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Senior Level "Prices" Online Exam on Empirical Demand and Price Analysis

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Senior Level "Prices" Online Exam on Empirical Demand and Price Analysis

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Description: This exam is a Canvas-based midterm exam in a senior level "Prices" course. The exam covers several topics on empirical demand and price analysis, which are explained in standard textbooks in the areas of managerial economics and agricultural markets and prices. The exam answers are structured using a multiple-choice format. The answer key is provided. The exam questions can be incorporated as lecture (in-class) examples, in-class assignments and homework questions.

Items included in this set of teaching (assessment) materials

1). Exam.

2). Exam: Answer Key.

3). A note prepared for the review session for this exam. It explains the difference between a quantity-dependent demand function and a price-dependent demand function and the difference between a linear regression model and a log-linear regression model (the latter is also referred to as a log-log linear regression model).

Additional Guidance

This exam was given during a regular in-person class session. Students received a paper copy of the exam at the beginning of the class session. It was recommended to complete this exam on paper first, and then to enter answers on Canvas. Canvas graded the exams immediately at the time of submission.

If this exam is to be given in a remote testing setting, it is recommended to upload PDF Exam file on Canvas (in "Files" section) 15 minutes before the exam becomes available on Canvas (in "Quizzes" section). In this case, students can print out the exam, so they have a paper copy in front of them.

The instructor enters this exam as a quiz on Canvas (in "Quizzes" section)

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

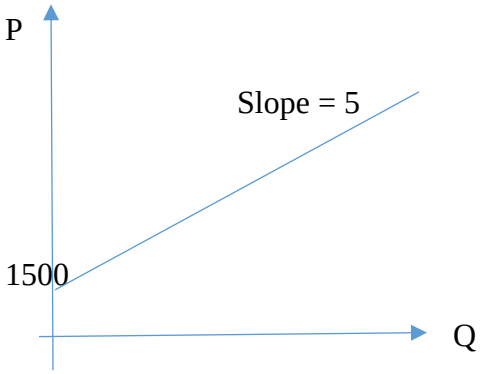
a). 36% b). 0.36 c). -0.36 d). -2.78 e). 2.78

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

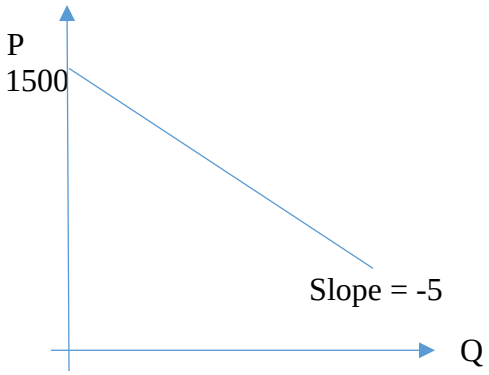
a). a % increase in peach quantity, which follows a 1% decrease in peach price
b). a % decrease in peach quantity, which follows a 1% increase in peach price
c). a % increase in peach price, which follows a 1% decrease in peach quantity
d). a % increase in peach price, which follows a 1% increase in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

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

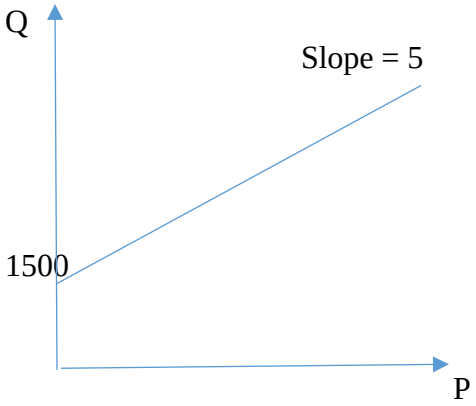
a). Graph A



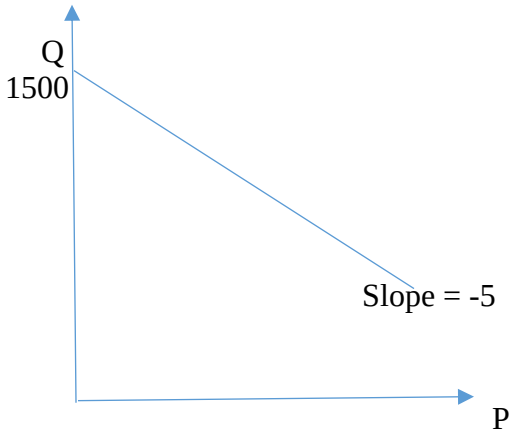
b). Graph B



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

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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 (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 questions presented on this page.

