) levels and corresponding T-statistic cut-off value
10% significance level: T-statistic cut-off value is |1.65|

15. Interpret *statistical significance* of the *estimated coefficient* for *ln P rice*
a). The estimated coefficient is not statistically significant from zero because -1.20 is smaller than the T-statistic cut-off value
b). The estimated coefficient is not statistically significant from zero because -2.65 is smaller than the T-statistic cut-off value
c). The estimated coefficient is statistically significant from zero because |-2.65| is greater than the T-statistic cut-off value

16. Interpret *statistical significance* of the *estimated coefficient* for *ln P potatoes*
a). The estimated coefficient is not statistically significant from zero because 0.70 is smaller than the T-statistic cut-off value
b). The estimated coefficient is not statistically significant from zero because 0.95 is smaller than the T-statistic cut-off value
c). The estimated coefficient is statistically significant from zero because 0.95 is greater than the T-statistic cut-off value

17. Interpret *statistical significance* of the *estimated coefficient* for *ln I*
a). The estimated coefficient is not statistically significant from zero because 1.10 is smaller than the T-statistic cut-off value
b). The estimated coefficient is not statistically significant from zero because 1.75 is smaller than the T-statistic cut-off value
c). The estimated coefficient is statistically significant from zero because 1.75 is greater than the T-statistic cut-off value

Quiz #2 (100 points)

Problem #3 (33 points) An Analysis of Consumer Demand for *Potatoes* *Econometric (Regression) Model of* Retail Demand for *Potatoes: Interpreting the Estimation Results*

Problem #3 includes Questions 18 – 28 (each correct answer is 3 points)

Using a regression analysis technique and a relevant data set, you have estimated a demand function for *potatoes* at the retail level. This demand function characterizes the final consumer's purchasing (consumption) behavior. *Rice* is a product-substitute for *potatoes*. ***Your estimation results are summarized below.***

Q potatoes = 80 – 10*P potatoes + 8*P rice + 0.01*I
(-3.32) (2.00) (0.95)
T-statistics are reported in the parentheses.
R2 = 0.60 or 60%.

Q potatoes is the quantity of potatoes demanded (purchased) per person per year (pounds)
P potatoes is retail price of potatoes ($ per pound)
P rice is retail price of rice ($ per pound)
I is income available to spend on food ($)

18. The estimated demand function is
a). a quantity-dependent demand function b). a price-dependent demand function

19. The estimated demand function is
a). a multivariate demand function b). a univariate demand function

20. The estimated demand function is
a). a linear demand function b). a log-linear demand function

21. A proper interpretation of the **flow of the causation effect** in this demand function is
a). a change in quantity of potatoes causes price of potatoes to change (i.e. quantity determines price)
b). a change in price of potatoes causes quantity of potatoes to change (i.e. price determines quantity)

22. Interpret R2
a). The variation in price of potatoes, price of rice and income explains 40% of the variation in the quantity of potatoes
b). The variation in the quantity of potatoes explains 60% of the variation in price of potatoes, price of rice and income
c). The variation in price of potatoes, price of rice and income explains 60% of the variation in the quantity of potatoes

Interpret the *sign* and *magnitude* of the *estimated coefficients (i.e. economic significance)*: Questions 23 - 25 (next page)

23. *Interpret* the ***estimated coefficient*** *for* ***P potatoes***
a). If price of potatoes decreases by 1%, then quantity of potatoes increases by 10%
b). If quantity of potatoes increases by 1%, then price of potatoes decreases by 10%.
c). If quantity of potatoes increases by 10 pounds, then price of potatoes decreases by $1/pound
d). If price of potatoes increases by $1/pound, then quantity of potatoes decreases by 10 pounds

24. *Interpret* the ***estimated coefficient*** *for* ***P rice***
a). If price of rice increases by 1%, then quantity of potatoes increases by 8%
b). If price of rice decreases by $1.00 per pound, then quantity of potatoes increases by 8 pounds
c). If price of rice decreases by 1%, then quantity of potatoes decreases by 8 pounds
d). If price of rice decreases by $1.00 per pound, then quantity of potatoes decreases by 8 pounds

25. *Interpret* the ***estimated coefficient*** *for* ***I***
a). If income decreases by $1, then quantity of potatoes decreases by 0.01 pounds
b). If income increases by $1, then quantity of potatoes decreases by 0.01 pounds
c). If income increases by 1%, then quantity of potatoes increases by 1%

Interpret *statistical significance* of the *estimated coefficients*: Questions 26 - 28.
Use the following significance (alpha) levels and corresponding T-statistic cut-off value
10% significance level: T-statistic cut-off value is |1.65|

26. Interpret *statistical significance* of the *estimated coefficient* for *P potatoes*
a). The estimated coefficient is not statistically significant from zero because -10 is smaller than the T-statistic cut-off value
b). The estimated coefficient is not statistically significant from zero because -3.32 is smaller than the T-statistic cut-off value
c). The estimated coefficient is statistically significant from zero because |-3.32| is greater than the T-statistic cut-off value

27. Interpret *statistical significance* of the *estimated coefficient* for *P rice*
a). The estimated coefficient is not statistically significant from zero because 2.00 is smaller than the T-statistic cut-off value
b). The estimated coefficient is statistically significant from zero because 8 is greater than the T-statistic cut-off value
c). The estimated coefficient is statistically significant from zero because 2.00 is greater than the T-statistic cut-off value

28. Interpret *statistical significance* of the *estimated coefficient* for *I*
a). The estimated coefficient is not statistically significant from zero because 0.01 is smaller than the T-statistic cut-off value
b). The estimated coefficient is not statistically significant from zero because 0.95 is smaller than the T-statistic cut-off value
c). The estimated coefficient is statistically significant from zero because 0.95 is greater than the T-statistic cut-off value

29. To earn your *base* points (22 points), confirm the following statement "I am a student enrolled in AGRB 4560": a). True b). False

Quiz #3 (100 points)

NAME_____

Canvas Score (points) _____

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Quiz #3 points (maximum 100 points): 25 base points + up to 75 points for correct answers. Each correct answer is 3 points.

