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Goat Meat Consumer Preferences: Implications for Goat Meat Marketing in Metropolitan Nashville, Tennessee Area

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Abstract

Goat meat has become an increasingly good source of protein for meat eaters in the global marketplace. Goat meat constitutes about 63% of all red meat consumed worldwide. It is the main source of animal protein in many North African, Middle Eastern nations, Southeast Asia, the Caribbean, and other tropical regions. This notwithstanding, goat meat is yet to take such prominence in the U.S. diet. Despite the acknowledgement of the meat as lean, tasty and less fatty than other meats (USDA 2001), consumption is still limited to certain groups. Results of this study will provide implications for a successful market expansion in the area.

Keywords: consumer preferences, goat meat, marketing, Analysis of Variance

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Background

In the last few decades, the demand for goat meat has far outstripped the supply. According to the National Agricultural Statistics Service (NASS) of the United States Department of Agriculture (USDA), there were 2.86 million goats in the United States in 2012, a 4% decline from 2011. In spite of this decline in supply, the demand has steadily increased over the years. Economic theory suggests that when the quantity demanded exceeds the quantity supplied, all things held constant, there will be a shortage which could lead to increased prices. This explains why the US imports about 750,000 goats each year to fill the supply gap. The goat slaughter rate at USDA inspected facilities reached approximately 647,000 in 2003 from about 208,000 goats in 1991 (Stanton 2004). A total of 773,800 goats were slaughtered in federally inspected facilities in the United States in 2011 (Pinkerton and McMillin 2011). In 2011, 48,583 goats were slaughtered in Tennessee (Menard 2011; Jamey 2011). While increased demand and supply may be good for producers, it may not be so good for the consumers in the short run. This situation was good news for goat producing states such as Tennessee, Texas, Ohio, Missouri, and Georgia among others (Montgomery 2010).

Consumer Goat Meat Preferences

The major demand for goat meat comes from the many ethnic groups dispersed in the United States. Overall, the predominately white, middle-class population consumes relatively very little goat meat. Ethnic and religious identity is often associated with goat meat consumption. Recent immigrants to the United States come from Asia or are of Hispanic background compared to earlier immigrants who tended to be of European descent. While Hispanics tend to concentrate in a few cities such as Los Angeles, New York, Miami and San Antonio, many Asians can be found in other cities such as Detroit. Ethnic composition in America's cities and urban areas distinctly differ in their goat meat preferences depending on the location of the city. There are currently more than 14 million Muslims in the United States. The diversity in the ethnic populations has led to unique preferences in goat meat in the United States. While young goats are preferred by Mexican-Americans, Chinese and Koreans prefer young goats of good quality weighing 60-70 pounds. Americans of Jewish extraction also prefer high quality kids (20 to 40 pounds). African immigrants from the West Indies prefer older goats of lesser quality, with male preference.

Recently, the United States has witnessed a rise in ethnic population, increased religious diversity and expanded disposable income. These factors derive the demand for goat meat. The recent acceptability of goat meat as an excellent source of nutritious and healthy source of protein for meat eaters has opened the market for goat meat consumption in the US. Availability of the nutrient composition of goat meat (USDA 2001) has attracted health-conscious consumers, thereby expanding demand for goat meat and goat food products such as cheese and milk (Montgomery 2010; Kick 2012). Goat meat has less fat and cholesterol than beef, pork, chicken and lamb.

As shown in Table 1, goat meat has lower calories, total fat, saturated fat, and cholesterol than other conventional meats. Health-conscious Americans are making informed decision to consume lesser amounts of saturated fat and cholesterol in their diets. Goat meat also contains high levels of iron and potassium than is found in other types of meats (Correa 2011). Goat meat has

higher levels of iron (3.2 mg) when compared to a similar serving size of beef (2.9 mg), pork (2.7 mg), lamb (1.4 mg), and chicken (1.5 mg). Comparatively, goat meat also contains higher potassium content with lower sodium levels. Regarding essential amino acid composition, goat meat closely resembles that of beef and lamb. As the health benefits of goat becomes more widely known among the general population, the demand for alternative low-fat red meat should also continue to increase.

Table 1. Nutrient Composition of Goat Meat and Other Types of Meat**

Nutrient	Goat	Chicken	Beef	Pork	Lamb
Calories	122	162	179	180	175
Fat (g)	2.6	6.3	7.9	8.2	8.1
Saturated Fat (g)	0.79	1.7	3.0	2.9	2.9
Protein (g)	23	25	25	25	24
Cholesterol (mg)	63.8	76.0	73.1	73.1	78.2
Iron (mg)	3.2	1.2	2.9	2.7	1.4

**Per 3 oz. of cooked meat; USDA Nutrient Database for Standard Reference, Release 14 (2001)
Source: http://www.aces.edu/pubs/docs/U/UNP-0061/

Data and Methodology

Face-to-face interviews of a conveniently selected sample of participants were used in collecting the data reported in this paper. Volunteers were sent to two locations in metropolitan Nashville, Tennessee area for this purpose. An area with stores that carried ethnic food items and restaurants was targeted for these interviews. Additional efforts were invested during a one-day small farm expo located in another part of the metro area. Three days total were spent on collecting data from these two locations. A total of fifty-five completed and usable surveys were collected. This represented 79% of the 70 questionnaires originally prepared for distribution at these locations. Data collected was coded and entered for processing using the Excel spreadsheet and the Statistical Package for the Social Sciences (SPSS). Mean, variance, standard deviations were calculated for variables that were of interest the study. Cross-tabulation, regression, and ANOVA procedures from SPSS were also used to calculate statistics of interest.

Results and Discussions

Results of the survey administered to participants in the research are presented in Tables 2 and 3. While 62.2% of respondent to the survey identified themselves as immigrants, 35.8% indicated that they were from the United States or one of its rust territories. When asked to identify country of birth, a little more than half (51.0%) of respondents identified themselves as Africans, 35.8% as born in the United States and 13.2% as Asian, Middle Eastern, or some other origin.

Table 2. Selected Profile of Goat Meat Consumers

Demography	Respondents(n)	Percent(%)
Place of Origin		
Immigrants	34	62.2
US & Trust territories	19	35.8
Country of Origin		
Africa (Nigeria & Ghana)	9	51.0
US & Trust territories	19	35.8
Asia/Middle-East/Others	7	13.2
Race/Ethnicity		
Black (African)	44	83.0
White (Caucasian, Asian/Others)	9	17.0
Place of Residence		
Metro Nashville, TN	50	91.0
Elsewhere (works in Nashville, TN)	4	9.0
Males	24	45.3
Females	29	54.7
Age		
18-30 years	16	28.3
31-50 years	25	47.0
51 years and older	13	24.5
Education		
High School or less	7	15.1
Some College	24	45.3
Professional/Postgraduate	20	37.7
Main Occupation		
Business	5	9.4
Farming	2	3.8
Professional work	23	43.4
Student	13	24.2
Other	10	26.9
Household Income		
Less than $30,000	13	24.5
$31,000-$60,000	22	41.5
$61,000-$90,000	6	11.3
Over $90,000	9	17.0

A total of 83.0% of study participants were Blacks of African descent while 17.0% were Asians, Whites (Caucasians), or other. While 91.0% identified themselves as residents of Metropolitan Nashville area, only 9.0% lived elsewhere although they worked in Nashville. The sample consisted of 45.3% males and 54.7% females. The following distribution was observed for the recorded age of participants: 18 to 30 years old, 28.3%, 31 to 50 years of age, 47.0% and 51 years and older, 24.5%. In terms of education, 45.3% of the participants had some college, 37.7% baccalaureate or postgraduate degrees, 15.1% high school or less. About 9% of the respondents worked in businesses, 43.4% professional workers, 26.9% other occupations, and 24.2% students. While 24.5% of the goat meat buyers earned an income of $30,000 or less, 41.5% made $31,000-$60,000, 11.3% earned $61,000-$90,000, and 17% generated $90,000 or more per year.

Table 3. Goat Meat Consumer Buying Behavior and Cut Preferences

Buying Behavior	Respondents (n)	Percent (%)
Buying Goat Meat	43	83.1
Fresh	41	77.4
Frozen	8	15.1
Other	4	7.5
Specific Cuts		
Ribs	1	1.9
Tenderloin	3	5.7
Chops	16	30.8
Other	5	9.6
No preference	28	52.0
Whole carcass	9	17
Young goat meat	6	9.4
Buy cut & whole carcass	10	19.2
Purchasing Location		
Direct – farmer	20	37.7
Retail store	14	26.4
Farmers market	8	15.1
Butcher	6	11.3
Other	3	5.7

Buying Behavior, Preference, and Location

The analysis of data (Table 3) showed that 83 percent of the respondents purchased goat meat. While 77% of the participants preferred buying fresh goat meat, 15.1% frozen, and 7.5 % had no specific preference. Regarding specific cuts, 1.9% said they purchased ribs, 5.7% tenderloin, 30.8% chops, 9.6% other parts, and 52% had no preference, would buy nearly any part, or were simply glad to find goat meat for their special occasions. Of the 53 participants who answered the question, while 60.3% of survey participants were willing to travel for up to 20 miles to

purchase their goat meat, 34.0% were willing to travel more than 20 miles one way to buy their meat. In terms of buying behavior 17% of the participants were willing to purchase whole carcass, 9.4% young goat under one-year old, and 19.2% both cut & whole carcass, while 56.6 other parts. In response to where they bought their meats, 37.7 % indicated that they bought theirs directly from farmer, 26.4 % retail stores, 15.1 % farmers' markets, 11.3 % from the butcher, and 5.7% purchased from other sources.

Factors Affecting Purchase Decision

Analysis of the survey responses showed that while 32.1% of the participants said they paid too high a price for their goat meat, 54.7 % said they paid the appropriate price for their purchase. In making the decision to buy goat meat, price was considered important by 85% of the buyers while 15% did not consider price important. Taste, package, and nutrition information were considered important by 84%, 75%, and 58% of respondents, respectively. Almost 60% of the participants indicated that they would buy more goat meat if additional information on nutritional value of goat meat was available to them.

Respondents were asked to rate factors that affected their decision to buy goat meat using a scale that ranged from 0, indicating not important to 3, indicating very important. Ranking based on average scores are presented in Table 4. Availability and the cleanliness of the store were tied in first place ranking with a mean score of 2.77 while taste, price, and seller reputation ranked in second, third, and fourth places with scores of 2.75, 2.65, and 2.38, respectively. Surprisingly, packaging scored the lowest in importance (2.06) for this sample of buyers. Overall quality was still of utmost importance to buyers as reflected in the score of 2.84.

Table 4. Mean Score Factors Affecting Goat Meat Purchasing Decision

Factor	Mean Score*
Overall Quality	2.84
Availability	2.77
Store Cleanliness	2.77
Taste	2.75
Price	2.65
Seller Reputation	2.38
Package	2.06

*Mean score based on scale that ranged from 0 = not important to 3 = very important.

A One-Way Analysis of Variance (ANOVA) procedure (Table 5) showed that the decision to buy goat meat was related (at the 1-percent level of significance) to US immigrants status ($F_{1, 49}$ = 13.920, p = 0.001), buying preference ($F_{1, 49}$ = 11.951, p = 0.001), and purchasing location ($F_{1, 48}$ = 7.714, p = 0.008). This implies that goat meat eaters are among the immigrant population who now live in the Nashville Metropolitan area and have the buying power and desire for goat meat. Furthermore, decision to buy goat meat was also significantly related to country of origin ($F_{1, 49}$ = 6.853, p = 0.012), preference-specific cuts ($F_{1, 23}$ = 5.143, p = 0.034), and travel distance to purchase goat meat ($F_{1, 47}$ = 4.022, p = 0.051) at the 5-percent level. These factors were also

significantly related to the length of time as meat goat consumer ($F_{1, 48} = 3.885$, $p = 0.055$) and preparation information ($F_{1, 38} = 3.196$, $p = 0.082$) at the 10-percent level.

Table 5. Results of a One-Way Analysis of Variance (ANOVA) Dependent Variable: Buying Goat Meat

Factors		Sum of Squares	Degrees of Freedom(df)	Mean Square (MS)	F	Significance (p)
Country of Origin	B-Groups	5.550	1	5.550	6.853	.012**
	W-Groups	38.870	48	.810		
	Total	44.420	49			
Immigrants (Non-USA-Trust Territory)	B-Groups	2.738	1	2.738	13.920	.001***
	W-Groups	9.442	48	.197		
	Total	12.182	49			
Length of Time as Consumer	B-Groups	.433	1	.433	3.885	.055*
	W-Groups	5.240	47	.111		
	Total	5.673	48			
Buying Preference	B-Groups	3.764	1	3.764	11.951	.001***
	W-Groups	15.116	48	.315		
	Total	18.880	49			
Preference-Specific Cuts	B-Groups	2.264	1	2.274	5.143	.034**
	W-Groups	9.726	22	.442		
	Total	12.000	23			
Purchasing Location	B-Groups	9.415	1	9.415	7.714	.008***
	W-Groups	57.360	47	1.220		
	Total	66.776	48			
Travel Distance to purchase goat meat	B-Groups	5.762	1	5.762	4.022	.051**
	W-Groups	65.905	46	1.433		
	Total	71.667	47			
Preparation Information	B-Groups	.750	1	.750	3.196	.082*
	W-Groups	8.686	37	.235		
	Total	9.436	38			

***p ≤ 0.01
**p ≤ 0.05
*p ≤ 0.10

The respondent said that if more information was available to them on how to prepare goat meat, they would be willing to purchase more. Some of these participants are non-traditional goat meat eaters born in the United States, and they are customers for goat meat. These health conscious American consumers chose to meet their nutritional need with eating goat meat. The market demand is expanding beyond the immigrant communities, wide sprayed from traditional to non-

traditional consumers. Tennessee goat meat producers and marketers have a great potential to fill or satisfy this growing demand with fresh local goat meat from the Metropolitan area markets.

Conclusions and Recommendations

This paper discussed the profile and preferences of goat meat consumers in the metropolitan Nashville, Tennessee area. Although the participants were selected from two specific sections of the area considered, the results shed some light on what general characteristics are important to buyers of goat meat. Not only are these buyers interested in buying fresh goat meat, they were quite willing to travel in excess of twenty miles to purchase their meat. Availability and the cleanliness of the store were important factors in the decision of the consumers to buy goat meat. While overall quality of the meat was considered very important, the packaging received a much lower factor ranking. The fact that many consumers were buying their meat directly from farmers indicates that there is an enormous opportunity for producers in the Metro Nashville area. Since consumer tastes and preferences are evolving over time, producers need to constantly stay in touch with their clients to constantly monitor changes in preferences. Surveys such as the one reported in this paper can provide such information. A more extensive sample drawn from many segments of Nashville may provide information and results that can be generalized to Tennessee.

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Examining College Students' Daily Consumption of Fresh Fruits and Vegetables

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Abstract

Results from a random sample of 305 college students suggest that consumption of fresh fruits and vegetables is independent of gender, academic ranks, and places of residence, but depends on perceptions of health status. Despite the statistically significant associations between perceptions of health and consumption of fruits and vegetables, 82 percent of the respondents who perceived their health status as poor or fair ate no fresh fruits or vegetables.

Keywords: consumption of fresh fruits and vegetables, health status, college students

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Introduction

Researchers have been suggesting for more than a decade that the United States is facing a serious healthcare crisis because of the sheer numbers of overweight and obese individuals, and the escalating costs for treating diet-related diseases. Agatston (2011) argues that unless we reverse our sedentary lifestyles and obesity epidemic, the U.S. healthcare system will go bankrupt. He also suggests that the current population of adults aged 30-45 many not live as long as their parents because of the incidences of diet-related diseases in this age group compared to the previous generations. The Robert Wood Johnson Foundation and Trust for America's Health September 2012 Report: *F as in Fat: How Obesity Threatens America's Future* (2012) also suggests that if the obesity trajectory continues, more than half of Americans will be obese by 2030, and the costs for treating new cases of diabetes, coronary heart disease, and stroke could exceed $66 billion per year. Rising obesity rates may also become a national security issue because the military now reports that 25 percent of 17-to-24-year olds are too overweight for military service. Further, the Department of Defense spends about $1 billion per year for weight-related health problems (Christeson et al. 2012).

Poor diets, obesity, and sedentary lifestyles have been associated with debilitating diseases such as heart disease, cancer, Type 2 diabetes, hypertension, and stroke, among others. Consumption of fresh fruits and vegetables is frequently recommended as a viable way to attain healthier diets and to reduce diseases. Fruits and vegetables are low in fat and calories and are excellent sources of vitamins and minerals. Therefore, the dietary guidelines recommend eating a wide variety and colors of fruits and vegetables daily to provide the body with valuable nutrients such as fiber, folate, potassium, and vitamins A and C (http://www.cdc.gov). Despite these recommendations, only 23.1 percent of the U.S. population consumes the recommended five or more servings of fruits and vegetables per day.

Kiviniemi and colleagues (2011) observed lower consumption of fruits and vegetables among racial/ethnic groups when psychology distress was present. Richard, Kattelmann, and Ren (2006) studied ways to motivate greater consumption of fruits and vegetables among 18-24 year olds and advanced the view that although conventional wisdom may suggest that this cohort is in good health, efforts should be made to help students to develop better eating habits because the eating patterns developed in college have life-long effects on health and well-being. Thus, teaching healthy eating habits to students should be of paramount importance. Knowledge of the daily recommendations for fruits and vegetables can also lead to increased consumption (Wolf et al. 2008). If fruits and vegetables are readily available in the home at an early age, consumption is more likely to become a life-long habit (Young, Fors, and Hayes 2004).

There is now convincing research suggesting that diets rich in fruits and vegetables can reverse, treat, or prevent diseases, and can add almost a decade to one's life. Further, vegans and vegetarians are shown to have lower incidences of heart disease, cancer, cholesterol, stroke, emphysema, dementia, Type 2 diabetes, kidney failure, and respiratory infections than the general population (Freston 2012). The challenge then is to get more Americans to move away from animal-focused diets and adopt plant-based diets. We concur with other researchers that universities are excellent settings to study eating habits and help young adults to make healthier food choices. In Louisiana, overweight and obesity rates have been increasing among 18-24-year olds. Given that

a large percentage of this cohort is enrolled in colleges, our study assesses the frequency of consuming fresh fruits and vegetables by a selected group of college students. The results will provide another opportunity to help students develop better eating habits.

Objectives

The study's overall objective is to examine fresh fruit and vegetable consumption among undergraduate students. The specific objectives are (a) to assess daily consumption of fresh fruits and vegetables; (b) to ascertain whether consumption varies across gender, academic classifications, and residency; and (c) to explore the links between consumption patterns and participants' perceptions of their overall health status.

Methods and Procedures

Data

The study's data were compiled from a sample of 305 university students during fall 2011 and spring 2012. The survey was designed to capture students' knowledge of the information on Nutrition Facts panels, knowledge about vitamins, frequency of reading labels, frequency of consuming fresh fruits and vegetables, perceptions of health and weight, levels of physical activity, and selected demographics characteristics (age, academic classifications, majors, hometown, residency, marital status, household income, race, and gender). The data were analyzed using the chi-square test for independence for two categorical variables. The null (H_0) and alternative (H_1) hypotheses were as follows.

1. H_0: Daily consumption is independent of the selected response categories
2. H_1: Daily consumption depends on the selected response categories

Empirical Results and Discussion

Descriptive Statistics

The average age of the sampled students was 23-years-old. Freshmen comprised 21 percent of the respondents; sophomores, 34 percent; juniors, 28 percent; and seniors, 17 percent. 63 percent lived off campus; 57 percent would like to pursue a career in nursing; 71 percent were women, while 87 percent had never been married. About 67 percent of the respondents perceived themselves to be in good or very good health. The results in Table 1 show that 50 percent of the students consumed no fruits and 52 percent consumed no vegetables daily, and that about 8 percent of the respondents consumed fresh fruits and vegetables at least three times per day.

Table 1. Daily Consumption Levels for Fresh Fruits and Vegetables (Percentages)

Eating Frequency	Fresh Fruits	Fresh Vegetables
0	50	52
1	29	27
2	13	13
≥3	8	9

Chi-Square Tests for Independence

Table 2 shows the cross tabulations between frequencies of consuming fruits and vegetables. From the results, 82 percent of the respondents did not consume any fresh fruits or vegetables daily. These results are statistically significant at the 1 percent level of probability. The results in Table 3 capture associations among consumption of fresh fruits, demographic characteristics, students' residence, and perceptions of overall health status. From the results, daily consumption of fresh vegetables is independent of gender, academic classifications, and residence, but depends on students' perceptions of their health. Thus, whether male or female, whether being freshmen, sophomores, juniors, or seniors, or whether students lived on or off campus, they ate fresh fruits infrequently. A closer examination of the results from Table 3 reveals that 65 percent of the respondents who perceive their health as fair or poor do not consume any fresh fruits on a daily basis. Further, 46 and 42 percent of those who felt they were in very good or excellent health, respectively also reported no daily consumption of fresh fruits.

Table 2. Cross-Tabulations for Daily Consumption of Fresh Fruits and Vegetables (Percentages)

Fruits	Vegetables					
	0	1	2	≥3	χ^2	P-Value
0	82	11	49	21		
1	23	49	21	7		
2	18	42	25	15		
≥3	17	25	17	41	148.303***	0.000

***Implies statistical significance at the 1-percent level of probability.

With respect to daily consumption of fresh vegetables (Table 4), consumption is also not associated with gender, academic classifications, or whether students lived on or off campus, but depends on perceptions of health status. Despite the statistically significant result, 42 percent of these students report no daily consumption of fresh vegetables. This finding echoes the warning issued by Richards and colleagues (2006) that although many students are in good health when they enroll in college, some still have undesirable eating habits. Therefore, universities should take steps to help all students to develop better eating habits so as to reduce the risks of them developing diet-related illnesses and diseases in the future.

Table 3. Cross-Tabulations between Fruit Consumption and Selected Characteristics (Percentages)

	Daily Consumption					
	0	1	2	≥3	χ^2	P-Value
Total	**50**	**29**	**13**	**18**		
Male	47	29	16	8		
Female	52	29	12	7	1.073	0.784
Freshman	58	22	9	11		
Sophomore	46	34	14	6		
Junior	53	26	15	6		
Senior	44	33	14	9		
On Campus	51	31	10	8		
Off Campus	50	28	15	7	1.164	0.762
Fair/Poor	65	23	8	4		
Very Good/Good	45	32	15	8		
Excellent	33	25	17	25	13.364**	0.012

** Implies statistical significance at the 5-percent level of probability.

Table 4. Cross -Tabulations between Vegetable Consumption and Selected Characteristics (Percentages)

	Daily Consumption					
	0	1	2	≥3	χ^2	P-Value
Total	**51**	**27**	**13**	**9**		
Male	52	23	17	8		
Female	51	29	11	9	2.678	0.444
Freshman	62	21	11	6		
Sophomore	46	24	18	12		
Junior	54	27	11	8		
Senior	46	38	8	8	11.635	0.236
On Campus	49	27	16	8		
Off Campus	53	27	11	9	1.674	0.643
Fair/Poor	65	22	5	8		
Very Good/Good	46	28	16	10		
Excellent	42	33	25	0	14.528**	0.024

**Implies statistical significance at the 5-percent level of probability.

Summary and Conclusions

The study's overall objective was to examine fresh fruit and vegetable consumption among undergraduate students. The specific objectives were (a) to assess the daily consumption of fresh fruits and vegetables; (b) to ascertain whether consumption varied across gender, academic classifications, and residency; and (c) to explore the links between consumption patterns and participants' perceptions of their overall health status.

Based on the results, the sampled respondents consumed very small percentages of fresh fruits and vegetables daily. In fact, 82 percent of the respondents reported that they did not eat fresh fruits or vegetables on a daily basis. Twenty-one percent indicated that they ate fresh fruits two or more times per day compared to 25 and 33 percent, respectively at the state and national levels. Regarding daily consumption of vegetables, only 9 percent consumed vegetables at least three times per day. At the state and national levels, 21 and 26 percent of consumers, respectively, report that they eat vegetables three or more times per day. The results also suggested that only a small percentage (4 percent) of the students who described themselves as being in poor or fair health consumed fruits three or more times daily; eight percent who described their health in a similar manner consumed vegetables at least three times per day.

The United States spends a tremendous amount of its resources treating diet and health related illnesses. These expenditures are predicted to continue to rise astronomically in the future unless we change our eating habits and lifestyles. Children and young adults are the country's future; therefore, they must be encouraged to eat better by expanding their consumption of fresh fruits and vegetables. Freston (2012) suggests that in the past, conflicts of interest on the U.S. dietary guidelines committee may have prevented the government from recommending a plant-based diet for Americans. However, as the healthcare crisis deepens, obesity epidemic widens, and children's health declines, each us of may be forced to adopt some of the ideas advanced by *Food Day* regarding healthy, affordable, and sustainable foods. In other words, plant-based diet may become the norm rather than the exception.

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How Consumers Respond to Corporate Social Responsibility Initiatives: A Cluster Analysis of Dairy Consumers

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Abstract

Corporate branding has been a key marketing strategy for many decades, but the nature and focus of branding activities has evolved along with the interests and buying motivations of consumers, especially in the food sector. An increasing number of food companies are creating loyal customers by positioning their products in a manner that addresses concerns buyers may have about the environment, food safety, community issues and other social issues. In this study, we highlight the common themes that milk consumers may prefer to support with their buying dollars, some that are common across the whole population (animal welfare) and others that vary across distinguishable consumer segments (support for economy, environmental impact).

Keywords: Corporate Social Responsibility, Consumer Segments

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A Look at Corporate Social Responsibility (CSR) in the Dairy Industry

Corporate Social Responsibility (CSR) is a formal commitment on the part of a private company to decrease the harmful effects it may have on society and the environment. Generally, specific CSR goals or actions are defined for the company as improvement or changes in specific areas that may otherwise be negatively affected due to company operations. The popularity of Corporate Social Responsibility (CSR) has increased in the past 20 years due to pressures from both the supply (firms and retailers) and demand side (consumer advocate groups, media and stakeholders) (Öberseder 2011).

The potential for environmental externalities and the rising consumer awareness of animal welfare issues in livestock operations (Lusk et al. 2011) make the dairy industry a particularly relevant testing ground for CSR-based product differentiation strategies. According to industry sources, large distributors such as Costco and Walmart (Martinez et al. 2008) have been a major driver of CSR implementation in the dairy supply chain in an effort to reduce the risk of media scandals or other negative publicity. CSR efforts may also be driven by a desire to counter any negative stereotypes about their operations, such as the idea that large, profit-driven companies have little interest in the well-being of their employees and society in general.

CSR as a Branding Strategy to Target Consumer Activists

CSR initiatives are believed to benefit not only society and the environment, but to also create a loyal base of consumers willing to pay a price premium for CSR-differentiated brands and products. Of the consumers that are inclined to potentially integrate CSR in their purchase decision, only a minority (21%) actually uses it as a criteria to choose among products (Mohr et al. 2001).

The lack of understanding about consumer's purchases related to CSR raises some potential questions for companies that want to market in the most effective way. Some potential questions include: Are there any clustered, like-minded consumers that are seeking a common set of CSR attributes? Do some existing labeling programs present clear signals of the CSR behaviors that "target consumer clusters" seek? And what are the purchase behaviors of the target consumers?

