# Senior Level "Prices" Research Project "Price-Quantity Relationship and Profitability in the U.S. Peanut Industry"

# Yuliya V. Bolotova

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# Senior Level "Prices" Research Project "Price-Quantity Relationship and Profitability in the U.S. Peanut Industry"

## Yuliya V. Bolotova, Clemson University

Description: The research project objective is to apply the inverse demand framework to analyze the price-quantity relationship and profitability in the U.S. peanut industry. This is a take-home research project. It includes an empirical price analysis, which involves estimating a pricedependent demand function for peanuts at the farm-gate level, and an analytical analysis of four market scenarios differing due to the peanut quantity produced, peanut price and the industry profitability. These market scenarios are a peanut over-supply scenario, a perfectly competitive industry scenario, a small degree of the seller market power scenario, and a hypothetical monopoly. The answer key is provided.

#### Research Project Items

1). Research Project.

2). Research Project: Answer Key with required attachments (see Excel files below).

3). Excel file with data downloaded from the USDA NASS Quick Stats Database.

4). Excel file with a data set prepared to be used in the regression analysis and the OLS estimation results (two sheets in the same Excel file).

The theoretical framework used in this research project and the U.S. peanut industry background are presented in the following article.

Bolotova, Y. 2019. Teaching Competition Topics: Applications of Seller Market Power in Agricultural Industries. *Applied Economics Teaching Resources* 1: 43-63. <u>https://ageconsearch.umn.edu/record/300072?ln=en</u>

# AGRB 4560 PRICES Research Project

# Applying the Inverse Demand Framework To Analyze the Industry's Seller Market Power: *Price-Quantity Relationship and Profitability in the U.S. Peanut Industry*

100 points (10% weight in the final course grade)

# Assigned on: April 02, 2019 (Tuesday) during a regular class session Due Date: April 18, 2019 (Thursday) at 12:30 p.m. Late Submission (25 points deduction): April 23, 2019 (Tuesday) at 12:30 p.m.

The research project can be performed *individually* or *in groups* (no more than 3 students per group). If the research project is submitted by a group of students, *each student has to briefly explain his/her contribution* (bullet points are provided for convenience). *Each student has to write his/her name (last and first) and CU ID*. If no CU ID is provided and/or the contribution is not clearly explained, the student receives 0 points. Students submitting individual projects do not have to explain their contribution: write down your name and CU ID.

# This research project is performed by



# Research project stages: To be performed in this exact sequence

Question #1: Data collection
Question #2: Economic model of inverse demand applied to the U.S. peanut industry
Question #3: Econometric analysis of the peanut price-quantity relationship:
Estimating inverse demand function for the U.S. peanut industry
Question #4: Conducting a peanut price forecast in two alternative market scenarios
differing due to the peanut quantity produced
Question #5: Calculating the profit-maximizing peanut quantity to produce and a corresponding
peanut price for two alternative market scenarios reflecting two types of market
structure: a perfectly competitive industry and a hypothetical monopoly
Question #6: Results' summary and conclusion: Evaluating the patterns of the peanut-price
quantity combinations and peanut industry profitability across the four analyzed
market scenarios.

Question #1 Data Collection: Peanut Price and Peanut Production for 2010-2016 Note that "Production" is "Quantity" in your analysis.

1). Use the U.S. Department of Agriculture National Agricultural Statistics Service *Quick Stats* database to *download* data for the U.S. peanut industry, which you will use to conduct your analysis in this research project. <u>https://quickstats.nass.usda.gov/</u>

**The search** you have to complete to download Peanut Price and Peanut Production for the period of 2010-2016 **is presented on the next page.** You have to organize your data in a way suitable for estimating a regression model.

Year	Peanut Price (\$ per pound)	Peanut Production (billion pounds)
2010		
2011		
2012		
2013		
2014		
2015		
2016		

It is suggested to organize your data using the Table format presented below.

#### 2). PRINT OUT and ATTACH to your research project TWO files (Tables):

- The file (table) you downloaded on the USDA web-page following the search steps presented on the next page.
- The file (table) you will use to estimate a regression model.

