

PRICE COMPARISONS OF SELECTED PRODUCE BETWEEN FARMERS' MARKETS
AND GROCERY STORES IN SAN LUIS OBISPO COUNTY.

Presented to the
Faculty of the Agribusiness Department
California Polytechnic State University

In partial fulfillment
of the requirements for the Degree
Bachelor of Science

By:
Jacqueline de Figueiredo

December 2010

TABLE OF CONTENTS

Chapter		Page
I	INTRODUCTION.....	1
	Problem Statement.....	2
	Hypothesis.....	2
	Objectives.....	2
	Justification.....	2
II	REVIEW OF LITERATURE.....	4
III	METHODOLOGY.....	8
	Procedures for Data Collection.....	8
	Procedures for Data Analysis.....	9
	Assumptions and Limitations.....	10
IV	DEVELOPMENT OF THE STUDY	11
V	SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	19
	Summary	19
	Conclusions.....	19
	Recommendations.....	20
	References Cited.....	21
	APPENDIX.....	23

LIST OF TABLES

Table	Page
1 Estimated Distance Between Selected Farmers' Markets and Paired Grocery Store.....	9
2 Descriptive Statistics of all Prices at SLO Farmers Markets and Grocery Stores, Fall 2010.....	11
3 ANOVA Test of Celery Prices at Farmer's Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County.....	13
4 ANOVA Test of Green Seedless Grape Prices at Farmer's Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County.....	14
5 ANOVA Test of Vine Ripe Tomato Prices at Farmer's Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County.....	15
6 ANOVA Test of Sweet Onion Prices at Farmer's Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County.....	16
7 ANOVA Test of Fuji Apple Prices at Farmer's Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County.....	17
8 ANOVA Test of All Prices at Farmer's Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County.....	18

Appendix Tables

1 All Data Collected for Celery in Fall 2010 Throughout San Luis Obispo County.....	24
2 All Data Collected for Vine Ripe Tomatoes in Fall 2010 Throughout San Luis Obispo County.....	25
3 All Data Collected for Sweet Onions in Fall 2010 Throughout San Luis Obispo County...	26
4 All Data Collected for Green Seedless Grapes in Fall 2010 Throughout San Luis Obispo County.....	27
5 All Data Collected for Fuji Apples in Fall 2010 Throughout San Luis Obispo County.....	28

Chapter I

INTRODUCTION

Farmer's markets have been growing throughout the United States. There has been a sixteen percent increase of farmers' markets from 2009 to 2010 (AMS-USDA, 2010). People nationwide are rediscovering the benefits of buying locally grown and farmer direct food. Every day, more and more consumers are looking to shop smarter and eat healthier. The alternative to grocery stores and supermarkets are local farmer's markets. Farmer's markets allow consumers to have a direct access to locally grown, farm fresh produce (Giacalone, 1999). It also enables the consumers to interact personally with the farmers to ask questions and share ideas. According to Watson and Gunderson (2010), consumers are willing to pay price premiums for products that have labels such as organic, safe and local; regardless of the actual benefit associated with the food that was purchased.

The San Luis Obispo farmers' market located on Higuera Street, is one example of a successful venture that has been established and growing since 1983. Other farmers' markets around the area offer the same benefits including fresh produce, convenience, and lower prices than surrounding grocery stores. Due to the increased awareness of health consciousness, more people are looking to their local farmer's markets to provide fresh produce for a cheaper value (Ange, 2001). The question arises whether the farmer's market produce is actually cheaper than their neighboring grocery store prices. Similar work has shown that prices at farmers' markets are lower than prices at grocery stores (Ange 2001, Faber 2000, Giacalone 1999). By comparing

different commodities in the San Luis Obispo County, a price comparison study can identify the price differences and determine if the numbers of studies done in the past are still true.

Problem Statement

Is there a difference among the prices of selected produce items at local farmers' markets and their paired grocery stores in San Luis Obispo County?

Hypothesis

Prices, on average, are lower at farmers' markets compared to their neighboring grocery store for the selected produce items in San Luis Obispo County. This is represented as:

$$\overline{H_A}: P_{FM} < \overline{P_{SM}}$$

Objectives

- 1) To assess the benefit to the consumer of farmers' market prices versus grocery store prices.
- 2) To evaluate and compare prices of five different commodities at local farmers' markets and neighboring grocery stores.
- 3) To display data that corresponds to the price comparisons and quality between selected produce sold at farmers' markets and grocery stores.