Data and Methods

A survey of milk consumers recruited amongst Colorado State University (CSU) personnel was carried out in the summer of 2011. A total of 96 individuals participated and the survey was administered via computer on CSU premises. In addition to a section soliciting socio-demographic information, the survey consisted of three types of tasks, which directly relate to each one of the stated research objectives:

1. In a best-worst exercise (Finn et al. 2006) participants ranked, by perceived importance, the involvement of an hypothetical dairy firm in nine alternative CSR areas of effort: animal welfare, energy consumption, water consumption, air pollution, community involvement, employee opportunities, local operation, waste management, and

sustainable agricultural practices. The description of each CSR activity provided to the participants is reproduced in Table 1.

Table 1. CSR Activities Included in Study

Dairy CSR Activities	Description
Animal welfare	There is a commitment to maintaining animal health through monitored nutrition and on-staff veterinarians, and reproduction by natural breeding rather than artificial insemination. Also, animals are kept outdoors on pastures rather than enclosed barns.
Energy consumption	Refers to the use of energy saving equipment in milk processing, and also to making transportation of milk to processing plants and retailers more energy efficient.
Water consumption	Implement recycling water programs through a water treatment facility and save water by using limited irrigation schedules to irrigate pastures and crops.
Air pollution	Manage the release of bovine methane by encouraging managed grazing and carbon soil sequestration. Also, decrease air pollution by making milk transportation from farm to plant and retailer more fuel efficient.
Community involvement	Company should be involved in charitable organizations, should implement volunteering days, and create and support local community programs.
Employee opportunities	The company should provide fair or above market wages, medical benefits, vacations, and retirement plans to employees. Employee advancement in company hierarchy is encouraged, as well as diversity in the workplace.
Local operation	The company uses local resources and generates local growth. The local economy is stimulated by creating jobs locally.
Waste management	Waste management refers mainly to composting solid waste to be used as fertilizer and monitoring waste runoff to the local water table.
Sustainable agricultural practices	Commitment to maintaining good soil health for a sustainable future of the business and the environment. Soil health implies practices such as the use crop rotation; using compost as natural organic fertilizer, and never using chemicals in maintaining a fertile soil.

2. Next, participants were asked to use a quantitative scale (from -5 “much worse” to + 5 for “much better”, in increments of one) to express how fluid milk displaying a specific label certification (USDA Organic, RBST-free, Validus, and Local Colorado Proud) was perceived to perform in the nine selected CSR areas.

3. Finally, for each of the four mentioned labels, participants used a sliding bar tool (from -$2.00 to +$2.00 in increments of 10 cents) to express how much more/less they would be willing to pay for a gallon of milk displaying the label (USDA Organic, RBST-free, Validus, and Local Colorado Proud), compared to a gallon of milk without it. The exercise was then repeated, and participants were asked to estimate how much the general consumer population would be willing to pay for the label. This final step's information is the focus of a companion paper (Costanigro et al. 2012).

Findings and Discussion

The study sample statistics provided in Table 2 are comparable to the demographics for the state of Colorado provided by the US Census Bureau (US Census Quick Facts 2012). Subsequently, the cluster analysis completed for this analysis should represent similar shares of consumers who may have similar purchase motivations and perceptions of labels.

Table 2. Sample Characteristics

Characteristic		**% of Sample**
Gender	Male	26.04
	Female	73.96
Race	White, Non-Hispanic	83.33
	Black, Non-Hispanic	4.17
	Hispanic	5.21
	Asian	2.08
	Other	5.21
Education	Some technical, business school or college	9.38
	Completed B.S., B.A. or College work	29.17
	Some graduate work	10.42
	Graduate degree (Ph.D., M.S., M.D., J.D., etc.)	48.96
	High school graduate or equivalent	2.08
Household income	Less than $20,000	2.08
	$20,000 to 34,000	10.42
	$35,000 to 49,000	18.75
	$50,000 to 74,000	30.21
	$75,000-99,000	18.75
	$100,000-124,000	7.29
	$125,000- $149,000	7.29
	Over $150,000	5.21

CSR Priorities for Consumers

The overall ranking of the CSR activities were reported in (Costanigro et al. 2012) and illustrated that an overwhelming majority of participants stated that a dairy's investment in improving Animal Welfare practices was a key priority to them with respect to enterprises in the dairy sector. However, what is more interesting for this exercise is that we also find evidence of heterogeneous preferences amongst consumers. That is, a specific CSR activity may not be very important for the general population, but be extremely significant for a niche of consumers. For example, "local" was voted most important practice in 100 times (third highest in terms of "best" votes) but its overall rank is 7th because such a high share of respondents chose it as a low priority. Following Bond et al.'s 2008 work on clustering among fresh produce consumers, we sought to find similarities in individual ranking patterns between consumers as a means to identify groups of consumers (segments) with similar priorities.

In order to identify consumer segments, we used a k-means clustering technique that identifies similarities in the pattern of best-worst responses to group like-minded consumers and then named those groups based on observed patterns (Bond et al. 2008). CSR preferences within each group, as well as group characteristics, are provided in Table 3.

One result that was consistent across all consumers was their preference to buy from those who produce with some type of animal welfare certification. Beyond this general finding, two specific consumer sub-groups emerge from the results: one emphasizes local business, equal opportunities for employees, and sustainable agricultural practices; while the other prioritizes air pollution, energy consumption, water quality, and waste management. The CSR preferences of the third group (Mixed) are quite similar to the ones we previously identified for the general population, so one might consider this group as a set of "average" or "representative" consumers.

As we expect for a set of representative consumers, the mixed group represents the bulk of our sample (60%). Despite their relatively smaller household income, their average own WTP for milk labels is second highest. They are also heavy milk drinkers (72.5% drink it "often"), which is one characteristic that is likely to be particularly important to dairy processors and their retail partners. Plain milk consumption patterns of our sample are provided in Figure 1.

The first group of "niche" consumers prioritizes outcomes which the individual firm can accomplish independently (e.g. enforcing equal opportunities for their employees). We label this cluster as the "local" group since the beneficiaries of these CSR activities are more likely to be the local communities and employees of the company. The second group prioritizes more "global" or collective outcomes such as: air and water quality, energy consumption, and proper waste management, and all imply the concerted efforts of a large number of firms, perhaps including global agribusiness corporations, to lead to desired outcomes. The beneficiaries of these CSR activities are not only the communities around the firm, but also the general world population and/or global ecosystems.

One of the most interesting clusters, which could be aligned with the "locavore" movement that is increasingly targeted by food retailers, is the one labeled as local development. Some of the reasons this dairy "cluster" is of interest include their high household income, the highest aver-

age own willingness to pay (WTP) for milk labels, and the fact that 85.7% of them report drinking milk "often". However, this is a small segment (22%) of our sample, but even that share is sizable enough to represent significant buying dollars.

Table 3. CSR Preference by Cluster

Cluster	Local Development	Global Impact	Mixed
	(22% sample)	*(18% sample)*	*(60% sample)*
Rank	1. Animal Welfare	1.Animal Welfare	1.Animal Welfare
	2.Local Business	2. Sustainable Ag. Practices	2. Sustainable Ag. Practices
	3. Employee Opportunities	**3. Waste Management**	3. Energy Consumption
	4. Sustainable Ag. Practices	**4. Energy Consumption**	4. Air Pollution
	5.Energy Consumption	**5. Water Management**	5. Employee Opportunities
	6.Water Management	**6. Air Pollution**	6. Waste Management
	7.Air Pollution	7. Employee Opportunities	7. Local Business
	8.Waste Management	8. Local Business	8.Water Management
	9. Community Involvement	9. Community Involvement	9. Community Involvement

HH Income	High	Medium	Low
	(24% over 100K, 81% over 50K)	(average 50k)	(majority 55% under 49k)
Age	Middle Aged (66% between 40-60yr)	Young &Old (extremes, 52% under 39yr, 33% over 50yr)	Young (59% under 39yr)
Education	High and low (graduate, college 67%, and the rest technical, high school only)	Generally high (graduate, college 76.5%)	Highly educated (graduate, college 83%)
WTP	Highest (avg. $0.837)	Lowest (avg. $0.525)	2nd highest(avg. $0.7)
Milk Consumption	Highest (85.7% drink it "Often")	Lowest (47% drink it "Often")	2nd highest (72.5% drink it "Often")

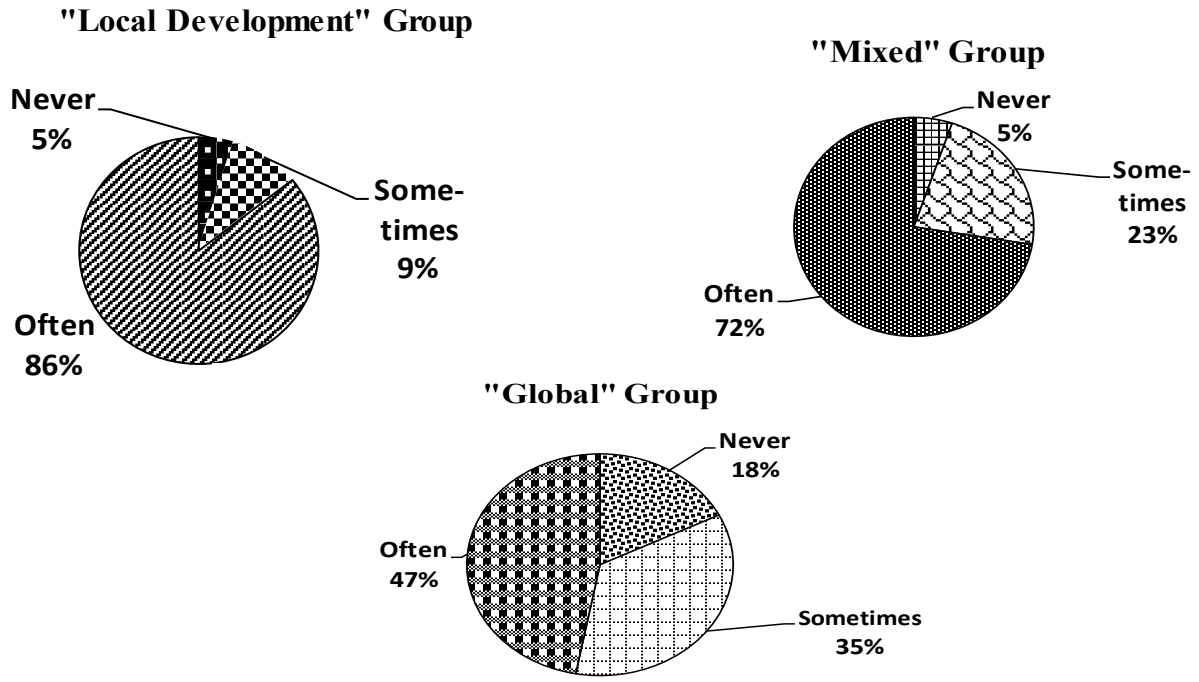

Figure 1. Milk Consumption by Cluster

Lessons on Corporate Responsibility as a Marketing Tool for the Dairy Industry

Businesses commonly seek ways to increase their competitive advantage in the marketplace, and marketing strategies often include differentiation through brands, promotions, and label information or placement in popular marketplaces.

In this study, we investigated several dimensions of consumer perceptions of CSR activities relevant to the dairy industry as a way to segment dairy buyers and identify criteria that may be effective in "branding" products toward those corporate social responsibility issues that may impact consumer buying decisions. While heterogeneity among consumers does exist, animal welfare is identified as the most preferred CSR activity by the great majority of study participants and a top priority for dairy farms. This result is not surprising in the context of increased consumer awareness of feedlot operations mistreating animals (Lusk et al. 2011).

Survey respondents were divided with respect to their CSR preferences into the "niche" sets of consumers who favor local (employee opportunities or sustainable agricultural practices) or global (air or water pollution) actions.

In short, animal welfare is an issue that is of importance and value to a fairly large set of dairy consumers, with other CSR initiatives of interest and value to smaller sets of consumers (who can be the recipient of more targeted promotion and marketing activities). So there is potential for dairy to use CSR to gain market advantage, but any firm must carefully consider how their choice of certifications, label choices, and positioning in markets frequented by certain groups of consumers will influence their success in promotion CSR.

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Picking up Pawpaws: An Evaluation of Consumer Willingness to Sample Unusual Regional Products

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Abstract

Product sampling is a widely used strategy to introduce consumers to unusual products in an effort to build market penetration and demand. Two products that are especially popular in the mid-south of the U.S. include pawpaw fruits and sorghum syrup. This study examines regional differences of consumer interest sampling products made from pawpaws and sorghum syrup in farmers markets while considering possible spatial and demographic characteristics influencing consumer interest. The results showed stronger state-by-state differences for sorghum products than for pawpaw products with particularly higher likelihood to sample products in the deep southern states.

Keywords: farm market, locally produced products, pawpaw, sampling, sorghum syrup

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Introduction

Consumers have been showing significant interest in locally produced products, and the demand for local foods has further been shown in some cases to vary by region (Hu et al. 2012). Specialty value-added products that include regional favorites such as pawpaw fruits and sorghum syrup have been explored by producers directly selling in farmers' markets (Pomper and Crabtree 2010; Pomper 2009; Mask and Morris 1991). Product sampling is a widely used strategy to introduce consumers to unusual products in an effort to facilitate market penetration and increase demand. Producers of both products are exploring market expansion and the possible development of value-added products that could help overcome limits of perishability and limited use and thereby reach beyond the region. This study examines regional differences in consumer interest in sampling and identifies other influential demographic characteristics.

Processed value-added pawpaw products have the potential to extend the marketing season, but marketers perceive they need to build on existing consumer demand and recognition for the fresh product. Sweet sorghum[1] is native to Ethiopia, and introduced to America in the colonial times (Bomford, 2012). Since then, sweet sorghum syrup has been produced at some level around the contiguous 48 states. Currently, however, sweet sorghum syrup production in Kentucky makes up about 90% of the total U.S. output among the Southeastern and Midwestern states (Bitzer 1997). Sweet sorghum syrup, however, is produced on a smaller scale than most sweeteners and also marketed in a relatively narrow geographic segment (Ravensthorpe 2012). Interest in value-added products from sorghum syrup has been less driven by perishability limits but more by expanded market utilization.

Consumers with limited market access to traditional pawpaw and sorghum syrup products may be willing to consider value-added forms of these products. This study investigates sampling interests at farmers' markets as a starting point for measuring the potential marketability of pawpaw and sorghum syrup products.

Empirical Models and Data

This study looks at sampling interest for pawpaw and sorghum products in farm markets where traditional product forms are typically sold. Specifically, it examines (1) the various food retail locations where those responding favorably to these products have sampled other products and (2) the regional and demographic differences of explaining variation in consumer interest in sampling these products. Logit and probit models, which readily indicate marginal effect of the independent variables on sampling interest, were utilized in this study.

The likelihood to sample the products is measured by a seven point Likert scale from 1: "*not at all likely*" to 7: "*very likely*". The Likert scale (4) represents that respondents are at least somewhat likely to sample the products. Thus, the Likert scale range of 4 (anchored by "*somewhat likely"*) to 7 ("*very likely"*) is treated as an indicator that respondents have positive propensity to sample the products, and the rest of the Likert scale (from 1 to 3) indicate a negative propensity

[1] The sweet sorghum is used to identify the variety of Sorghum bicolor (L.) Moench. The sweet sorghum profile can be retrieved from: http://plants.usda.gov/java/profile?symbol=SOBI2

to sample the products.[2] Therefore, the probability of propensity to sample the products can be presented as:

$$(1)\ p = pr(y_i = 1|\boldsymbol{x}_i) = F(x'\beta) = \begin{cases} \frac{\exp(x_i'\beta)}{1+\exp(x_i'\beta)} & for\ logit \\ \Phi(x_i'\beta) & for\ probit \end{cases}$$

where y_i =1 indicates positive propensity to sample; $\boldsymbol{x}_i$ denotes independent variables. The probability of the logit model is the cumulative density function of the logistic distribution; and the probability of the probit model is the cumulative density function of the standard normal distribution. The marginal effects are calculated as $\partial p/\partial x_j = F'(x'\beta)\beta_j$ for the logit and probit models. The empirical specifications in this study for pawpaw and sorghum syrup products are:

$$(2)\ pawpaw = y^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_{16} X_{16} + \varepsilon$$
$$(3)\ sorghum = y^* = \gamma_0 + \gamma_1 X_1 + \gamma_2 X_2 + \cdots + \gamma_{15} X_{15} + \varepsilon$$

where the dependent variables (*pawpaw* and *sorghum*) are explained by sixteen and fifteen independent variables (X_s), respectively, while the β_s and γ_s are parameters to be estimated. The explanatory variables consist of demographic and regional characteristic variables.

A web-based survey of 3,406 farmers' market patrons was conducted exploring a variety of food sampling questions in eight Mid-South U.S. states (including Virginia, West Virginia, Ohio, Indiana, Illinois, Missouri, Kentucky, and Tennessee) in 2012. The responses of the sample are proportional to the relative population of each state. This survey was conducted through an existing consumer panel maintained by Zoomerang.com, an affiliate of MarketTools, Inc.

The demographic independent variables included in this study are: *Female*, *Age*, *Race* (*white, non-white*), *Have kids*, *Education*, and *Income*. Residence was designated as either rural (countryside or farm) or urban (urban or suburban). State location is also identified, i.e. *MO*, *KY*, *TN*, *WV*, *VA*, *IL*, *IN*, and *OH*. Ohio is selected to be an intercept state for comparison.

The definitions and sample descriptive statistics of these variables are presented in Table 1. Over half of the respondents have positive propensity to sample pawpaw and sorghum syrup products.

Sampling Interests at Farmers' Markets

Farmers' markets are popular venues for vendors to introduce unusual and regional products to consumers with an interest shaped by their regional preferences. Pawpaw and sorghum syrup products are popular in the Mid-South of the United States. Respondents were asked how likely they would be to sample a variety of different products if offered during their farmers' market visit. Individuals responding to pawpaw and sorghum with Likert scores of 6 and 7 ("*very*

[2] An ordered logit model was applied first. However, it did not meet the proportional odds assumption (equivalent parameterization), so a generalized ordered logit model, also called partial proportional odds model, was applied. Since the findings of the generalized ordered logit model suggest no particular differences among each group comparison, here we provide the simplest set of outcomes by using binary probit and logit models. The full set of the generalized ordered logit outcomes is available upon request.

likely") were further asked to indicate whether they had any sampling experiences within the past 12 months in ten sampling sites. Notably, respondents that are *very likely* to sample pawpaw products (Figure 1) and sorghum product (Figure 2) are sampling most frequently at natural food stores and gourmet or specialty food stores.

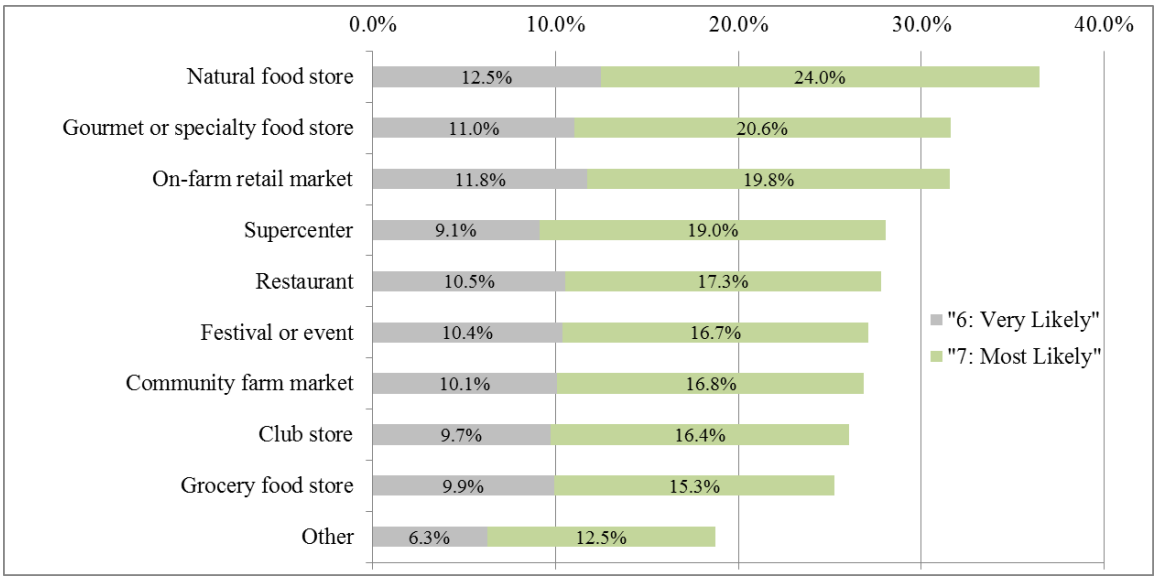

Figure 1. Recent General Food Sampling Sites Indicated by Likely Pawpaw Patrons
Note: N=3,406 respondents from MO, KY, TN, WV, VA, IL, IN, and OH

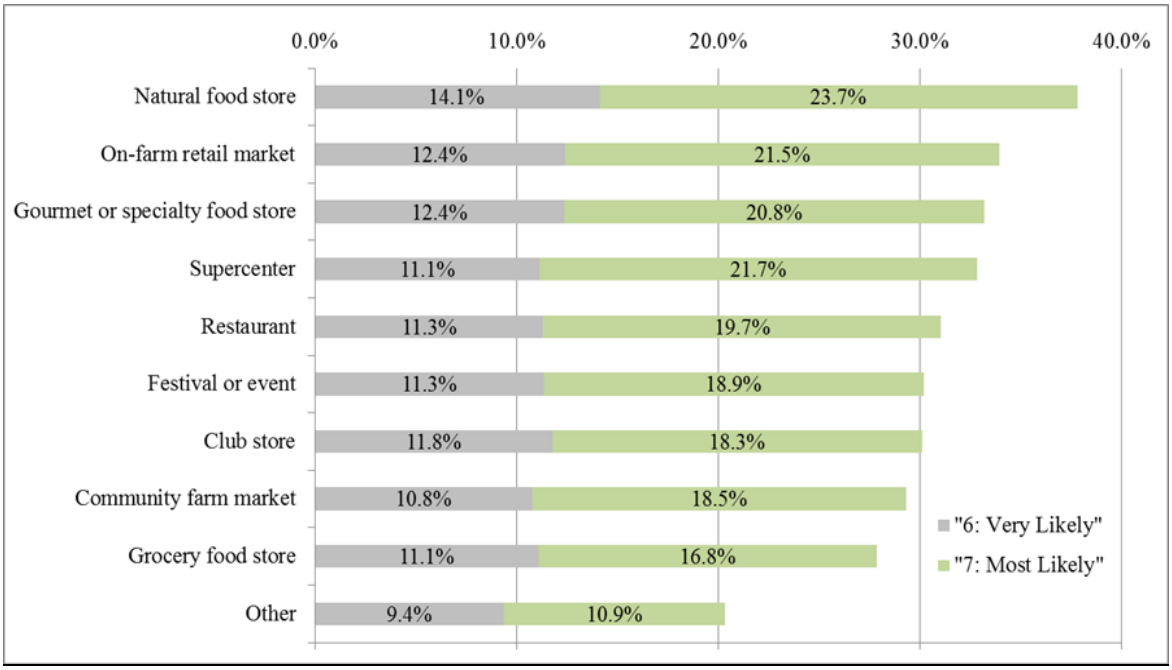

Figure 2.
Note: N=3,406 respondents from MO, KY, TN, WV, VA, IL, IN, and OH

Table 1. Definitions and Sample Statistics of Variables (*N=3,406)*

	Description of Variables	Mean	Std. Dev.	Min.	Max.
Pawpaw	Binary variable=1 if respondent chooses *at least above somewhat likely* (4) to sample pawpaw products, 0 otherwise	0.62	0.48	0	1
Sorghum	Binary variable=1 if respondent chooses *at least above somewhat likely* (4) to sample sorghum syrup products, 0 otherwise	0.63	0.48	0	1
Female	Binary variable=1 if respondent is female, 0 otherwise	0.61	0.48	0	1
Age	Continuous variable; years of age	47.93	14.24	10	70
White	Binary variable=1 if respondent's race is white, 0 otherwise	0.88	0.31	0	1
Have kids	Binary variable=1 if respondent has kids under 18 years old at home, 0 otherwise	0.35	0.47	0	1
Education	Continuous variable; years of education	14.37	2.14	8	18
Income	Continuous variable; total yearly household income before tax ($ thousand)	62.16	42.79	7.5	237.5
Rural	Binary variable=1 if respondent is from countryside or farm, 0 otherwise (non-rural includes urban/suburban residence)	0.16	0.37	0	1
MO	Binary variable=1 if respondent is from Missouri, 0 otherwise (N=354)	0.10	0.30	0	1
KY	Binary variable=1 if respondent is from Kentucky, 0 otherwise (N=226)	0.06	0.24	0	1
TN	Binary variable=1 if respondent is from Tennessee, 0 otherwise (N=291)	0.08	0.27	0	1
WV	Binary variable=1 if respondent is from West Virginia, 0 otherwise (N=94)	0.02	0.16	0	1
VA	Binary variable=1 if respondent is from Virginia, 0 otherwise (N=385)	0.11	0.31	0	1
IL	Binary variable=1 if respondent is from Illinois, 0 otherwise (N=799)	0.23	0.42	0	1
IN	Binary variable=1 if respondent is from Indiana, 0 otherwise (N=395)	0.11	0.32	0	1
OH	Binary variable=1 if respondent is from Ohio, 0 otherwise (N=863)	0.25	0.43	0	1

Empirical Regression Results

The estimated parameters from the logit and probit models are presented in Table 2. Table 3 reports the estimated marginal effects for the likelihood to sample pawpaw and sorghum syrup products. The estimated parameters are compared between the logit and probit models for *pawpaw* and *sorghum* in Tables 2 and 3.

Table 2. Results of Logit and Probit Models for the Likelihood to Sample for the Products

Dependent Variable	**Pawpaw**		**Sorghum**	
Estimator	Logit	Probit	Logit	Probit
Female	-0.689**	-0.422**	-0.999***	-0.606***
Age	-0.013***	-0.008***	-0.012***	-0.007***
*Age*Female*	0.014***	0.008***	0.017***	0.010***
White	0.292***	0.181***	0.365***	0.224***
Have kids	0.064	0.040	-0.026	-0.016
Education	0.453**	0.284**	0.039**	0.023**
Education^2	-0.014*	-0.009*	-	-
Income	0.001	0.0006	0.0005	0.0003
Rural	0.156	0.096	0.219**	0.131**
MO	-0.080	-0.050	0.335**	0.206**
KY	0.295*	0.180*	0.694***	0.418***
TN	-0.039	-0.024	0.582***	0.357***
WV	0.166	0.100	0.475**	0.290**
VA	-0.160	-0.098	0.025	0.015
IL	-0.059	-0.036	0.094	0.057
IN	0.099	0.062	0.130	0.081
constant	-2.668	-1.675	0.165	0.102
Log Likelihood	-2241.898	-2241.924	-2203.740	-2203.945
LR χ^2	37.570	37.520	71.400	70.990
Pseudo R^2	0.008	0.008	0.015	0.015
N. of observations	3406	3406	3406	3406
Correctly predict	62.33%	62.33%	64.06%	64.12%
Homoscedasticity test	yes	yes	yes	yes

Note: Asterisks indicate levels of significance: *=0.10, **=0.05, and *=0.01.**

Many estimated coefficients of the demographic characteristic variables are significant for both products. Race (white), gender (male), education, and residence (rural – for sorghum) have positive effects, while age has a negative effect.