# DATA SEARCH STEPS: U.S. Peanut industry: yearly data

https://quickstats.nass.usda.gov/

Program: Select -> Survey

Sector: Select -> Crops

**Group:** Select -> Field Crops

**Commodity:** Select -> Peanuts

Category: Select -> Price received AND Production

**Data item:** Select -> Peanuts - Price received, measured in \$/lb and Peanuts - Production, measured in lb

**Domain:** Select -> Total

Geographic level: Select -> National

**State:** Select -> US Total

**Year:** Select -> 2010-2016

**Period type:** Select -> Annual

**Period:** Select -> Marketing year and Year

Click GET DATA

To download file,

USE "SAVE" OR "SPREADSHEET" OPTION: UPPER MENUE, RIGHT HANDSIDE Make sure you save the file using EXCEL format

**ATTENTION:** you have to sort and clean the originally downloaded data to develop a data set in which you have your variables organized in a form suitable to estimate a regression model. In particular:

- Delete columns and/or rows you do not need;
- In the case of PRICE: keep *MARKETING YEAR* PRICE only;
- Arrange years from 2010 to 2016;
- Check the data tables you used to estimate regression models during the semester to make sure you have develop a data table correctly.

# Question #2 *Economic* model of *inverse* demand applied to the U.S. peanut industry

Formulate (write down) an economic model of inverse demand, which can be used to analyze the price-quantity relationship in the U.S. peanut industry.

- Introduce notations for the variables included in the economic model (i.e. equation/function)
- Specify the units of measurement for the variables
- Describe (explain) the relationship between peanut price and quantity

# Question #3 *Econometric* analysis of the peanut price-quantity relationship: Estimating *inverse demand function* for the U.S. peanut industry

3.1. Using the economic model you formulated in Question #2, write down an econometric (regression) model of inverse demand for the U.S. peanut industry to be estimated.

• Formulate a **hypothesis for the coefficient to be estimated** for the independent variable (positive or negative).

3.2. Use the Ordinary Least Squares (OLS) estimation procedure to **estimate the econometric model** you developed in the previous question. *You can use Excel or any other software program that can be used to estimate a regression model.* 

- *!!! RECOMMENDED: USE "PRODUCTION" IN BILLION POUNDS*
- PRINT OUT and ATTACH to your research project regression output

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3.3. Using the OLS regression output, write down the *estimated* econometric (regression) model of inverse demand for the U.S. peanut industry (i.e. peanut industry inverse demand function). Below each estimated coefficient, write down T-statistic in the parentheses. Write-down R2 statistic.

#### **3.4. Interpret the OLS estimation results**

- Interpret the **explanatory power** of the estimated econometric model: R2.
- Interpret the **estimated coefficient for the independent variable.**

• Interpret statistical significance of the constant and of the estimated coefficient for the independent variable. *Explain the T-test procedure you use to interpret statistical significance of the estimated parameters (constant and coefficient).* 

# Question #4 Conducting a *peanut price forecast* in two alternative *market scenarios differing due to the peanut quantity produced:* → Scenario 1 and Scenario 2

Use the estimated inverse demand function for the U.S. peanut industry to predict peanut price under two alternative market scenarios differing due to the peanut quantity produced by the industry each year.

4.1. Scenario 1 "A relatively large peanut quantity produced: The over-supply of peanuts": Predict peanut price, if the peanut industry produces (and supplies to the market) 7 billion pounds of peanuts. *Show your work*.

4.2. Scenario 2 "A relatively small peanut quantity produced: The peanut industry has a small degree of the seller market power": Predict peanut price, if the peanut industry produces (and supplies to the market) 3 billion pounds of peanuts. *Show your work*.

4.3. Calculate (predict) the U.S. peanut industry revenue in two analyzed market scenarios. Summarize your calculations in a table below. Make sure that you keep track of the units of measurement.