Justification

With the increase popularity of a more health conscious lifestyle, the demand for fresh produce has grown worldwide. The number of farmers' markets has been continuously growing. As of mid-2010, there were 6,132 farmers markets operating throughout the United States (USDA-AMS, 2010). As farmers' markets continue to expand, the increase in the volume of sellers allows for fresh produce to be sold at a lower price.

Farmers' markets allow consumers to have access to locally grown, farm fresh produce. Traveling around the world, the best places to get a sense of the area is to visit the public food markets. The relationship that can be built between the farmers and the consumers is one that cannot be obtained at a local grocery store. The benefits of farmers' markets relates to both producers, consumers, and the community as a whole. Farmer's markets allow small and medium sized producers to start their businesses. More farmers selling their produce at local farmers' markets allow consumers to have a wide variety of choices among various produce and provides local competition for grocery stores. This gives the farmers an income, keeps consumers satisfied, and allows the community to access fresh and nutritious foods that may be otherwise limited (USDA-AMS, 2010).

A notable example of a prosperous, well known, and year-round farmers' market is the San Luis Obispo's Thursday night Farmers' Market located on the central coast of California. This particular San Luis Obispo Farmers' Market occurs every Thursday night in the center of downtown San Luis Obispo. Seeking various products, consumers from college students to families come to enjoy all aspects it has to offer. It is important to look at what prices the products are being sold at. Looking at farmers markets in San Luis Obispo County and comparing them to neighboring grocery stores can display a price comparison of similar produce sold at both. This knowledge will help the consumer, producer, and community to see what the best overall price for the amount of produce being sold.

CHAPTER II

REVIEW OF LITERATURE

The number of farmers markets has been growing steadily in recent years. Cities throughout the world are taking an interest in developing farmers markets to add vitality to their public spaces, to revitalize neighborhoods, and to make fresh food available in areas surrounded by supermarkets. Their steady growth and popularity has been attributed to several features commonly sought by customers attending the markets (Bukenya, *etal.*, 2007).

Familiarity with consumers' motivation for shopping at public markets is important in order to determine how farmers' markets might function to meet consumers' needs (Bukenya, *etal.*, 2007). Farmers' markets are drawing increasing attention by consumers as a local source of fresh foods; by producers as an alternative marketing opportunity to improve farm sales; and by policy makers concerned about the limited availability of affordable and nutritious foods (Schmit and Gomez 2010). Furthermore, farmers' markets allow individual farmers and their families to contribute to the economic life of local communities by providing goods and services that are not available through mass markets (Lyson, Gillespie, and Hilchey 1995).

The National Farmer Market Managers Survey examines the operations, management, sales, and organization of farmers markets based on the real experience of farmers' market managers. According to the last Survey, conducted in 2005, sales at farmers markets were slightly over \$1 billion annually and more than 25 percent of vendors at surveyed markets derived their sole source of farm income from farmers markets (USDA-AMS 2010). This creates cash flow in the community and provides income for farmers.

One benefit of farmer's markets is the improvement in nutritional food access in rural communities (Gomez and Schmit 2010). Evidence suggests that increasing availability and convenience of food items may be effective strategies when marketing for farmers' markets (Glanz and Yaroch 2004). Although grocery stores offer a more convenient outlet, farmers' markets embrace both large and small locations where consumers can purchase food products. According to Summer, Herrick, and Sommer (1981) in a study of farmers' markets and supermarkets, farmers' markets were perceived by their customers as more friendly, personal, rural, smaller, and happier settings than supermarkets.

Today, consumers are generally better educated and expect a wider range of products. Further, consumers are more conscious about health related aspects of fresh fruits and vegetables. Also, the perception of product quality is no longer restricted to the physical properties of the product but also other attributes including production practices (Shewfeld and Bernhard 2000). As a result, there are frequent needs for new products and a more differentiated food product assortment.

Consumers who attend farmers' markets and those who do not should know whether they are getting the best deal for their money and time (Ange 2001). Taking a look at price data of produce in grocery stores versus farmers' market prices can lead to benefits for both consumers and producers. Payne (2000) found marketing directly to the customer, farmers are able to eliminate middlemen and increase returns. This has the additional effect of providing customers with high-quality, fresh produce at a price comparable to that found in grocery stores. According to Wolf and Ahern (2002), regulations placed on farmers' market venues exclude third parties or wholesale operations from participating, but the primary goal of the study was comparing prices

of farmer's markets. This creates a venue for farmers selling directly to consumers at market locations.