The results showed stronger state-by-state differences for sorghum products than for pawpaw products with particularly higher likelihood to sample products in the deep southern states. Consumers in Kentucky were 7% more likely to have higher sampling interest compared to those in Ohio for pawpaw products; other state effects were not significant. Consumers in other states were more likely to have higher sampling interest than Ohio for sorghum products, including Kentucky (16%), Tennessee (13%), West Virginia (11%), and Missouri (8%). No differences were observed for consumers in Virginia, Illinois, or Indiana.

Table 3. Marginal Effects of the Likelihood to Sample Pawpaw and Sorghum Syrup

Dependent Variable	**Pawpaw**		**Sorghum**	
Estimator	Logit	Probit	Logit	Probit
Female	-0.160**	-0.159**	-0.227***	-0.224***
Age	-0.003***	-0.003***	-0.002***	-0.002***
*Age*Female*	0.003***	0.003***	0.004***	0.003***
White	0.068***	0.068***	0.083***	0.083***
Have kids	0.015	0.015	-0.006	-0.006
Education	0.105**	0.107**	0.008**	0.008**
Education^2	-0.003*	-0.003*	-	-
Income	0.0002	0.0002	0.0001	0.0001
Rural	0.036	0.036	0.049**	0.048**
MO	-0.018	-0.018	0.076**	0.076***
KY	0.068*	0.067*	0.158***	0.155***
TN	-0.009	-0.009	0.132***	0.132***
WV	0.038	0.037	0.108**	0.107**
VA	-0.037	-0.037	0.005	0.005
IL	-0.013	-0.013	0.021	0.021
IN	0.023	0.023	0.029	0.030

Note: Asterisks indicate levels of significance: *=0.10, **=0.05, and ***=0.01.

Conclusion

Consumer interest in sampling pawpaw and sorghum syrup products has distinctive demographic and regional characteristics. The findings of this study have implications for marketing strategies geared toward expansion. There appears to be a strong connection between sampling interest for these products and gourmet/specialty food stores: retail venues that can be explored to help reach beyond the traditional famers market. Demographics do seem to matter and can be considered for various product selection and merchandising strategies. Place is an important consideration. Consumers from different regions reflect different responses on unusual products sampling. Individuals from rural regions are more likely to sample sorghum syrup products. Individuals from Kentucky have positive likelihood to sample for both pawpaw and sorghum syrup products. Further, individuals from Missouri, West Virginia, and Tennessee are more positive likely to sample sorghum syrup products. The results showed stronger state-by-state differences for sorghum products than for pawpaw products, with particularly higher likelihood to sample products in the deep southern states.

These results should be informative to pawpaw and sorghum producers exploring value-added products and market expansion. The study goes beyond simply awareness and interest. Willingness to sample provides useful insight into who may be open to shopping for these kinds of products and where they may shop. Offering first-time sampling, or sampling what consumers understand to be an "unusual" product, is a widely used strategy in the market expansion process for food products. The results suggest regional markets and specific demographics where product development for pawpaws and sorghum syrup products is more likely to take place.

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Food Insecurity, the National School Lunch Program and Educational Achievement: Evidence from Georgia's Public Schools

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Abstract

In 2011, nearly 1.7 million Georgians, 17.9% of the population, lived in poverty, and of those, 24.8% were children. Poverty is closely associated with food insecurity. Food insecurity has been associated with various developmental consequences for U.S. children. Research indicates that hungry children do more poorly in school and have lower academic achievement because they are not well prepared for school and cannot concentrate. This research examines the relationship between food insecurity, the National School Lunch Program (NSLP) and academic achievement of 5th grade students in Georgia.

Keywords: food insecurity, poverty, NSLP, children, schools

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Introduction

Despite federal food assistance and private charitable programs, food insecurity is a persistent national and local problem, affecting 17.8% of all households and 27.9% of households with children in Georgia (Gunderson et al. 2011). Food insecurity refers to limited or uncertain availability of, or inability to acquire, nutritionally adequate, safe, and acceptable foods due to financial resource constraint (Bickel et al. 2000). According to the USDA, 635,000 (16.9%) households in Georgia were food insecure from 2008-2010, and approximately 240,000 households in Georgia (6.4%) were classified as very low food secure (FRAC, 2012).

Children raised in food-insecure households are at increased risk for academic and socio-emotional difficulties (Cook & Frank 2008). The government's response to inadequate sources of food includes food assistance programs such as the Supplemental Nutrition Assistance Program (SNAP), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and others. These programs help alleviate hunger and address the negative effects that hunger and malnutrition have on an individual's health, educational development, and growth. The National School Lunch Program (NSLP) exists in roughly 97% of the nation's school districts, serving 30 million lunches per day (Estey & Ciambella 2005). The objective of this study is to identify the key associations between NSLP participation and academic performance of 5th grade students in Georgia. We test the hypothesis that there is a strong inverse relationship between poverty/food insecurity, as exhibited by participation in NSLP, and achievement test scores in reading and mathematics at that level.

Food Insecurity in Georgia

As the nation's economy declined during the Great Recession (2007 to 2009) and slow recovery, an increasing number of Georgians lived on the financial edge, where even a small change in a family's employment situation could immediately plunge them into poverty. Major cities in the state had poverty rates at critical levels, ranging from Athens-Clarke (33.8%) to Atlanta (22.6%) (U.S. Census 2010). These areas demonstrated high levels of food insecurity among children, especially among the working poor, as Georgia's unemployment rate increased rapidly over this period. As the unemployment rate climbed, along with gas prices, food prices, and housing costs, "getting-by", especially for households with children, meant relying on low-cost foods or cutting the size of meal portions. Against this backdrop, the importance of school meals becomes obvious (Bradford & Medora 2008). Food insecurity is highly correlated to poverty; Georgia's population is 17.9% food insecure (FRAC 2011). Low levels of education, single parenting, and living in a Hispanic-headed household have also been associated with an increased likelihood of experiencing food insecurity (Hamilton et al. 1997).

Food insecurity in early childhood can limit a child's cognitive and socio-emotional development, ultimately impairing school achievement and thus long-term productivity and economic potential. Jyoti, Frongillo, & Jones (2005) have shown that, by the third grade, children who had been food insecure in kindergarten incurred a 13% decline in their reading and math test scores compared to their food-secure peers. Hungry children are also more likely to suffer from hyperactivity, absenteeism, generally poor behavior, and poor academic functioning (Murphy et al. 1998). Nord (2009) found that food insecure children exhibit more behavioral problems and

lower math and reading achievement scores. To prevent or alleviate hunger at school, the USDA's Food and Nutrition Service developed the NSLP, established under the National School Lunch Act in 1946.

Meals served through the NSLP are required to meet national nutrition standards by federal law, and schools receive reimbursement for each meal served. Children in families with incomes at or below 130% of the poverty level are eligible for free meals, and those with household incomes between 130% and 185% of the poverty level are eligible for reduced-price meals, for which the student cannot be charged more than 40 cents. During the 2010 federal fiscal year, 20.6 million low-income children received free or reduced-price meals through the NSLP (FRAC 2011). While 46% of the households in Georgia qualify for free lunch, an additional 21% of households with children qualify to receive reduced-price lunches (FRAC 2012).

Dunifon and Kowaleski-Jones (2004) concluded that family income is significantly and negatively associated with continuous food insecurity. They also indicated that black children are more likely to be marginally food insecure and that paternal education is associated with a reduced likelihood of marginal food insecurity. Hinrichs (2010) found the NSLP lead to a significant increase in educational opportunity and attainment but an insignificant increase in health levels from childhood to adulthood. Subsidized lunches offered to children in the program may have encouraged children to attend school more consistently than they would have.

Theoretical Framework

As poor health and nutrition may hinder a child's ability to learn **(**Pollitt 1990), school meals have become a critical part of the safety net against food insecurity, benefiting students' academic achievement, because those who participate demonstrate more positive behavior in the classroom. The focus of this paper is to bring awareness of the importance these meals serve as safety nets to alleviate hunger in low-income households. Children experiencing hunger have lower math scores and are more likely to have to repeat a grade than those who are not hungry (Alaimo, Olsen, & Frongillo 2001). Thus, the hypothesis to be tested is that there is a strong inverse relationship between poverty and food insecurity, as exhibited by participation in NSLP, and achievement test scores in reading and mathematics. To measure student achievement, the achievement score or an "exceeding standards" score was used as the dependent variable.

The NSLP explanatory variable represents the percent of total students eligible to participate in the NSLP in each school system in Georgia, and is a proxy for poverty/food insecurity. Another factor included in the analysis to determine students' achievement is teaching experience (Aelterman & Rots 2009). County expenditures per FTE students are also investigated, as school expenditure variables are hypothesized to have positive relationships with the dependent variables – 'achievement' and 'exceeds standards'. This study also includes explanatory variables that are representative of human growth, as well as socioeconomic status of students. To illustrate the human capital factor, the percentages of the county population with high school diplomas or with college degrees were included as explanatory variables, as was median household income. Lastly, measurements of single parent households and race/ethnic groups are included to capture their hypothesized associations with educational achievement.

Data and Methodology

Achievement data were taken from the Georgia Department of Education and Governor's Office of Student Achievement, as reported in the "2008 Georgia Report Card for Parents" (Georgia Public Policy Foundation 2009). The Report Card provides information to help parents make informed decisions about the quality of public education in Georgia based on data for the 2008/9 school year. There are 1,283 elementary schools included in the analysis. Data on the *NSLP* and *College* variables came from the USDA-ERS' Food Environment Atlas and the U.S. Census Bureau, respectively. We performed this analysis at the school level for fifth grade data.

In the generalized linear model framework, a generalization of Poisson regression was used to model the percentage of those achieving standards using SAS Proc Glimmix (SAS/STAT *User's Guide* 2008). When modeling the percentage of students achieving standards, the outcome was converted to numbers achieving standards (%achieve=num_achieve/FTE * 100) and a typical approach to model such data would be to use Poisson regression. This was supported by histograms of the outcome variable, which reflected non-normality. The natural log of the outcome was modeled as a linear function of the predictors. To account for the differences in school enrollment levels, an offset was used, modeled as the log of FTE. Further, the data were clustered in counties, with the assumption that schools within counties would share similar characteristics, and a multilevel Poisson model was used to capture this clustered data.

Let the multilevel regression equations be specified, at School-level (for the i^{th} school in the j^{th} county):

$$(1) \quad Log\left(Num\_Achieve\_Stand_{ij}\right) = Log\left(FTE_{ij}\right) + \beta_{1ij} + \beta_{2ij} povrate_{ij} + \beta_{3ij} sitespend_{ij} + \varepsilon_{ij}$$

and at County-level (for the j^{th} county):

$$(2) \quad \beta_{1j} = \gamma_{1j} + \gamma_{2j} SingparHH_j + \gamma_{3j} MedHHINC_j + \gamma_{4j} PCTcollege_j + r_j$$

Subtracting *Log(FTE)* from both sides and combining the school and county-level models yields the final model,

$$(3) \quad Log\left(percent\_achieve_{ij}\right) = \gamma_{1j} + \gamma_{2j} SingparHH_j + \gamma_{3j} MedHHINC_j + \gamma_{4j} PCTcollege_j + \beta_{2ij} povrate_{ij} + \beta_{3ij} sitespend_{ij} + \varepsilon_{ij} + r_j$$

This was the empirical model estimated in this analysis. However, caution should be exercised in interpreting the estimated coefficients due to the log-linear relationship in the model. Through exponentiation of equation (3) we find,

$$(4) \quad percent_{achieve_{ij}} = \exp(\gamma_{1j} + \gamma_{2j} SingparHH_j + \gamma_{3j} MedHHINC_j + \gamma_{4j} PCTcollege_j + \beta_{2ij} povrate_{ij} + \beta_{3ij} sitespend_{ij} + \varepsilon_{ij} + r_j)$$

$$(5) \quad = \exp(\gamma_{1j}) * \exp(\gamma_{2j} SingparHH_j) * \exp(\gamma_{3j} MedHHINC_j) * \exp(\gamma_{4j} PCTcollege_j) * \exp(\beta_{2ij} povrate_{ij}) * \exp(\beta_{3ij} sitespend_{ij}) \exp(\varepsilon_{ij}) \exp(r_j)$$

Or,

$$(6) \quad achievescore_{ij} = \exp(\gamma_{1j} + \gamma_{2j} Pov\_rate_{ij} + \gamma_{3j} SchoolSiteSpend_{ij} + \gamma_{4j} PCollegeGrad_j + \gamma_{5j} SINGLEPHH_j + \gamma_{6j} PAsian_j + \gamma_{7j} PBlack_j + \gamma_{8j} PHisp_j + \varepsilon_{ij} + r_j)$$

$$(7) \quad = \exp(\gamma_{1j}) * \exp(\gamma_{2j} Pov\_rate_{ij}) * \exp(\gamma_{3j} SchoolSiteSpend_{ij}) * \exp(\gamma_{4j} PCollegeGrad_j) * \exp(\gamma_{5j} SINGLEPHH_j) * \exp(\gamma_{6j} PAsian_j) * \exp(\gamma_{7j} PBlack_j) * \exp(\gamma_{8j} PHisp_j) \exp(\varepsilon_{ij}) \exp(r_j)$$

This shows the multiplicative nature of the parameter estimates. Rather than a one-unit increase in a predictor leading to a β increase (or decrease) in the outcome, with the log-linear relationship, a one-unit increase in a predictor leads to a multiplicative increase of β in the outcome. For example, a one-unit increase in poverty rate, which signifies deterioration in the economic conditions of the county, the log of %_achieving_standards decreases by -1.5661. As the poverty rate increases by one unit, the % eligible for NSLP is multiplied by a factor of .2089 (=e^.-1.5661; i.e., the percent achieving standards is below what it otherwise would have been). This is the expected relationship: as the poverty rate increases, the percent of those achieving standards decreases. The same logic applies to the other variables in the model.

Results and Discussion

Our findings confirm the hypothesis that there exists a strong inverse relationship between poverty, as exhibited by participation in NSLP, and achievement test scores. The coefficient of Poverty/*NSLP* was negative and significant in the both the *Achievement* and *Exceeds Standards* equations at the 1% level. Thus, there are three significant predictors of achievement scores in school i within county j. These are poverty rate (exp(γ_2j)=0.769, p<.0001), percent of the county who are college graduates (exp(γ_2j)=0.999, p=.0178), and percent of county residents who are Asian (exp(γ_2j)=1.005, p=.0036). The multiplicative effects for college graduate and percent Asian are close to one, indicating that, while the coefficients are significant, they have little effect on achievement, after controlling for the other variables in the model. Poverty rate is the most informative variable for us. We see that the higher the poverty rate, the lower the average achievement score, which is supported by the substantive research. Holding other things constant, a 1% increase in poverty rate decreases achievement scores by a multiplicative rate of 0.7692. Thus, the higher the percentage of children receiving free or reduced-price lunches, the lower was the percentage of children meeting standards on the Reading and Math sections of the CRCT, all other factors being equal.

Results on *Spending* are positive in both the achievement of standards and the exceeding standards models, but significant only in the exceeding standards model and relatively small in multiplicative impact. Interestingly, once income/poverty, education of parent(s) and single

parent effects for the household were accounted, race/ethnic group differences diminished or were insignificant indicators of successful achievement.

Table 1. Summary Statistics on Educational Achievement in Georgia's Elementary Schools and Socio-Economics Characteristics, 2008.

Variable	Units	Mean	Std Dev	Minimum	Maximum
Achievement Score	%	85.8	9.0	54.0	100.0
Exceeding Standards	%	25.5	14.0	0	77.5
Poverty Rate/NSLP participants	%	57.6	27.0	0	100
Met_AYP	%	95.5	20.7	0	100
School Site Spending per FTE	$	7300	1221	155.0	14642
Teachers with 30 Years Exp.	%	4.8	2.0	0	17.9
SINGPARHH	%	36.3	10.6	13.2	77.2
% unemployed	%	10.3	1.6	6.6	22.4
MEDHHINC	$	46,875	11,494	23,887	81,629
HS_Graduate	%	83.1	6.5	58.4	93.6
College_Graduate	%	26.3	12.2	4.7	47.6
White	%	55.3	18.5	14.1	96.4
Black	%	31.1	17.6	0.31	73.8
Hispanic	%	8.6	6.0	0.8	31.6
Asian	%	2.9	2.5	0.03	10.5
American Indian	%	0.2	0.07	0	1.36
Other	%	.05	.064	0	0.57

Table 2. Achievement of Georgia 5th Grade Students' Scores in Relation to NSLP Participation (High School Graduates), Poisson Response Distribution

Solutions for Fixed Effects						
Effect	**Estimate**	**Exp(Estimate)**	**Standard Error**	**DF**	**t Value**	**Pr > |t|**
Intercept	4.6337		0.02846	154	162.81	<.0001
Poverty_Rate/NSLP	-0.2624	0.769203281	0.01577	1020	-16.64	<.0001
School_Site_Spending	2.528E-6	1.000002528	2.163E-6	1020	1.17	0.2427
SINGLEPHH	-0.00040	0.99960008	0.000707	1020	-0.56	0.5753
pCollege_Graduate	-0.00121	0.998790732	0.000504	154	-2.40	0.0178
pASIAN_2010	0.005283	1.00529698	0.001786	154	2.96	0.0036
pBLK_2010	-0.00037	0.999630068	0.000419	154	-0.89	0.3751
pHISP_2010	-0.00122	0.998780744	0.000772	154	-1.57	0.1174

Table 3. Exceeds Achievement Standards Related to NSLP Participants (College), Poisson Response Distribution of Georgia in 5th Grade Students

	Solutions for Fixed Effects					
Effect	**Estimate**	**Exp(Estimate)**	**Standard Error**	**DF**	**t Value**	**Pr > |t|**
Intercept	4.4461		0.4248	154	10.47	<.0001
Poverty_Rate/NSLP	-1.5681	0.208441	0.08188	1019	-19.15	<.0001
School_Site_Spending	0.000019	1.000019	7.531E-6	1019	2.49	0.0131
SINGLEPHH	-0.00642	0.993601	0.004936	1019	-1.30	0.1936
MEDHHINC	-6.27E-6	0.999994	3.383E-6	1019	-1.85	0.0640
pHS_Graduate	-0.00098	0.99902	0.004981	154	-0.20	0.8442
pASIAN_2010	0.02087	1.021089	0.01452	154	1.44	0.1527
pBLK_2010	0.000051	1.000051	0.002599	154	0.02	0.9845
pHISP_2010	0.000304	1.000304	0.004067	154	0.07	0.9405

Conclusions

The average percentage of Georgia's 5th grade children participating in the NSLP in fiscal year 2008-2009 exceeded 57% NSLP, and these participation rates negatively and significantly affect achievement on math and reading CRCTs in Georgia. NSLP participation rates have an even greater negative impact on the likelihood of children exceeding standards on CRCTs in Georgia schools. Single parent households likewise contribute significantly and negatively to test results in Georgia.

The next step in our research will be to compare 3rd grade achievement and 8th grade achievement with the 5th grade results relative to the percentage of students who are eligible to receive free/reduced-price lunches. A further step is to analyze how well schools are performing on CRCT exams relative to poverty rates as measured by students' participation not only in the NSLP, but also to other food assistance programs, such as the School Breakfast Program (SBP) and Summer Food Service Program (SFSP).

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Impacts of Community Supported Agriculture Program Participation on Consumer Food Purchases and Dietary Choice

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Abstract

Few studies have assessed changes in dietary choice and food preparation habits through community supported agriculture (CSA) program membership. If CSA program participation does indeed produce attitude and behavioral change in its participants, public policy encouraging CSA program membership, such as is currently done with farmers' markets, would provide another vehicle for fostering dietary improvements, especially in areas where farmers' markets may not be available or accessible for targeted populations. This study attempts to explore the effects of CSA membership on consumer dietary choice and nutritional intake, as well as the potential modifications in food purchase, preparation and dining out practices.

Keywords: CSAs, dietary choice, consumption patterns, fresh produce

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Introduction

Community Supported Agriculture (CSA) programs have been shown to be a viable networking and direct marketing approach, providing benefits to both farmers and consumers alike (Brehm and Eisenhauer 2008; Curtis 2011; Conner, Colasanti, Ross and Smalley 2010; Thilmany, Bond and Bond 2008). CSAs in particular provide an opportunity for consumers to experience new foods, develop new social networks and reconnect community members with the land and the traditional practices of agriculture (O'Hara and Stagl 2001). Furthermore, a number of studies have discussed behavioral changes in relation to other purchasing decisions based on the knowledge acquired through CSA partnerships (Russell and Zepeda 2007).

The majority of nutritional research into direct markets, such as farmers' markets, has revolved around the impacts of public programs on fruit/vegetable consumption among low income families and home-bound senior citizens (McCormack et al. 2010; Johnson, et al. 2004). Few studies have assessed changes in dietary choice and food preparation habits through CSA membership. If CSA program participation does indeed produce attitude and behavioral change in its participants, public policy encouraging CSA program membership, such as is currently done with farmers' markets, would provide another vehicle for fostering dietary improvements, especially in areas where farmers' markets may not be available or accessible for targeted populations. This study attempts to explore the effects of CSA membership on changes in dietary choice and nutritional intake, as well as the potential modifications in food purchase, preparation and dining out practices.

Literature Review

Programs that connect consumers to local food sources have gained momentum in recent years. Frustrations with the conventional, or globalized, food chain have brought local growers together with consumers in a variety of innovative alternative food networks (Cox et al. 2008). CSA programs, started as a local community food system in the US in the 1980s, unite farmers and community members through a sustainable partnership that involves the direct sale of farm produce through weekly pre-paid baskets during the growing season (Bougheraraa et al. 2009). It has been argued that through the shortened supply system, farmers are able to sell their produce at a higher price and consumers are provided access to high quality, safe, and better tasting produce, commonly at lower prices than are available in traditional grocery outlets (Cooley and Lass 1998; DeMuth 1993).

Research on consumer motivations and satisfaction from CSA program participation is prevalent in the literature. Cooley and Lass (1998) and Cone and Myhre (2000) found that consumers join CSA programs because of their concern for the environment, a desire for fresh food, and to support local food sources. Sabine and Stagl (2001) determined that a sense of community connectedness, through interaction between food producers and consumers, was another strong motivator. However, retention rates have shown to fluctuate year-to-year due to the provision of too much produce which is later wasted (Kane and Lohr 1997), a lack of variety and choice within the baskets (Cooley and Lass 1998), and the inconvenience of pick-up locations and times (Lang 2005).

A number of researchers have also documented changes in consumer behaviors and values as a direct result of their involvement with CSAs. O'Hara and Stangl (2001) found that consumers' environmental concerns grew stronger over the course of CSA membership, resulting in a desire to eat produce while it was in season and a desire to reduce packaging waste. Russell and Zepeda (2007) argue that it is precisely because of these attitudinal changes that consumers continue to participate in CSA programs. Ostrum (1997) found that not only were eating habits affected, but changes in other consumption patterns resulted. Therefore, CSA members tend to develop a stronger sense of community because consumers believe buying local is better for the environment, the health of the community, and the health of their family members.

Exposure to locally sourced, organic produce has also been shown to affect food-related behavioral changes over time. Perez et al. (2003) discovered that CSA participants were likely to eat more fruits and vegetables and to cook more creatively. Russell and Zepeda (2007) claim that these changes, along with increased consideration of food seasonality, are a direct result of the educational components of CSAs, including farm visits, newsletters, recipe exchanges, and increased interactions between farmers and other health conscious consumers. Examples of specific changes found in Russell and Zepeda's study include planning meals around available produce, exploring new foods, freezing or storing excess vegetables, and reductions in meat consumption.

However, specific changes in dietary practices and eating patterns have seldom been empirically studied. Conrey et al. (2003) investigated the changes in nutritional health for the WIC (Women, Infant, and Children) public voucher system. By including coupons that could be redeemed at local farmers' markets, they found that increased fruit and vegetable consumption was directly related to the nutritional information which supplemented the program. Dollahite et al. (2005) found that farmers' market access for low-income families was a barrier to the WIC program in their study. In a program where CSA baskets were delivered directly to home-bound seniors, Johnson et al. (2004) found participants increased their produce intake by a full serving per day, however they attribute this success to "innovative partnerships and concurrent efforts at the individual, institutional, community, and policy levels" (Lea et al. 2006) found that the inclusion of locally-sourced salad bars in the Australian public school system encouraged an increase of produce consumption in both students and staff.

However, an empirical study of diet changes, changes in food preparation habits, and the prevalence of food consumed outside the home involving voluntary members of CSA programs has not yet been published. This study examines the impacts on fruit/vegetable consumption patterns and the preparation of nutritionally enhanced meals by active members of a CSA program in Logan, Utah in 2012. It is proposed that if a healthier pattern of food consumption results from CSA membership, public policy may have a new avenue to foster dietary improvements.

Methodology

A total of 15 participants in four CSA programs in Logan, Utah took part in this study. A series of pre-program, monthly, and post program surveys were administered to the participants during the summer and fall of 2012. As a supplement to the self-reporting surveys, participants submitted their monthly grocery store and other food purchase receipts (June to December 2012).

Additionally, all contents of participant weekly CSA shares were tracked by item and weight. These data sources allow for comparisons prior, during, and after CSA program completion. Nutritional/dietary intake information was taken from grocery receipts and CSA basket content, while the survey data provided stated information on changes in dining out and food preparation behavior, such as the use of new, unfamiliar food varieties, changes in the quantity of meals consumed outside the home, and attitudinal changes in fruit/vegetable consumption and food preparation.

Monthly surveys included questions such as the percentage of CSA basket contents consumed, the use/preparation of unfamiliar foods; the storage (canning, freezing or drying) of excess produce, the use of CSA provided recipes, and the number of meals consumed at home on a weekly basis. A two-mean sample comparison t-test was completed to measure significant changes at the 5% level in the first four months so far completed in the study.

Results

As this study is still in progress, only preliminary results are presented here. Results from the pre-program survey, such as food consumption and purchase habits, CSA membership motivations, conservation habits, food attribute preferences, and socio-demographics are presented. Additionally, the results compiled from the first four monthly surveys are provided.

The project participants were all active members in a CSA program in Logan, Utah. A total of 16 participants completed the pre-program survey in which 81% were female, 75% were married, nine had children under the age of 17 present in the home (56%), 76% Caucasian, and 5.9% Asian or Hispanic. There were seven participants who reported incomes less than $50,000 and eight participants who reported household incomes above $66,000. Eighty-one percent had a four-year degree or higher, with 38% employed full time and 31% employed part-time. Two respondents were homemakers and three were students (see Table 1 in Appendix).

The participants were asked to rank the importance of product attributes on a scale of 1 (not important) to 5 (very important). Taste received a score of 4.5, followed by quality (4.4) and freshness (4.1) (See Figure 1). When asked to rank food related concerns, using the same scale, concern over diet ranked highest (4.6) followed by supporting local farmers (4.4) and food safety (4.4). Over 75% of the participants supplemented their CSA membership with trips to the local farmers' market, and 56% shopped four to seven times each week at their local grocery store.