Variable	Scenario 1: A relatively large	Scenario 2: A relatively small peaput quantity	Difference: Scenario 2- Scenario 1
	produced	produced	Sechario 1
Peanut Quantity			
Unit of measurement:			
Peanut <b>Price</b>			
Unit of measurement:			
Peanut Industry <b>Revenue</b>			
Unit of measurement:			

#### AGRB 4560 S19 Research Project

4.4. Show a demand curve corresponding to the estimated inverse demand function on a graph. Show on the same graph the two peanut price-quantity combinations that you analyzed in Question 4. *Make sure that you label the axes and clearly indicate two scenarios.* 

4.5. Use the results of your analysis to conclude which market scenario is more beneficial for the industry: Scenario 1 or Scenario 2? Why? *Provide a brief explanation*.

# Question #5 Calculating the *profit-maximizing* peanut *quantity* to produce and a corresponding peanut *price* for two alternative market scenarios reflecting two types of market structure: a *perfectly competitive* industry and a *hypothetical* monopoly → Scenario 3 and Scenario 4

# *!!!* To answer this question you have to use a relevant cost measure: Assume that marginal cost (MC) of producing peanuts is \$0.25 per pound.

5.1. Scenario 3 "A perfectly competitive industry": Calculate the peanut quantity that the peanut industry has to produce to maximize its profit, assuming it is a *perfectly competitive* industry. Use appropriate version of MR=MC rule. Also, calculate (predict) peanut price in this market scenario.

**5.2.** Scenario 4 "A hypothetical monopoly": Calculate the peanut quantity that the U.S. peanut industry has to produce to maximize its profit, assuming it is a *hypothetical* monopolist. *Use appropriate version of MR=MC rule*. Also, calculate (predict) peanut price in this market scenario.

# Question #6 Results' summary and conclusion: Evaluating the *patterns* of the *peanut-price quantity combinations* and peanut industry *profitability* across the four analyzed market scenarios

6.1. Graphical analysis: Summary

• Show the peanut price-quantity combinations calculated for a perfectly competitive industry and a hypothetical monopoly on a graph below (Scenario 3 and Scenario 4). *Make sure you label the axes, show and label all relevant curves and clearly show the peanut price-quantity combinations.* 

• On the same graph: show the peanut price-quantity combinations you analyzed in Question 4 (Scenario 1 and Scenario 2).

### 6.2. Profitability analysis: Summary

Summarize the results of your analysis in a table below. In addition, calculate a number of measures characterizing the profitability of the peanut industry in four analyzed scenarios: the industry total revenue, total cost, total profit, profit per unit and Lerner Index of market power (the two latter measures are price-cost margins). Marginal cost is the same in all four scenarios. <u>The choice of units of measurement is up to you (million, thousand, etc.)</u>.

Variable/Measure	The peanut industry produces						
	Scenario 1: a relatively large peanut quantity: Over-supply of peanuts	Scenario 3: the peanut quantity consistent with perfect competition	Scenario 2: a relatively small peanut quantity: A small degree of the seller market power	Scenario 4: the peanut quantity consistent with a hypothetical monopoly			
Marginal Cost (\$ per pound)							
= Average Cost (\$ per pound)	0.25	0.25	0.25	0.25			
Peanut <b>Quantity</b> (pounds)							
Peanut <b>Price</b> (\$ per pound)							
Total <b>Revenue</b> (\$)							
Total <b>Cost</b> (\$)							
Total <b>Profit</b> (\$)							
Profit per unit (\$ per pound)							
Lerner Index of market power (% of price)							

**6.3.** Discuss the results summarized in the table: Compare peanut quantity, peanut price and peanut industry profitability in the four analyzed market scenarios.

6.4. What is the difference between the analyses performed in Question 4 and Question 5? How does the availability of cost information improve your analysis?

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# AGRB 4560 PRICES Research Project

# Applying the Inverse Demand Framework To Analyze the Industry's Seller Market Power: *Price-Quantity Relationship and Profitability in the U.S. Peanut Industry*

100 points (15% weight in the final course grade)

# Assigned on: April 03, 2018 (Tuesday) during a regular class session Due Date: April 19, 2018 (Thursday) at 12:30 p.m. Late Submission (25 points deduction): April 24, 2018 (Tuesday) at 12:30 p.m.