A thorough study must first consider producer activity and price trend analysis to determine prices that are placed on producers at farmers' markets. Measuring producer activity is necessary in price comparisons to provide the community with a better understanding of the prices placed on produce. Gunderson and Watson (2010) suggest that as the consumer demand increases for quality products at reasonable prices, so should producer supply. In relation to consumer needs, the producer must be able to respond quickly to price fluctuations. Furthermore, Gunderson and Watson (2010) emphasized that as consumers' interest in farmers' markets increases, the consumer's willingness-to-pay for the perceived benefit associated with the products that they purchase at these locations will increase. This is strong evidence that prices at farmer's markets are lower than prices at grocery stores.

Prices placed on the produce sold at farmer's markets are affected by many factors. These factors include availability of certain produce and seasonal price variation in both markets (Ange 2001). Knowledge of how prices are affected allows consumers to interact with the producers at farmers' markets to further exchange ideas and improve the relationship between consumers and producers. In a recent study done by Watson and Gunderson (2010) in the state of Florida, results concluded that 60% of consumers are highly likely to purchase local food products and 40% are neutral or somewhat likely to purchase local food products in the absence of prices. This information concludes that there are positive results for the future of the continually growing popularity of farmers' markets.

Contributing to consumer's perceptions of farmers markets, Jekanowski, Williams, and Schiek (2000) suggested consumer purchasing behavior was a function of several factors,

including perceptions of the quality, value of the product in question, and prior shopping experiences. Confirming these attributes, past studies show that farmers' market consumers are also concerned with the overall quality of the products offered, the lower prices compared to those of comparable goods in supermarkets, and the market's atmosphere (Agustini, *etal.*, 2008).

With similar studies and data collection done in other states, it is important to compare the demographics in San Luis Obispo County. In a study done by Wolf, Spittler, and Ahern (2005), a survey of 336 produce consumers in San Luis Obispo County was distributed to compare the profile of farmers' market shoppers. Results found that when purchasing produce, consumers ranked quality and value as the most important attributes. The study also found that consumers believe the produce at farmers' markets to be fresher, more reasonably priced, easily traceable to the grower, better for the environment, and locally grown when compared to grocery store produce. It is important to note that the study did find that many consumers do not shop at farmers' markets due to the lack of convenience.

Ange (2001) found that price is an issue among sellers at farmers' markets when reviewing other senior projects involving price comparisons. Hunt (2000) and Faber (2000) conducted studies using different commodities among farmer's markets and grocery stores. Those studies determined that the prices at farmers' markets were lower than supermarket prices. Furthermore, Giacalone (1999) found that prices on average at San Luis Obispo farmers' markets were 72 cents less than grocery stores on Granny Smith apples, Naval Oranges, large tomatoes, and cauliflower. Although a number of studies have addressed the price comparisons of produce in San Luis Obispo County and reasons for consumer preferences and producer benefits, it is important to keep an updated price comparison analysis.

CHAPTER III

METHODOLOGY

Procedures for Data Collection

Research on economic benefits to consumers and producers will be done by gathering comparable price data of commodities at farmers' markets and neighboring grocery stores in San Luis Obispo County. There were five different commodities that were evaluated in price comparisons. The five commodities were: Fuji apples, vine ripe tomatoes, green seedless grapes, sweet onions, and celery. All commodities were measured per pound, with the exception of celery which was measured on a per unit/bunch; a bunch contains 10-15 stems.

The data was collected over a two month time period, from October 2010 through December 2010 at three farmers' markets in San Luis Obispo County. The markets included the San Luis Obispo farmers' market on Higuera Street held every Thursday from 6 to 9pm, the farmers' market located in the Madonna Shopping Center on Madonna Road held every Saturday from 8 to 10:30 am, and a farmers market in Morro Bay located on the 800 block of Main Street held every Saturday from 1 to 5pm. The neighboring grocery stores are as follows; Albertsons located in the Foothill Shopping Center on Foothill Blvd., Ralphs located in the Madonna shopping center on Madonna Road, and Spencers Fresh Market located on 2650 Main Street in Morro Bay. Prices were compared every three weeks for a total of three times throughout the eight week period. The data gathered includes prices of each commodity, location, and date. All

of this data is displayed on tables done in Excel (see Appendix 1A).

