

THE ORGANIC MARKET: RESULTS FROM A TUCSON STUDY

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Although the public has expressed environmental and health concerns regarding the use of pesticides on produce, few consumers have elected to buy organically grown produce rather than conventionally grown produce. The organic sector was expected to flourish in the 1990's, but currently less than three percent of American consumers purchase primarily organically grown produce.¹

Many consumers claim that they do not purchase organically grown produce because it is too expensive relative to conventional produce. Growth in the organic sector may also be slow because consumers refuse to buy produce of inferior cosmetic quality. Organic produce is often perceived as having poorer appearance than conventional produce. However, few studies have evaluated cosmetic quality differences between organic and conventional produce.

Because such a small percentage of consumers purchase primarily organic produce, analyzing the demographic and socio-economic characteristics (factors such as education, income, age, and gender) which explain or predict organic produce purchases may be helpful for

marketing purposes. Organic retailers could use this information to identify favorable markets for organic produce.

A study has been conducted in Tucson, Arizona, to provide a better understanding of the organic produce industry at the retail level. The three major objectives of this study include:

- 1) determining if differences in cosmetic defects between organic and conventional produce exist at the retail level,
- 2) measuring retail price differences between organic and conventional produce,
- 3) determining which demographic factors and socio-economic characteristics, if any, cause consumers to be more likely to purchase organic produce rather than conventional produce.

Data Collection

Data concerning the price, cosmetic quality, and consumption of organic and conventional produce items were collected at two retail outlets in Tucson, Arizona. Data were gathered on Monday and Tuesday afternoons during a twelve week period between February 7 and April 26, 1994. The two retail stores were chosen as sites for data collection and consumer surveying because they stocked both organic and conventional produce on a regular basis. One of the stores used for data collection was a regional chain specialty grocery store, and the other was a local cooperative.

The produce items that were examined include *red delicious* apples, broccoli, carrots, green leaf lettuce, and tomatoes. These items were selected because the two retail outlets supplied both organic and conventional items on a fairly consistent basis, and because these items ac-

¹ Cook, R. "Consumer Demand for Food Safety-Oriented Marketing Labels: Implications for Sustainable Agriculture." Paper presented at the International Agricultural Economics Association Meeting, Tokyo, Japan, August 1991.

Table 1. Average Number of Cosmetic Defects.

	<i>Apples</i>	<i>Broccoli</i>	<i>Carrots</i>	<i>Leaf Lettuce</i>	<i>Tomatoes</i>
Conventional					
<i>Average</i>	.500	.246	.673	.381	.439
<i>Observations</i>	230	216	110	186	230
Organic					
<i>Average</i>	.309	.175	.422	.483	.445
<i>Observations</i>	230	212	230	223	200

count for a large portion of the produce consumed in the United States.

Weekly price data of the five produce items, both organic and conventional, were collected to estimate the price premia² for the organic items. Data regarding the cosmetic quality of the produce were also collected. The Agricultural Marketing Services' (AMS) standards for grading produce were used as a benchmark for determining what was to be considered a "cosmetic defect." Because AMS inspectors grade produce at the wholesale level, a few adjustments regarding the data collection process at the retail level in this study were necessary. The AMS grades a certain percentage (approximately 1%) of the fruits or vegetables at the wholesale level. In grading produce at the retail level for the present study, the five commodities were graded by randomly selecting a sample of ten individual fruits or vegetables for inspection. Only visible quality defects were scored; the defects listed in the score sheets received equal weight when evaluating the quality of produce.

In addition to inspecting produce items during the weekly store visits, consumer surveys were also administered to collect data concerning shoppers' demo-

² The price premium is the additional amount of money (per pound) that a person must pay to purchase organic produce rather than conventional produce.

graphic and socio-economic characteristics. The interviewer approached shoppers in the produce section of the grocery once they had completed their shopping for fresh produce items. The consumers were asked if they would complete a brief, one page survey about the produce that they were purchasing that day. The survey asked the consumer if he had purchased any of the five fresh produce items of interest in this study, and, if yes, if the items were organic or conventional. Several questions concerning the respondents demographic and socio-economic characteristics were also asked. Information concerning the consumers' household, education, income, age, gender, and distance from the store to their home was elicited.