The research project can be performed *individually* or *in groups* (no more than 3 students per group). If the research project is submitted by a group of students, *each student has to briefly explain his/her contribution* (bullet points are provided for convenience). *Each student has to write his/her name (last and first) and CU ID.* If no CU ID is provided and/or the contribution is not clearly explained, the student receives 0 points. Students submitting individual projects do not have to explain their contribution: write down your name and CU ID.



#### This research project is performed by

AGRB 4560 S18 Research Project

#### Research project stages: To be performed in this exact sequence

Question	#1:	Data	coll	lection	
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- Question #2: Economic model of inverse demand applied to the U.S. peanut industry
- Question #3: Econometric analysis of the peanut price-quantity relationship: Estimating inverse demand function for the U.S. peanut industry
- Question #4: Conducting a peanut price forecast in two alternative market scenarios differing due to the peanut quantity produced
- Question #5: Calculating the profit-maximizing peanut quantity to produce and a corresponding peanut price for two alternative market scenarios reflecting two types of market structure: a perfectly competitive industry and a *hypothetical* monopoly
- Question #6: Results' summary and conclusion: Evaluating the patterns of the peanut-price quantity combinations and peanut industry profitability across the four analyzed market scenarios.

#### Question #1 Data Collection: Peanut Price and Peanut Production for 2010-2016 Note that "Production" is "Quantity" in your analysis.

1). Use the U.S. Department of Agriculture National Agricultural Statistics Service Quick Stats database to download data for the U.S. peanut industry, which you will use to conduct your analysis in this research project. <u>https://quickstats.nass.usda.gov/</u>

**The search** you have to complete to download Peanut Price and Peanut Production for the period of 2010-2016 **is presented on the next page.** You have to organize your data in a way suitable for estimating a regression model.

Year	Peanut Price (\$ per pound)	Peanut Production ( <i>billion</i> pounds)
2010		
2011		
2012		
2013		
2014		
2015		
2016		

It is suggested to organize your data using the Table format presented below.

#### 2). PRINT OUT and ATTACH to your research project TWO files (Tables):

- The file (table) you downloaded on the USDA web-page following the search steps presented on the next page.
- The file (table) you will use to estimate a regression model.



# DATA SEARCH STEPS: U.S. Peanut industry: yearly data

https://quickstats.nass.usda.gov/

**Program:** Select -> Survey

Sector: Select -> Crops

Group: Select -> Field Crops

Commodity: Select -> Peanuts

Category: Select -> Price received AND Production

**Data item:** Select -> Peanuts - Price received, measured in \$/lb and Peanuts - Production, measured in lb

**Domain:** Select -> Total

Geographic level: Select -> National

State: Select -> US Total

**Year:** Select -> 2010-2016

**Period type:** Select -> Annual

Period: Select -> Marketing year and Year

Click GET DATA

To download file,

USE "SAVE" OR "SPREADSHEET" OPTION: UPPER MENUE, RIGHT HANDSIDE Make sure you save the file using EXCEL format

**ATTENTION:** you have to sort and clean the originally downloaded data to develop a data set in which you have your variables organized in a form suitable to estimate a regression model. In particular:

- Delete columns and/or rows you do not need;
- In the case of PRICE: keep *MARKETING YEAR* PRICE only;
- Arrange years from 2010 to 2016;
- Check the data tables you used to estimate regression models during the semester to make sure you have develop a data table correctly.

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# ✓ Question #2 *Economic* model of *inverse* demand applied to the U.S. peanut industry

Formulate (write down) an economic model of inverse demand, which can be used to analyze the price-quantity relationship in the U.S. peanut industry.

- Introduce notations for the variables included in the economic model (i.e. equation/function)
- $\checkmark$  Specify the units of measurement for the variables

Describe (explain) the relationship between peanut price and quantity Qis total quantity of peanuts moduced lacy gear (pounds) Pis peanut parce (average yearly) (& pound) p = a + b Q, aso and b L DIf peanut QT, then PU

# Question #3 *Econometric* analysis of the peanut price-quantity relationship: Estimating *inverse demand function* for the U.S. peanut industry

3.1. Using the economic model you formulated in Question #2, write down an econometric (regression) model of inverse demand for the U.S. peanut industry to be estimated.