Table 1. Estimated Distance Between Selected Farmers' Markets and Paired Grocery Stores

Estimated Distance	Albertsons	Ralphs	Spencers Shopping Center
San Luis Obispo Farmers' Market, Higuera Street	1.4 Miles		
Maddona Shopping Center Farmers Market		0.2 Miles	
Morro Bay Farmers' Market			1.7 Miles

Procedures for Data Analysis

Prices of the five commodities are displayed in Appendix tables 1-5. The prices of each commodity were analyzed over an 8 week period for differences in farmers' market and grocery store prices using ANOVA for mean differences. The data provides prices that were identified at farmers' markets (FM) or grocery stores (GS). The information collected was placed into Minitab Statistics Program 15, which was available at Cal Poly. The data was analyzed using an Analysis of Variance (ANOVA) procedure. This tests for equality of several groups means. This is used to test the hypothesis that the average price at farmers' markets is less than the average price at grocery stores: $H_a: \bar{P}_{FM} < \bar{P}_{SM}$.

Assumptions

The data in this study is presented assuming that seasonality and producer decisions may require substitutions among each market and produce selected.

Limitations

At the start of this project, it was planned to collect data for twelve different commodities. Due to the lack of produce presented at the Morro Bay farmers' market, only five of the twelve items were chosen and data was collected; given that all five chosen were available to analyze at each location. Also, time was a limiting factor when trying to decide which farmers' markets to attend. Due to schedule conflicts and project due date, the chosen markets were the best fit, although there were more markets that could have been attended.

CHAPTER IV

DEVELOPMENT OF THE STUDY

Prices of the five selected produce and their neighboring grocery stores were analyzed. An average of each commodity at the three selected farmer's markets was calculated for the eight week period, visiting each location three times each. Similarly, the average prices of each commodity at the three selected neighboring grocery stores were calculated. The data of all prices from farmer's markets and grocery stores is compared and can be represented below:

Table 1: Descriptive Statistics of all Prices at SLO Farmers Markets and Grocery Stores, Fall 2010

Variable	N	Mean	SE Mean	StDev	Min	Q1	Median	Q3	Max	COV
Grocery Store Prices	45	1.9691	0.0866	0.5808	0.9900	1.5000	1.8900	2.399	2.9900	0.337
Farmers Market Prices	45	1.7636	0.0480	0.3221	1.0000	1.5000	0.5000	2.0000	2.1300	0.1037

Table 2 above shows an example of how the data was analyzed at each farmer's market and their paired neighboring grocery store. The important aspects to notice are the means of the prices. The mean prices at all farmers' markets are 21 cents less when compared to all the prices at the selected grocery stores. This shows that on average and given the five produce selected, the average prices at farmer's markets are less than the average prices at their neighboring grocery store. Also, looking the standard deviation measures how much variation there is from the mean. Since the grocery store prices and farmers' market standard deviations are a low number, this indicates that the prices are very close to the mean value. Furthermore, covariance provides a measure of strength of the correlation between two variables given a sample size.

Since the covariance of the prices is greater than zero, there is a statistical correlation between grocery store prices and farmers' market prices.

Although the analysis shows that when averaging all the prices combined was less at farmers' markets, it is important to note that Fuji Apple prices, on average, were higher at farmers' markets. All vendors at each farmers' market allowed consumers to choose a variety of apples, besides just Fuji. This means that consumers were allowed to choose different varieties of apples which could cost more at grocery stores, and purchase them for 2 dollars per pound.

An ANOVA test was done on each commodity and then on all commodity prices combined. This measures the amount of variation in a sample. The test compares the means of each population against each other through the use of the F-statistic and the p-value. The test compared the means for significant differences of prices between farmers' markets and grocery stores. When there is little differences between the means, the F-statistic will be small and the p-value will be large. As the difference between the sample mean increases, the F-statistic becomes larger and the p-value decreases. The point at which the difference is considered significant is when the p-value is smaller than 0.05. Although most of the results had an insignificant p-value, there is still an apparent nominal significance meaning there was a difference in the mean prices at farmers' markets and grocery stores. To further prove test the hypothesis an ANOVA was done after combining all the prices together. This ultimately proves that the mean prices at farmers' markets are in fact lower than grocery stores on the five selected commodities.

More importantly, all prices at farmers' markets and grocery stores are included in each test. Separating the prices into specific categories of each market or grocery store location is insignificant when testing the hypothesis. All ANOVA results are listed below in tables.

Table 3. ANOVA Test of Celery Prices at Farmers' Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County

Units: \$/unit(10-15 Stems of celery in one unit).

Source	DF	SS	MS	F	P
Farmers Market	1	0.0144	0.0144	0.33	0.572
Error	16	0.6950	0.0434		
Total	17	0.7094			

S = 0.2084 R-Sq = 2.04% R-Sq(adj) = 0.00%

Individual 95% CIs For Mean Based on Pooled StDev: No Significant Difference.