Price Analysis in the U.S. Onion Industry:

Estimating (quantifying) the **onion price-quantity relationship** using regression analysis technique and interpreting the estimation results

Problem #1: Questions 1- 13

Your ***objective*** is to ***conduct a price analysis in the U.S onion industry. At the first stage,*** you analyze the ***effect of changes in the onion quantity produced on the level of onion price received by onion growers.*** You have collected yearly data on onion quantity produced and onion price from the USDA National Agricultural Statistics Service database (see a table below).

Year	Onion Production: Quantity (million cwt)	Onion Price ($/cwt)
2000	73	11
2001	70	11
2002	70	12
2003	73	14
2004	84	9
2005	73	14
2006	73	16
2007	80	11
2008	75	12
2009	76	15
2010	74	16
2011	74	11
2012	71	14
2013	70	15
2014	70	14
2015	67	16
Average	***73***	***13***

Quiz #3 (100 points)

Units of measurement: Onion **quantity** produced is measured in **million cwt.**
Onion **price** is measured in **$ per cwt**.
cwt is one hundredweight (=100 pounds).

1. Select ***an economic model*** that reflects the analyzed price-quantity relationship. You will use this economic model to develop an econometric (regression) model to be estimated.

a). Q onions = f(P onions): the *quantity*-dependent demand function (i.e. *ordinary* demand)
b). P onions = f(Q onions): the *price*-dependent demand function (i.e. *inverse* demand)

2. Select ***an econometric (regression) model to be estimated*** in combination with the appropriate ***hypothesis for the coefficient*** for the right-hand-side variable (i.e. the expected sign: positive or negative). This should be *a* ***linear regression model.***

a). Q onions = a + b*P onions + e. Hypothesis: b < 0
b). P onions = a + b*Q onions + e. Hypothesis: b > 0
c). P onions = a + b*Q onions + e. Hypothesis: b < 0
d). ln P onions = a + b* ln Q onions + e. Hypothesis: b<0

You have estimated a ***linear regression model*** *using the OLS estimation procedure.* **The Excel regression output (i.e. estimation results) is attached (Attachment 1).** *Use this regression output to answer the rest of the questions included in Problem #1.*

3. Select ***the estimated econometric (regression) model.***

a). Q onions = 33.84 – 0.28*P onions
b). P onions = 33.84 – 0.28*Q onions
c). 33.84 = P onions – 0.28*Q onions

Interpretation of the estimation results: Questions 4-7

4. ***Interpret R2*** (R square: the explanatory power of the estimated econometric model)
a). The variation in onion price explains 29% of the variation in onion quantity
b). The variation in onion price explains 71% of the variation in onion quantity
c). The variation in onion quantity explains 29% of the variation in onion price
d). The variation in onion quantity explains 71% of the variation in onion price

5. ***Interpret the estimated coefficient for the right-hand-side variable***
a). If onion quantity produced by onion growers increases by 1 million cwt, then onion price received by onion growers decreases by $0.28 per cwt
b). If onion price received by onion growers increases by $1 per cwt, then onion quantity produced by onion growers decreases by 0.28 million cwt
c). If onion quantity produced by onion growers increases by 1%, then onion price received by onion growers decreases by 0.28%
d). If onion quantity produced by onion growers increases by 1 cwt, then onion price received by onion growers decreases by $0.28 per cwt

Quiz #3 (100 points)

6. Interpret ***statistical significance of the constant (intercept):***
use Alpha level = 10% and T-statistic cut-off value = |1.65|

a). Constant is statistically significant from zero, because 3.85 is greater than the T-statistic cut-off value
b). Constant is statistically significant from zero, because 33.84 is greater than the T-statistic cut-off value
c). Constant is not statistically significant from zero, because 3.85 is smaller than the T-statistic cut-off value

7. Interpret ***statistical significance of the estimated coefficient for the right-hand-side variable:***
use Alpha level = 10% and T-statistic cut-off value = |1.65|

a). The estimated coefficient is not statistically significant from zero, because -0.28 is smaller than the T-statistic cut-off value
b). The estimated coefficient is statistically significant from zero, because |-0.28| is greater than the T-statistic cut-off value
c). The estimated coefficient is statistically significant from zero, because |-2.36| is greater than the T-statistic cut-off value
d). The estimated coefficient is not statistically significant from zero, because -2.36 is smaller than the T-statistic cut-off value

Conducting onion price forecast: Questions 8-12

8. Use the estimation results (the estimated coefficient) to ***conduct an onion price forecast***. In particular, ***predict a change in onion price*** received by onion growers, ***if onion quantity produced by onion growers during a particular year increases by 2 million cwt***

a). onion price increases by $0.28 per cwt
b). onion price increases by $0.56 per cwt
c). onion price decreases by $0.28 per cwt
d). onion price decreases by $0.56 per cwt

9. Use the estimation results (the estimated coefficient) to ***conduct an onion price forecast***. In particular, ***predict a change in onion price*** received by onion growers, ***if onion quantity produced by onion growers during a particular year decreases by 2 million cwt***

a). onion price increases by $0.28 per cwt
b). onion price increases by $0.56 per cwt
c). onion price decreases by $0.28 per cwt
d). onion price decreases by $0.56 per cwt

Quiz #3 (100 points)

10. Use the estimation results (the estimated econometric model: equation from Question 3) to ***conduct an onion price forecast***. In particular, ***predict onion price, of onion growers produce 70 million cwt of onions*** during a particular year

a). $14.24 per cwt
b). $53.44 per cwt
c). $33.84 per cwt

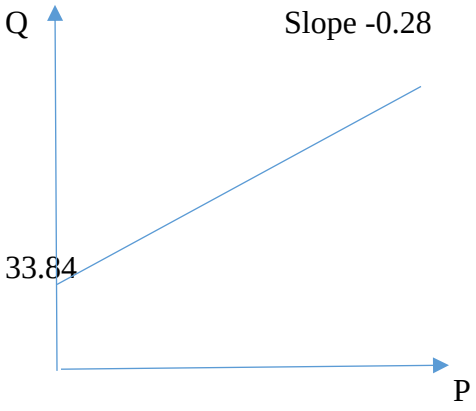
11. Use the estimation results (the estimated econometric model: equation from Question 3) and the yearly average onion quantity produced equal to 73 million cwt to ***calculate onion price flexibility***. Onion price flexibility is