• Formulate a hypothesis for the coefficient to be estimated for the independent variable (positive or negative).

Pt=d+BQt+Et H: J=> D H: p=1 D due to inverse relationship between Pand Q

3.2. Use the Ordinary Least Squares (OLS) estimation procedure to **estimate the econometric model** you developed in the previous question. You can use Excel or any other software program that can be used to estimate a regression model.

- **!!! RECOMMENDED:** USE "PRODUCTION" IN *BILLION* POUNDS
- PRINT OUT and ATTACH to your research project regression output

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3.3. Using the OLS regression output, write down the *estimated* econometric (regression) model of inverse demand for the U.S. peanut industry (i.e. peanut industry inverse demand function). Below each estimated coefficient, write down T-statistic in the parentheses. Write-down R2 statistic.

P = 0, 29 - 0.01 Q(2,93) (-0.4g) BIL fill /h

RZ = 0.04

**3.4. Interpret the OLS estimation results** 

• Interpret the **explanatory power** of the estimated econometric model: R2.

The variation in peanut quantity explains 4% of the variation in peanut phice • Interpret the estimated coefficient for the independent variable.

It the total peanul quantity produced T(V) by I Bill 18, The peanul partie V (1) by #0.01 /16

• Interpret statistical significance of the constant and of the estimated coefficient for the independent variable. Explain the T-test procedure you use to interpret statistical significance of the estimated parameters (constant and coefficient).  $T - H_1 = \frac{1}{2} - \frac{1}{2$ 

Constant: T.St. = 2.93 2.93> 1.64 -> Acject Ho 5.5

Coeff.for Q: T-sf = -0.48 |-0.48 | 2 | 1.64 | -> fail to reject the ISNOF 55

h-level = 10% Ho. B=D Ha: B=O T-St. cut - off = 11.641

\*35 If (T-Sf/ > | T-St cut.off / Reject Ho in favor of Ha -> The coefficient is s.s. NSS If 17-5+12 17-5+ cut off 5 Fuil to reject the 5 > The coeff is Not ss

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### Question #4 Conducting a *peanut price forecast* in two alternative *market* scenarios differing due to the peanut quantity produced: → Scenario 1 and Scenario 2

Use the estimated inverse demand function for the U.S. peanut industry to predict potato price under two alternative market scenarios differing due to the peanut quantity produced by the industry each year.  $\frac{8}{16}$   $P = 0.29 - 0.01 Q / \frac{61}{10}$ 

MM-Supply 1. Scenario 1 "A relatively large peanut quantity produced: The over-supply of peanuts": Bredict peanut price, if the peanut industry produces (and supplies to the market) 7 billion pounds of peanuts. Show your work.

P= 0,29-0,019=0,29-0,01(7)=0,29-0.07=0,22 Q= 7 fill. 16. -> P= \$0.22/16.

5MWISMP 4.2. Scenario 2 "A relatively small peanut quantity produced: The peanut industry has a small degree of the seller market power": Predict peanut price, if the peanut industry produces (and supplies to the market) 3 billion pounds of peanuts. Show your work.

P = 0.29 - 0.01Q = 0.29 - 0.01(3) = 0.29 - 0.03 = 0.26Q= 3 fill. 11. -> P= \$ 0.26/18.

4.3. Calculate (predict) the U.S. peanut industry revenue in two analyzed market scenarios. Summarize your calculations in a table below. Make sure that you keep track of the units of measurement.

Variable	Scenario 1: A relatively large peanut quantity produced	Scenario 2: A relatively small peanut quantity produced	<b>Difference:</b> Scenario 2- Scenario 1
Peanut <b>Quantity</b> Unit of measurement: Millio h priemol s	7	3	-4
Peanut <b>Price</b> Unit of measurement: & //WWMA	0.22	D. 26	+0.04
Peanut Industry <b>Revenue</b> Unit of measurement:	1,54	0,48	-0,46

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4.4. Show a demand curve corresponding to the estimated inverse demand function on a graph. Show on the same graph the two peanut price-quantity combinations that you analyzed in Question 4. *Make sure that you label the axes and clearly indicate two scenarios.* 



4.5. Use the results of your analysis to conclude which market scenario is more beneficial for the industry: Scenario 1 or Scenario 2? Why? *Provide a brief explanation.* 

Based on Revenue -> 5.2 Based on Price Received -> 5.1.