Level	N	Mean	StDev	-----+-----+-----+-----+-----
GS	9	1.5567	0.2000	(-----*-----)
FM	9	1.5000	0.2165	(-----*-----)
				-----+-----+-----+-----+-----
				1.40 1.50 1.60 1.70

Pooled StDev = 0.2084

Notes: a) GS represents grocery stores.

b) FM represents farmer's markets.

c) Celery is measured on a dollar per unit. A unit includes 10 to 15 stems of celery. □

Looking at the table above, the F test, which is relatively low and comparing it to the p-value which is high, concludes that there is no significance in the value of the means of the farmers' market prices versus the grocery store prices for celery? In contrast, although there is no significance, one can conclude there is an apparent nominal significance; the mean price of celery at the selected Grocery Stores is .06 cents higher than the farmers' market mean price. Also, there is a 95% confidence that the mean values of price at both the farmers' market and grocery stores lies between \$1.50 and \$1.56. There is not a significance difference in this data.

Table 4. ANOVA Test of Green Seedless Grapes at Farmers' Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County.

Units are dollar per pound.

Source	DF	SS	MS	F	* P
Farmers Market	1	1.8113	1.8113	26.29	0.000
Error	16	1.1022	0.0689		
Total	17	2.9136			

S = 0.2625 R-Sq = 62.17% R-Sq(adj) = 59.80% *Significant at p=0.05

Individual 95% CIs For Mean Based on Pooled StDev: 63 Cents Less at FM, ~30% Lower Prices

Level	N	Mean	StDev	+-----+-----+-----+-----
GS	9	2.6344	0.3712	(-----*-----)
FM	9	2.0000	0.0000	(-----*-----)
				+-----+-----+-----+-----
				1.80 2.10 2.40 2.70

Pooled StDev = 0.2625

Notes: a) GS represents grocery stores.
b) FM represents farmer's markets.
c) Green seedless grapes are measured on a per pound basis in dollars.

Illustrated in the table above, since the F tests for significant differences among variances and is greater than one, the results are statistically significant. There is a significant difference in the price of green seedless grapes at farmers' markets and grocery stores. Average prices at grocery stores are 63 cents greater than average prices at farmer's market which is thirty percent higher.

Table 5. ANOVA Test of Vine Ripe Tomatoes at Farmers' Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County.

Source	DF	SS	MS	F	P
Farmers Market	1	0.823	0.823	3.70	0.073
Error	16	3.564	0.223		
Total	17	4.388			

S = 0.4720 R-Sq = 18.77% R-Sq(adj) = 13.69%

Individual 95% CIs For Mean Based on Pooled StDev: No Significant difference.

Level	N	Mean	StDev	
GS	9	2.3567	0.6403	(-----*-----)
FM	9	1.9289	0.1884	(-----*-----)

-----+-----+-----+-----+--
1.80 2.10 2.40 2.70

Pooled StDev = 0.4720

Notes: a) GS represents grocery stores.
b) FM represents farmer's markets.
c) Vine ripe tomatoes are measured on a per pound basis in dollars

In the table above, the mean price for the grocery store is \$2.35 and the mean price for the farmers' market is \$1.92. Average price of Vine Ripe tomatoes at grocery stores is \$0.43 cents greater than at farmer's markets. Although the p-value is above 0.05, there is a nominal significance in price, but the results are not significant enough based on the small sample size. The ANOVA test also shows that for vine ripe tomatoes the standard deviation is 18 cents on either side of the mean. This means there is less variation in prices at farmers' markets when compared to grocery stores.

Table 6. ANOVA Test of Sweet Onions at Farmers' Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County.

Source	DF	SS	MS	F	P
Farmers Market	1	0.101	0.101	0.80	0.385
Error	16	2.029	0.127		
Total	17	2.131			

S = 0.3561 R-Sq = 4.75% R-Sq(adj) = 0.00%

Individual 95% CIs For Mean Based on Pooled StDev: No Significant Difference

Level	N	Mean	StDev	+-----+-----+-----+-----
GS	9	1.5944	0.3414	(-----*-----)
FM	9	1.4444	0.3703	(-----*-----)
				+-----+-----+-----+-----
				1.20 1.40 1.60 1.80

Pooled StDev = 0.3561

Notes: a) GS represents grocery stores.
b) FM represents farmer's markets.
c) Sweet Onions are measured on a per pound basis in dollars.

The table for Sweet onions displays the p-value being greater than 0.05 and the f test being low. Again, this shows there is no significance in price difference, but there is a nominal significance in the mean prices. The mean prices at grocery stores are 15 cents higher than at farmer's markets, but not significant based on this small sample.