a). 1.53 b). -1.53 c). 153% d). -0.05 e). -1.57

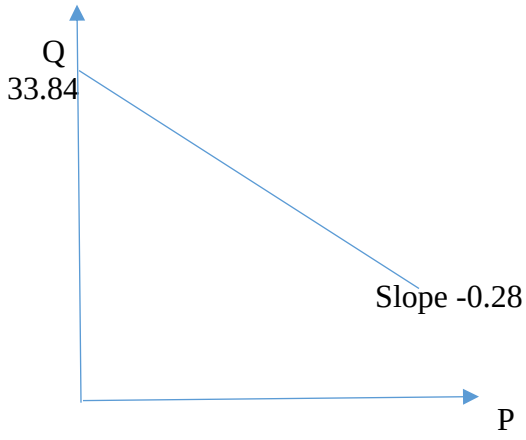
12. The calculated ***onion price flexibility indicates***
a). a % increase in onion quantity, which follows a 1% decrease in onion price
b). a % decrease in onion quantity, which follows a 1% increase in onion price
c). a % increase in onion price, which follows a 1% decrease in onion quantity
d). a % increase in onion price, which follows a 1% increase in onion quantity

13. Select a graph, which shows ***onion demand curve*** *reflecting your estimated demand function.*

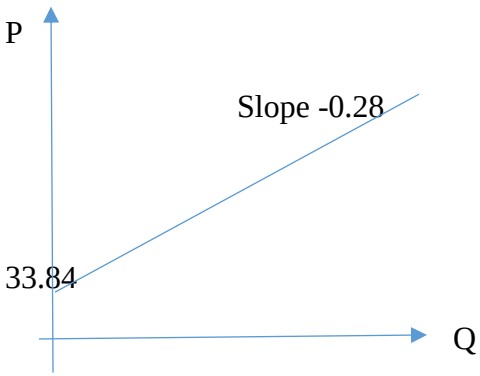
a). Graph A



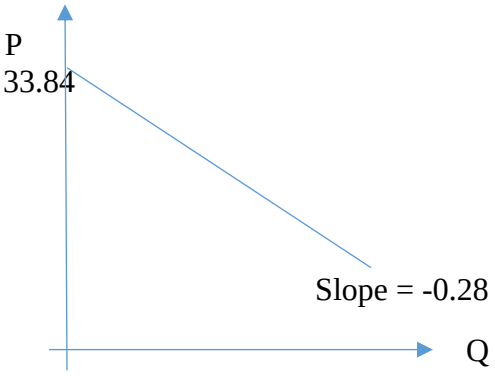
b). Graph B



c). Graph C



d). Graph D



Problem #2: Questions 14-21

You ***continue conducting a price analysis*** in the U.S. onion industry. Your objective is to analyze the ***effect of changes in the onion quantity produced on the level of onion price received by onion growers. At the second stage,*** you have estimated ***a log-linear econometric (regression) model***, using onion quantity and price variables reported in the table on page 1. *You transformed these variables in the natural log form to estimate this log-linear regression model.*

14. Select ***an economic model*** that reflects the analyzed price-quantity relationship. You will use this economic model to develop an econometric (regression) model to be estimated.

a). Q onions = f(P onions): the *quantity*-dependent demand function (i.e. *ordinary* demand)
b). P onions = f(Q onions): the *price*-dependent demand function (i.e. *inverse* demand)

15. Select ***an econometric (regression) model to be estimated*** in combination with the appropriate ***hypothesis for the coefficient*** (i.e. the expected sign: positive or negative).

a). ln Q onions = a + b* ln P onions + e. Hypothesis: $b < 0$
b). ln P onions = a + b* ln Q onions + e. Hypothesis: $b > 0$
c). ln P onions = a + b* ln Q onions + e. Hypothesis: $b < 0$
d). P onions = a + b* Q onions + e. Hypothesis: $b < 0$

16. You have estimated a log-linear regression model using the transformed in natural log form onion quantities and prices. **The estimation results (regression output) are attached (Attachment 2).** Select the estimated econometric model.

a). Q onions = 10 – 2*P onions
b). ln Q onions = 10 – 2* ln P onions
c). P onions = 10 – 2*Q onions
d). ln P onions = 10 – 2* ln Q onions

17. ***Interpret*** *the estimated* ***coefficient*** *for the* ***right-hand-side variable***
a). If onion price received by onion growers increases by 1%, then onion quantity produced by onion growers decreases by 2%
b). If onion quantity produced by onion growers increases by 1%, then onion price received by onion growers decreases by 2%
c). If onion quantity produced by onion growers increases by 1 million cwt, then onion price received by onion growers decreases by $2.00 per cwt
d). If onion quantity produced by onion growers decreases by 1%, then onion price received by onion growers decreases by 2%

Quiz #3 (100 points)

18. Using the estimation results (regression output), determine the estimated ***onion price flexibility***

a). 10
b). -10
c). -2
d). 2
e). -20%

19. ***Conclude whether the estimated onion price flexibility is statistically significant from zero:*** *use Alpha level = 10% and T-statistic cut-off value = |1.65|*

a). Onion price flexibility is statistically significant from zero, because 10 is greater than the T-statistic cut-off value
b). Onion price flexibility is statistically significant from zero, because 3.37 is greater than the T-statistic cut-off value
c). Onion price flexibility is not statistically significant from zero, because -2.51 is smaller than the T-statistic cut-off value
d). Onion price flexibility is statistically significant from zero, because |-2.51| is greater than the T-statistic cut-off value

20. Use your estimation results (the estimated coefficient for the right-hand-side variable) to ***conduct an onion price forecast***. In particular, ***predict a change in onion price*** received by onion growers, ***assuming that onion quantity produced by onion growers decreases by 2% in a particular year.***

a). onion price decreases by $4.00 per cwt
b). onion price decreases by 4%
c). onion price increases by $4.00 per cwt
d). onion price increases by 4%

21. Use your estimation results (the estimated coefficient for the right-hand-side variable) to ***conduct an onion price forecast***. In particular, ***predict a change in onion price*** received by onion growers, ***assuming that onion quantity produced by onion growers increases by 2% in a particular year.***

a). onion price decreases by $4.00 per cwt
b). onion price decreases by 4%
c). onion price increases by $4.00 per cwt
d). onion price increases by 4%

Quiz #3 (100 points)

Problem #3: Questions 22 - 25

You ***continue conducting a price analysis*** in the U.S. onion industry. ***At the third stage,*** you analyze the ***effects of changes in the onion area harvested and onion yield per acre on the level of onion price received by onion growers*.**

Units of measurement: Onion **area harvested** is measured in **thousand acres.**
Onion **yield *per acre*** is measured in **cwt per acre.** Onion **price** is measured in **$ per cwt**.