At this point in the study, only the change in the produce storage (canning, freezing or drying) is significant at the 5% level with only 33% of the participants engaging in the storage of food in July and 72% in October (see Table 2). While not statistically significant, basket usage peaked in August, with 93% of the basket items consumed, but dropped to 87% in October. Additionally, at the start of the CSA season, 72% of the participants were using foods that were previously unfamiliar to them, but by October only 45% made the same claim. The use of CSA provided recipes steadily declined throughout the four months, starting with 50% in July and dropping to 27% by October. The average number of meals consumed at home increased slightly, peaking in October at 18.6 (out of 21 possible).

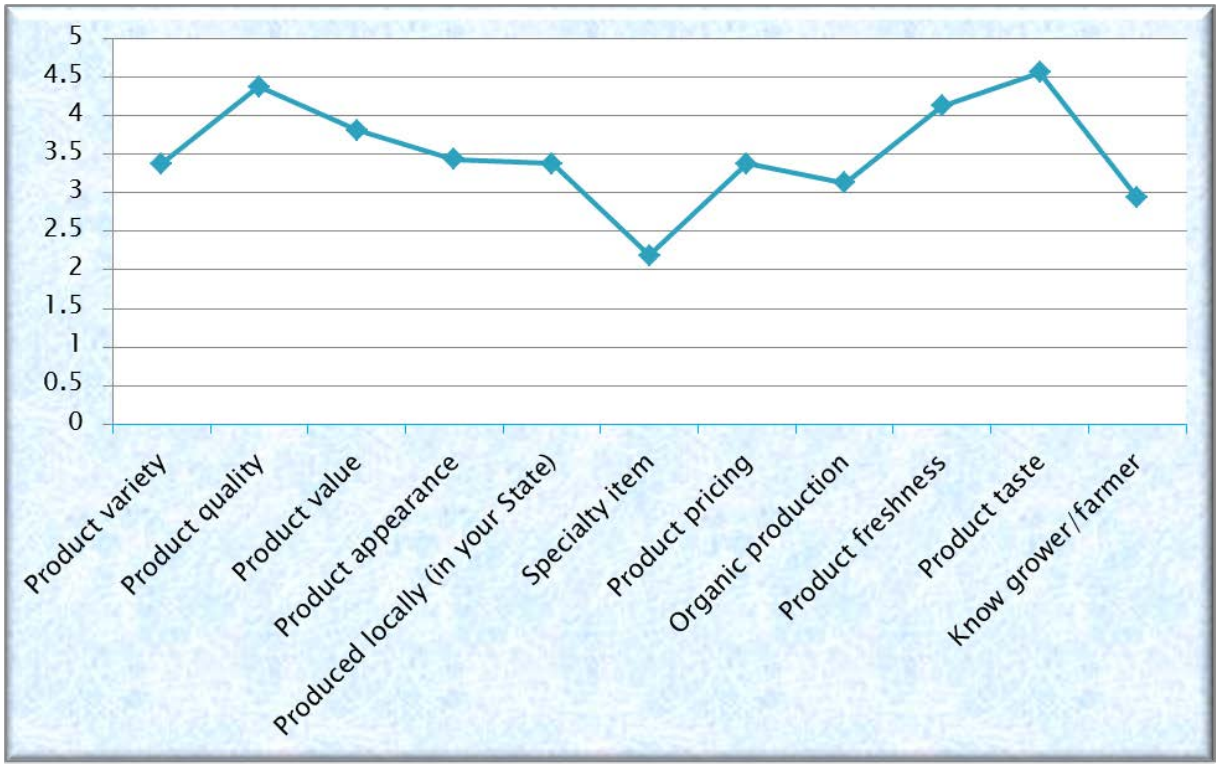

Figure 1. Importance of Product Attributes (Scale of 1-5)

Table 2. Monthly Survey Results: Changes in Food Consumption/Preparation

Variable	Mean	Std. Dev.	T =
CSA basket usage percentage			
July	.890	.164	0.276
October	.872	.151	
Use/preparation of unfamiliar items			
July	.727	.467	1.291
October	.454	.522	
Storage (can, dry, freeze) of basket items			
July	.333	.492	-1.964*
October	.727	.467	
Use of CSA provided recipes			
July	.500	.522	1.096
October	.273	.467	
Average number of meals consumed at home			
July	17.182	3.281	-0.640
October	18.636	6.786	

* Represents significance at the 5% level.

Conclusions

This paper provides preliminary results of a study exploring the effects of CSA membership on consumer dietary choice and nutritional intake, as well as the potential modifications in food purchase and dining out practices. Study results show that CSA participants are primarily highly educated females at average income levels with health and food safety concerns. They participate in recycling and home gardening activities, and join CSAs to support local farmers and purchase fresh local foods. Results show a shift in food preparation habits as CSA membership led to increased consumption of meals at home and storage of food items. Research shows that the prevalence of obesity is influenced by the number of meals consumed away from home (French et al. 2002), likely due to the larger portion sizes offered (Rolls et al. 2002). Convenience, income, and familiarity with food preparation are considered the major driving factors in the proportion of restaurant meals consumed (Glanz et al. 1998, Condrasky and Hegler 2010). Future research in this study will focus more on food consumption and nutritional/dietary change pre and post CSA program participation.

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Appendix

Table 1. Pre-Program Survey Statistics

Variable	Description	Frequency	Percentage
Gender	Male	3	18.75%
	Female	13	81.25%
Marital Status	Married	12	75.00%
	Single	4	25.00%
Income	under 20 K	1	6.25%
	20-36 K	3	18.75%
	37-50 K	3	18.75%
	51-65 K	0	0.00%
	66-79 K	3	18.75%
	80-105 K	3	18.75%
	105 K +	1	6.25%
	N/A	2	12.50%
Education	Middle School	0	0.00%
	High School	2	12.50%
	Some College	1	6.25%
	2-year	0	0.00%
	4-year	8	50.00%
	Graduate	5	31.25%
Employment Status	Full-time	6	37.50%
	Part-time	5	31.25%
	Unemployed	0	0.00%
	Homemaker		12.50%
	Retired	2	0.00%
	Student	3	18.80%
Ethnicity	African American	0	0.00%
	Asian	1	5.88%
	Pacific Islander	0	0.00%
	Caucasian	13	76.47%
	Middle Eastern	0	0.00%
	Native American	0	0.00%
	Hispanic	1	5.88%
	N/A	2	11.76%

Table 1. Pre-Program Survey Statistics *Cont.*

Variable	Description	Frequency	Percentage
Preferred basket size	1-2 people	7	41.18%
	2-3 people	8	47.06%
	3-4 people	2	11.76%
How did you hear about CSA	Word-of-Mouth	8	47.06%
	Flyer/Poster	1	5.88%
	Newspaper	1	5.88%
	Farmers' Market	1	5.88%
	Website	2	11.76%
	Facebook	1	5.88%
	Email	1	5.88%
	Other	2	11.76%
Consumer categories	Omnivore	12	75.00%
	Vegetarian	2	12.50%
	Vegan	1	6.25%
	Raw Food	0	0.00%
	Other	1	6.25%
Primarily grocery purchases	Grocery Store	14	87.50%
	Bulk Store	1	6.25%
	Multi-purpose Store	1	6.25%
	Specialty Store	0	0.00%
	Discount Store	0	0.00%

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Supermarket Sales of Crawfish and Competing Crustacean Products

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Abstract

Understanding supermarket sales of crawfish and potential competing crustacean products has the potential to assist the crawfish industry to refine its marketing strategies. A.C. Nielsen scanner data were used to develop a descriptive sales analysis of crawfish and competing crustacean product markets. Market shares, market trends and price fluctuations for different product forms of crawfish, crab, shrimp and lobster are presented for the period of 2005-2010. Markets for crawfish and competing products are described for different cities in the U.S. Discussions of potential effects of market specific demographics on consumption of crawfish and competing crustacean products are included.

Keywords: Marketing Strategies, Frozen Crawfish, Crawfish Price, US Crawfish Sales

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Introduction

Supply of crawfish in the US comes from domestic aquaculture, wild catch, and imported aquaculture sources. Crawfish was originally cultured and consumed in Louisiana with about 70 % of crawfish production being locally consumed. Consumers outside the southeast US view crawfish as a novelty product. Demand in those areas is largely dependent on promotion and consumer education.

In the US crawfish market, 88% of crawfish are sold as whole live or boiled and sold to restaurants and retailers while the remaining 12% are further processed into tail meat and sold to restaurants, distributors, and retail food stores (Lee and Kennedy 2008). The US processes about 10% of total live crawfish, and supplies about 2 million pounds of tail meat, equal to approximately $13 million a year. Crawfish meat is imported to the US from China, Canada, Spain, and Japan, totaling approximately 6 million pounds or $48 million/year during the 2006-2010 period of this dataset. Imports of frozen crawfish tail meat is increasing, as evidenced by the US market share of crawfish tail meat having decreased from 42% to 13% during the 2006 to 2010 period (US ITC 2003).

Objectives

The objective of this article is to provide a brief overview of the US crawfish market, specifically for crawfish products sold at supermarkets, i.e., frozen product, in major US cities. Sales of crustacean products are compared graphically over the study period for the major cities selling crawfish products.

Data

Data on crustacean species' sales volume, price, and promotion were collected by Nielsen scanners for 52 major cities in the US. The dataset is for weekly sales from June 2005 through June 2010. Data used in the crawfish analysis is for frozen crawfish products. There were 132 individual crawfish product items in the US supermarkets that were categorized into six product forms (crawfish; crawfish and crab pie; crawfish cake; crawfish pie; crawfish pistolette; crawfish whole). Sales of crustacean products are compared graphically over the study period for the major cities selling crawfish products.

Of the 132 individual crawfish products the top 20 items accounted for 91.5% of total sales. Crawfish package sizes ranged from 12 oz., 16 oz. and 48 oz., with sales volume shares of 59%, 31%, and 10%, respectively. Frozen crawfish were sold in forms such as tail meat, whole, chopped, patties, and piece. The crawfish product type shares were dressed (45%), regular (39%), peeled (5%), Cajun (5%), Etouffee (2%), hot and spicy boiled whole (2%), and wild caught with Cajun spicing (2%). Product prices ranged from $3.00 to $16.00 per pound with an average price of $7.50 per pound in the 2009/2010 season.

Results

In Table 1, a description of supermarket crustacean sales for the entire US supermarket outlet is presented for the 2005-2010 study period. Crustacean species are processed and sold at the US retail store level in different product forms. For example, shrimp has 703 different individual products, crab 558 individual products, lobster 178 individual products, and crawfish 132 individual products (Table 1). The average sales value and price on a weekly basis over the study period is presented in Table 1. Shrimp accounts for 60% of the total market share of the crustacean market with an average price of approximately $4/lb. Crab accounts for 28% of the total market share and the average price is $6/lb. Crawfish and lobster together account for about 12% of total market share, with prices higher than shrimp and crab, at approximately $7/lb and $12/lb respectively. The promotion variable measures the average weekly value of each commodity being a part of some kind of sales promotion, such as having a reduced price, having sale signs put up for a featured item or having a product display. Lobster and shrimp products have gone to more frequent promotions than crab and crawfish products.

Table 1. Description of Crustacean Products Sold in US Supermarkets, 2005-2010

Species	Products (individual / group)	Weekly Average Sales ($)	Weekly Average Unit value ($/lb)	Market share (%)	Weekly Sales Under Promotions($)
Shrimp	703 / 39	2,516,215	3.94	60.19	1,192,789 (47%)
Crab	558 / 28	1,185,056	6.00	28.35	440,719 (37%)
Crawfish	132 / 6	271,727	6.92	6.50	76,858 (28%)
Lobster	178 / 9	207,321	11.70	4.96	112,201 (54%)

In Figure 1 crustacean (crab, shrimp, crawfish and lobster) product sales per year (2006-2010) is presented with the top three sales amounts occurring in the New Orleans/Mobile area, New York and Philadelphia. Figure 2 shows the total crustacean sales for the top 10 US cities by year for the same time period. In Figures 3 through 12 the annual supermarket sales of frozen crustacean product sales for the US area/cities of New Orleans LA / Mobile AL area, Houston TX, Atlanta GA, Chicago IL, Dallas TX, Little Rock AR, Memphis TN, Nashville TN, New York NY, and San Antonio TX, respectively.

Crawfish supermarket sales were greater in the New Orleans/Mobile area than for any other city and were preferred over the three other crustacean products (Figure 3). Sales in this city increased in each of the study years (from $6 million in 2006 to over $8 million in 2010). Houston was the other city that preferred crawfish over other crustacean products (Figure 4). Other cities that liked crawfish product along with shrimp products included Dallas (Figure 7), Little Rock (Figure 8), Memphis (Figure 9), and San Antonio (Figure 12). Cities that preferred shrimp crustacean products over crawfish products included Atlanta (Figure 5), Chicago (Figure 6), Little Rock (Figure 8), Memphis (Figure 9), Nashville (Figure 10), New York (Figure 11), and San Antonio (Figure 12). Cities that predominantly preferred crab products over other crustacean products included Atlanta and Memphis. Atlanta, Chicago and New York had a lobster preference, while shrimp was a favorite in most cities.

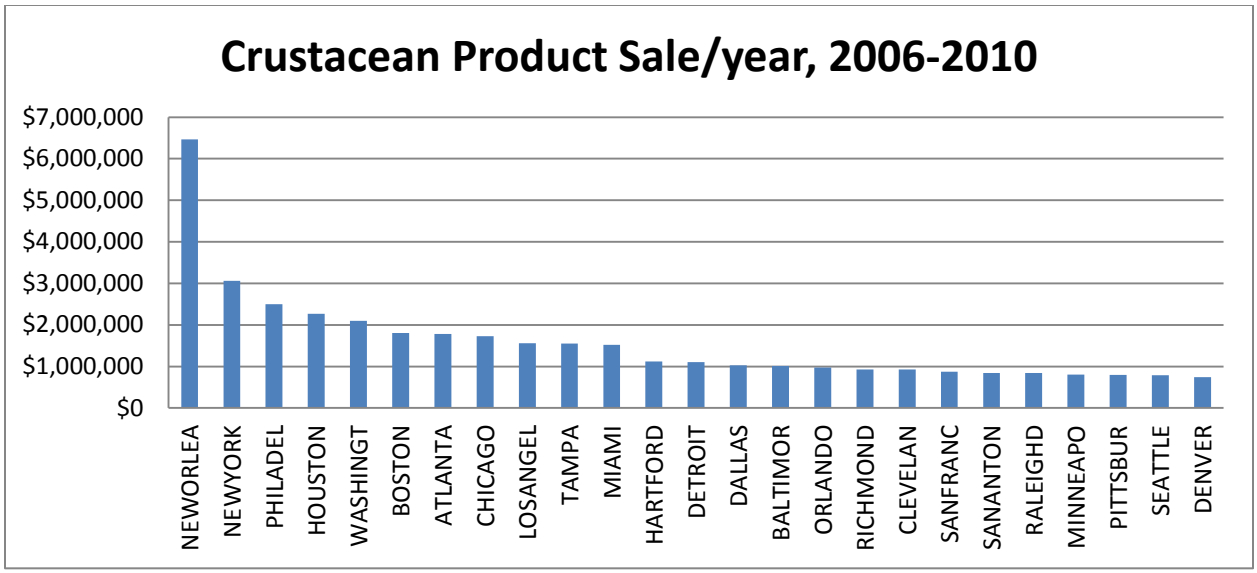

Figure 1. Crustacean Product Sales per Year, 2006-2010.

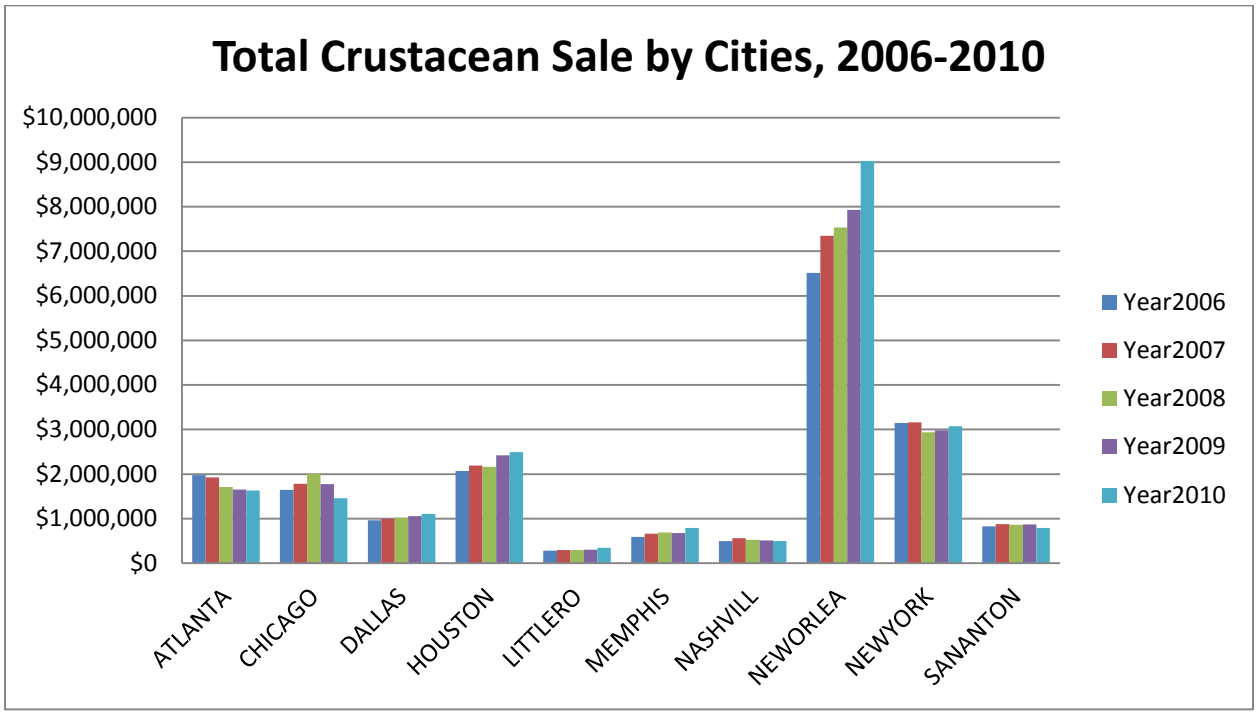

Figure 2. Total Crustacean Sale by Cities 2006-2010.

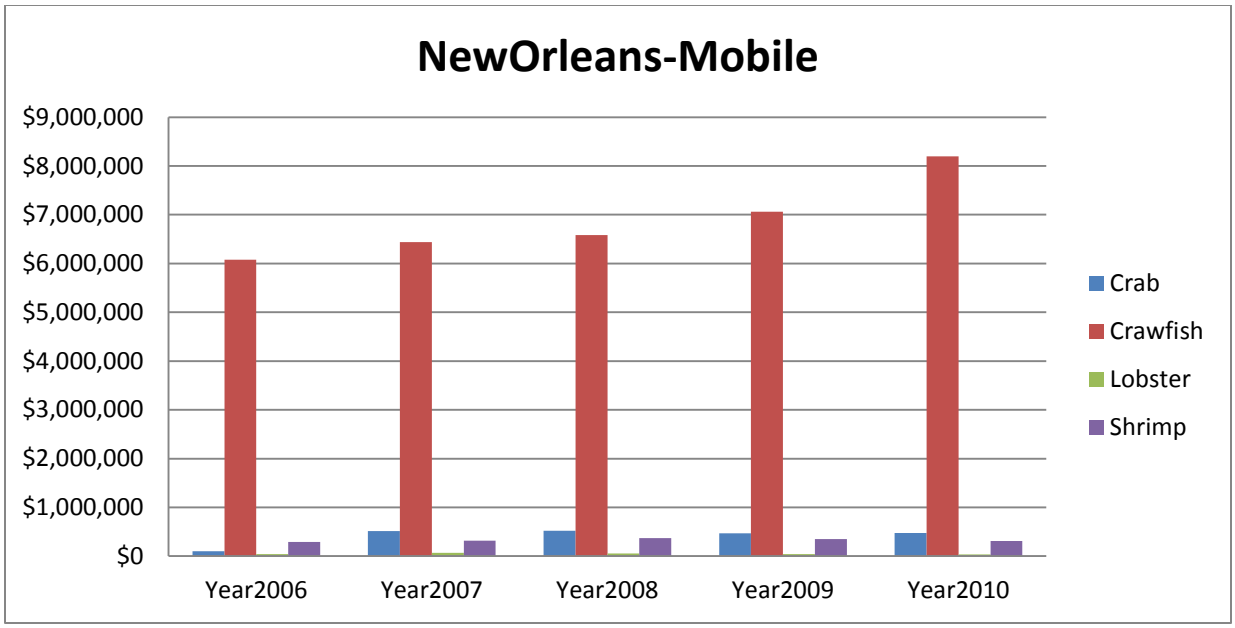

Figure 3. Annual New Orleans, LA / Mobile, AL Supermarket Sales of Frozen Crustacean Products, 2006-2010.

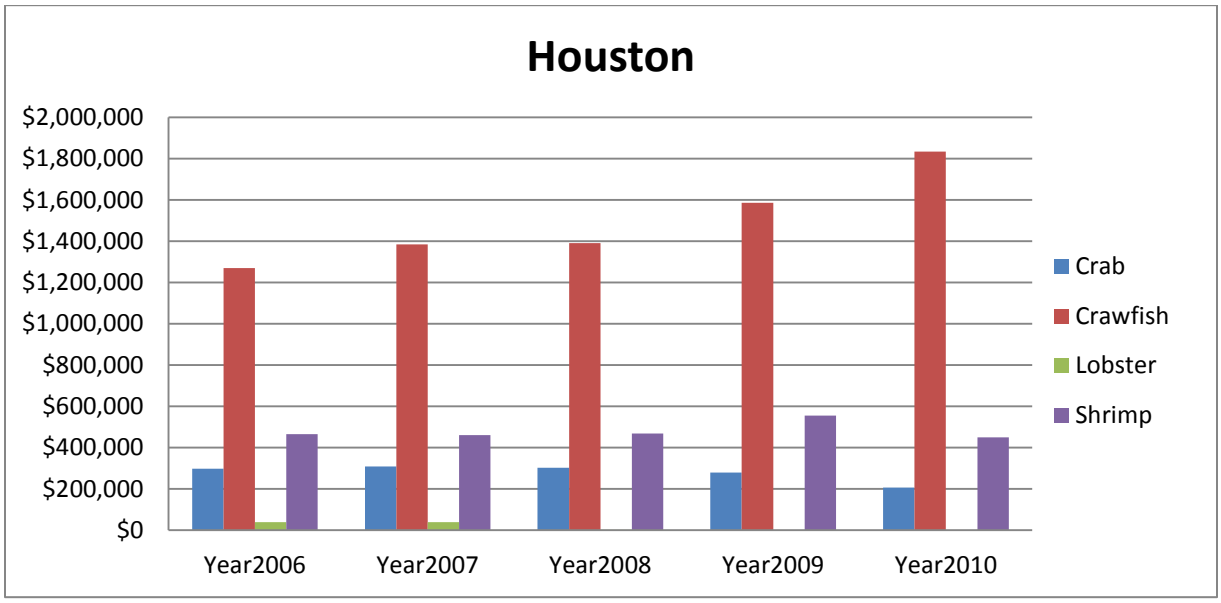

Figure 4. Annual Houston, TX Supermarket Sales of Frozen Crustacean Products, 2006-2010.

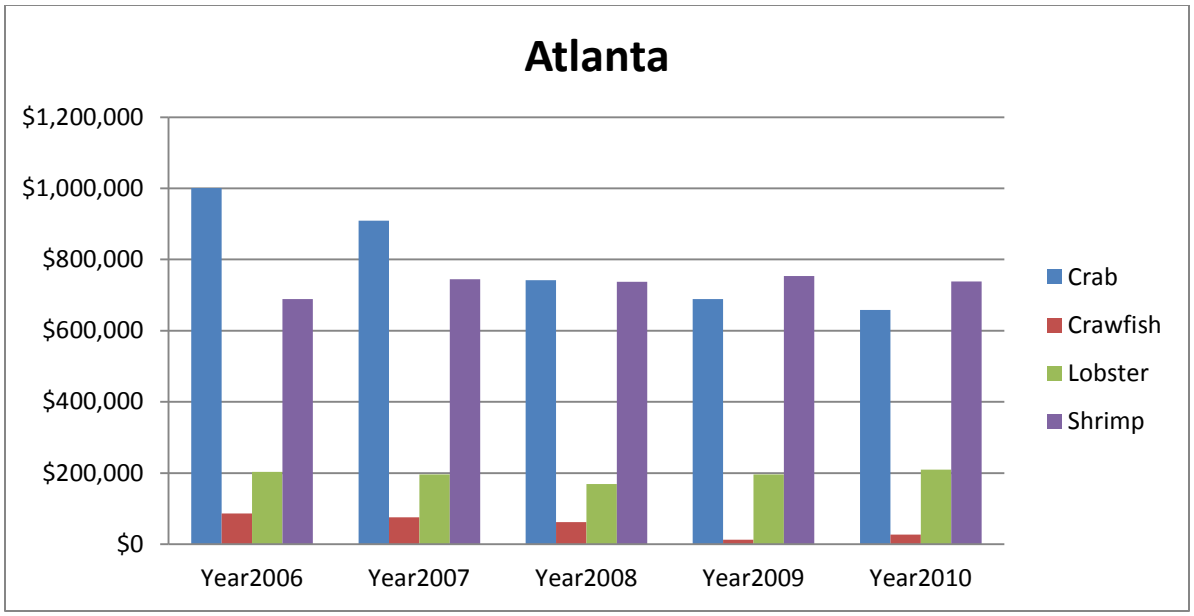

Figure 5. Annual Atlanta, GA Supermarket Sales of Frozen Crustacean Products, 2006-2010.

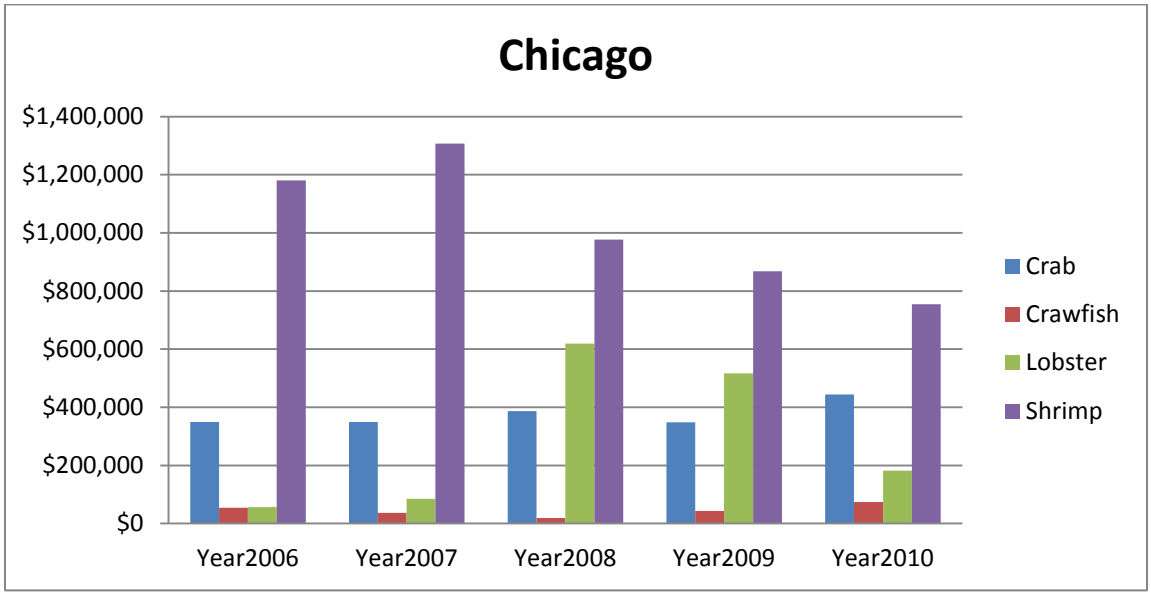

Figure 6. Annual Chicago, IL Supermarket Sales of Frozen Crustacean Products, 2006-2010.