Table 7. ANOVA Test of Fuji Apples at Farmers' Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County.

Source	DF	SS	MS	F	P
Farmers Market	1	0.2427	0.2427	5.98	0.026
Error	16	0.6489	0.0406		
Total	17	0.8916			

S = 0.2014 R-Sq = 27.22% R-Sq(adj) = 22.67%

Individual 95% CIs For Mean Based on Pooled StDev: Price GS > FM

Level	N	Mean	StDev	
GS	9	1.6567	0.1803	(-----*-----)
FM	9	1.8889	0.2205	(-----*-----)
				-----+-----+-----+-----+
				1.65 1.80 1.95 2.10

Pooled StDev = 0.2014

Notes: a) GS represents grocery stores.
b) FM represents farmer's markets.
c) Fuji Apples are measured on a per pound basis in dollars.

According to the table above, the ANOVA test shows there is a significant difference in prices due to the F value of 5.98. The average price of Fuji apples at the farmer's markets are 23 cents higher than at the grocery stores. Fuji apples are the only exception where prices are greater at farmers' markets. It is important to understand that at all farmers' markets in this study; apple prices were the same for other variations of apples that were more expensive at grocery stores. Vendors allowed a "mix/match" selection of all variations of apples. This is the first instance where the average prices at farmer's markets are greater than the average prices at the grocery stores, but it is still not significant.

Table 8. ANOVA Test of All Prices at Farmers' Markets and Grocery Stores Collected in Fall 2010 Throughout San Luis Obispo County.

Source	DF	SS	MS	F	* P
Farmers Market	1	0.967	0.967	4.37	0.039
Error	88	19.471	0.221		
Total	89	20.438			

S = 0.4704 R-Sq = 4.73% R-Sq(adj) = 3.65% * Significant at p=0.05

Individual 95% CIs For Mean Based on Pooled StDev

Level	N	Mean	StDev	--+-----+-----+-----+-----			
GS	45	1.9598	0.5819	(-----*-----)			
FM	45	1.7524	0.3223	(-----*-----)			
				--+-----+-----+-----+-----			
				1.65	1.80	1.95	2.10

Pooled StDev = 0.4704

Notes: a) GS represents grocery stores.
b) FM represents farmers markets.
c) Units are in dollars.

The table shown aggregates all prices at farmers' markets and grocery stores. The average price at the selected grocery stores is 21 cents higher than the average prices at the selected farmer's markets. This is a ten percent decrease in prices at farmers' market. The ANOVA test shows that there is a significant difference in prices since the p-value is less than 0.05. Also, since the stand deviation is \$1.75 at farmers' markets, there is less variation in prices among the produce selected. This table ultimately proves the hypothesis that farmers' market prices are lower than grocery store prices on average.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The goal of this study was to test the null hypothesis of the five selected produce prices being lower at farmers' markets versus grocery stores in San Luis Obispo. The five selected commodities were chosen and prices were collected from three different farmers' markets in San Luis Obispo County along with their neighboring grocery store. From the data that was collected the analysis suggested that the alternative hypothesis, $\bar{P}_{FM} < \bar{P}_{SM}$, is true in four out of the five commodities.

This information is beneficial to consumers who are looking to become educated on the price comparisons among farmers' markets and grocery stores.

Conclusions

The data collected was placed into Minitab and an ANOVA test was performed. All tests provided prices of the commodity at farmers' markets versus grocery stores. The mean averages for all commodities were compared among the markets. Finally, after combining all the prices, the data produced showed that there was significance in price differences among farmers' market prices and grocery store prices among the selected produce.

Also, there were certain commodities that were offered at the grocery stores, but excluded at farmer's markets. At certain times, offerings are not as broad as grocery store offerings.

Recommendations

For future projects, recommendations would be to use more than five commodities to achieve a more confident conclusion on the price differences. Further recommendations include other factors than just price, to compare differences when shopping at farmers' markets and grocery stores.