2. *Marginal Utility* the consumer receives from consuming food is $MU_F = C + 4$

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

3. *Marginal Utility* the consumer receives from consuming clothing is $MU_C = F + 2$

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

4. The tangency condition is $\frac{MU_F}{MU_C} = \frac{P_F}{P_C} \Rightarrow \frac{C+4}{F+2} = \frac{4}{8}$ (1) $\frac{1}{2}$

B 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 $P_F F + P_C C = B \Rightarrow 4F + 8C = 168$ (2)

C 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*.

(1) $\rightarrow 2C + 8 = F + 2$

$F = 2C + 6$ (3) $\rightarrow$ (2)

B (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

$4(2C+6) + 8C = 168$

$8C + 24 + 8C = 168$

$16C = 144 \rightarrow C^* = 9$ units (3)

(3) $F = 2C + 6$

$F = 2(9) + 6 = 18 + 6$

$F^* = 24$ units

OPT is F = 24 and C = 9

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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 (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 applies and peaches

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

a). Price of peaches and price of apples
B (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 (d). Q peaches = f(P peaches, P apples, Income)

$Q_{peaches} = f(P_{peaches}, P_{apples}, I)$ (−) (+) (+)

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 (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

$Q_{peaches} = \alpha + \beta_1 P_{peaches} + \beta_2 P_{app} + \beta_3 I + \varepsilon$
$\beta_1 < 0$ $\beta_2 > 0$ $\beta_3 > 0$

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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 own-price effect negative

A (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 cross-price effect (+)

a). Negative: the own price effect on quantity demanded
B (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 income effect (+)

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 (c). Positive: the income effect on quantity demanded
d). Negative: the income effect on quantity demanded

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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 − 0.25*P peaches + 0.15*P apples + 0.20* 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). A *quantity*-dependent demand function
b). A *price*-dependent demand function

15. ***A proper interpretation*** of the ***flow of the causation (causal) effect*** in the demand function is
A (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). a linear regression model
b). a log-linear regression model

17. ***Interpret*** the ***explanatory power*** of the estimated econometric model: **R2**
A (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 0.25%
b). If peach price decreases by $1 per pound, then peach quantity decreases by 0.25 pounds
c). If peach quantity decreases by 1 pound, then peach price increases by $0.25 per pound
D (d). If peach price increases by $1 per pound, then peach quantity decreases by 0.25 pounds

19. ***Interpret*** the ***magnitude and sign*** of ***the estimated coefficient*** *for* ***P apples*** 1.15

A (a). If apple price increases by $1 per pound, then peach quantity increases by 0.15 pounds
b). If apple price decreases by 1%, then peach quantity decreases by 0.15%
c). If apple price decreases by $1 per pound, then apple quantity increases by 0.15 pounds
d). If peach quantity increases by 1 pound, then apple price increases by $0.15 per pound

20. ***Interpret the magnitude and sign*** of ***the estimated coefficient*** *for* ***Income*** 1.20

a). If income increases by 1%, then peach quantity increases by 0.20%
B (b). If income increases by $1, then peach quantity increases by 0.20 pounds
c). If income increases by $1, then peach quantity increases by 0.20%
d). If income increases by $1, then peach quantity decreases by 0.20 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*** $Tst = |-2.25| > |1.65| \rightarrow$ S.S.

a). Is NOT statistically significant from zero, because the absolute value of the coefficient |-0.25| is smaller than the T-Statistic cut-off value
B (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*** $Tst = 1.70 > |1.65| \rightarrow$ S.S

a). Is NOT statistically significant from zero, because the absolute value of the coefficient |0.15| is smaller than the T-Statistic cut-off value
B (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*** $T\text{-}st = 1.25 < |1.65| \rightarrow$ is not S.S.

a). Is NOT statistically significant from zero, because the absolute value of the coefficient |0.20| is smaller than the T-Statistic cut-off value
B (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

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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).