*You have **estimated** a **linear regression model**. T-statistics are in the parentheses.*

PRICE onions = 20 – 0.10*AREA onions – 0.05*YIELD onions
(- 3.55) (-0.90)

R2 = 0.70 or 70%

22. *Interpret* the estimated ***coefficient*** for ***AREA***
a). If onion area harvested decreases by 1,000 acres, then onion price increases by 0.10%
b). If onion area harvested decreases by 1,000 acres, then onion price increases by $0.10 per cwt
c). If onion area harvested increases by 1%, then onion price decreases by 0.10%

23. *Interpret* the estimated ***coefficient*** for ***YIELD***
a). If onion yield decreases by 1 cwt per acre, then onion price increases by 0.05%
b). If onion yield decreases by 1 cwt per acre, then onion price increases by $0.05 per cwt
c). If onion yield increases by 1%, then onion price decreases by 0.05%

24. Choose a ***correct pattern*** of ***statistical significance*** of the ***estimated coefficients:***
use Alpha level = 10% and T-statistic cut-off value = |1.65|

a). The coefficient for AREA and the coefficient for YIELD are not statistically significant from zero
b). The coefficient for AREA is statistically significant from zero; the coefficient for YIELD is not statistically significant from zero
c). The coefficient for AREA is not statistically significant from zero; the coefficient for YIELD is statistically significant from zero

25. *Interpret R2 (R square: the explanatory power of the estimated econometric model)*
a). The variation in onion price explains 70% of the variation in onion area and yield
b). The variation in onion area and yield explains 70% of the variation in onion price
c). The variation in onion price explains 30% of the variation in onion area and yield
d). The variation in onion area and yield explains 30% of the variation in onion price

BASE POINTS QUESTION

26. To get your base points (25 points), confirm the following statement: “I am a student enrolled in AGRB 4560”
a). True b). False

SUMMARY OUTPUT

Quiz #3
Problem #1

Attachment #1

Regression Statistics	
Multiple R	0.53
R Square	0.29
Adjusted R Square	0.23
Standard Error	1.88
Observations	16

U.S. Onion Industry (2000-2015)

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	19.74926837	19.7492684	5.584271768	0.033124965
Residual	14	49.51223163	3.53658797		
Total	15	69.2615			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	33.84	8.78966102	3.85	0.001768152	14.98672187	52.69061777	14.98672187	52.69061777
Onion Production (million cwt)	-0.28	0.119802129	-2.36	0.033124965	-0.540055186	-0.026155164	-0.540055186	-0.02615516

SUMMARY OUTPUT

Quiz #3
Problem #2

Attachment #2

Regression Statistics	
Multiple R	0.56
R Square	**0.31**
Adjusted R Square	0.26
Standard Error	0.15
Observations	16

U.S. Onion industry (2000-2015)

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.134849352	0.134849352	6.322711322	0.024762756
Residual	14	0.298588822	0.021327773		
Total	15	0.433438174			

	Coefficients	*Standard Error*	***t Stat***	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	**10**	3.00194882	**3.37**	0.004607078	3.668514376	16.54559411	3.668514376	16.54559411
ln Onion Quantity	**-2**	0.69926776	**-2.51**	0.024762756	-3.258089115	-0.258528749	-3.258089115	-0.258528749

AGRB 4560 PRICES
Spring 2020

February 27, 2019 (Thursday)
12:30 p.m. – 1:45 p.m.

Midterm Exam (100 points)

50 questions: each correct answer is 2 points
The total number of pages is 14

NAME _____

Canvas Exam Score (points) _____

- You are allowed to use simple calculators. You are not allowed to use calculators built into your electronic devices and programmable calculators.
- ***Text-books, lecture notes and other materials are not allowed to use.***
- ***You are not allowed to leave the room during the exam.***
- All electronic devices must be turned off during the exam, except for the laptop you use to complete the exam on Canvas.
- If you are using a laptop in a manner you are NOT supposed to use it during the exam and/or if you are engaged in inappropriate behavior (i.e. using some kind of help, speaking to another student, using your phone, etc.), <u>you will be asked to leave the room immediately and your exam will automatically receive 0 points</u>.
- ***If your laptop stops working properly, let the instructor know immediately.***

Exam Submission Requirements

1). The exam must be completed on Canvas.
2). The paper exam must be returned to the instructor with your name and Canvas exam score (points) written on the first page. *The paper exam may be blank (no answers or answers to selected questions only).* ***If you do not submit your paper exam to the instructor by the end of the class, your exam grade will be 0 points, regardless of the exam points reported on Canvas.***
3). You are not required to complete this exam on paper. *You might find it to be helpful to complete some of the questions on paper, and then to enter your answers on Canvas.*
<u>4). It is recommended to complete your exam on paper first, and then to enter your answers on Canvas (just in case you have problems with your laptop)</u>

Problem #1 Consumer Choice: Optimal Consumption Bundle

Problem #1 includes questions 1 - 6

A consumer purchases two goods: F (food) and C (clothing).
The consumer's total utility function is TU(F,C) = F×C+4×F+2×C.
F and C are measured in physical units (quantity of food and quantity of clothing).
Product prices: Pf = $4 per unit and Pc = $8 per unit.
The available budget to spend on food and clothing is $168.

1. Select a correct ***formulation of the total utility maximization problem*** for this consumer.

a). The consumer maximizes total utility.
b). The consumer minimizes his expenditures on food and clothing to maximize his total utility.
c). The consumer maximizes total utility subject to a budget constraint.
d). The consumer minimizes budget constraint.

Determine the optimal consumption bundle *for this consumer:* ***calculate the quantity of food*** *and* ***quantity of clothing*** *maximizing the total utility of the analyzed consumer.*

Proceed by answering the rest of the questions presented on this page.