References Cited

- Agustini, Haerani N., Merritt Taylor, Joao E. Mutondo, Brian Whitacre, B. Warren Roberts. and Shida Rastegari Henneberry. 2008. "The Economic Impacts of Direct Produce /Marketing: A Case Study of Oklahoma's Farmers' Markets." Paper presented at the Southern Agricultural Economics Association Annual Meeting, Dallas, February 2-6.
- Agricultural Marketing Service US Department of Agriculture (AMS-USDA). AMS Farmers' Market Facts. United States, December 2010 <http://www.ams.usda.gov/farmersmarkets/facts.htm>
- Ange, Joseph. 2001 "Comparison of Price and Quality Between Farmers' Markets and Supermarkets in San Luis Obispo County." Unpublished Senior Project. California Polytechnic State College, San Luis Obispo. Project #01-0511. pp 3-20.
- Bukenya, James O., Michael L. Mukiibi, Joseph J. Molnar and Arthur T. Siaway. 2007. "Consumer Purchasing Behaviors and Attitudes toward Shopping at Public Markets." *Journal of Food Distribution Research*. July (38:2) pp. 12.
- Faber, Adam. 2000 "A Price Comparison of Fresh Produce from the Farmers' Market vs. the Supermarket Prices." Unpublished Senior Project. California Polytechnic State College, San Luis Obispo. Project #00-0261. pp. 1-12.
- Giacalone, Ruth. 1999 "A Price Comparison of Fresh Produce from the Farmers Market vs. the Supermarket's Price." Unpublished Senior Project. California Polytechnic State University, San Luis Obispo. Project #99-0531. pp 2-15.
- Glanz, Karen and Amy L. Yaroch. 2004. "Strategies for Increasing Fruit and Vegetable Intake in Grocery Stores and Communities: Policy, Pricing, and Environmental Change." *Preventive Medicine*. (39:3) September. pp. 75-80.
- Gunderson, Michael and Jonathan Adam Watson. 2010. "Direct Marketing of Specialty Crops by Producers: A Price-Comparison Between Farmers' Markets and Grocery Stores." *Research in Agriculture and Applied Economics*. October. Selected Paper. pp. 1-28.
- Hunt, Allison. 2000. "A Better Value for Consumers Farmers' Markets or Supermarkets." Unpublished Senior Project. California Polytechnic State University, San Luis Obispo. Project #00-0698. pp13.
- Jekanowski, Mark D., Daniel R. Williams II, and William A. Schiek. 2000. "Consumers' Willingness to Purchase Locally Produced Agricultural Products: An Analysis of an Indiana Survey." *Agricultural and Resource Economics Review* April (29.8).43-53.

- Lyson, T. A., G. W. Gillespie Jr., and D. Hilchey. 1995. "Farmers' Markets and the Local Community: Bridging the Formal and Informal Economy." *American Journal of Alternative Agriculture*. (10:3). October .pp 108-13.
- Payne, Tim. 2000. "U.S. Farmers' Markets 2000: A Study of Emerging Trends." *American Journal of Agriculture*. March (33:1). pp 173-175.
- Schmit, T.M. and M.I. Gómez, 2010. "Developing Viable Farmers Markets in Rural Communities: An Investigation of Vendor Performance Using Objective and Subjective Valuations." *Food Policy*. (36:2) April. pp 119-127.
- Shewfelt, Robert L., and Bernhard Bruckner. Fruit and Vegetable Quality: an Integrated View. Lancaster: Technomic, 2000. pp. 1-6.
- Summer, Robert, John Herrick, and Ted R. Sommer. 1981. "The Behavioral Ecology of Supermarkets and Farmers' Markets." *Journal of Environmental Psychology*. (1:1) March. pp. 13-19.
- Wolf, Marianne M. and James Ahern. 2002. "California Farmers' Markets Seller Price Perceptions: The Normative and the Positive." *Journal of Food Distribution Research*. March (33:1) pp. 21-24.
- Wolf, Marianne McGarry, Arianne Spittler, and James Ahern. 2005. "A Profile of Farmers' Market Consumers and the Perceived Advantages of Produce Sold at Farmers' Markets." *Journal of Food Distribution Research*. March (36:1). pp. 192-201.

Appendix

Appendix Table 1. All Data Collected for Celery in Fall 2010 throughout San Luis Obispo County

Date:	Commodity	Farmers' Market	Grocery Store
Week 1	Celery per bunch	San Luis Obispo	Albertsons
10/7/2010		\$1.50/bunch	\$1.69/bunch
		Madonna Shopping Center	Ralphs
10/9/2010		\$1.25	\$1.69
		Morro Bay	Spencers Fresh Market
10/9/2010		\$1.50	\$1.29
Week 4		San Luis Obispo	Albertsons
10/28/2010		\$1.25	\$1.69
		Madonna Shopping Center	Ralphs
10/30/2010		\$1.50	\$1.69
		Morro Bay	Spencers Fresh Market
10/30/2010		\$1.50	\$1.29
Week 8		San Luis Obispo	Albertsons
11/18/2010		\$2.00	\$1.69
		Madonna Shopping Center	Ralphs
11/20/200		\$1.50	\$1.69
		Morro Bay	Spencers Fresh Market
11/20/2010		\$1.50	\$1.29