Cosmetic Quality Differences Between Organic and Conventional Produce

The first objective of this study is to determine if organic produce contains more defects than conventional produce at the retail level, as has frequently been suggested. The average number of defects, and the number of observations, for the five items is reported in Table 1. The observance of defects for this study indicates that for only two of the five items, lettuce and tomatoes, the average number of defects was higher for organic produce than conventional produce. Organic apples, broccoli, and carrots actually had fewer defects, on average, than their conventional counterparts. The differences in the average number of defects between the organic and conventional varieties of each commodity are illustrated in Figure 1. Each commodity has unique, specific applicable defects and each defect recorded receives equal weight. Therefore, the average total defects can only be compared for organic and conventional varieties of the same commodity; the defects cannot be compared across all the items.

Tests were conducted to determine if the average number of defects was significantly different for organic and conventional produce. For the three commodities in which the average number of defects was greater for the conventional items than the organic items - apples, broccoli, and carrots - there was a statistically significant difference in the number of average number of defects. In the case of tomatoes, the difference in quality between organic and conventional tomatoes was statistically insignificant. The only commodity that displayed a statistically significant higher number of defects for the organic item compared to its conventional counterpart was leaf lettuce.

In this study, organic produce did not necessarily possess more defects than conventional produce at the retail level. In fact, organic produce often has fewer cosmetic defects than conventional produce. Whether or not major differences in the quality between the two varieties exist at the wholesale level is beyond the scope of this study. Also, it is not certain whether or not more intensive culling practices are used in supermarkets for the organic bins than the conventional ones. However, this study does conclude that consumers do not have to sacrifice cosmetic quality for the absence of pesticide use. Quality differences may exist between organic and conventional produce from week to week, of course, but these differences may favor the organic produce as well as the conventional produce.

Price Differences Between Organic and Conventional Produce

Price data were collected for both the organic and conventional varieties of the five produce items each week. The average prices, and the maximum and minimum prices, for both varieties are located in Table 2.

Figure 1. Average Number of Defects.

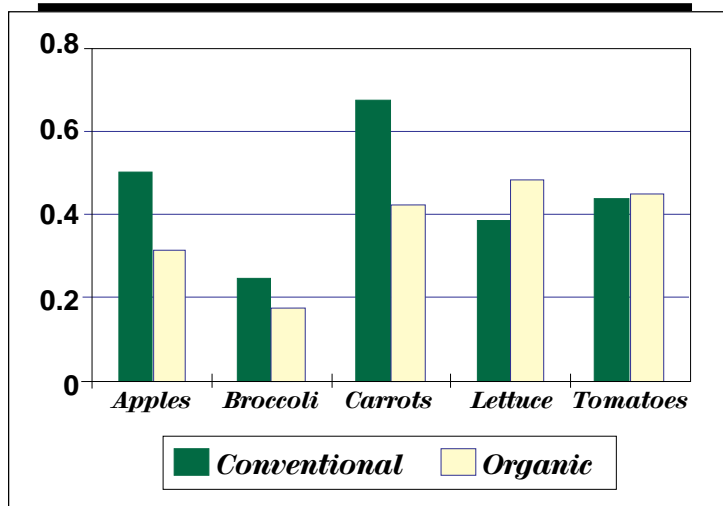


Table 2. Produce Price Comparisons.