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Question #5 Calculating the *profit-maximizing* peanut *quantity* to produce and a corresponding peanut *price* for two alternative market scenarios reflecting two types of market structure: a *perfectly competitive* industry and a *hypothetical* monopoly → Scenario 3 and Scenario 4

**!!!** To answer this question you have to use a relevant cost measure: Assume that marginal cost (MC) of producing peanuts is \$0.25 per pound.

P=0.29-0.01Q

5.1. Scenario 3 "A perfectly competitive industry": Calculate the peanut quantity that the peanut industry has to produce to maximize its profit, assuming it is a *perfectly competitive* industry. Use appropriate version of MR=MC rule. Also, calculate (predict) peanut price in this market scenario. MB=MC = 7 P = MC

0,29-0.01 @= 0,25 0.01 P- 0.04 Qpc = 4 fill. 16.

P=0,29-0,01Q P=0,29-0,01(4)=0,29-0.04=0.25

Por = \$0,25/16

5.2. Scenario 4 "A hypothetical monopoly": Calculate the peanut quantity that the U.S. peanut industry has to produce to maximize its profit, assuming it is a *hypothetical* monopolist. Use appropriate version of MR=MC rule. Also, calculate (predict) peanut price in this market scenario.

Mhm=ML

MRM = 0.29-0.02Q

 $p_{2}q_{-}p_{0}p_{2}q_{-}=0.25$ 0.02Q = 0.04QM \*= 2 fill. /8.

Pm= 0,29-0.01(2) = 0.29 - 0.02 = 0.24

Pm = 0.24/12

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# Question #6 Results' summary and conclusion: Evaluating the patterns of the peanut-price quantity combinations and peanut industry profitability across the four analyzed market scenarios

#### 6.1. Graphical analysis: Summary

Show the peanut price-quantity combinations calculated for a perfectly competitive industry • and a hypothetical monopoly on a graph below (Scenario 3 and Scenario 4). Make sure you label the axes, show and label all relevant curves and clearly show the peanut price-quantity combinations.

On the same graph: show the peanut price-quantity combinations you analyzed in Question 4 • (Scenario 1 and Scenario 2). · Show MR = MC



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#### 6.2. Profitability analysis: Summary

Summarize the results of your analysis in a table below. In addition, calculate a number of measures characterizing the profitability of the peanut industry in four analyzed scenarios: the industry total revenue, total cost, total profit, profit per unit and Lerner Index of market power (the two latter measures are price-cost margins). Marginal cost is the same in all four scenarios. <u>The choice of units of measurement is up to you (million, thousand, etc.)</u>.

Variable/Measure	The peanut industry produces					
	Scenario 1: a relatively large peanut quantity: Over-supply of peanuts	Scenario 3: the peanut quantity consistent with perfect competition	Scenario 2: a relatively small peanut quantity: A small degree of the seller market power	Scenario 4: the peanut quantity consistent with a hypothetical monopoly		
Marginal Cost (\$ per pound) = Average Cost (\$ per pound)	0.25	0.25	0.25	0.25		
Peanut <b>Quantity</b> (pounds) <i>billi'01</i>	4	4	3	2		
Peanut <b>Price</b> (\$ per pound)	0.22	0,25	0.26	0.24		
Total <b>Revenue</b> (\$) Fillion PXQ	1,54	1,00	0, 48	0.54		
Total Cost (\$) billion Cost xQ	1.75	1.00	0,45	0,50		
Total <b>Profit</b> (\$) = TR -TC	-0.21 L055	0,00	0.03	0.04		
Profit per unit (\$ per pound) P-MC OR Tofal PROFit- Q	-0,03 2055	0,00	0,01	0.02		
Lerner Index of market power (%) $\frac{P-MC}{P} \times 100\%$	- 13.64	0.00	3,85	7.41		

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6.3. Discuss the results summarized in the table: Compare and contrast peanut quantity, peanut price and peanut industry profitability in the four analyzed market scenarios.