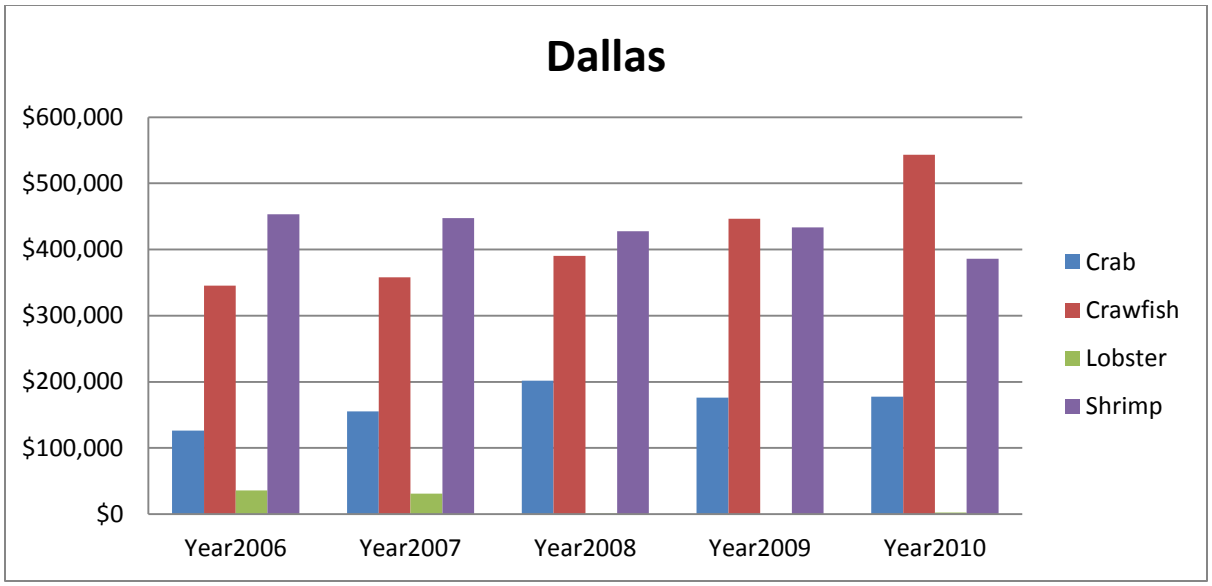

Figure 7. Annual Dallas, TX Supermarket Sales of Frozen Crustacean Products, 2006-2010.

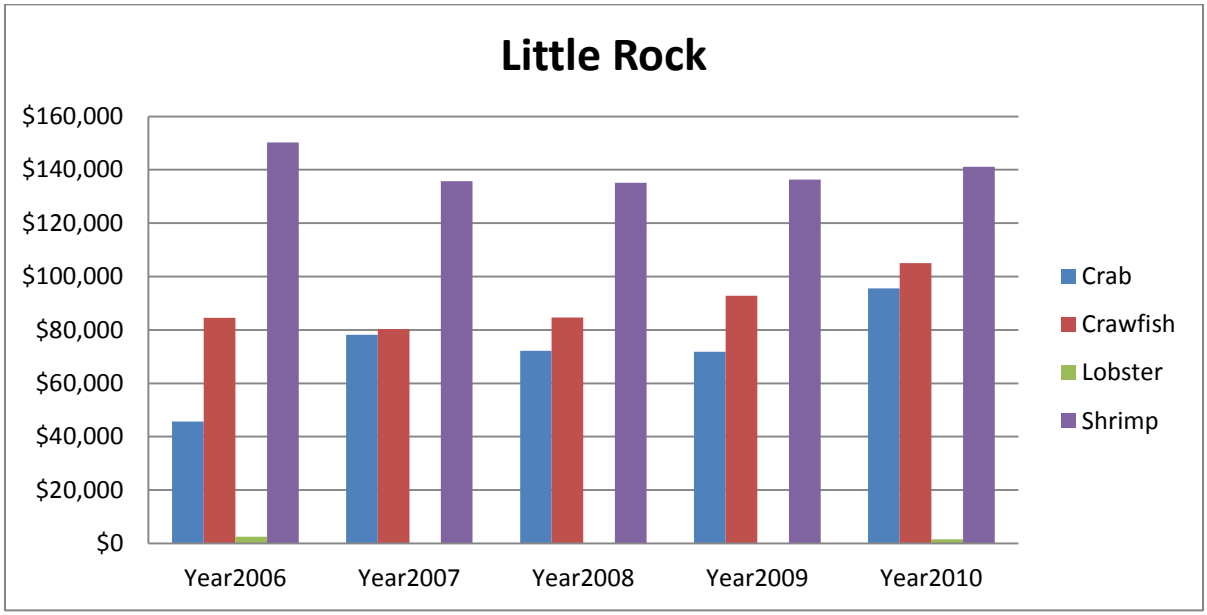

Figure 8. Annual Little Rock, AR Supermarket Sales of Frozen Crustacean Products, 2006-2010.

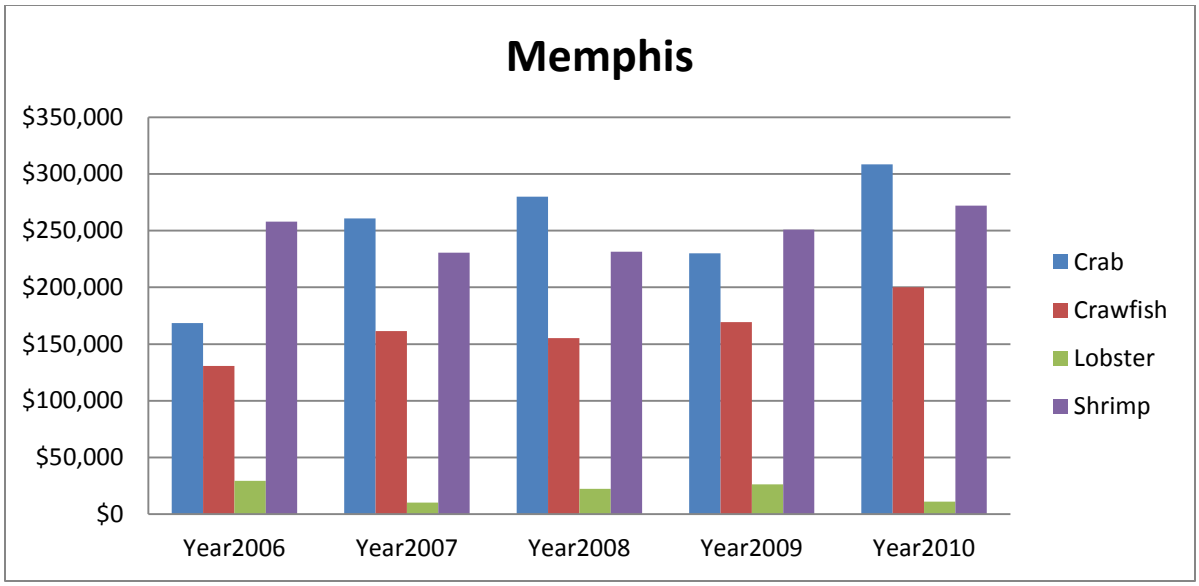

Figure 9. Annual Memphis, TN Supermarket Sales of Frozen Crustacean Products, 2006-2010.

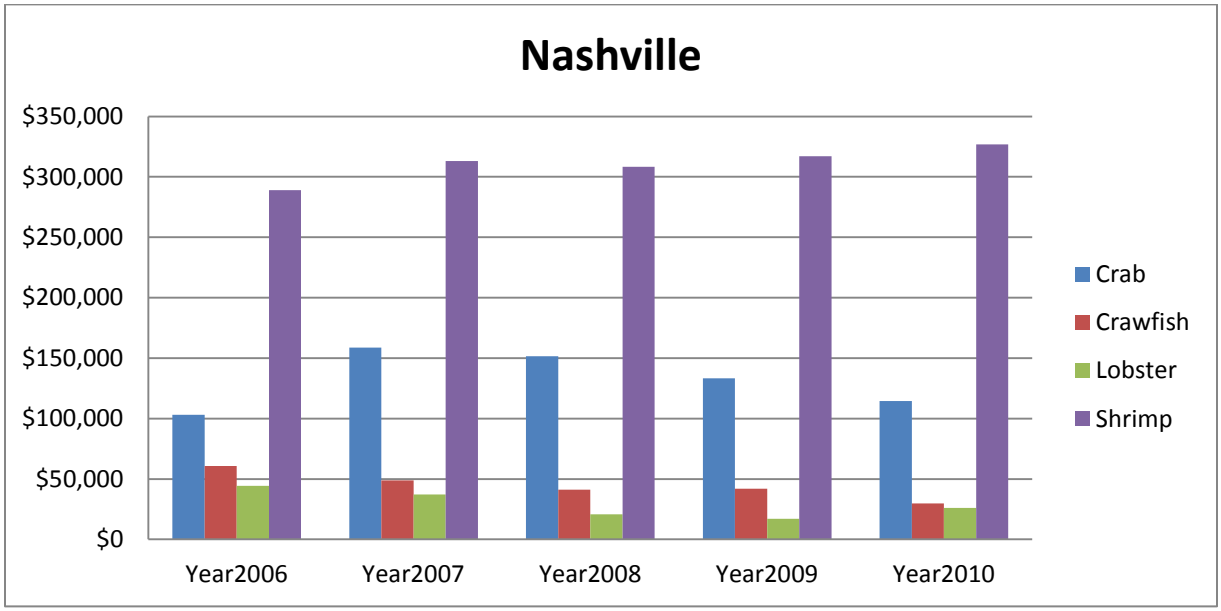

Figure 10. Annual Nashville, TN Supermarket Sales of Frozen Crustacean Products, 2006-2010.

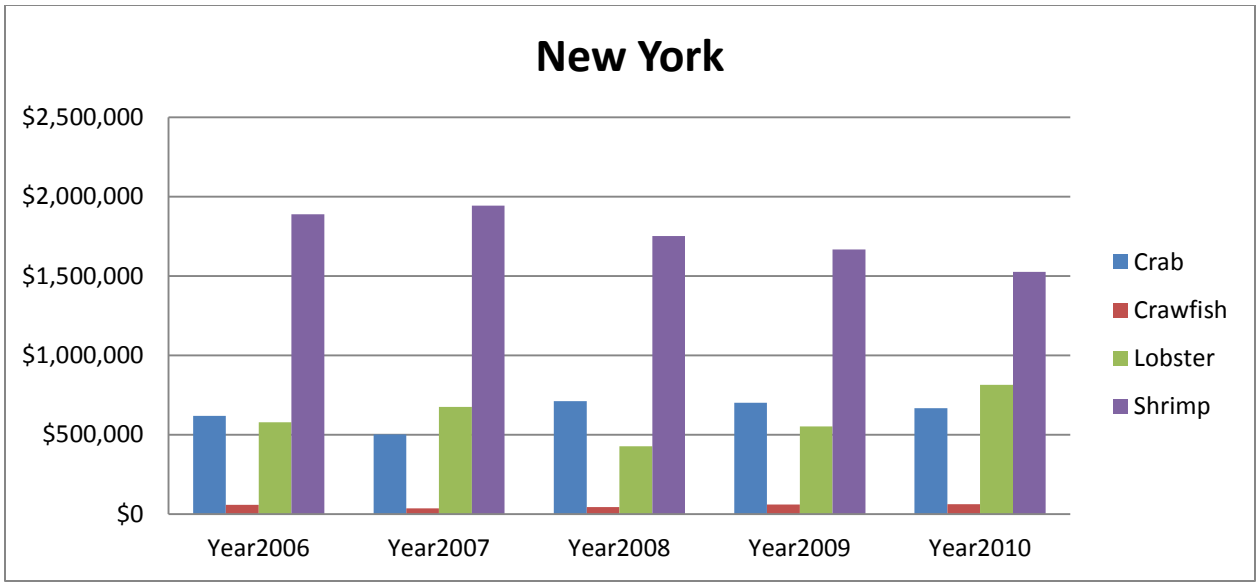

Figure 11. Annual New York, NY Supermarket Sales of Frozen Crustacean Products, 2006-2010.

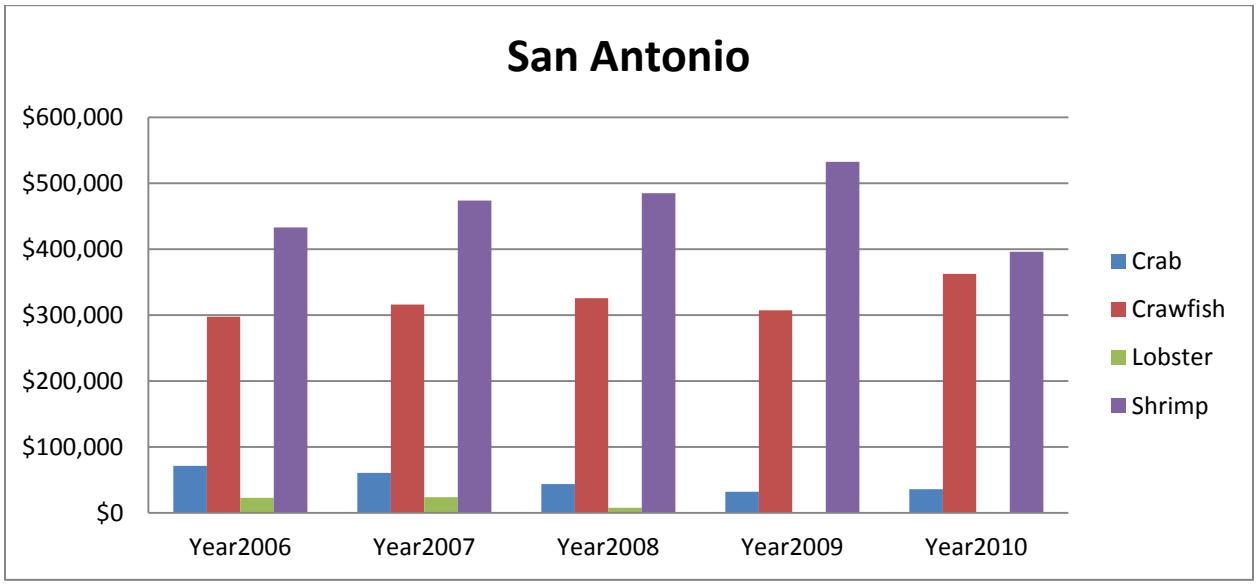

Figure 12. Annual San Antonio, TX Supermarket Sales of Frozen Crustacean Products, 2006-2010.

Conclusions

This brief descriptive analysis provides an insight into supermarket preferences for crustacean products within many larger US cities with several cities preferring crawfish over other crustacean products. While this descriptive review compares US city preferences for crustacean products, a more in-depth demand analysis is required. Chidmi, Hanson and Nguyen (2012) used a non-linear AIDS model to estimate substitution patterns across seafood categories at the US re-

tail market, but do not specifically investigate individual city's demand for these products. Future analysis of this data will estimate demand elasticities for crustacean products at the city supermarket level. This would be beneficial to crawfish retailers as they could price this product to increase their total revenues.

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An Assessment of Communication Technology and Social Media Adoption

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Abstract

This paper reports the results of a survey of cooperative managers regarding the use of communication technology including social media. The survey categorized 105 different cooperatives by current technology use and management practices. The survey found that Texas cooperative managers are willing to expand on their current use of communication technology; however, a clear definition of how to use new concepts as a powerful tool is needed. In terms of governance, we found that many cooperatives have no stated policies regarding the use of communication technologies.

Keywords: communication, cooperatives, agribusiness, management

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Introduction

The advancement of communication technology in the modern business atmosphere continually improves customer relations through the rapid exchange of information, ideas and insight. "Business blogs, corporate Facebook pages, instructional YouTube videos, private enterprise-grade social networking platforms, and other social media and web 2.0 tools can facilitate speedy and successful two-way communication with customers, as well as well as creative and constructive collaboration with colleagues" (Flynn 2012). As technology progresses, the importance of understanding the capacity of specific tools to improve business functions becomes paramount. A business can stimulate healthy customer interaction and internal dialogue from the proper employment use of social media strategies, digital communication practices for the Board of Directors, and flexible adoption policies that adapt to the influx of technology.

A Survey of Cooperatives

This study conducts market research of the Texas cooperative industry through a written and electronic survey. The sample for the survey was derived from the list of cooperatives operating within the state of Texas provided by the Texas Agricultural Cooperative Council. TACC personnel estimate that this list accounts for 95% of all active cooperatives within the state. A total of 32 questions were developed to accomplish the objectives of the survey. The questions for the survey include discrete, categorical, ordinal categorical, and continuous data. The use of varying questions was intended to capture the spectrum of opinions from those least likely to be open to adopting new technology to those most likely to adopt new technology.

The survey was created and distributed in both printed and electronic formats to the entire sample. Providing identical alternate response avenues in this way avoids selection bias consistent with providing only an electronic response avenue when measuring technology adoption. The printed survey was mailed to every cooperative on the TACC list located within the state of Texas, along with a pre-stamped return envelope. The cover page of the survey contained a URL linked to the online survey. The URL takes respondents to an identical survey using Qualtrics survey software. A similar invitation to take the survey online was delivered via email to each potential respondent.

Results

The survey had a 33% response rate, with 105 out of 312 cooperatives in the survey population. Regarding data collection, 37% of the responses were recorded electronically, with one response completed via mobile device. Of the 105 total responses, 82 respondents were members of the TACC. Utility cooperatives made up 24 of the responses, with 14 of them being TACC members. Cotton gins were represented by 18 respondents, all of which belonged to TACC. Selected results are presented here.

Respondents were asked to indicate their level of agreement (strongly disagree to strongly agree) with statements regarding management practices. In general, respondents seem to indicate that there is value in marketing efforts that extend beyond traditional word of mouth. Further, they

generally agreed that using communication technology and social media could be an effective means for improving their competitiveness. However, when asked about their plans to use social media, respondents were less certain and responses were more disparate (see Table 1 for more detailed results).

Table 1. Manager responses regarding value and use of communication technologies

Variable	N	Mean	Median	Min	Max	Stan Dev.
Marketing to Customers Beyond Word of Mouth is Essential	105	4.14	4	2	5	0.85
Member/Customer Engagement is Essential	105	4.57	5	3	5	0.52
Only Adopt User Friendly Tech	105	3.90	4	1	5	0.78
New Forms of Tech Make Us Competitive	105	3.94	4	1	5	0.93
Must Develop Better Lines of Communication	105	4.24	4	1	5	0.81
Can Fully Engage Customer Through Word of Mouth	105	2.47	2	1	5	1.04
Use of Social Media Is Effective Communication With Members	105	3.99	4	1	5	0.86
We Use/Planning to Use Social Media to Communicate With Members	105	3.43	4	1	5	1.07

Regarding cooperative policies of communication and information technology, average responses indicate that 31% provide a text messaging policy, 29% provide a chat platform policy, 43% provide an email policy, 49% provide a personal phone use policy, 23% provide a social media policy, and 38% do not provide any communication and information technology policy. The median respondent in this survey does not have policies defining the use of text messaging, chat platforms, emailing, personal phone use, or social media use in the cooperative (see Table 2 for more detailed results).

Table 2. Manager Responses to Use of Policies Regarding Communication Technologies

Variable	N	Mean	Median	Min	Max	Stan Dev.
Text Messaging Policy	105	0.31	0	0	1	0.47
Chat Platform Policy	105	0.29	0	0	1	0.45
Email Policy	105	0.43	0	0	1	0.50
Personal Phone Policy	105	0.49	0	0	1	0.50
Social Media Policy	105	0.23	0	0	1	0.42
None of the Above	104	0.38	0	0	1	0.49

Conclusion

An overall need has been identified for communication and technology communication education and adoption, and an implementation strategy is in order. Social media campaigns can be tailored to each organization to help them find workable solutions to communicate with their members and customers. Understanding the driving forces behind each cooperative's adoption of new technology will aid educators in developing educational materials to help progress the technological literacy of cooperatives and inspire improved member interaction and involvement.

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Price Hikes in US Agricultural Commodity Futures Markets: An Empirical Efficiency Test

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Abstract

This paper evaluates how efficient US futures prices have predicted future spot prices since 2006. It uses cointegration and causality methods to assess the efficiency of US commodity futures markets. The cointegration between the spot and futures price is a necessary condition for our definition of market efficiency. It ensures that there exists a long-run equilibrium relationship between the two prices (Ali and Gupta 2011). Causality assists in examining the existence of lead or lag relationships between futures and spot prices in order to make inferences on the directions (unidirectional or bidirectional) of information flow.

Keywords: Commodities, futures, markets, agriculture

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Introduction

Agricultural futures markets primarily function as a mechanism for discovering prices and managing market risks associated with price variability and stock holding. Holding commodity over time entails risk, and as a reward for that risk, the future spot price must be higher than the current futures price. In general, market participants, including farmers, will hold stocks if futures prices are lower than the expected futures spot prices, net storage cost or marginal convenience yield. For markets to be efficient, we expect spot and futures prices to move together over time to avoid arbitrage opportunities. To perform the risk-transfer and informative or price discovery roles efficiently, we expect futures markets to meet the basic hypothesis of market efficiency[1] – i.e. futures price must be an unbiased predictor of spot price. However, since 2006, the volume of contracts traded on US futures markets has increased dramatically amidst increased price spikes and volatilities. As prices have become more volatile and convergence less predictable, many believe the US futures markets have lost their efficiency of price discovery and risk management functions and may have contributed to recent price spikes and volatility (Stoll and Robert Whaley 2010; US Senate 2009).

Although price spikes and volatility in US agricultural commodities have attracted the attention of the media, studies on the efficiency, causal relationships of recent spikes, and volatility in both spot and futures prices of the US commodity futures markets are rare. Studies on the convergence or the lack thereof between spot and futures prices failed to evaluate causal factors (Irwin et al. 2007). Other studies on recent price spikes focused on regulatory requirements, index investments, and excess speculation. This paper evaluates how efficient US futures prices have predicted future spot prices since 2006. It uses cointegration and causality methods to assess the efficiency of US commodity futures markets. The cointegration between the spot and futures price is a necessary condition for our definition of market efficiency. It ensures that there exists a long-run equilibrium relationship between the two prices (Ali and Gupta 2011). Causality assists in examining the existence of lead or lag relationships between futures and spot prices in order to make inferences on the directions (unidirectional or bidirectional) of information flow.

Data

Data used consists of spot prices and daily closing prices of futures contracts of selected twelve (12) agricultural commodities reported in the Commitments of Traders (COT) reports for 2006-2011. The commodities are CBOT corn, soybeans, wheat, soybean oil, KCBOT wheat, CSCE cotton, coffee C, sugar, cocoa, CME live cattle, lean hogs, and feeder cattle.

Methodology

An efficient agricultural commodity market is one in which the spot market "fully reflects" the available information (Fama 1970); i.e. an efficient futures market should send price signals to the spot market immediately to eliminate supernormal profit from arbitraging on price differences or at maturity, the future prices become equivalent to spot prices except for some transaction costs. With cost-of-carry (stochastic convenient yield) and no-arbitrage profit expectation, the efficiency in US agricultural futures markets can be represented as:

$$(1) \qquad F_{t,t-k} = S_{t,t-k} + d_t$$

where d_t is the cost-of-carry or stochastic convenience yield, $F_{t,t-k}$ is the futures price at time t for delivery at time t-k, and S_{t-k} is the expected spot price at maturity of the contract, i.e. time t-k. If the cost-of-carry is stationary or zero, th -arbitrage model implies that the futures price is cointegrated with the spot price. Two critical criteria must be met to ensure long-term efficiency of US commodity futures markets – i.e. S and F must be integrated (stationary) to the same order and they must also be cointegrated, otherwise S and F will tend to drift apart over time.

Cointegration Test

The no-arbitrage profit condition of market efficiency suggests that spot and futures prices will only be co-integrated if the cost-of-carry is stationary. We tested for stationarity using "Augmented Dickey-Fuller Test" (Dickey 1984; Dickey and Fuller 1979, 1981). This involves estimating lagged values of ΔX until autocorrelation is eliminated. The test is based on equation:

$$(2) \qquad \Delta X_t = \mu + \delta_t + \rho X_{t-1} + \sum_{j=1}^{k} \gamma_j \Delta X_{t-j} + \varepsilon_t$$

where X_t and X_{t-1} are the present and the immediate past values of a variable, respectively; and μ_t is a stationary error term. The null hypothesis $\rho = 0$ can be tested using a t-statistic. j is the minimum lag length of the augmentation term, necessary to reduce the residuals to white noise.

The second critical condition that must be satisfied to ensure long-term market efficiency in US commodity futures markets is cointegration – i.e. we investigated whether the final settlement spot prices and the futures prices are cointegration. Generally, the presence of cointegration ensures long term relationship of spot and futures prices and the absence of cointegration shows that spot and futures prices drift apart without bound or the futures price provides little information about the movement of the spot price.

Our approach is based on the vector auto-regression (VAR) framework developed by Johansen (Johansen 1988; Johansen and Juselius 1990). Johansen's cointegration tests have been used to assess the long-run relationship among spot and futures prices, using maximum likelihood technique. The Johansen's cointegration test, assuming an n-dimensional vector $\mathbf{X_t}$ with integration of an order I(1), estimates a vector autoregressive models. Johansen and Juselius (1990) further improved the model by incorporating an error correction as:

$$(3) \qquad \mathrm{X_t} = c + \sum_{i=1}^{k} \prod_i \mathrm{X}_{t-1} + \varepsilon_t$$

$$(4) \qquad \mathrm{X}_t = \mu + \sum_{i=1}^{\mu-1} r_i \, \Delta_i \mathrm{X}_{t-1} + \prod_i \mathrm{X}_{t-1} + \varepsilon_t$$

where X_t is an n x 1 vector of the I(1) variables representing spot (S_t) and futures (F_{t-n}) prices, respectively, μ is a deterministic component which may include a linear trend term, an intercept term, or both, Δ denotes the first difference operator, $\prod_i$ is an n x r matrix of parameters indicating α and β, c is a vector of constants, k is lag length based on the Hannan-Quinn criterion, and ε_t is error term, indicating how many linear combinations of X_t are stationary.