(dollars per pound)

	Conventional	Organic	Aggregate
Apples			
<i>Average price</i>	1.04	1.49	1.26
<i>Minimum price</i>	.79	.99	.79
<i>Maximum price</i>	1.39	1.99	1.99
Broccoli			
<i>Average price</i>	.90	1.65	1.27
<i>Minimum price</i>	.79	.99	.79
<i>Maximum price</i>	.99	2.09	2.09
Carrots			
<i>Average price</i>	.45	1.21	.84
<i>Minimum price</i>	.39	.79	.39
<i>Maximum price</i>	.50	1.49	1.49
Leaf Lettuce			
<i>Average price</i>	1.00	1.89	1.45
<i>Minimum price</i>	.52	1.45	.52
<i>Maximum price</i>	1.58	3.18	3.18
Tomatoes			
<i>Average price</i>	1.39	2.01	1.69
<i>Minimum price</i>	.69	1.49	.69
<i>Maximum price</i>	2.49	2.99	2.99

The organic price premia were estimated for each item using price analysis. This price analysis was also used to explain how produce prices may vary in relation to certain quality characteristics. The regression results indicated that the method of production (organic or conventional) and the choice of store significantly affected the prices of the items. Prices were consistently higher if the items were organically grown, and if the items were sold at the specialty grocery store rather than the cooperative. The average number of defects and the timing of the weekly data collections had a negligible influence on the prices.

The estimated organic price premia were relatively high for all of the items, ranging from \$.44 per pound for apples to \$.90 per pound for leaf lettuce. The premia estimates are located in Table 3. The price premia are also expressed as a percentage of the average conventional price for each commodity in Table 3. The premia ranged from 37% for tomatoes to 171% for carrots.

The large organic premia suggest that the real trade-off for buying organic produce rather than conventional is the relative price increase. The findings of this study indicate that a consumer does not have to sacrifice quality, but he or she will have to spend more money to purchase the organic variety.

Identifying Common Characteristics of Organic Produce Consumers

Determining if certain socio-economic or demographic characteristics cause consumers to be more likely to purchase organic produce would be helpful for the marketing of organic produce. Because organic produce represents only 1% of the produce marketed in the United States, detecting a target market could be beneficial for organic produce producers and retailers.

The potential influence that a consumer's personal characteristics have upon his or her choice of organic versus conventional produce was examined using the survey information describing the respondent's produce purchases and his or her socio-economic and demographic characteristics. In addition to the consumer questionnaire data, information concerning the prices and quality of the produce and the store in which the item was purchased were also examined as potential factors affecting consumers' purchase decisions. A model was estimated for each of the five produce items examining which of the above factors significantly influenced a person to buy organic produce. The results indicated that the only factor that consistently had a significant effect on a consumer's decision to purchase organic produce was the choice of store. The analysis indicated that people who shopped at the specialty grocery store were less likely to purchase organics than the shoppers at the cooperative.

A choice-based sampling technique was used for the collection of data — the two stores were specifically chosen as interview sites because they both offer conventional and organic produce. Choice-based sampling suggests that the choice

Table 3. Organic Price Premia.

	<i>Organic Price Premia (dollars per pound)</i>	<i>Average Conventional Price (dollars per pound)</i>	<i>Premia as a Percentage of Conventional Price</i>
<i>Apples</i>	.44	1.04	42%
<i>Broccoli</i>	.70	.90	78%
<i>Carrots</i>	.77	.45	171%
<i>Leaf Lettuce</i>	.90	1.00	90%
<i>Tomatoes</i>	.51	1.39	37%

of store could also be explained by a consumer's personal characteristics. Therefore, a two equation model was designed to examine the factors influencing both store choice and the purchase of organic or conventional produce.

This model examined if the choice of store could be explained by a consumer's level of education, income, age, or gender. The only factor that was significant in explaining choice of store was income. Consumers with higher incomes were more likely to shop at the specialty grocery store than the cooperative. It should be noted that affluent customers may choose to shop at the specialty store not only because organic produce is available, but because many other specialty items - which are often relatively expensive - are also offered.