Q → P or P = f(Q) (−)

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

P = f(Q) (−) inverse demand P ⊖ Q price-dependent function

25. This ***economic model*** represents
A (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

this

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

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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.***

$P = \alpha + \beta Q + \varepsilon$
$\beta < 0$ demand

A (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.***

$P = 1{,}500 - 5Q$
$/ton$ thousand tons

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 (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) $R2 = 60\%$

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 (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*** -5.00

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 (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

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

T-st = 9.36 > |1.65| → S.S.

A (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|*

T-st = |-2.33| > |1.65| → S.S

a). The estimated coefficient is not statistically significant from zero, because -5 is smaller than the T-statistic cut-off value

B (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

coeff = -5

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.***

Q↑ by 2 thous. tons

ΔP = coeff × Δ in Q

= -5(+2) = -10 $/ton ↓

a). peach price decreases by $5 per ton

B (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.***

Q↓ by 2 thousand tons

ΔP = coeff × Δ in Q

= -5(-2) = $10/ton ↑

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 (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 (b). $1,000 per ton

c). $955 per ton

P = 1500 - 5Q

P = 1500 - 5(100)

P = 1500 - 500

P = $1000/ton

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$\bar{Q}$ = 80 thousand tons

$P = 1500 - 5Q \Rightarrow \bar{P} = 1500 - 5(80)$

$\bar{P} = 1,100$ $/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

$E_{P,Q} = \frac{\Delta P}{\Delta Q} \times \frac{Q}{P} = -5 \times \frac{80}{1,100} = -0.36$

($\frac{\Delta P}{\Delta Q} = -5$)

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

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

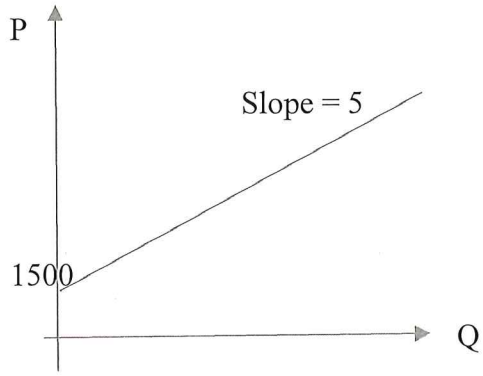
$E_{P,Q} = -0.36$

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 (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

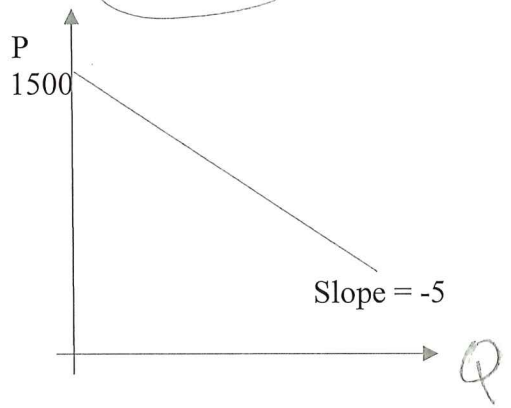
38. Select a graph, which shows *a curve reflecting your estimated function.*

a). Graph A

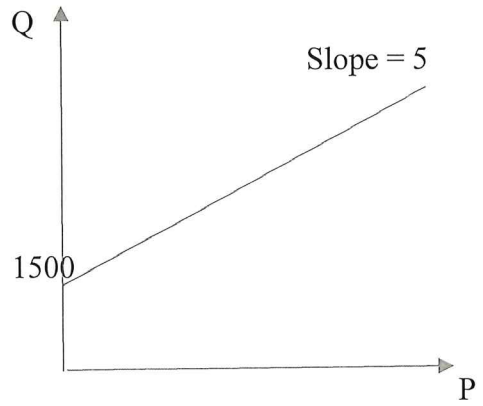
B



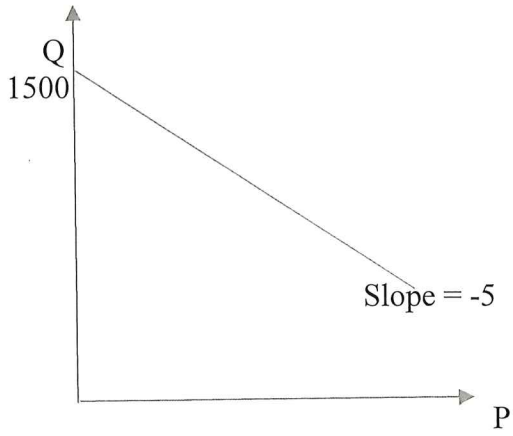
b). Graph B



c). Graph C



d). Graph D



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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).