The cointegration model asserts that if the coefficient matrix $\prod$ has reduced rank r < k, then co-integrating relationship can be determined by examining the rank of the coefficient matrix $\prod$, which is based on the number of co-integrating vectors. The e rank of $\prod$ thus defines the number of co-integrating vectors. For the two variables (S_t and $F_{0,t}$) in our study, the maximum rank of $\prod$ will be 2, indicating that S_t and $F_{0,t}$ are jointly stationary. A rank of one (1) will indicate a single cointegration and a zero (0) rank will indicate lack of cointegration between S_t and $F_{0,t}$. Johansen suggests the trace and maximum eigenvalue likelihood tests to determine the rank of $\prod$. These are presented in equations (5) and (6) respectively:

$$(5) \qquad J_{trace} = -T \sum_{i=r+1}^{n} \ln\left(1 - \hat{\lambda}_i\right)$$

$$(6) \qquad J_{max} = -T \ln\left(1 - \hat{\lambda}_{r+1}\right)$$

where T is the sample size and $\hat{\lambda}$ is the i:th largest canonical correlation. Asymptotic critical values have been provided by Johansen and Juselius (1990) as test statistics.

Causality Test

We conducted linear Granger causality tests in order to analyze the dynamic relationship between the spot and futures prices. These tests allow us to make some inferences about the causal relations and direction of information flows between spot and futures markets of the 12 agricultural commodities – i.e. to examine whether changes in the price of futures contracts lead changes in spot prices, whether changes in spot prices lead changes in futures prices, or both. Formally, the Granger causality test determines whether the past values of the first valuable contain additional information on the current value of the second variable that is not contained in the past values of the later. If so, then the first variable is said to Granger-cause the second variable. We defined the spot price of a commodity as:

$$(7) \qquad RS_t = InS_t - InS_{t-}1$$

where S_t is the price in the spot market at time (day) *t*, and the futures return is defined as:

$$(8) \qquad RF_t = InF_t - InF_{t-1}$$

where F_t is the futures price of the nearby contract at time *t*. We used the first difference I(1) of the daily returns of spot (RS_t) and futures (RF_t) for our Granger causality test because the results of equation (1) on the logs of spot and futures prices of each of the twelve commodities are found to be I(1) or first difference stationary. More specifically, our Granger causality test in-

volved analyzing the relationship between RS_t and p lagged values of RS_t and RF_t by estimating the regression models:

$$(9) \qquad RS_t = a_0 + \sum_{k=1}^{p} a_{1k} RS_{t-k} + \sum_{k=1}^{p} a_{2k} RF_{t-k} + e_t$$

$$(10) \qquad RF_t = a_0 + \sum_{k=1}^{p} a_{1k} RF_{t-k} + \sum_{k=1}^{p} a_{2k} RS_{t-k} + e_t$$

F-test is used to test whether RF_t does not Granger-cause RS_t by examine the null hypothesis that the lagged coefficients of RF_t are equal to zero. A similar F-test was used to test the opposite effect – i.e. whether RS_t does not Granger-cause RF_t. The critical aspect here is the choice of lags (k) in both equations (9) and (10). Insufficient lags could yield incorrect test statistics, while too many lags may reduce the power of the test. Hence the lag structure suggested by Akaike Information Criterion (AIC) within each commodity is used for testing causality.

Results

Integration (Stationarity) Results

All the results (not presented) of the Dickey and Fuller (ADF) and Phillips and Perron (PP) unit root tests for the twelve selected commodities showed that both the spot and futures prices are not stationary but become stationary at the first difference. The results are characterized as I(1) or first difference stationary. This satisfies the first criterion of our market efficiency definition.

Cointegration Results

The cointegration results test the second condition of our definition of market efficiency. Table 1 presents the cointegration results from applying equations (5) and (6) to the price series of the twelve agricultural commodities. The results of the Johansen λ_{trace} and λ_{max} indicate that the null hypothesis of non- cointegration (r = 0) is rejected at the 5 percent significant level for all the 12 commodities. The only departure from these results is Coffee traded on ICE where the results show no- cointegration. These results show that there are cointegrations between the spot and futures prices for all the twelve agricultural commodities in our study. The existence of cointegration satisfies our second condition of long-term market efficiency and indicates that the U.S. agricultural futures prices efficiently predict spot prices or the futures prices provide enough information about the movement of the spot prices.

Table 1. Johansen's Cointegration Results for 12 Agricultural Commodities: 2006-2011

Commodities	Trace Statistics		Maxeigen Statistics		Co/Non- cointegration
	r	λ_{trace}	*p-value*	λ_{max}	*p-value*	
CBT Corn	H_0: r = 0	13.8268***	0.0878	12.1373	0.1056	cointegrated
	H_0: r ≤ 1	1.6895	0.1937	1.6895	0.1937	
CBT Soybean Oil	H_0: r = 0	12.9273	0.1175	7.8956	0.3894	cointegrated
	H_0: r ≤ 1	5.0316**	0.0249	5.0316**	0.0249	
CBT Soybean	H_0: r = 0	36.4335*	0.0000	33.4153*	0.0000	cointegrated
	H_0: r ≤ 1	3.0183***	0.0823	3.0183**	0.0823	
CBT Wheat	H_0: r = 0	16.3515**	0.0371	10.3043	0.1927	cointegrated
	H_0: r ≤ 1	6.0471	0.0139	6.0471**	0.0139	
CME Feeder Cattle	H_0: r = 0	164.1221*	0.0001	163.9620*	0.0001	cointegrated
	H_0: r ≤ 1	0.1601	0.6891	0.1601	0.6891	
CME Lean Hog	H_0: r = 0	105.6599*	0.0001	100.7869*	0.0000	cointegrated
	H_0: r ≤ 1	4.8729	0.0273	4.8729	0.0273	
CME Live Cattle	H_0: r = 0	108.3159*	0.0001	106.7413*	0.0001	cointegrated
	H_0: r ≤ 1	1.5746	0.2095	1.5746	0.2095	
CSCE Cocoa	H_0: r = 0	64.1010*	0.0000	60.4994*	0.0000	cointegrated
	H_0: r ≤ 1	3.6015	0.0577	3.6016***	0.0577	
CSCE Coffee	H_0: r = 0	7.6394	0.5047	5.3792	0.6934	Not cointegrated
	H_0: r ≤ 1	2.2601	0.1327	2.2602	0.1327	
CSCE Cotton	H_0: r = 0	99.5270*	0.0001	97.9951*	0.0000	cointegrated
	H_0: r ≤ 1	1.5319	0.2158	1.5319	0.2158	
CSCE Sugar	H_0: r = 0	26.6062*	0.0007	25.1778*	0.0007	cointegrated
	H_0: r ≤ 1	1.4284	0.2320	1.4284	0.2320	
KCBT Wheat	H_0: r = 0	15.7601**	0.0456	11.2273	0.1432	cointegrated
	H_0: r ≤ 1	4.5328	0.0332	4.5325**	0.0332	

Causality Results

The Granger causality test result is reported in Table 2. The upper and lower rows of the F-statistic column reports the null hypotheses that futures price does not Granger-cause spot price, and spot price does not Granger-cause futures price respectively. Generally, the null hypothesis that the futures markets prices do not Granger-cause the prices in spot markets is uniformly rejected at the 1 percent significance level for all commodities. Only in CSCE cotton and KCBT wheat do spot prices Granger-cause futures prices.

Table 2. Granger Causality Test Results for 12 Agricultural Commodities: 2006-2011

Commodities	Hypothesis	F-statistic	Prob.	Direction	Relation
CBOT Corn	S↛ F	6.7997*	0.0006	Bi-directional	F ↔ S
	F↛ S	4.9011*	0.0000		
CBOT Soy Oil	S↛ F	4.7170*	0.0122	Bi-directional	F ↔ S
	F↛ S	3.2169**	0.0009		
CBOT Soybean	S↛ F	0.8892	0.4696	Unidirectional	F →S
	F↛ S	11.6667*	0.0000		
CBOT Wheat	S↛ F	3.2154**	0.0122	Bi-directional	S ↔ F
	F↛ S	7.5143*	0.0000		
CME Feeder Cattle	S↛ F	49.9006*	0.0021	Bi-directional	F↔ S
	F↛ S	4.2364*	0.0021		
CME Lean Hog	S↛ F	35.9276*	0.1214	Unidirectional	F → S
	F↛ S	1.8252	0.0000		
CME Live Cattle	S↛ F	2.4327**	0.0456	Bi-directional	S↔ F
	F↛ S	39.9023*	0.0000		
CSCE Cocoa	S↛ F	2.2027***	0.0665	Bi-directional	S↔ F
	F↛ S	813.6660*	0.0000		
CSCE Coffee	S↛ F	2.3410***	0.0531	Bi-directional	S ↔ F
	F↛ S	38.8080*	0.0000		
CSCE Cotton	S↛ F	9.2136*	0.0000	Unidirectional	S → F
	F↛ S	1.6677	0.1549		
CSCE Sugar	S↛ F	12.0757*	0.0000	Bi-directional	S ↔ F
	F↛ S	71.2041*	0.0000		
KCBT Wheat	S↛ F	0.3169	0.0000	Unidirectional	S → F
	F↛ S	7.8976*	0.8668		

Table 3 is a two-by-three matrix of the cointegration and causality test results. Generally, commodities with cointegration and uni-directional relationship of futures market prices leading the spot market prices (F → S) have better ability to discover prices than those with cointegration and bi-directional relationship. Table 3 shows that future prices Granger cause spot prices (F → S) in 2 commodities (CBOT soybean and CME lean hogs). The implication is that futures market prices have stronger ability to discover spot prices or spot market prices are influenced by the futures market prices only in these two commodities. Table 3 also reports bidirectional causality relationship (F ↔ S) results 8 commodities in 2006-2011. However, examination of the F-statistics for all bidirectional relations for the twelve commodities indicate strong evidence that futures market prices dominate or lead spot markets prices. These results suggest that futures markets dominate spot markets or, equivalently, that the spot prices for these commodities are discovered in the futures markets.

Table 3. Cointegration and Granger Causality Tests Summary

Cointegration	Unidirectional (S → F)*	Unidirectional (F → S)	Bi-directional (F ↔ S)
		Period: 2006 - 2011	
Non-Cointegration	None	I commodity CSCE Coffee	None
Cointegration	2 commodities KCBT Wheat CSCE Cotton	2 commodities CBOT Soybean CME Lean hogs	8 commodities CBOT Wheat CBOT Corn CBOT Soy oil CME Live cattle CME Feeder cattle CSCE Cocoa CSCE Sugar CSCE Coffee

Source: Compiled from Tables 1 and 2. *F = futures prices; S = spot prices

Conclusion

The results of the Johansen's cointegration tests have shown that the spot and futures markets for the 12 agricultural commodities are cointegration. This suggests that the markets are efficient and the agriculture commodity futures exchanges (CBOT, KCBT, CME, and ICE) provide efficient hedge against price risks for agricultural commodities. The Granger causality test results show bi-directional flow of information in majority of the commodities during period. This shows both the spot and future markets are equally responsible for the price discovery process. However, examination of the F-statistics indicates a strong flow of information from the futures markets to spot markets than the reverse. The unidirectional causal relationships exhibited by wheat, soybean, lean hogs and cocoa, imply that the futures markets help discover prices in the spot markets and that the markets are efficient. The results meet our three criteria of market efficiency and suggest that there may be no need to change current futures market regulations.

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The Effect of the Eurozone Crisis on U.S. Food Companies

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Abstract

From the beginning of 2011 to the middle of 2012, the U.S. stock market generally did not perform well. This subpar performance has been largely attributed by the business media to the Eurozone crisis. The purpose of this paper is to determine the extent to which the values of U.S. food companies are related to the Eurozone crisis. The stock prices of nine well-known U.S. food companies and the S&P index are regressed, using a system of equations approach, against a set of variables accounting for profitability and the economic wellbeing of the Eurozone and the United States. Based on the findings of this study it would seem that the U.S. stock market, including food companies, is primarily affected by the wellbeing of the U.S. economy as opposed to that of the EU.

Keywords: SUR, agriculture, stock prices, crisis

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Introduction

Since the last recession began at the end of 2007, according to The Conference Board (2012), through the middle of 2012, U.S. companies, as measured by the benchmark equity market index, the S&P 500, have had great difficulty recovering, including many U.S. food companies. However, since the end of the recession, pegged at the end of June 2009 according to The Conference Board (2012), to the beginning of June 2012, the S&P index increased over 42% with some U.S. food companies besting this percentage increase and many below it. Most of this gain accrued before the start of 2011 (Yahoo! Inc. 2012).

From the beginning of 2011 to the middle of 2012 the situation appeared rather lackluster, with the S&P increasing a mere 0.51%, with many U.S. food companies performing worse (Yahoo! Inc. 2012). This less than stellar performance has been largely attributed by the business media to the Eurozone crisis (BBC 2012; Domm 2012; Farrell 2011; Thomson Reuters 2012).

The purpose of this paper is to determine the extent to which the values of U.S. food companies are related to the Eurozone crisis. The stock prices of nine well-known U.S. food companies and the S&P index are regressed, using a system of equations approach, against a set of variables accounting for profitability and the economic wellbeing of the Eurozone and the United States.

A study by Schnitkey and Kramer (2012) indicates that very little research has been conducted to explain the comportment of stock prices for agricultural firms. Their study compared the stock price performance of select groups of publicly traded agricultural companies relative to the S&P 500 index performance from the beginning of 2000 to the end of 2011. The types of agricultural companies included in their study were those on the farm input side and those at the first handler-processor level on the farm output side. Dummy variables accounting for enactment of the U.S. energy bill and the most recent recession did not reveal any effects. Food companies, such as those included in our analysis, were not included in Schnitkey and Kramer's study. Another recent work by Enlow and Katchova (2011) did find that agricultural firms with a relatively large return on equity were less adversely affected by recession than agricultural firms with a lower return on equity.

Model and Data

The general model specification is based on economic and finance theory (Bodie, Kane, and Marcus 2005; Varian 1992). The specific variables selected for the model are those suggested by the business media such as BLOOMBERG L.P. (2012), CNBC, LLC (2012), and FOX News Network, LLC (2012).

For the S&P 500 and nine representative U.S. food companies, stock price is specified as a function of profitability, a set of variables that account for the macroeconomic conditions in the EU, and a set of variables that account for the macroeconomic conditions in the United States. Profitability for the S&P 500 is in terms of earnings per share. The measure of profitability for the food companies is net income as a percentage of total revenue. The EU macro variables include Greek per capita GDP on a quarterly basis, EU per capita GDP on a quarterly basis, and the value of the Euro as tracked by the FXE (CurrencyShares Euro Trust) ETF (exchange traded fund). The U.S. macro variables are the UUP (PowerShares DB US Dollar Index Bullish) ETF,

which tracks the value of the dollar, and the U.S. per capita GDP on a quarterly basis. The stock price and ETF data are from Yahoo! Finance (Yahoo! Inc. 2012); the profitability data are from Standard & Poor's Financial Services (2012) and YCharts (2012); the Greek and EU per capita GDP data are from Eurostat (European Commission, EU. 2012); and the U.S. per capita GDP data are from the BEA (USDC 2012).

Based on economic and finance theory as commonly indicated by business media pundits, all independent variables are expected to be positively related to stock prices with the exception of the value of the dollar. The dataset is monthly and extends from January 2008 to June 2012 for a total of 54 observations. Quarterly observations are associated with monthly observations based on when the quarterly data became public. For example, January, February, and March 2008 prices and ETF values are associated with profit and GDP estimates for the fourth quarter of 2007, April, May, and June 2008 prices and ETF values are associated with profit and GDP estimates for the first quarter of 2008, etc. The variable descriptions and simple statistics for the data are presented in Table 1.

Model Estimation and Results

The SUR results are presented in Table 2. Because of unit root problems, the estimation results are based on data that are first differenced (Kennedy 2008). Using the variance inflation factor (VIF) method, no multicollinearity was exhibited (Gujarati 2003). The discussion regarding coefficient significance levels is uniformly in terms of the 10% level of significance.

For the S&P 500 price (spprice) equation, all of the coefficients have the expected sign except that for the value of Euro (fxe). Even so, only one coefficient is significant, that for the value of the dollar (uup).

The results for the nine representative food companies vary widely. Five of the nine firms have the correct coefficient sign for the measure of profitability, of which three are significant. Those with the wrong sign include Kellogg (K), Dean Foods (DF), ConAgra Foods (CAG), and Kraft Foods (KFT). Only that for KFT is significant. Ironically, CAG and KFT have fared relatively well since the beginning of the recession with prices increasing about 7% and 19%, respectively, as shown in Table 3. From the beginning of the Eurozone crisis, CAG and KFT prices increased about 9% and 20%, respectively. Even greater was the rise in the price of DF, about 55%, during this period, as seen in Table 3.

During the Eurozone crisis period of this study, more often than not, the path of the Greek economy was given as a reason by the business media for faltering U.S. stock performance. Nonetheless, in this study not a single coefficient for Greek per capita GDP (grkgdp) is significant, as shown in Table 2. The situation is similar regarding the EU per capita GDP (eugdp) as an indicator of U.S. stock performance. Just three food companies have a eugdp coefficient with the expected positive sign – that for CAG, WFM (Whole Foods Market), and SFK (Smithfield Foods). Only the coefficient for WFM is significant. Of the companies with an unexpected eugdp coefficient sign, the one for TAP (Molson Coors) is significant. Again, another indicator of the economic wellbeing of the EU, the value of the Euro (fxe), seems not to be related to the performance of U.S. food company stocks. Only one company, Kroger (KR), has an fxe coefficient with the expected positive sign, though not significant. Only the fxe coefficient for KFT is significant, but with a negative sign.

Table 1. Variable Descriptions and Simple Statistics

Variable	Description	Units	Mean	Std. Dev.	Min	Max
spprice	S&P 500 Index	USD	1.17	0.18	0.74	1.41
kprice	Kellogg Price	USD	47.12	4.96	33.08	55.11
tapprice	Molson Coors Price	USD	42.44	4.20	31.48	52.51
dfprice	Dean Foods Price	USD	15.31	4.96	7.26	27.69
cagprice	ConAgra Foods Price	USD	20.54	3.55	12.80	26.16
gisprice	General Mills Price	USD	31.90	5.02	22.38	39.46
wfmprice	Whole Foods Market Price	USD	41.83	22.66	9.33	88.48
sfdprice	Smithfield Foods Price	USD	18.52	5.48	6.81	31.29
krprice	Kroger Price	USD	22.48	2.11	18.96	26.94
kftprice	Kraft Foods Price	USD	28.67	5.05	19.78	39.56
spprofit	S&P 500 Profit	USD	14.50	10.45	-23.25	23.03
kprofit	Kellogg Profit	%	9.29	1.90	6.07	12.60
tapprofit	Molson Coors Profit	%	17.34	7.80	2.53	29.27
dfprofit	Dean Foods Profit	%	-1.45	10.75	-45.17	2.82
cagprofit	ConAgra Foods Profit	%	6.52	3.11	-2.13	14.47
gisprofit	General Mills Profit	%	10.14	2.55	5.34	15.10
wfmprofit	Whole Foods Market Profit	%	2.45	1.09	0.08	4.41
sfdprofit	Smithfield Foods Profit	%	1.06	2.71	-3.97	6.36
krprofit	Kroger Profit	%	0.98	1.63	-4.95	2.02
kftprofit	Kraft Foods Profit	%	7.42	3.13	1.93	16.64
grkgdp	Greek Per Capita Quarterly GDP	EUR	4782.50	604.54	3444.00	5500.00
eugdp	EU Per Capita Quarterly GDP	EUR	6161.11	231.01	5700.00	6500.00
fxe	CurrencyShares Euro Trust ETF Price	USD	137.70	9.15	121.60	156.00
uup	PowerShares DB US Dollar Index Bullish ETF Price	USD	23.19	1.43	20.95	26.55
usgdp	U.S. Per Capita Quarterly GDP	thous USD	11.76	0.30	11.31	12.35

Table 2. SUR Coefficient Estimates of the Eurozone Crisis on Stock Prices: S&P 500 and Nine US Food Companies

Variable	S&P 500	K	TAP	DF	CAG	GIS	WFM	SFD	KR	KFT
profit	5.7E-04	-0.1144	0.0456	-0.0178	-0.0124	0.0673*	1.7386*	0.2697*	0.0015	-0.0822*
	(5.7E-04)	(0.1288)	(0.0425)	(0.0167)	(0.0204)	(0.0356)	(0.6500)	(0.1526)	(0.0576)	(0.0338)
grkgdp	1.0E-06	0.0004	0.0011	-0.0002	4.7E-05	0.0004	-0.0007	-0.0001	0.0002	0.0006
	(2.3E-05)	(0.0010)	(0.0013)	(0.0011)	(0.0005)	(0.0005)	(0.0017)	(0.0011)	(0.0005)	(0.0006)
eugdp	2.6E-05	-0.0018	-0.0036*	-0.0002	0.0005	-0.0007	0.0069*	0.0006	-0.0008	-0.0015
	(3.9E-05)	(0.0023)	(0.0017)	(0.0017)	(0.0007)	(0.0008)	(0.0025)	(0.0018)	(0.0007)	(0.0010)
fxe	-0.0034	-0.2608	-0.1281	-0.0667	-0.1255	-0.1390	-0.4728	-0.1814	0.1509	-0.4555*
	(0.0057)	(0.2515)	(0.2825)	(0.2695)	(0.1169)	(0.1355)	(0.4001)	(0.2848)	(0.1211)	(0.1399)
uup	-0.0749*	-2.7124	-3.6065*	-0.5687	-1.4229*	-1.0409	-4.0056	-2.7723	0.4815	-3.9159*
	(0.0408)	(1.7894)	(2.0135)	(1.9161)	(0.8318)	(0.9644)	(2.8449)	(2.0273)	(0.8617)	(0.9957)
usgdp	0.0377	3.3046	6.0239*	0.7977	-0.7220	2.6334*	-0.8103	0.7810	3.3239*	4.4549*
	(0.0731)	(3.2563)	(3.3721)	(3.2037)	(1.4000)	(1.6288)	(4.7707)	(3.4772)	(1.4438)	(1.7942)
intercept	-0.0036	-0.0911	-0.2301	-0.3129	0.0773	0.1331	0.4612	-0.3196	-0.0725	-0.1221
	(0.0076)	(0.3380)	(0.3802)	(0.3578)	(0.1562)	(0.1808)	(0.5324)	(0.3797)	(0.1606)	(0.1880)
R-sq	0.43	0.14	0.47	0.05	0.19	0.05	0.23	0.25	0.22	0.36
Chi-sq	39.78	8.45	48.04	4.43	12.51	8.67	19.20	16.51	15.59	35.40
P	0.00	0.29	0.00	0.73	0.08	0.28	0.01	0.02	0.03	0.00
Breusch-Pagan test of independence: Chi-sq (45) = 204.26, P = 0.00										

Note: the values in parentheses are standard errors. Asterisks (*) indicate significance at the 10% level or better.

Regarding the health of the U.S. economy, the value of the dollar is discussed in two ways by the business media. On one hand, a strong dollar is good for the U.S. consumer as the cost of goods tend to be lower. On the other hand, a weak dollar is good for U.S. business, as U.S. goods become relatively cheap in foreign markets giving rise to an increase in demand for U.S. goods. Of the set of variables used in this analysis, the value of the dollar (uup) behaves relatively well according to expectations. The expected negative sign for the uup coefficient manifests in every case except that for KR, though not significant. The coefficient is significant for TAP, CAG, and KFT. Foreign sales account for 98% and 60%, respectively, of total sales for TAP and KFT, which is high relative to that for the other representative companies in this study, as seen in Table 3. The remaining variable reflecting the health of the U.S. economy is U.S. per capita GDP (usgdp). Two companies, CAG and WFM, have unexpected negative usgdp coefficient signs, though not significant. Four companies have significant and positive usgdp coefficient signs – TAP, GIS (General Mills), KR, and KFT.

Table 3. Percentage Stock Price Changes by Time Period and Foreign Sales Percentage

Company	1/4/08-6/1/12[a]	7/2/09-6/1/12[b]	1/7/11-6/1/12[c]	Foreign Sales
S&P	-9.46	42.43	0.51	46.00
K	-5.77	2.99	-5.45	38.00
TAP	-24.38	-11.62	-19.25	98.00
DF	-37.31	-21.47	55.31	3.00
CAG	7.01	32.49	8.76	5.00
GIS	36.09	29.57	6.40	25.00
WFM	125.90	376.80	76.30	3.00
SFD	-28.00	41.17	-0.46	11.00
KR	-14.60	1.79	0.19	0.00
KFT	19.46	44.72	20.46	60.00

[a]From beginning of last recession.
[b]From end of last recession.
[c]From beginning of Eurozone crisis.
Note: Foreign sales percentages are from ADVFN (2012) except for the S&P and CAG which are from Standard & Poor's Financial Services (2012) and Nvest, Inc. (2012), respectively.

Conclusions

The results of this analysis are mixed at best. The fact that only one coefficient, that for the value of the dollar, is significant in the broad market (S&P) equation is telling. Even reported profitability seems to have no bearing on the S&P index. Moreover, the efficacy of business media reporting regarding the effects of the Eurozone crisis on the U.S. stock market appears to be specious. Given the importance of the value of the dollar, it should be noted that 46% of S&P 500 company gross sales are foreign (Standard & Poor's Financial Services 2012).

For the nine representative food companies, the results diverge markedly from that for the S&P 500. One would easily expect reported company profitability to have a powerful and direct effect on the value of the company stock. However, this was generally not found. Only three companies had positive and significant profitability coefficients. It may be that other forms of profitability information are more important, for example, earnings projections by leading analysts.

None of the variables alleged by the business media pundits to be central regarding the impact of the Eurozone crisis on the U.S. stock market was found to be important. The Greek per capita GDP, EU per capita GDP, and the value of the Euro were expected to be directly related to the food company stock prices in this study. Not a single significant coefficient with the correct sign manifested for the Greek per capita GDP or value of the Euro. Only one was found for the EU per capita GDP.

The measures reflecting the health of the U.S. economy seemed to yield somewhat better results. For the nine food companies, save one, the value of the dollar exhibited the expected negative relationship, though only three of the coefficients were significant. There was some evidence that the magnitude of foreign sales might be important with respect to the value of the dollar. The expected positive relationship between U.S. per capita GDP and food company stock prices manifested for seven of the nine firms, and in four of those cases the coefficient was significant. Based on the findings of this study it would seem that the U.S. stock market, including food companies, is primarily affected by the wellbeing of the U.S. economy as opposed to that of the EU.

Given the less than stellar results with respect to the reported profitability measures used in this analysis, future research should consider alternatives such as an array of projected earnings growth measures by different recognized analysts. Of course, a study like this regarding the effect of the Chinese economy on U.S. food companies is another extension to consider.

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The Role of Social Capital in Nascent Agri-Food Industries: A Case Study of Michigan Chestnut Growers, Inc.

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Abstract

Despite early financial and organizational struggles, Chestnut Growers Inc. continues to play a central role in the industry and membership has increased. The purpose of this study is to explore this apparent paradox. We apply concepts from management and organizational theory to provide a greater understanding of dynamics of new ventures in emerging agri-food industries. In particular, we suggest that organizational identity and social capital may play an important role in explaining the underperformance, and yet sustainability of collective action strategies used to organization new ventures. Chestnut Growers, Inc. is used as a case study for this analysis.

Keywords: social capital, organizational identity, cooperatives, entrepreneurship

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Introduction

Entrepreneurial ventures often require the active participation of groups of entrepreneurs or multiple stakeholders to be successful. This is particularly true in the context of nascent agri-food industries. One type of group organization that is common in agriculture and food industries is a cooperative. Cooperatives allow its members to build legitimacy (market power) in the marketplace, capture economies of scale and scope, and share information and knowledge about best practices with fellow cooperative members all of which are of central concern to entrepreneurial businesses as they seek to take advantage of potential market opportunities. However, such cooperatives also face significant barriers, particularly in terms of the coordination of members.