2. *Marginal Utility* the consumer receives from consuming *food* is

a). MUf = C+4 b). MUf = F*C+4 c). MUf = F+2

3. *Marginal Utility* the consumer receives from consuming *clothing* is

a). MUc = C+4 b). MUc = F+2 c). MUc = F*C+2

4. The *tangency condition* is

a). (C+4)/(F+2) = 8/4 b). (C+4)/(F+2) = 4/8 c). (F*C+4)/(F*C+2) = 4/8

5. *The budget constraint* is

a). F*C+4*F+2*C = 168 b). 8*F+4*C = 168 c). 4*F+8*C = 168

6. Use the tangency condition and budget constraint to *calculate the optimal consumption bundle for this consumer*.

a). F = 9 units and C = 24 units
b). F = 24 units and C = 9 units
c). F = 8.4 units and C = 16.8 units
d). F = 16.8 units and C = 8.4 units

Problem #2 Consumer Demand: Formulating Economic Model of Consumer Demand for Peaches and Specifying a Relevant Econometric Model

Problem #2 includes questions 7-13

A **consumer purchases peaches and apples**, and she **perceives these two types of fruits** as **imperfect substitutes**. The consumer has a **fixed income** that she has to **spend on peaches and apples**. The consumer **observes retail prices** that she has to pay to purchase peaches and apples. Assume that the **total utility this consumer receives is a function of the quantity of peaches and quantity of apples she purchases.**

7. Select ***a correct formulation of the total utility maximization problem*** for this consumer.

a). The consumer maximizes total utility from consuming peaches, subject to a budget constraint
b). The consumer maximizes total utility from consuming peaches and apples, subject to a budget constraint
c). The consumer maximizes total utility from consuming apples, subject to a budget constraint
d). The consumer minimizes expenditures on purchasing apples and peaches

8. Select the ***decision variables for the consumer***

a). Price of peaches and price of apples
b). Quantity of peaches and quantity of apples to purchase
c). Income available to purchase peaches and apples

Proceed with analyzing consumer (retail) demand for PEACHES (answer two questions below)

9. Formulate a relevant ***economic model explaining consumer demand for peaches at the retail level. In particular, a general version*** of the ***consumer demand function for peaches*** is

a). P peaches = f(Q peaches, Q apples, Income)
b). Q apples = f(P apples, P peaches, Income)
c). Q peaches = f(P peaches, Q apples, Income)
d). Q peaches = f(P peaches, P apples, Income)

10. Using the economic model, formulate an ***econometric model to be estimated***

a). P peaches = a + b1*Q peaches + b2 * Q apples + b3*Income + e
b). Q peaches = a + b1*P peaches + b2 * P apples + b3*Income + e
c). Q apples = a + b1*P apples + b2 * P peaches + b3*Income + e
d). Q peaches = a + b1*P peaches + b2 * Q apples + b3*Income + e

Using consumer demand theory, formulate a set of testable hypotheses (questions on this page)

11. The relationship between Q peaches and P peaches: the estimated coefficient characterizing the relationship between these two variables is expected to be

a). Negative: the own price effect on quantity demanded
b). Positive: the cross-price effect on quantity demanded (assuming the price is for product – substitute)
c). Positive: the own price effect on quantity demanded
d). Negative: the cross-price effect on quantity demanded (assuming the price is for product – substitute)

12. The relationship between Q peaches and P apples: the estimated coefficient characterizing the relationship between these two variables is expected to be

a). Negative: the own price effect on quantity demanded
b). Positive: the cross-price effect on quantity demanded (assuming the price is for product – substitute)
c). Positive: the own price effect on quantity demanded
d). Negative: the cross-price effect on quantity demanded (assuming the price is for product – substitute)

13. The relationship between Q peaches and Income: the estimated coefficient characterizing the relationship between these two variables is expected to be

a). Negative: the own price effect on quantity demanded
b). Positive: the cross-price effect on quantity demanded (assuming the price is for product – substitute)
c). Positive: the income effect on quantity demanded
d). Negative: the income effect on quantity demanded

Problem #3 Consumer Demand Analysis: Consumer Demand for Peaches at the Retail Level

Problem #3 includes questions 14-23

You have estimated the following **consumer demand function** for **peaches** at the **retail** level. This is a multivariate function. **T-statistic** for each estimated coefficient is reported **in the parentheses** below the coefficient (T-statistic for intercept is not reported). The explanation of the variables is provided below. **R2 = 0.85.**

Q peaches = 65 – 1.25*P peaches + 1.15*P apples +1.20* Income
(-2.25) (1.70) (1.25)

Q peaches is the **quantity of peaches** demanded (purchased) per person per year (pounds)
P peaches is **retail price of peaches** ($ per pound)
P apples is **retail price of apples** ($ per pound)
Income is **income** available to spend on food ($)

14. The estimated ***demand function*** presented above is
a). A *quantity*-dependent demand function
b). A *price*-dependent demand function

15. ***A proper interpretation*** of the ***flow of the causation (causal) effect*** in this demand function is
a). A change in peach price causes peach quantity to change
b). A change in peach quantity causes peach price to change

16. The ***estimated econometric (regression) model*** is
a). a linear regression model
b). a log-linear regression model

17. ***Interpret*** the ***explanatory power*** of the estimated econometric model: **R2**
a). The variation in price of peaches, price of apples and income explains 85% of the variation in the quantity of peaches demanded
b). The variation in the quantity of peaches demanded explains 85% of the variation in price of peaches, price of apples and income
c). The variation in price of peaches, price of apples and income explains 15% of the variation in the quantity of peaches demanded
d). The variation in the quantity of peaches demanded explains 15% of the variation in price of peaches, price of apples and income

18. ***Interpret*** the ***magnitude and sign*** of ***the estimated coefficient*** *for* ***P peaches***
a). If peach price increases by 1%, then peach quantity decreases by 1.25%
b). If peach price decreases by $1 per pound, then peach quantity decreases by 1.25 pounds
c). If peach quantity decreases by 1 pound, then peach price increases by $1.25 per pound
d). If peach price increases by $1 per pound, then peach quantity decreases by 1.25 pounds