P = f(Area, Yield) (−) (−)

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.

$$\ln \text{Price} = 10.18 \underset{(-2.32)}{-1.13^{*}} \ln \text{Area} \underset{(-0.69)}{-0.13^{*}} \ln \text{Yield}$$

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

B **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

B **41.** ***Interpret*** the ***explanatory power*** of the estimated econometric model: ***R2*** = 70%
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.

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42. ***Interpret*** *the* ***magnitude and sign*** of the ***estimated coefficient*** *for* **ln Area** −1.13

a). If peach bearing area increases by 1,000 acres, then peach price decreases by $1.13 per ton
B (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** −0.13

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 (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| $|T_{st}| = |-2.32| > |1.65| \rightarrow$ S. S

a). The estimated coefficient is not statistically significant from zero, because -2.32 is smaller than the T-statistic cut-off value
B (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| $|T_{st}| = |-0.69| < |1.65| \rightarrow$ S. S is not

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 (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

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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 (b). RP = a+b*FP, b>0
c). RP = a+b*Q, b<0
d). FP = a+b*Q, b<0

RP = f(FP) VPT (+)

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 (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 (b). RP = a+b*FP+e
c). FP = a+b*RP+e
d). FP = a+b*Q+e

$RP = \alpha + \beta FP + \varepsilon$

49. You have ***estimated the following linear econometric (regression) model***:

$/pound RP = 1.00 + 4.00*FP $/pound

Interpret the ***magnitude and sign*** of the ***estimated coefficient*** for ***FP*** = 4.00

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 (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 (c). $3.00 per pound

RP = 1.00+4.00FP
RP = 1.00+4.00(0.50)
RP = 1+2
RP = $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	39232.69337	5.408818873	0.058987932
Residual	6	43520.80663	7253.467771		
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

midterm exam: Review session #1

(1)

Quantity-dependent demand fxn

(y) (x)

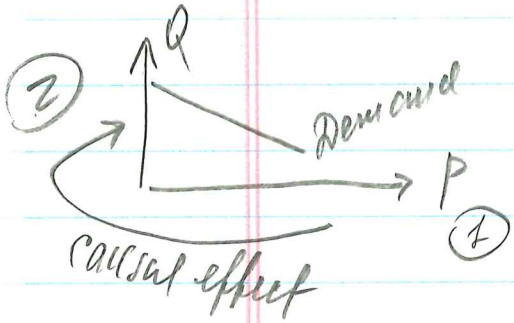
$Q = a + bP$, $b < 0$

causal EFFECT

dependent variable — independent variable

$b < 0$

a change in Price causes Quantity to change



Price-dependent demand fxn

(y) (x)

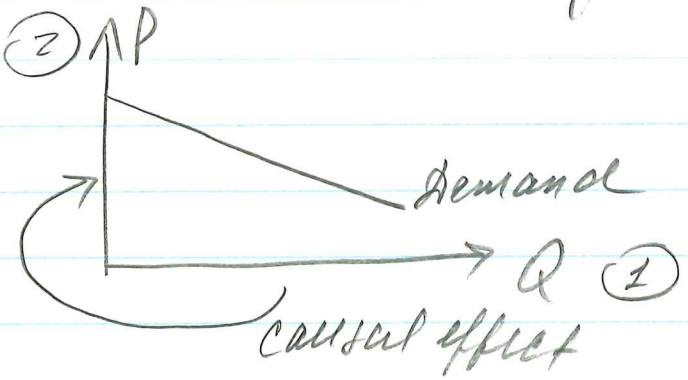
$P = a + bQ$, $b < 0$

causal effect

dependent variable — independent variable

$b < 0$

a change in Quantity causes Price to change



(2)

a linear model

$Q = a + bP$, $b < 0$

$P = a + bQ$, $b < 0$

} Q is in units, P is in $/unit

when interpret "b", use "units" and "$/unit" (provided units of measurement)

a log-linear model ("log-log")

$\ln Q = a + b \ln P$

$\ln P = a + b \ln Q$

when interpret "b" use % changes