One such cooperative that was formed to exploit a market opportunity is CGI (Chestnut Growers Inc.). This cooperative was formed with the goal of raising awareness of chestnut products to help farmers expand their consumer base and to realize higher prices for their chestnut production. Unfortunately, this cooperative has struggled to be profitable and in particular has been unable to procure a consistent supply and quality of chestnuts from growers to fill significant market opportunities. Though much of this supply inconsistency can be attributed to weather related events (e.g. frost, pests, disease, etc.), farmer practices such as selling (cooperative committed) production to other markets that are offering a higher price is also prevalent.

Despite these early financial and organizational struggles, CGI continues to play a central role in the industry and membership has increased. The purpose of this study is to explore this apparent paradox. We apply concepts from management and organizational theory to provide a greater understanding of dynamics of new ventures in emerging agri-food industries. In particular, we suggest that organizational identity and social capital may play an important role in explaining the underperformance, and yet sustainability of collective action strategies used to organization new ventures. Chestnut Growers, Inc. is used as a case study for this analysis.

Case: Michigan Chestnut Industry and Chestnut Growers, Inc.

Midwest Chestnut Industry

The Midwest chestnut industry is an emergent agri-food industry. Most chestnut producers have been in business for less than 15 years and are only now starting to produce commercially, production volumes are low, and 80% of growers report less than $5,000 in annual sales (Gold, Cernusca and Godsey 2006). Furthermore, U.S. chestnut consumption is minimal (0.1 lb per capita vs. Europe (1lb/capita) and Korea (4 lb/capita) (Bodet 2001) and is generally restricted by a lack awareness of chestnuts beyond traditional "chestnuts roasting on an open fire" occasions. In addition, the growth of the Midwest chestnut industry is also inhibited by significant time lags between planting and nut production (5-10 years), continued experimentation with best practices for cultivar selection, or planting/harvesting methods for the Midwest climate, and volatile supplies due to climate conditions (i.e. frost).

Chestnut Growers, Inc.

After a series of previously failed chestnut ventures in Michigan, several chestnut farmers that still wanted to pursue chestnuts as a viable, long-term crop came together to create Chestnut Growers, Inc. (CGI). GI was formed as a cooperative with the purpose of processing and marketing chestnuts (e.g. fresh, peeled, sliced, flour) under a common brand. When it was established in 2000, it included roughly 20 members and has since expanded to over 40 active members.

The membership of CGI exhibits significant heterogeneity. Members vary by size of orchard, cultivars, time of establishment, management practices, and motivations for participating in the industry and in the CGI co-operative. Membership has also grown and expanded beyond Michigan to include members from Washington and Iowa. CGI members have also become further divided by the slow development of the market for value-added chestnut products. In fact, a significant number of members have expressed their doubt about the viability of products such as peeled or freeze-dried sliced chestnuts, or chestnut flour, and would prefer CGI to carry-on "tried and true" methods of collecting and marketing only "fresh" chestnuts. The lack of clear profitability from their own chestnut orchards and CGI has led to increased tensions within the group as frustration has grown with a crop and a business venture they originally perceived as a quick profit opportunity has not materialized.

CGI has actively sought marketing agreements with large customers to help maintain adequate business volume. Even though they can interest buyers in their chestnut products, CGI members continue to routinely sell their chestnut production to alternative marketing outlets where they can receive higher initial prices as opposed to the higher overall returns (i.e. lower initial prices + royalties) they receive from CGI (see Table 1). As a result of low member participation (in the form of chestnuts sold to the cooperative), large value-added market opportunities are left unmet and cooperative prices remain low compared to alternative markets. This situation is consistent with what Schmid (1999) described as cumulative causation (see Figure 1). However, this description does not fully explain the behavior of all cooperative members. Such as, why do chestnut producers continue to support CGI despite their unwillingness to sell their chestnut production to the cooperative?

Table 1. Chestnut Sales and Average Prices Received by Marketing Channel

Ranking	Outlet	% Farmers	Avg. Price Received
1	Chestnut Growers Inc.	72%	$1.50
2	Direct on farm sales	41%	$2.50
3	Farmers market	24%	$5.00
4	Upscale grocery stores	14%	$3.00
4	Wholesalers	14%	$2.50
4	Restaurants	14%	$3.50
7	Other (usually u-pick)	10%	N/A
8	Distributor	4%	$3.00
9	Online, direct to customers	4%	$5.50

Figure 1. Circular Causation of CGI

Methodology

This study utilizes a grounded theory case study methodology as described by Yin (2003) to examine the effects of organizational identity and social capital on organizational performance within the context of an emerging agri-food co-operative, Chestnut Growers, Inc. A multi-method qualitative approach (i.e. survey, interview, participant observation) is used to collect and analyze data for the case study. An initial exploratory survey was administered to 46 chestnut farmers (total population) associated with CGI. We received a response rate of 70% as 32 individuals responded. The purpose of this survey was to gather information on the characteristics of the Michigan chestnut industry and Chestnut Growers Inc. as an organization including demographics, production and marketing practices, attitudes regarding cooperatives and CGI specifically, and organizational and farm performance. The results of the survey were used to structure follow-up interviews with CGI members to further inform our case study.

Interview responses were obtained from 10 chestnut farmers that were selected based on their participation in the initial survey and by using expert opinion to get geographic, demographic and group status diversity. Data was also collected from participation observations at various conference meetings and CGI board meetings during the 2009-11 period.

The Role of Organizational Identity and Social Capital

This case study utilizes the organizational identity and social capital literatures to provide a foundation for understanding the CGI paradox. The organizational identity literature suggests that an organization's commitment and legitimacy is influenced by the congruence between member's perceptions of, and expectations for, their organization's identity (Foreman and Whetten 2002). That is, CGI members are likely to commit a greater share of their chestnut

harvest and view the CGI as a legitimate marketing channel if they perceive that the CGI is meeting the goals and objectives that they expect from the organization.

Proposition 1: *The greater the dissonance between the perceived-expected actions of CGI, the less members will commit their chestnut harvest to the organization.*

Social capital, on the other hand, refers to an individual's sympathy toward another that may produce a potential benefit beyond what is normally expected in an exchange relationship (Robison and Flora 2003). For example, even though the financial returns received from CGI may be less than alternative marketing channels, CGI members may be willing to support the organization if they also receive other benefits associated with their social connection to the other members of the organizations.

Proposition 2: *The greater the social capital that members receive from their affiliation with the CGI, the more likely the organization is to be sustainable through periods of financial distress.*

Results and Conclusions

An analysis of the data collected to inform this case study of CGI reveals several important findings. First of all, the members of CGI can be categorized into two distinct types: hobbyists and commercial producers. Hobbyists are likely to be either chestnut enthusiasts or retirement farmers looking to supplement their incomes. These chestnut producers tend to devote a large portion of time and acreage to chestnut production, and also produce less the $5000 in sales. Commercial chestnut producers, on the other hand, are likely to have larger land holdings but only devote a small portion of their agricultural production to chestnuts. Some of these producers produce over $5000 in chestnut sales and use chestnut production to diversify their operations. As one industry expert explains further:

> "The first group [hobbyists] farm simply because they have land and are experimental, willing to do anything regardless of cost because farming is a passion and not a primary source of income. The second group [commercial producers] thinks more economically, as they want to know the full financial costs upfront"

These differences also play a role in determining the member's participation in CGI with respect to their commitment (i.e. % of harvest) to deliver their chestnut production to the cooperative. As illustrated in Figure 2, hobbyists (i.e. retirement) deliver a significantly higher proportion of their chestnut production to CGI than do commercial producers.

It is also evident from our study that most members of CGI do not perceive that the organization's values or practices are congruent with their own expectations (see Figure 3). As suggested by organizational identity theory and Proposition 1, this finding is consistent with why members, especially commercial producers, do not fully commit to CGI and sell a significant portion of their chestnut production to alternative marketing channels other than CGI.

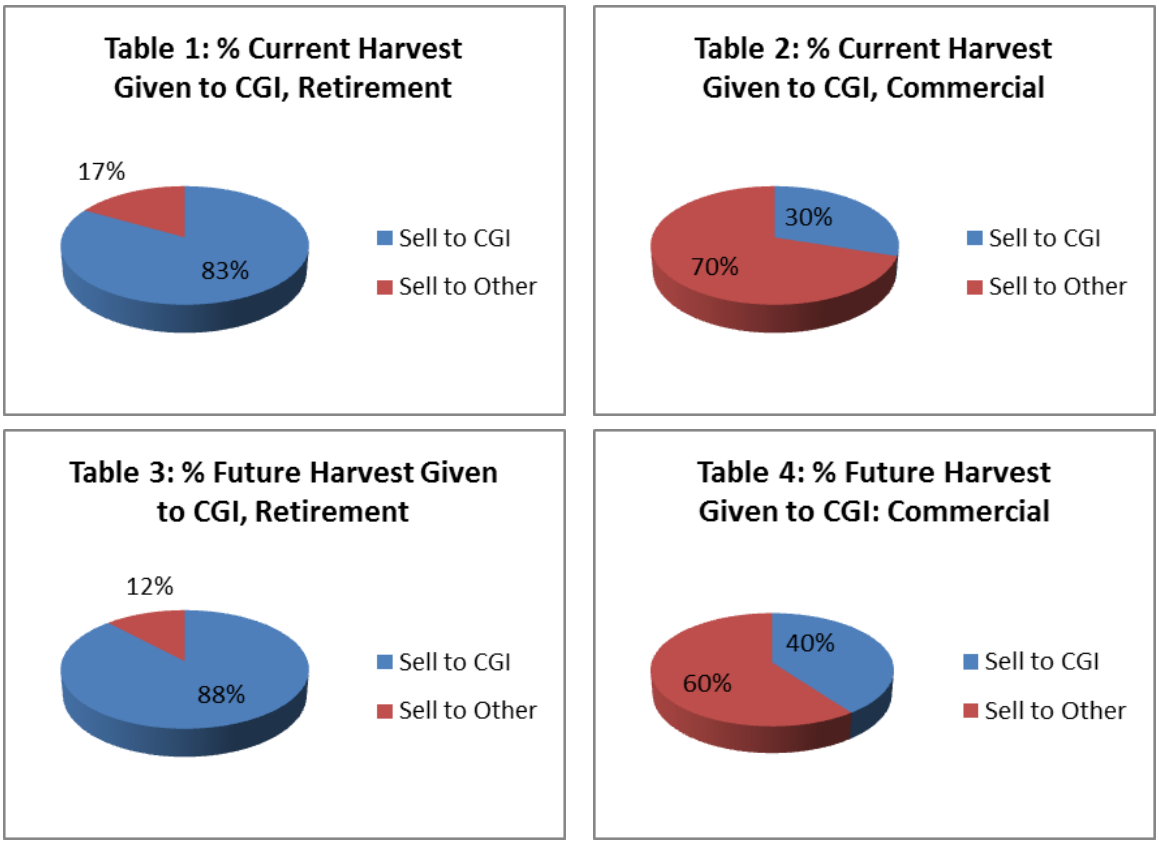

Figure 2. Current and Expected % of Member Harvest Delivered to CGI by Member Type.

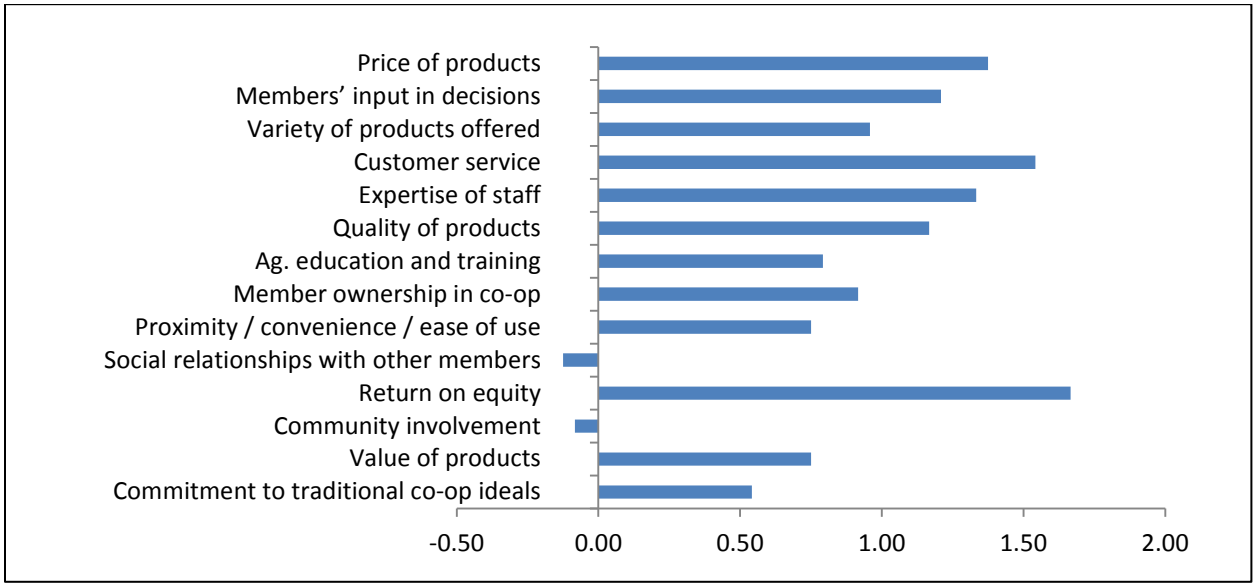

Figure 3. Dissonance Between Perceived CGI Values and Group Member Values

Note: A positive number for a given issue implies that group members believe that the issue should be more important to the co-op than it currently is while a negative number implies that group members believe that co-op should place less importance on that issue than they currently do.

Finally, we observe that CGI members do in fact receive significant social capital from their membership in the organization (see Table 2). This finding may help to explain why chestnut

producers continue to participate in CGI even though selling their chestnut production to other marketing outlets would appear to be more profitable. Consistent with proposition 2, social capital may increase the sustainability of new ventures, particularly in emerging industries. In this sense, social capital can be seen as an intangible asset and a source of sustainable competitive advantage for such ventures.

Table 2. Social Capital Measure of CGI Members

	Interviewee								
Question	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Member Type	H	C	C	C	H	C	H	C	H
Invite to wedding?	Y	Y	N	Y	Y	N	Y	N	Y
Receive invite to wedding?	N	N/A	N	Y	Y	N	Y	N	N/A
If sick, would receive help?	N	Y	N	Y	Y	N	Y	N	N
Help sick member?	Y	N	N/A	Y	Y	Y	Y		Y
If car broke, ask for help?	N	Y	Y	Y	Y	Y	Y	Y	Y
If car broke, offer ride?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Offer a loan?	N	N	N	Y	N/A	N	Y	N	Y
Expect loan offer?	N	N	N	N	N	N	N	N	Y

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Prospects of Entry into the Energy Market by Small and Mid-Sized Farmers: Evidence from Tennessee

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Abstract

The goal of this study was to get feedback from farmers in selected Tennessee counties on their willingness to grow switchgrass as a dedicated bioenergy crop. Switchgrass can be grown on marginal land. It is environmentally friendly (useful for erosion control etc.) and can assist rural communities by developing rural infrastructure and job creation. There is call for shift from using food products such as corn to cellulosic source such as switch grass as feedstock for bioenergy. Recent increase in the price of corn is noted to have impact of increasing its price, demand for land and more application of fertilizer thereby having undesirable outcomes on economic and environmental aspects.

Keywords: Focus groups and surveys; willingness to grow Switchgrass; bioenergy; Small and mid-sized Tennessee farmers

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The goal of this study was to get feedback from farmers in selected Tennessee counties on their willingness to grow switchgrass as a dedicated bioenergy crop. Switchgrass can be grown on marginal land. It is environmentally friendly (useful for erosion control, etc.) and can assist rural communities by developing rural infrastructure and job creation. There is call for shift from using food products, such as corn, to cellulosic source such as switch grass as feedstock for bio-energy. Recent increases in the price of corn is noted to have an impact on increasing price, demand for land, and more application of fertilizer, thereby having undesirable outcomes on economic and environmental aspects. The shift to cellulosic energy source is expected to generate significant quantity of biofuel that can be accompanied by substantial cost saving.

Methodology and Data

Pre- and post-focus group surveys were administered face to face to forty four farmers from Robertson, Franklin, Montgomery, and Haywood counties between June 20 and August 18, 2011. The focus group discussion and the surveys involved various issues ranging from their farm operations to willingness to grow switchgrass as a dedicated bioenergy crop. Participating farmers operated different enterprises and were recruited by county extension agents. The farmers were provided basic information about switchgrass, including the length of the establishment period, the type of land on which it can be grown, and the amount of subsidy given to farmers during the transition period. The focus group meetings were moderated by project researchers.

Results and Discussion

Initially, the farmers' knowledge of switchgrass as a feedstock for bioenergy was very limited and was enhanced after participating in the focus group meetings (Figure 1). In terms of intentions to grow switchgrass, the number of farmers that indicated their willingness to grow it was higher after the focus group meetings compared to the pre-focus group meetings (Figure 2). Farmers were also asked to indicate factors that may influence their intention to produce it. In response, availability of information about switch grass in general and price/market for it, cost of production, land/equipment needs, and profits in particular were found to be important (Figure 3). Extension agents, other farmers and focus group meetings were found to play role in influencing the farmers' decision making (Figure 4).

During focus group meetings, the farmers noted the importance of getting research based information on marketing and profitability of switchgrass. They also stated the need for technical assistance in planting, weed control, and harvesting. In addition, they pointed out that uncertainty plays a role in their decision making regarding participation in producing switchgrass. Changes in government policies pertaining to bioenergy; demand and stability of market for switchgrass; cost of production; availability of processing facilities in the local area; and finance are noted to be key issues contributing to uncertainty. There is need to engage the above issues to encourage entry of small and mid-sized farmers into the energy market.

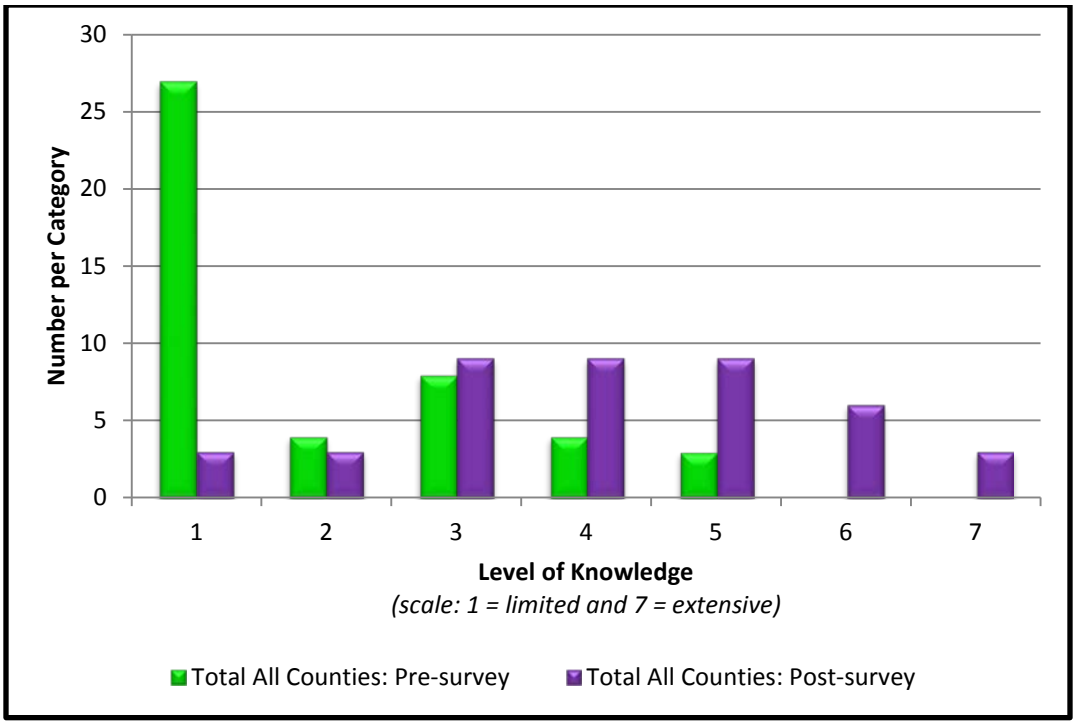

Figure 1. Farmers' Knowledge of Switchgrass as Energy Crop

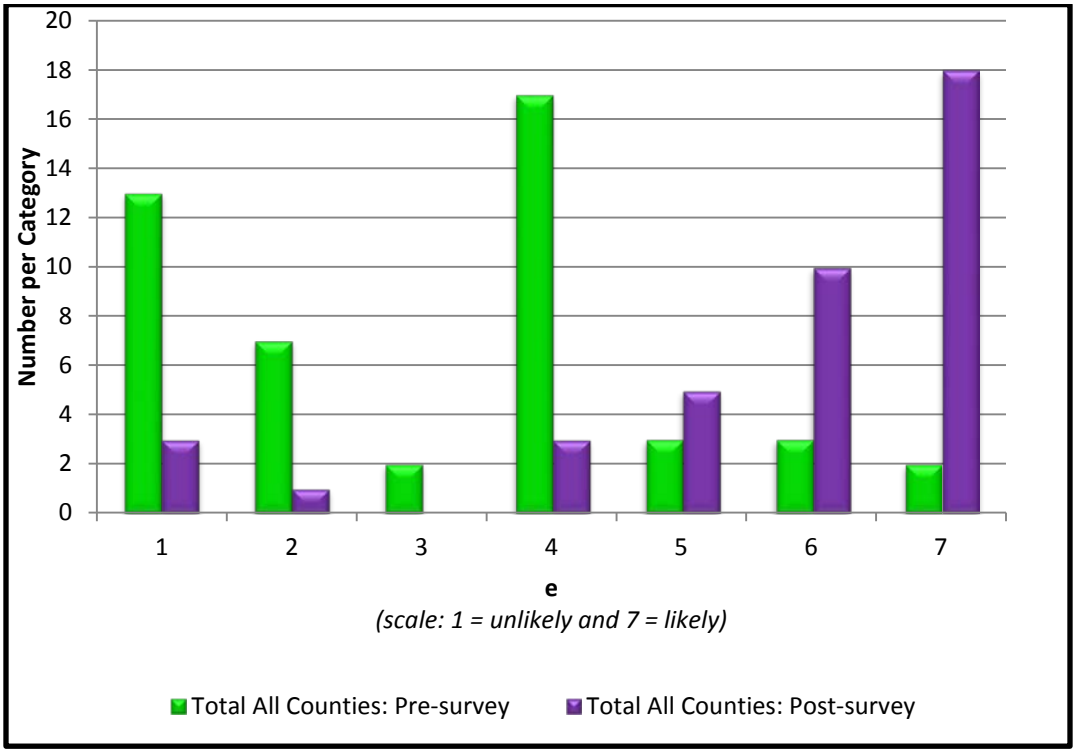

Figure 2. Farmers' Intent to Grow Switchgrass

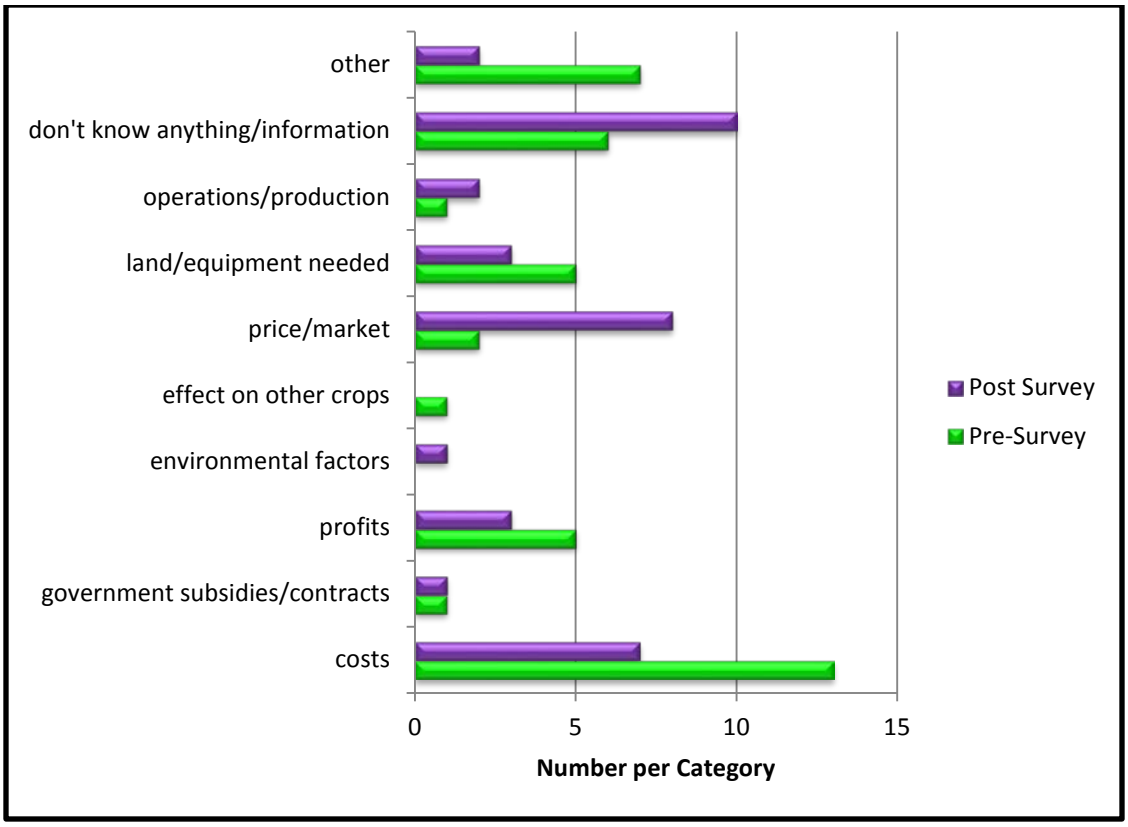

Figure 3. Factors Affecting the Farmers' Intent to Grow Switchgrass

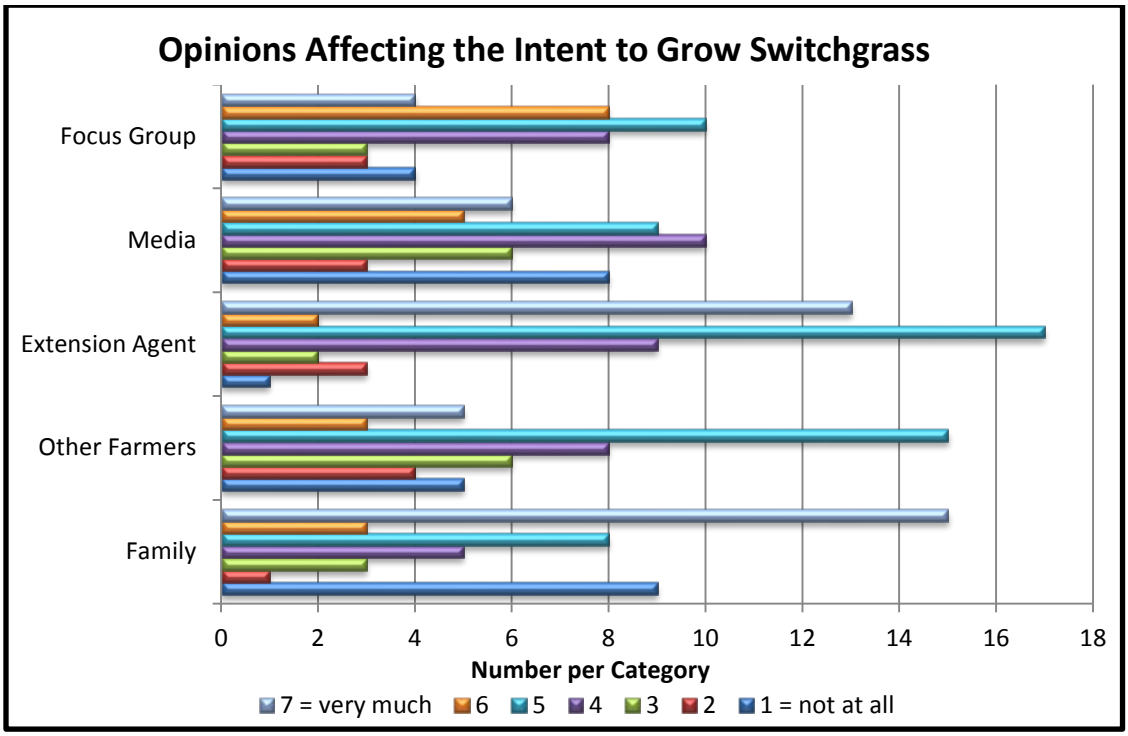

Figure 4. Opinions Affecting Farmers' Intent to Grow Switchgrass

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Consumer Choices for Organic and Local Food Products in North Carolina

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Abstract

Consumer preferences for local and organic food in North Carolina have been steadily growing over the past decade. In order to measure the attitudes and preferences associated with the decision to select organic over local or vice versa, we first use qualitative methods to gain more knowledge in potential factors that affect consumers who patronize farmers' markets, the most utilized sales outlet by North Carolina organic and local farmers. We begin this process through the use of focus groups. These focus groups are selected from five locations throughout the state from three regions – Coastal (Wilmington), Piedmont (Charlotte, Greensboro, and Raleigh), and Mountain (Asheville). Therefore, the objective of the study is to evaluate the perceptions of consumers' choices for organic and locally grown available at farmers market produce.