6.4. What is the difference between the analyses performed in Question 4 and Question 5? How does the availability of cost information improve your analysis?

#### USDA NASS DATA (Page 1)

Program	Year	Period	Week Er	Geo Level	State	State	Ag Dist	Ag Distr	Count	County	Zip Co
SURVEY	2016	MARKETING YEAR		NATIONAL	US TOTAL						
SURVEY	2016	YEAR		NATIONAL	US TOTAL						
SURVEY	2016	YEAR		NATIONAL	US TOTAL						
SURVEY	2015	MARKETING YEAR		NATIONAL	US TOTAL						
SURVEY	2015	YEAR		NATIONAL	US TOTAL						
SURVEY	2015	YEAR		NATIONAL	US TOTAL						
SURVEY	2014	MARKETING YEAR		NATIONAL	US TOTAL						
SURVEY	2014	YEAR		NATIONAL	US TOTAL						
SURVEY	2014	YEAR		NATIONAL	US TOTAL						
SURVEY	2013	MARKETING YEAR		NATIONAL	US TOTAL						
SURVEY	2013	YEAR		NATIONAL	US TOTAL						
SURVEY	2013	YEAR		NATIONAL	US TOTAL						
SURVEY	2012	MARKETING YEAR		NATIONAL	US TOTAL						
SURVEY	2012	YEAR		NATIONAL	US TOTAL						
SURVEY	2012	YEAR		NATIONAL	US TOTAL						
SURVEY	2011	MARKETING YEAR		NATIONAL	US TOTAL						
SURVEY	2011	YEAR		NATIONAL	US TOTAL						
SURVEY	2011	YEAR		NATIONAL	US TOTAL						
SURVEY	2010	MARKETING YEAR		NATIONAL	US TOTAL						
SURVEY	2010	YEAR		NATIONAL	US TOTAL						
SURVEY	2010	YEAR		NATIONAL	US TOTAL	1					

#### USDA NASS DATA (Page 2)

Regio	watersh	Wate	Commodity	Data Item	Domain	Domain Catego
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRODUCTION, MEASURED IN LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRODUCTION, MEASURED IN LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRODUCTION, MEASURED IN LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRODUCTION, MEASURED IN LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRODUCTION, MEASURED IN LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRODUCTION, MEASURED IN LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRICE RECEIVED, MEASURED IN \$ / LB	TOTAL	NOT SPECIFIED
	0		PEANUTS	PEANUTS - PRODUCTION, MEASURED IN LB	TOTAL	NOT SPECIFIED

#### USDA NASS DATA (Page 3)

Value	CV (%)
0.197	
0.19	
5,581,570,000	
0.193	
0.21	
6,001,357,000	
0.22	
0.23	
5,188,665,000	
0.249	
0.27	
4,173,170,000	
0.301	
0.34	
6,753,880,000	
0.318	
0.25	
3,658,590,000	
0.225	
0.21	
4,156,840,000	

# Data Set to be used in Regression Analysis

Year	Peanut Price (\$ per pound)	Peanut Production (billion pounds)
2010	0.225	4.157
2011	0.318	3.659
2012	0.301	6.754
2013	0.249	4.173
2014	0.22	5.189
2015	0.193	6.001
2016	0.197	5.582

#### **Regression Analysis Results**

#### SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.21
R Square	0.04
Adjusted R Square	-0.15
Standard Error	0.05
Observations	7

ANOVA

					Significance		
	df	SS	MS	F	F		
Regression	1	0.000643457	0.00064346	0.2322953	0.650184		
Residual	5	0.013849972	0.00276999				
Total	6	0.014493429	I				
		Standard				Upper	Lower
	Coefficients	Error	t Stat	P-value	Lower 95%	95%	95.0%
Intercept	0.29	0.10	2.93	0.03	0.04	0.54	0.04
Peanut Production (billion pounds)	-0.01	0.02	-0.48	0.65	-0.06	0.04	-0.06

Upper 95.0% 0.54 0.04