19. ***Interpret*** the ***magnitude and sign*** of ***the estimated coefficient*** *for* ***P apples***

a). If apple price increases by $1 per pound, then peach quantity increases by 1.15 pounds
b). If apple price decreases by 1%, then peach quantity decreases by 1.15%
c). If apple price decreases by $1 per pound, then apple quantity increases by 1.15 pounds
d). If peach quantity increases by 1 pound, then apple price increases by $1.15 per pound

20. ***Interpret the magnitude and sign*** of ***the estimated coefficient*** *for* ***Income***

a). If income increases by 1%, then peach quantity increases by 1.20%
b). If income increases by $1, then peach quantity increases by 1.20 pounds
c). If income increases by $1, then peach quantity increases by 1.20%
d). If income increases by $1, then peach quantity decreases by 1.20 pounds

Interpret ***statistical significance*** **of the** ***estimated coefficients by answering all questions presented on this page.***

Use significance (alpha) level = 10% and the corresponding T-statistic cut-off value = |1.65|

21. The ***estimated coefficient*** *for* ***P peaches***

a). Is NOT statistically significant from zero, because the absolute value of the coefficient |-1.25| is smaller than the T-Statistic cut-off value
b). Is statistically significant from zero, because the absolute value of its T-Statistic |-2.25| is greater than the T-Statistic cut-off value
c). Is NOT statistically significant from zero, because its T-Statistic -2.25 is smaller than the T-Statistic cut-off value

22. The ***estimated coefficient*** *for* ***P apples***

a). Is NOT statistically significant from zero, because the absolute value of the coefficient |1.15| is smaller than the T-Statistic cut-off value
b). Is statistically significant from zero, because the absolute value of its T-Statistic |1.70| is greater than the T-Statistic cut-off value
c). Is NOT statistically significant from zero, because its T-Statistic 1.70 is smaller than the T-Statistic cut-off value

23. The ***estimated coefficient*** *for* ***Income***

a). Is NOT statistically significant from zero, because the absolute value of the coefficient |1.20| is smaller than the T-Statistic cut-off value
b). Is NOT statistically significant from zero, because the absolute value of its T-Statistic |1.25| is smaller than the T-Statistic cut-off value
c). Is statistically significant from zero, because the absolute value of its T-Statistic |1.25| is greater than the T-Statistic cut-off value

Problem #4 Peach Price Analysis and Price Forecast in the Peach Industry in South Carolina

Problem #4 includes questions 24-38

Your ***objective*** is to ***conduct a price analysis and price forecast in the peach industry in South Carolina.*** You aim to analyze the ***effect of changes in the peach quantity produced by all peach growers in South Carolina on the level of peach price received by these peach growers.*** You have collected yearly data on peach quantity produced and peach price from the USDA National Agricultural Statistics Service database (see a table below).

Year	Peach **Quantity** Produced (**1,000** tons)	Peach **Price** ($ per ton)
2009	75.040	977
2010	110.050	955
2011	95.015	970
2012	66.150	1 050
2013	69.720	1070
2014	65.660	1120
2015	68.880	1070
2016	63.310	1290

Units of measurement: Peach **quantity** produced is measured in ***thousand* tons.**
Peach **price** is measured in **$ per ton** (1 ton is approximately 2,000 pounds)

To conduct the peach price analysis and price forecast, answer all questions included in this problem.

24. Select ***an economic model*** that reflects the analyzed peach price-quantity relationship. You will use this economic model to develop an econometric (regression) model to be estimated.

a). Q peaches = f(P peaches): a *quantity*-dependent function
b). P peaches = f(Q peaches): a *price*-dependent function

25. This ***economic model*** represents
a). a peach demand function at the farm gate level
b). a peach supply function at the farm gate level
c). a peach demand function at the retail level
d). a peach supply function at the retail level

26. ***A proper interpretation*** of the ***flow of the causation (causal) effect*** in this economic model (i.e. function) is
a). A change in peach price causes peach quantity to change
b). A change in peach quantity causes peach price to change

27. Select ***an econometric (regression) model to be estimated*** in combination with the appropriate ***hypothesis for the coefficient*** for the right-hand-side variable (i.e. the expected sign: positive or negative). This should be *a* ***linear regression model.***

a). P peaches = a + b*Q peaches + e. Hypothesis: b < 0
b). ln P peaches = a + b* ln Q peaches + e. Hypothesis: b<0
c). Q peaches = a + b*P peaches + e. Hypothesis: b < 0
d). P peaches = a + b*Q peaches + e. Hypothesis: b > 0

You have estimated a ***linear regression model*** *using the OLS estimation procedure.* **The Excel regression output (i.e. estimation results) is attached.** *Use this regression output to answer the rest of the questions included in Problem #4.*

28. Select ***the estimated econometric (regression) model.***

a). 1,500 = P peaches – 5*Q peaches
b). -5*Q peaches = 1,500 + P peaches
c). Q peaches = 1,500 – 5*P peaches
d). P peaches = 1,500 – 5*Q peaches

Interpretation of the estimation results: Questions 29-32

29. ***Interpret R2*** (R square: the explanatory power of the estimated econometric model)

a). The variation in peach price explains 60% of the variation in peach quantity
b). The variation in peach price explains 40% of the variation in peach quantity
c). The variation in peach quantity explains 60% of the variation in peach price
d). The variation in peach quantity explains 40% of the variation in peach price

30. ***Interpret the estimated coefficient for the right-hand-side variable***

a). If peach price received by peach growers increases by $1 per ton, then peach quantity produced by peach growers decreases by 5 thousand tons
b). If peach quantity produced by peach growers increases by 1%, then peach price received by peach growers decreases by 5%
c). If peach quantity produced by peach growers decreases by 1 ton, then peach price received by peach growers increases by $5 per ton
d). If peach quantity produced by peach growers increases by 1 thousand tons, then peach price received by peach growers decreases by $5 per ton

31. ***Interpret statistical significance of the constant (intercept):***
use Alpha level = 10% and T-statistic cut-off value = |1.65|
a). Constant is statistically significant from zero, because 9.36 is greater than the T-statistic cut-off value
b). Constant is statistically significant from zero, because 1,500 is greater than the T-statistic cut-off value
c). Constant is not statistically significant from zero, because 9.36 is smaller than the T-statistic cut-off value