This update focuses primarily on the Piedmont Triad region, which is located in the North-central region of the state including three major cities, which include Greensboro, High Point and Winston-Salem. The availability of locally and organically produced foods includes several regional supermarkets, specialty grocery stores, consumer cooperatives, farmers markets, and community supported agriculture initiatives. Ten to twelve target participants for the focus groups are representative of consumers of organic food products as indicated by the Organic Trade Association - 74 percent Caucasian, 13 percent African American, eight percent Hispanic, 2.7 percent Asian and other make up 1.6 percent of all organic consumers.

Preliminary findings revealed that the only distinction consumers make between locally produced and organically produced foods is labeling. Participants did provide their definition of "local," which included "within the county, state or couple of hundred mile radius." However, participants had limited knowledge regarding organic certification. Although the majority of participants purchase more local foods versus organic foods, they were willing to pay as much as 100% more for organic food with some participants "willing to find ways to make it affordable." Although farmers markets, consumer cooperatives, and community supported agriculture provided outlets for purchasing locally and organically produced foods. Participants also made purchases at available regional and specialty grocery stores. The primary implications of the preliminary findings in the Piedmont Triad region of North Carolina are as follow: (1) consumers appear indifferent to locally produced foods and organically produced foods and (2) consumers are "willing to pay" for food products that are perceived to have healthy, affordable, quality (taste/color) and local economy attributes.

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The Market Legitimacy of Cool Climate Wineries: Distribution Challenges and Strategies for a Nascent Food Industry

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Research Update

In the last decade we have observed the establishment of a growing number of new small- and medium-sized wineries in "undiscovered" wine regions such as in the states of Michigan, Missouri, and New York (excluding Finger Lakes region). While there may actually be a long history of grape and wine production in these regions, most wineries are new (< 10 years old), small (< 3,000 cases), geographically dispersed, and fairly inexperienced in the tasks of producing wine and marketing their products. Their success will likely depend on demand for their products and regional reputation (Schamel 2009), but they face a formidable task in attracting customers and developing relationships with distributors.

The purpose of this research study is to identify strategies to overcome distribution challenges of start-up wineries and increase their access to non-local markets. The small scale of start-ups and the absence of a new venture's track record of performance result in lack of confidence on the part of customers, distributors, and suppliers that the venture will survive and therefore little reason to provide patronage. This "legitimacy challenge" is more pronounced in emerging wine regions as their wines are little known by distributors and consumers. Following the literature on institutional legitimacy (Zimmerman and Zeitz 2002), we contend that a start-up winery is in a quandary: it may have few resources to increase performance and also lack the legitimacy it

needs to access such resources since it has little or no record of past performance on which to base its claim for legitimacy.

Given this context, this study examines the strategies that wineries pursue to build legitimacy and how these strategies affect winery performance. Among others, these strategies may include: utilizing well-known winemaking practices, receiving awards at wine competitions or certifications from reputable institutions, joining industry or regional trade associations, or partnering with complementary businesses such as restaurants. Data for this study was collected from a survey of 107 wineries in Michigan, Missouri, and New York (excluding Finger Lakes region) during the summer of 2012, representing an overall response rate of 39%. Preliminary results indicate that wineries in these regions are active in wine competitions and in their wine trade associations, but tend to utilize innovative winemaking practices and rely heavily of tasting rooms to distribute product. In addition to this survey, ongoing activities are collecting data on the perceived legitimacy of these wineries by various stakeholder groups.

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Seasonal Price Analysis to Determine Economic Gains Associated with High-Tunnel Season Extension for Mississippi Vegetable Producers

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Mississippi is not known for fruit and vegetable production. However, small scale commercial fruit and vegetable producers generated an estimated $80 million dollars, or 2% of the total value of agriculture, in the state, in 2010 (Riley). Most of the fruit and vegetable growers in Mississippi are small scale operators with an average of less than 200 acres of production (USDA 2007 Census of Agriculture).

Small scale producers do not command a large share of the fruit and vegetable market and do not produce the quantities required to dictate the price in the market place. Mississippi producers will generally be quoted prices similar to the reported daily average price paid at the Atlanta, Georgia, terminal market. Another problem that small scale growers contend with at direct markets is over supply of fresh produce at peak harvest time. In rural areas, home gardens may flood the local market at the peak harvest time and drive prices down. In theory high tunnels will allow growers to harvest produce earlier and later than traditional growing season harvest time and capture stronger prices.

The total estimated annual cost, both variable and fixed, per tunnel is $2,633. Total cost per pound is $0.43. The fixed cost was estimated using an initial investment of $3575 per 30 ft. by 96 ft. high tunnel. Estimated yield is 307 twenty-pound boxes of tomatoes per tunnel (Table 1).

Traditional harvest time for field grown tomatoes in Mississippi begins the last week in May and ends the last week in July. Fall crop tomatoes begin harvest the last week in September and ends with first frost, generally the third week of October. High tunnel production allows harvest to begin first week in May for spring crop. The high tunnel can extend fall crop harvest into the second week of December. Graph 1 exhibits the 10-year average monthly prices, per pound, received for tomatoes at the Atlanta, Georgia terminal market for the years 2001-2010. Average prices paid for tomatoes were consistently higher prior to and after traditional harvest periods in Mississippi.

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Table 1. Estimated total cost of production per 30' x 96' tunnel for Missi ssippi 2010

Item	Annual Cost/Tunnel	Cost/Sq. ft	Cost/lb
Total Fixed cost	1,227	0.43	0.20
Total Direct Inputs	494	0.17	0.08
Total Labor cost	858	0.30	0.14
Interest on Operating capital	54	0.02	0.01
Total Cost	**2,633**	**0.91**	**0.43**

Source: Unpublished preliminary research, Mississippi State University, 2010.

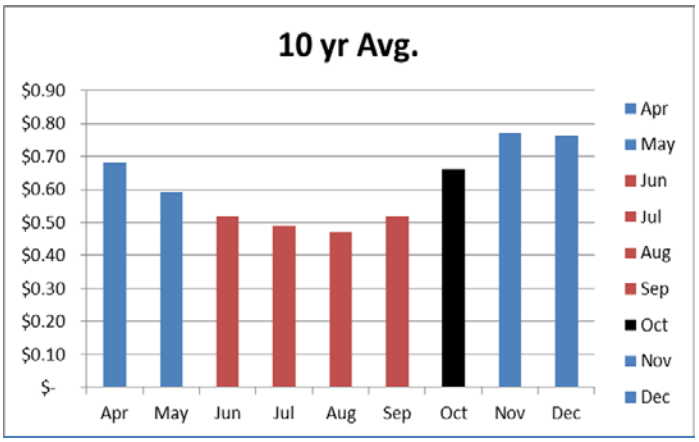

Figure 1. Ten-year average monthly prices for tomatoes, Atlanta, Georgia terminal market

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Uncovering Success Attributes for the Direct Farmers Markets and Agritourism: Mid-Atlantic Region of the United States

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Despite the many advantages that come with direct farmers' markets/agri-tourism, issues of capacity utilization require strategic thinking on part of the operators. What can the operators do differently to attract more diverse patronage? Factor, cluster, and regression analyses were applied on a 2010 survey of consumers from Delaware, New Jersey, and Pennsylvania visiting agri-tourism operations and shopped at direct (farmer-to-consumer) markets. Results from the analyses show that bundling of farmers' markets activities/site attributes is a workable business strategy. Implementing the strategy will spur diverse and steady patronage beyond the traditional fresh produce and value added products. Patronage to farmers' markets/ agritourism sites may be broken down into five distinct dimensions/experiences: learning, naturalist, purchasing, leisurely, and entertainment experiences. Information on the experiences was subjected to cluster analysis yielding four consumer market segments: (1) consumers with a strong affection with the rural scenery, (2) a segment interested in knowing more about agriculture, (3) consumers who visit just to buy the farmers' produce and value added products, and (4) a group of consumers who visit to connect and have fun.

Segmentation/customer profiling stands out as a valuable piece of information that farmers' markets/agritourism business operators could use in positioning themselves better for the future. The business operators now know who their customers are and what it takes to attract them. The regression results show that a number of socio economic variables are related with the patronage experience. The study finds that there is potential for generating activity year round by bundling attributes/activities to tap on a wider market beyond traditional fresh produce buyers.

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Purchasing Locally Grown Ethnic Greens and Herbs to Support Local Farms in the Eastern Coastal United States

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The Earth Summit in Rio de Janeiro in 1992 laid the foundation for integrating agriculture and environment as the lynchpin for achieving sustainable development. Policy makers and researchers at various levels of institutional arrangements produce ways to minimize agriculture's environmental footprints for a sustainable ecosystem. One way to account for the embedded energy in transporting food is to incorporate the cost of averting environmental degradation through environmental accounting. The primary objective of this paper is to understand how perceptive and willing local communities are supporting local farmers through their purchasing behavior of locally grown produce, viz. locally grown ethnic greens and herbs in the eastern parts of the United States. To investigate ethnic consumers' purchasing behavior, a telephone survey was conducted May through October 2010, covering 16 east coast states and Washington D.C to better serve small and medium size farmers. Our target populations were Asian Indians, Chinese, Mexican, and Puerto Rican consumers. One of the focuses of our study was to predict how socioeconomic, demographic, and cultural variables influence the purchasing behavior of locally grown green and herbs to support local farms using a logit model.

Results indicate that 44% of respondents purchase locally grown ethnic greens and herbs to support local farms. The logit model indicates the age of the respondent when arriving to the United States, total expenditure per month on listed greens/herbs, language spoken by the store employee, respondents with high quality produce expectations, and Puerto Ricans positively relate to the likelihood of purchasing locally grown ethnic greens/herbs to support local farms. The model indicates that the number of visits per month, distance to the nearest grocery store, respondents who thought that the freshness and selection of produce is important while shopping, those who reside in urban and suburban areas, and those who make between $20,000 and $40,000 per annum are negatively related to likelihood of purchasing locally grown ethnic greens and herbs to support local farms. These results may be useful to the local farmers investigating the possibility of growing ethnic greens and herbs based on the demand and target markets.

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Do Wine Bottle Sizes & Shapes and Wine Label Colors & Shapes Matter in Agritourism Wine Prices and Sales?

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What determines wine prices at farm vineyards and wineries involved in agritourism? Is the solution in a simple competitive market model where the prices are the result of supply and demand, or even matching/meeting the price offered down the road at the next agritourism winery? There appears to be more than the mere price or cost of wine in the bottle; consumer appeal attributes apparently add value above and beyond the sensory wine attributes of clarity, taste, aroma, color, translucence, etc. What the eye sees, the eye buys – and what does the eye see: wine bottle shape and size as well as messaging in wine labels and shapes.

Any relationship between sales and prices and the bottles' shapes and sizes and labels' shapes and colors is investigated using five north Georgia wineries that market similar types of wines, but in vastly different containers or bottles as well as label shapes and colors. There are over 30 Georgia wineries as members of the Winegrowers Association of Georgia, and many of them are linked via Georgia's Wine Highway – all competing for agritourism dollars from wine sales at their respective vineyards and wineries. The collaborating wineries ranged from a resort winery along I-85 to small operational wineries on the twisted back roads of the Northeast Georgia Mountains.

Initial observations from the 2009 – 2011 vintages sold at the five wineries suggest that the posted price of wine increased more than proportionally with the size of the bottle, and that wine consumers rely mainly on the bottle's label to infer the quality of its content, and that there are strong preferences for selected color-shape combinations in label design, and the consumers are willing to pay "premium" prices for those desired attributes of the bottle and its label.

Bottle sizes ranged from the useful half-bottle to the traditional or standard size (0.75 liter) to some 'large format' bottles (magnums and double magnums). A relative scaled price index was determined as the ratio of the observed price of the bottle to the normalized price relative to the price of the standard bottle for the same wine, assuming no economies of scale. The relationship between sizes of bottles measured in liters and the price index indicates that whatever the size of the bottle and the perceived quality of the producer was virtually undifferentiated, although the shape of the relationship may be a regional phenomenon.

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Economic Impact of the U.S. Food Processing Industry

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The U.S. economy depends on and benefits from the economic activity (employment, compensation, output, and taxes) of food processing, as well as the impacts from the supply and distribution chains that support this industry. The analysis in this report relied solely on IMPLAN data for the United States in 2010.

The results confirmed that this industry is a major contributor to the health of the U.S. economy. Food processing in the U.S. produced more than $1.08 trillion in economic output, including $812.26 billion direct economic impact, and $275.17 billion in indirect economic impact in 2010. These activities generated about 1.93 million direct jobs within the food industry, while another 10.747 million indirect jobs were created by this industry and would not have existed without the activities of food processing in the U.S. in 2010. Associated with the 12.3 million jobs were more than $104 billion in direct employee compensation and almost $390.67 billion in indirect compensation to support other households in the U.S. economy.

In 2010, food processing contributed more than $1.07 trillion in value-added activity to the U.S. economy. VA is a more accurate measure than industry output for determining how much the economy expanded because of food processing during this period.

The amount of taxes totaled almost $227 billion in 2010. Local and state taxes from food processing totaled $89.56 billion during this period. Federal taxes totaled $137.16 billion, with most of the taxes coming from higher sales taxes, property taxes, social security taxes, and personal income taxes as more people worked and received incomes.

The results of this study show that the Food Processing Industry produced positive economic impacts in the U.S. economy in 2010. This industry directly accounted for 15.65 percent of the more than 12.3 million jobs created as part of the supply chain for food processing during this period. Food processing and its supply chains produced more than $2.7 billion in total output in 2010. Of this amount, food processing accounted for 40.23 percent of the direct total output, while supply chains accounted for the remaining 59.77 percent during this period. The industry generated $226.72 billion in annual local, state, and federal government tax revenues in 2010.

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Outreach Program Update: Evaluation the Educational Effectiveness and Economic Impacts of the TAA for Farmers Program

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The TAA for Farmers program provides technical training to help applicants develop business plans and adjust business practices. Participants are also eligible to receive cash payments up to $12,000 to implement knowledge gained from the trainings. The Southern Risk Management Education Center coordinates the delivery of the training program and the business planning consultation in the Southern Region. The 2010 and 2011 programs saw shrimp and catfish accepted with a total of 6,106 applicants qualifying for training in the South (56% of national signup). This update highlights the ongoing evaluation of the training and proposes a method for estimating the economic impact of the financial payments made to farmers in the program.

The preliminary results from our surveys indicate that the training program has been successful overall, providing relevant topics and effective training. Local educators were highly rated in their delivery of training. However, participants responding after finishing the 12 hours of training gave lower than anticipated ratings on the program's effectiveness at demonstrating how the knowledge gained can be used to make changes to the business. The business planning phase of the program may have alleviated this "application gap" as indicated by the limited survey data from participants that have completed the long term business plan. These participants responded with higher training ratings after finishing the business planning phase – which is aimed at helping put the knowledge gained in workshops to use on a farm. The evaluation is on-going and this summary and this summary is based on preliminary analysis.

The economic impact of the TAA for Farmers payments made to Arkansas Catfish farmers was estimated in an effort to establish a framework to assess the impact of the TAA for Farmers program. Payments to 120 catfish farmers in Arkansas were used to build impact scenarios around: 1) industry expenditures and 2) farm household spending. The direct impact of the TAA for Farmers payments to Arkansas catfish farmers is equal to $1,440,000. The results of the impact analysis indicate that the total economic impact of the TAA for Farmers payments is $2.35 million in value added (equal to labor income + property income and indirect business taxes). The program payments to catfish farmers generated an additional $500,000 in labor income and over $900,000 in value added in the region. The impact analysis shows that the impacts of the cash payments extend well beyond the farm.

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Childhood Food Insecurity: Factors Associated with the National School Lunch Program in the U.S.

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Almost a quarter of all U.S. children are food insecure. This translates into roughly 17.2 million or more than 1 in 5 children living at risk of hunger (Feeding America 2011). Several studies have demonstrated that childhood food insecurity opens risks of poor cognitive development among young children and is associated to poorer school performance. Some of the conditions that food insecure children are more likely to exhibit include behavioral problems, poorer physical and psychosocial function and development, higher rates of anxiety, depression, chronic health conditions, and lower math and reading achievement scores in schools (Nord 2009). In addition, children living in food-insecure households face elevated risks of problematic health and higher associated health costs.

A number of nutrition assistance programs administered by USDA's Food and Nutrition Service (FNS) and assisted by the federal government are available to provide better access to food and promote healthy eating through nutrition education programs. The National School Lunch Program, the foremost nutrition program for children, provided nutritionally balanced, low-cost or free lunches to more than 31.7 million children each school day in 2010 (USDA/FNS 2012).

This research analyzes factors associated with childhood food insecurity nationally as reflected by the NSLP participation rates. An empirical model is estimated to analyze county-level free and reduced-price lunch participation rates across the U.S. and its associations to different food environment factors and socio-economic characteristics such as food access, income, unemployment, metro/non-metro classification, education, and ethnicity. The model is estimated at the national and regional-level before and during the recessionary years, 2006 and 2008, respectively.

Results show that median household income and unemployment rate are consistently significant explanatory variables of childhood food insecurity, before and during the recession, both at the national and regional models. Other significant factors that need attention are education and presence of food deserts. The results have broad policy implications. Potential policies to alleviate childhood food insecurity include regional targeting of food assistance programs to increase program efficiency, revenue generation to mitigate food insecurity, and strengthening of school lunch programs targeting children's nutritional and food security levels.

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Improving Consumer Participation in Oklahoma Farmers' Markets

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Consumer interest in locally grown foods has increased dramatically in the United States, which has contributed to an increase in the number of farmers' markets (FMs). In Oklahoma, between 2004 and 2011, the number of farmers' markets has tripled from 24 to 72. Despite the growth, consumer participation in these direct markets has been limited. In fact, only 15% of adults in Oklahoma consume the recommended quantity of five or more servings per day of fruits and vegetables. A better understanding of FMs consumer and producer characteristics would help in designing appropriate marketing strategies aimed at increasing consumer participation.

The general objective of this study is to give a better understanding of Oklahoma farmers' markets participants' (consumers and producers) characteristics. More specifically, Oklahoma FMs consumer and producer surveys were conducted and analyzed in 2010 in order to determine the following information:

a. Consumer and producer demographics
b. Producer perceptions of farmers' markets consumer demographics
c. Producer participation in food assistance programs
d. Consumer and producer perception of price, quality, and freshness of products offered at farmers' markets as compared with those sold at grocery stores

Survey summary statistics and analysis revealed several interesting points:

1. The majority of farmers' market customers are female, like to cook, and have household income above $80,001.

2. One of the barriers to consumer spending at FMs is that many sellers are not able to accept credit/debit cards. This limits the participation of SNAP participants and the amount consumers can potentially spend at the FMs.
3. An interval censored regression model was used to determine the impact of various consumer and producer attributes and demographics on their perceived differences in price, quality, and

freshness between products offered in farmers' markets and grocery stores. Results show that most consumers and producers believe that quality and freshness of farmers' markets products are superior to the same products sold in grocery stores.

Other Findings:

1. Consumers rank "locally grown", "organic", "better nutrition", and "food safety" as the most valued attributes of products offered at farmers' markets.

2. Consumers are willing to pay a premium price for products offered at farmers' markets as compared to those offered at retail outlets.

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Attitudes toward Locally Produced Food Products" Households and Food Retailers

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"Locally produced" is generally defined as the production and marketing of food products within a certain geographic proximity of farmers and consumers. Locally produced sector includes business operations such as farmers' markets, farm-to-school programs, and community supported agriculture (CSA) among others. In 2008, farm level value of locally produced agricultural products was estimated at $4.8 billion, or approximately 1.6% of the market value of agricultural products (Johnson et al., 2012). Nearly 5% of the farms of all categories took part in locally produced market. Increasing gasoline and food prices, the demand for organically produced food, the demand for fresher and higher quality foods, the desire to support local farming economies, the environmental movement and trends in horticulture research have led to growing popularity of locally produced fruits and vegetables (Roth 1999; Andreatta and Wickliffe 2002; Brown 2002). The influence of current food shopping trends - local food, support for local farmers and agribusinesses, and fresh quality produce and meat - are considered to be behind the strong surge of farmers who utilize direct marketing. (LeRoux et al. 2009; Mark et al. 2009) In addition to farmers markets, road-side markets and u-pick markets, producers have found direct sales to the local restaurants, food service institutions, and schools profitable marketing strategies (USDA 2001). In various studies, buyers of fresh fruits and vegetables have also reported a favorable attitude toward local production.

While examining the perceived attitude of food service directors in Midwest schools, Gregoire and Strohbehn (2002) have reported several perceived benefits to purchasing locally produced food including ability to purchase smaller quantities and fresher food, support to local economy, and good public relation. Similarly, the barriers to local purchases were reported as year round supply, adequate quantity, and consistent quality (Gregoire and Strohbehn 2002; Cottingham et al. 2000). Perceived benefits and obstacles to buying locally produced food, however, are likely to vary across types of food service institutions. There are many sub-sectors within the broad sector of hotel, restaurant and institutional (HRI) market, including fast food to fine dining restaurants, health care, schools, and business. Vendor selection decisions vary across these

sub-sectors depending on ownership type, menu, capacity of the restaurant, and compliance with Federal and State agencies. For example, locally owned and operated restaurants may have a different set of purchase practices and programs regarding locally produced food compared to a restaurant owned and operated under national franchise.

Objectives and Method

The objective of this study was to examine purchasing practices of locally produced fresh vegetables and dairy products among restaurants and grocery stores. Samples were drawn from restaurants and grocery stores belonging to national or regional chains, and the locally and independent owned. A comparative analysis was conducted to highlight key differences between these two types of retail outlets. The study examined 1) factors affecting the purchase decisions of locally grown fresh vegetables and dairy products; 2) willingness to buy locally grown produce; 3) key attributes desired while supplying locally grown produce to these restaurants and grocery stores; and 4) perceived attitude toward locally produced food. Part of the study was sponsored by Missouri Department of Natural Resources (MDNR) to support Renewable Energy-Sustainable Food Feasibility Project. The sample for the study included managers of 75 restaurants and dining centers out of a total of nearly 700 food service outlets in a mid-size metropolitan city in Midwest with a population of about 200,000. In addition, 72 grocery store managers and 150 households were surveyed. The retail questionnaire consisted of five sections: 1) characteristics of food retail facilities including ownership (independent locally owned and operated vs. national franchise); capacity in terms of seats and customer served; 2) usage of fresh vegetables and dairy products, sources of supply and prices paid; 3) existing practices of purchasing locally produced fresh vegetables and dairy products; 4) attributes desired while selecting vendors to supply locally produced food; and 5) perception and attitude of restaurant and grocery store managers toward locally produced food. Grocery shoppers were intercepted at the grocery stores to examine their food purchase habit. Questionnaire included attitude and perception toward locally produced food products.

Preliminary Results and Implications

The study findings show differential preferences between national/regional chains and the local independently owned restaurants and grocery stores for the locally produced fresh vegetables and dairy products. Although managers across the board expressed willingness to buy local, actual purchasing decisions were largely driven by price, freshness, quality and availability. Interestingly, store managers and grocery shoppers were closely aligned in terms of reported importance of dairy product attributes. Shoppers considered price (53%) followed by freshness (22%) as the most important attributes while making dairy product purchase decisions. Similarly, 45.8% of the store managers thought price was “extremely important” followed by 32% saying “farm fresh” was “extremely important.”

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Organic Vegetable Production in the Southeast

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Organic food represents one of the fastest growing sectors of the American agriculture economy. Sales of organic foods have grown from $6 billion in 2000 to nearly $27 billion in 2010, an increase rate of 450 percent (Organic Trade Association, 2011 Industry Survey). This growth rate exceeds the growth rate for total food sales which grew at 135 percent. Most of these sales are for fruits and vegetables, with meat and dairy product sales second. Reasons for the growth are concerns that many consumers have over the use of hormones and chemicals, the desire for nutritious food sources for their families and care for the environment. Organic consumers believe that the absence of chemicals mean less residue in the food supply and therefore is better for consumption. Consumers generally are willing to pay extra for organic foods.

Farmers have responded by increasing production of organic foods. However, many in the organic industry believe that supply limitations have hindered the growth of the sector. The major organic producers are located primarily in the Western and Northern states. The southern states have relatively few organic producers – none are in the top ten certified and non-certified organic farms. Within the southern region only North Carolina, Virginia, Florida and Texas have more than 75 certified organic farmers (2011 Certified Organic Production Survey, NASS, USDA). Although the number of certified organic producers in the Southeast has declined, the production of organic vegetables in the Southeast increased by 67 percent from 2008 to 2011 (2008 and 2011 Certified Organic Production Survey, NASS, USDA).

The prices for organic vegetables are much higher than for conventional vegetables, at least 40 to 80 percent higher. In addition, as much as 65 percent of the organic vegetables in the US are imported. There appears to be a large potential for organic farmers to increase production and profits. The conversion to organic production takes three years, and undergoes a certification process. The expense and regulation may limit the desire of some farmers to convert even at the higher prices and potentially greater profits.

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