Price and quality differences between the organic and conventional produce items, a consumer's age, gender, whether or not he or she has children, and his or her choice of store were examined as factors that could potentially explain a consumer's decision to buy organic produce. A separate equation had to be estimated for each of the five items; therefore, it is possible that a factor could be significant in explaining a person's purchase for some of the items, but not the others. This is the case for the variable reflecting whether or not the consumer has children younger than 18 years old living in the household. This variable was significant in the cases of carrots and lettuce, indicating that the survey respondent's with children were more likely to buy the organic variety of carrots and lettuce than were consumers without children. Because the variable was significant for the purchasing of organics for two of the five items, it is difficult to draw a definite conclusion regarding the impact that shopping for children has upon a person's decision to buy organics.

The regression results showed that the variable representing the price ratio of the two varieties (organic price/ conventional price) was significant in the cases of

tomatoes and broccoli, indicating that as the organic price of an item increased relative to its conventional counterpart, the consumer was less likely to purchase the organic variety. Tomatoes and broccoli had the highest average displayed prices of the five organic items observed, at \$2.01 and \$1.65 per pound, respectively.³ Consumers may be more price sensitive as the price for produce reaches a certain level. To illustrate, some consumers may not wish to pay over \$2.00 a pound for any produce item. Once the organic item surpasses that cost, consumers may favor the cheaper alternative of conventional produce. This may indicate that the future growth in the organic market may be greater for lower priced commodities.

While the price variable had a significant influence upon consumers' produce purchase decisions (for the higher priced items), the level of defects for the two varieties of produce had little effect on purchase choices. The variable reflecting the difference in the average number of defects (organic - conventional) was significant only in the case of broccoli. For all other items, this variable was insignificant in affecting the consumer's decision to purchase organics. The fact that the difference in defects was rarely significant in affecting the consumer's decision to purchase organics may stem from the fact that, in general, there was little difference in the average number of defects between the two commodities. These differences may have been fairly negligible to the consumer.

Overall, the choice of store was the most significant variable in explaining consumers' produce purchases. The results indicate that shoppers of the specialty grocery store were less likely to

³ Although the average per pound price of organic lettuce was 1.89, as indicated in Table 2, the *displayed prices* for lettuce were per head. The lettuce was weighed and converted to per pound prices for this study. The displayed prices for lettuce were much lower - usually \$1.19 or \$1.29 per head.

purchase organic produce than the shoppers at the cooperative. The store variable was significant for four of the five items - apples, broccoli, carrots, and lettuce. Therefore, the primary indicator of an organic produce shopper, at least in the case of Tucson, is the choice of store by the consumer.

The price analysis indicated that the specialty store had higher produce prices than the cooperative. Thus, produce shoppers — particularly organic shoppers, who must pay a premium — wanting lower produce prices may be more inclined to shop at the cooperative rather than the specialty store.

Although some of the demographic factors were significant in explaining produce purchase behavior, no well-defined target market for organic produce consumers was identified using consumers' demographic and socio-economic characteristics. Age and gender had no effect on a person's choice of store nor his or her choice of organic versus conventional produce. However, this study concludes store selectivity to be a highly relevant factor for identifying prospective organic produce consumers: produce shoppers were more likely to purchase

organic produce at the cooperative than at the specialty grocery store. This result is perhaps not surprising given that sales of organic produce have been relatively low in the larger, chain supermarkets in the 1990's. The environment of the cooperative resembles that of a health food store, where the organic market has experienced greater success in recent years.

The current study indicates that consumers' demographic and socio-economic characteristics have, overall, little effect on their decisions to purchase organic produce. A study focusing more on lifestyle characteristics could possibly identify a target market. When surveys were conducted at the two retail outlets, the interviewer observed that many of the respondents were interested in physical fitness, and many were vegetarians. Further research focusing on aspects such as these may reveal that there is a target market for organic consumers according to people's fitness habits and their diets in general. Such findings could advance the efficiency of the advertising and marketing of organic produce.

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