32. ***Interpret statistical significance of the estimated coefficient for the right-hand-side variable:***
use Alpha level = 10% and T-statistic cut-off value = |1.65|
a). The estimated coefficient is not statistically significant from zero, because -5 is smaller than the T-statistic cut-off value
b). The estimated coefficient is statistically significant from zero, because |-2.33| is greater than the T-statistic cut-off value
c). The estimated coefficient is statistically significant from zero, because |-5| is greater than the T-statistic cut-off value
d). The estimated coefficient is not statistically significant from zero, because -2.33 is smaller than the T-statistic cut-off value

Peach price forecast: questions 33-37

33. Use the estimation results (the estimated coefficient) to ***conduct a peach price forecast***. In particular, ***predict the change in peach price*** received by peach growers, ***if peach quantity produced by peach growers during the current year increases by 2 thousand tons, relative to the previous year.***
a). peach price decreases by $5 per ton
b). peach price decreases by $10 per ton
c). peach price increases by $5 per ton
d). peach price increases by $10 per ton

34. Use the estimation results (the estimated coefficient) to ***conduct a peach price forecast***. In particular, ***predict the change in peach price*** received by peach growers, ***if peach quantity produced by peach growers during the current year decreases by 2 thousand tons, relative to the previous year.***
a). peach price decreases by $5 per ton
b). peach price decreases by $10 per ton
c). peach price increases by $5 per ton
d). peach price increases by $10 per ton

35. Use the estimation results (the estimated econometric model: equation from Question 28) to ***conduct a peach price forecast***. In particular, ***predict peach price, if peach growers produce 100 thousand tons of peaches*** during the current year.
a). $1,500 per ton
b). $1,000 per ton
c). $955 per ton

36. Use the estimation results (the estimated econometric model: equation from Question 28) and the **yearly average peach quantity** produced equal to **80 thousand tons** to ***calculate peach price flexibility***. Peach price flexibility is

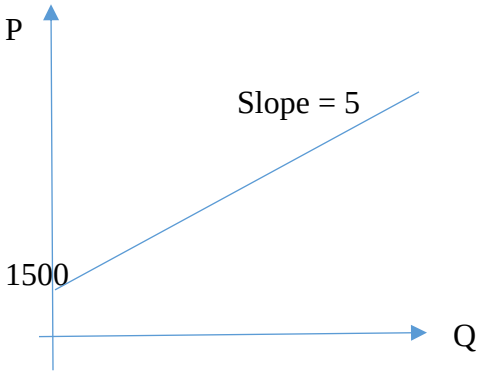
a). 36% b). 0.36 c). -0.36 d). -2.78 e). 2.78

37. The calculated ***peach price flexibility indicates***

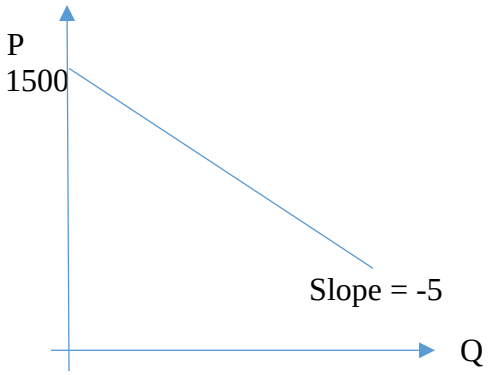
a). a % increase in peach quantity, which follows a 1% decrease in peach price
b). a % decrease in peach quantity, which follows a 1% increase in peach price
c). a % increase in peach price, which follows a 1% decrease in peach quantity
d). a % increase in peach price, which follows a 1% increase in peach quantity

38. Select a graph, which shows *a curve reflecting your estimated function.*

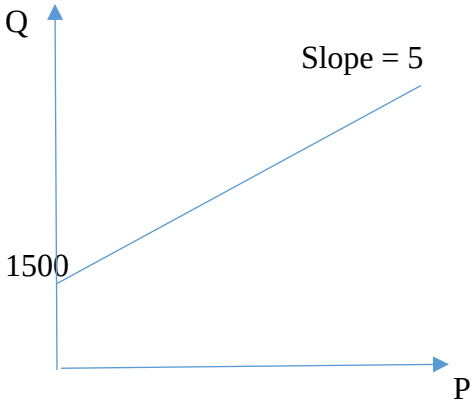
a). Graph A



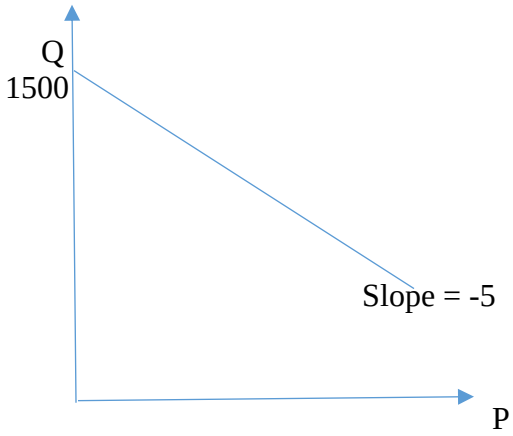
b). Graph B



c). Graph C



d). Graph D



Problem #5 Peach Price Analysis at the Peach Growers' Level: Peach Price as Affected by Peach Area and Yield

Problem #5 includes questions 39-45

Your **objective** is to analyze **the relationship between peach price received by peach growers, peach bearing area (i.e. the area harvested) and peach yield (quantity) per acre.** In particular, you aim to **analyze** the **effects** of **changes** in **peach bearing area and peach yield per acre on peach price received by peach growers.** Using the USDA National Agricultural Statistics Service database, you collected the following variables (they are reported on a yearly basis).