Appendix Table 2. All Data Collected for Vine Ripe Tomatoes in Fall 2010 throughout San Luis Obispo County

Date:	Commodity	Farmers' Market	Grocery Store
Week 1	Tomatoes, vine ripe, per lb	San Luis Obispo	Albertsons
10/7/2010		\$1.75/lb	\$2.99/lb
		Madonna Shopping Center	Ralphs
10/9/2010		\$2.00	\$2.99
		Morro Bay	Spencers Fresh Market
10/9/2010		\$1.99	\$1.99
Week 4		San Luis Obispo	Albertsons
10/28/2010		\$2.00	\$1.99
		Madonna Shopping Center	Ralphs
10/30/2010		\$2.125	\$2.99
		Morro Bay	Spencers Fresh Market
10/30/2010		\$1.99	\$1.99
Week 8		San Luis Obispo	Albertsons
11/18/2010		\$1.50	\$1.99
		Madonna Shopping Center	Ralphs
11/20/2010		\$2.00	\$2.99
		Morro Bay	Spencers Fresh Market
11/20/2010		\$2.00	\$1.29

Appendix Table 3. All Data Collected for Sweet Onions in Fall 2010 throughout San Luis Obispo County

Date:	Commodity	Farmers' Market	Grocery Store
Week 1	Sweet Onions, per lb	San Luis Obispo	Albertsons
10/7/2010		\$1.00/lb	\$1.49/lb
		Madonna Shopping Center	Ralphs
10/9/2010		\$1.75	\$1.99
		Morro Bay	Spencers Fresh Market
10/9/2010		\$1.00	\$2.00
Week 4		San Luis Obispo	Albertsons
10/28/2010		\$1.50	\$0.99
		Madonna Shopping Center	Ralphs
10/30/2010		\$1.50	\$1.50
		Morro Bay	Spencers Fresh Market
10/30/2010		\$1.00	\$2.00
Week 8		San Luis Obispo	Albertsons
11/18/2010		\$1.75	\$1.49
		Madonna Shopping Center	Ralphs
11/20/2010		\$1.50	\$1.50
		Morro Bay	Spencers Fresh Market
11/20/2010		\$2.00	\$1.39

Appendix Table 4. All Data Collected for Green Seedless Grapes in Fall 2010 throughout San Luis Obispo County

Date:	Commodity	Farmers' Market	Grocery Store
Week 1	Green Seedless Grapes, per lb	San Luis Obispo	Albertsons
10/7/2010		\$2.00/lb	\$2.49/lb
		Madonna Shopping Center	Ralphs
10/9/2010		\$2.00	\$2.99
		Morro Bay	Spencers Fresh Market
10/9/2010		\$2.00	\$2.29
Week 4		San Luis Obispo	Albertsons
10/28/2010		\$2.00	\$2.49
		Madonna Shopping Center	Ralphs
10/30/2010		\$2.00	\$1.99
		Morro Bay	Spencers Fresh Market
10/30/2010		\$2.00	\$2.99
Week 8		San Luis Obispo	Albertsons
11/18/2010		\$2.00	\$2.99
		Madonna Shopping Center	Ralphs
11/20/2010		\$2.00	\$2.99
		Morro Bay	Spencers Fresh Market
11/20/2010		\$2.00	\$2.49

Appendix Table 5. All Data Collected for Fuji Apples in Fall 2010 throughout San Luis Obispo County

Date:	Commodity	Farmers' Market	Grocery Store
Week 1	Fuji Apples, per lb	San Luis Obispo	Albertsons
10/7/2010		\$2.00	\$1.79
		Madonna Shopping Center	Ralphs
10/9/2010		\$1.50	\$1.79
		Morro Bay	Spencers Fresh Market
10/9/2010		\$2.00	\$1.59
Week 4		San Luis Obispo	Albertsons
10/28/2010		\$2.00	\$1.49
		Madonna Shopping Center	Ralphs
10/30/2010		\$2.00	\$1.79
		Morro Bay FM	Spencers Fresh Market
10/30/2010		\$2.00	\$1.59
Week 8		San Luis Obispo	Albertsons
11/18/2010		\$1.50	\$1.79
		Madonna Shopping Center	Ralphs
11/20/2010		\$2.00	\$1.79
		Morro Bay	Spencers Fresh Market
11/20/2010		\$2.00	\$1.29