Peach Price, which is measured **in $ per ton (Price)**
Peach Bearing Area, which is measured **in 1,000 acres (Area)**
Peach Yield, which is measured **in tons per acre (Yield)**

Year	Peach Bearing **Area** (**1,000** Acres)	Peach **Yield** (tons per acre)	Peach **Price** ($ per ton)
2009	14.000	5.36	977
2010	15.500	7.1	955
2011	15.500	6.13	970
2012	15.000	4.41	1 050
2013	14.000	4.98	1070
2014	14.000	4.69	1120
2015	14.000	4.92	1070
2016	13.000	4.87	1290

You have transformed *these* ***variables*** *into the* ***natural logarithm*** form to estimate ***a log-linear econometric*** *(regression)* ***model.*** The ***estimated regression model is presented below***. **T-Statistics** are reported in the **parentheses**. **R2 = 0.70.**

ln Price = 10.18 – 1.13* ln Area – 0.13* ln Yield
(-2.32) (-0.69)

39. The ***estimated price function*** (i.e. the equation presented above) is
a). A *quantity*-dependent function b). A *price*-dependent function

40. ***A proper interpretation*** of the ***flow of the causation (causal) effect*** in the price function is
a). A change in peach price causes peach area and peach yield to change
b). A change in peach area and peach yield causes peach price to change

41. ***Interpret*** the ***explanatory power*** of the estimated econometric model: ***R2***
a). The variation in peach price explains 70% of the variation in peach bearing area and yield
b). The variation in peach bearing area and yield explains 70% of the variation in peach price
c). The variation in peach price explains 30% of the variation in peach bearing area and yield
d). The variation in peach bearing area and yield explains 30% of the variation in peach price

42. ***Interpret*** *the* ***magnitude and sign*** of the ***estimated coefficient*** *for* **ln Area**

a). If peach bearing area increases by 1,000 acres, then peach price decreases by $1.13 per ton
b). If peach bearing area decreases by 1%, then peach price increases by 1.13%
c). If peach price increases by 1%, then peach bearing area decreases by 1.13%
d). If peach bearing area increases by 1 acre, then peach price decreases by 1.13%

43. ***Interpret*** *the* ***magnitude and sign*** of the ***estimated coefficient*** *for* **ln Yield**

a). If peach yield decreases by 1 ton per acre, then peach price increases by $0.13 per ton
b). If the peach yield decreases by 0.13%, then peach price increases by 1%
c). If peach yield decreases by 1%, then peach price increases by 0.13%
d). If peach yield decreases by 1 ton per acre, then peach price increases by 0.13%

44. Interpret ***statistical significance*** of the ***estimated coefficient*** for **ln Area:**
use Alpha level = 10% and T-statistic cut-off value = |1.65|

a). The estimated coefficient is not statistically significant from zero, because -2.32 is smaller than the T-statistic cut-off value
b). The estimated coefficient is statistically significant from zero, because |-2.32| is greater than the T-statistic cut-off value
c). The estimated coefficient is not statistically significant from zero, because |-1.13| is smaller than the T-statistic cut-off value
d). The estimated coefficient is not statistically significant from zero, because -1.13 is smaller than the T-statistic cut-off value

45. Interpret ***statistical significance*** of the ***estimated coefficient*** *for* **ln Yield:**
use Alpha level = 10% and T-statistic cut-off value = |1.65|

a). The estimated coefficient is not statistically significant from zero, because -0.13 is smaller than the T-statistic cut-off value
b). The estimated coefficient is not statistically significant from zero, because |-0.13| is smaller than the T-statistic cut-off value
c). The estimated coefficient is not statistically significant from zero, because |-0.69| is smaller than the T-statistic cut-off value
d). The estimated coefficient is statistically significant from zero, because |-0.69| is greater than the T-statistic cut-off value

Problem #6 Peach Price Analysis at the Retail Level

Problem #6 includes questions 46-50

Your **objective** is to analyze **the relationship between retail peach price and peach price received by peach growers (farm peach price).** In particular, you aim is to **analyze the effect of changes in farm peach price on retail peach price. Using the USDA databases, you collected the following variables**. ***Retail peach price (RP)*** is measured in **$ per pound:** *this is the price charged/received by retailers and the price paid by final consumers*. ***Farm (wholesale) peach price (FP)*** is measured in **$ per pound:** *this is the price charged/received by peach growers and the price paid by retailers, when they purchase peaches from peach growers.*

46. ***Select*** an ***economic model*** that ***describes the analyzed relationship between retail peach price and farm peach price and the hypothesis for the right-hand-side variable***
a). FP = a+b*RP, b>0
b). RP = a+b*FP, b>0
c). RP = a+b*Q, b<0
d). FP = a+b*Q, b<0

47. ***A proper interpretation*** of the ***flow of the causation (causal) effect*** in the price function is
a). A change in retail peach price causes farm peach price to change
b). A change in farm peach price causes retail peach price to change
c). A change in peach quantity causes retail peach price to change
d). A change in peach quantity causes farm peach price to change

48. ***Select*** an ***econometric (regression) model to be estimated***. Note that it is ***a linear*** *model.*
a). RP = a+b*Q+e
b). RP = a+b*FP+e
c). FP = a+b*RP+e
d). FP = a+b*Q+e

49. You have ***estimated the following linear econometric (regression) model***:
RP = 1.00 + 4.00*FP
Interpret the ***magnitude and sign*** of the ***estimated coefficient*** for ***FP***
a). If farm peach price increases by 1%, then retail peach price increases by 4%
b). If farm peach price increases by $1 per pound, then retail peach price decreases by $4 per pound
c). If retail peach price increases by $1 per pound, then farm peach price increases by $4 per pound
d). If farm peach price increases by $1 per pound, then retail peach price increases by $4 per pound

50. ***Use the estimated econometric (regression) model*** (i.e. the retail price equation in question 49) to ***predict retail peach price.*** *In particular,* ***calculate retail peach price, if farm peach price is equal to $0.50 per pound.***

a). $1.00 per pound
b). $4.00 per pound
c). $3.00 per pound

SUMMARY OUTPUT

Problem #4

S.C. Peach Industry (2009-2016)

Regression Statistics	
Multiple R	0.69
R Square	0.60
Adjusted R Square	0.39
Standard Error	85.17
Observations	8

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	39232.69337	39232.693	5.408819	0.058987932
Residual	6	43520.80663	7253.4678		
Total	7	82753.5			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1500.00	150.18	9.36	8.5E-05	1.0E+03	1.8E+03	1.0E+03	1.8E+03
Peach Quantity Produced (1,000 tons)	-5.00	1.92	-2.33	5.9E-02	-9.2E+00	2.3E-01	-9.2E+00	2.3E-01