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Is Local Food More Expensive? A Grand Rapids Case Study

HNR 499 Senior Thesis

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I. Introduction

Over the past few years, interest in buying locally grown and produced food has skyrocketed, thanks in part to growing awareness about industrial food production and the industrial food supply chain (see, for example, Pollan (2006), Schlosser (2001), and *Food, Inc.* (2008)). Farmers markets and Community Supported Agriculture partnerships (CSAs) have flourished nationwide, increasing the availability and variety of fresh produce and meats. From 2010 to 2011, the number of farmers markets in the United States has increased from 6,132 to 7,175 in 2011, about 17% growth (“More than 1,000...” 2011). Despite an apparent increase in demand for local products, many consumers perceive that fruits and vegetables sold at farmers markets and other direct market venues are too expensive and therefore financially out of their reach. This study tests whether locally sourced food is more expensive in the Grand Rapids area.

One aspect that has been studied in conjunction with this question is the topic of food deserts. Although the academic community has differing perspectives as to what constitutes a food desert (Hendrickson et. al. 2006, Walker et. al. 2010), it can be broadly defined as a geographic area in which fresh, nutritious foods (such as fruits and vegetables) are unavailable for retail purchase. Food deserts generally plague urban areas, where it is more difficult - or more unsavory - for supermarkets to locate (a consequence of which is what Eisenhauer (2001) refers to as supermarket redlining, where supermarkets build primarily in suburban areas because of concerns of theft and lower profits in urban locations). As a consequence, urban residents are generally left with convenience and liquor stores, which primarily sell ‘junk’ food (food high in calories yet low in nutrition); if produce is sold, it is more expensive and of poor quality. Logically, then, the presence of a farmers market in a food desert may alleviate many of the problems associated with such areas (primarily, the dearth of fresh food and its cost). Because urban residents tend to be poorer¹, with a decreased ability to travel to suburban areas where supermarkets are more common (Hendrickson et. al. [2006]), urban farmers markets provide produce to people with few other desirable options.

¹ According to the 2010 Current Population Survey by the U.S. Census Bureau, out of 46.1 million people living below 100% of the poverty line, 38.3 million lived inside metro statistical areas. For more information, see www.census.gov.

Intimately connected to the topic of food deserts is that of the socioeconomic status of many urban residents. Residents of inner-city areas tend to be poorer than suburban residents. Chung and Meyers (1999) go one step further and test whether the poor pay more for food. They find that the poor pay more for groceries because of a lack of chain grocery stores in their neighborhoods (the reason being that chain stores generally offer better prices than non-chain stores). If this is the case, evidence that farmers markets offer quality produce as cheap as, or cheaper than, local chain stores – which could attract urban customers - could have serious consequences on the willingness of farmers market operators to locate in urban areas. This market-based solution would offer a more efficient way to tackle the problem of nutrition in food deserts, benefitting poor communities and local farmers alike.

The relative price of local food has somewhat different consequences for another class of people. As the awareness about industrial food production grows, so does the prevalence of ‘anti-corporate’ attitudes, such as those espoused by the Organic Consumers Association (OCA). For example, the OCA’s “Millions against Monsanto” campaign encourages consumers to boycott foods made with genetically modified organisms (GMOs) and to petition for ‘truth in labeling’ laws, which would require food companies to explicitly state whether a product contains GMOs (“Millions against Monsanto,” 2012). This, in turn, leads to an increased demand for local products and the desire to support local producers. Consumers who exhibit anti-corporate attitudes concede that non-local foods *may* be cheaper (at least this is the perception of many consumers); there are nevertheless enormous opportunity costs to buying non-local food for such consumers. Quality may be sacrificed, as non-local food travels much farther to end up on a diner’s plate and thus loses much of its freshness and taste (Chambers et al. 2007). Social justice issues may come into play when considering the implications of migrant labor (Schlosser 2001, *Food Inc.* 2008). Even the inequality of wealth between large agribusinesses and smaller, local farmers may influence when consumers decide to buy local food (Korth 2007). That is, the desire to support local farmers, who may be struggling financially, and in the process “stick it to” the large corporations, could factor into the decision to buy local.

Shoppers who are willing to buy more locally grown food may believe that it is more expensive and therefore cannot fit into the family budget. As the literature review will show,

many consumers harbor misconceptions about local food prices. People may want to buy local, but believe that it is more expensive, and thus continue to buy non-local food. Evidence to illustrate that local food is in fact cheaper (at least during the peak season) would disprove such misconceptions and could lead to a greater demand for locally produced food.

The paper is organized as follows. Section II provides a brief overview of the related literature. Section III describes the methodology of the study. Section IV gives the results of the statistical analysis, and Section V discusses the implications of the findings and Section VI concludes.

II. Review of the Literature

This study replicates Pirog and McCann (2009), who studied urban areas in Iowa. The researchers obtained prices for various products in both farmers markets and local supermarkets. At the farmers markets, they recorded the prices at two randomly selected vendors for each product, while for the supermarket prices, they recorded two large chain stores' prices for the same products on the same day. The authors also noted other product characteristics, including certified organic, hormone-free and free-range.

They find that the mean price per pound for a local vegetable basket was \$1.25, whereas the mean price per pound for the non-local vegetable basket was \$1.39. Statistically, however, mean price per pound of the local basket was not significantly different from that of the non-local basket (p -value = 0.208). The authors found that locally produced zucchini, summer squash, string beans, and lean ground beef were significantly less expensive than non-local counterparts. They found no difference in prices for local cucumbers, cabbage, sweet onions, tomatoes, and bone-in pork chops. In terms of local-local comparisons (i.e., local food sold at the farmers market versus local food sold at the supermarket), no significant difference in price was found for any products.

Over three decades ago, Sommer et. al. (1980) surveyed 15 farmers' markets and 3 supermarket chain stores in California in the summer and fall of 1979 to determine the extent of price savings to consumers at farmers' markets (i.e. direct market operations, where those who grow food sell it directly to the customers). In contrast to Pirog and McCann (2009), these researchers recorded the prices for each identifiable item sold by all vendors, and omitted

products from consideration if they used a different pricing system (for example, if apples were sold by the bushel at the farmers market, but by the pound at the supermarket). The authors computed the percentage savings realized at the farmers markets as

$$\frac{\text{Average Supermarket Price} - \text{Average Farmers Market Price}}{\text{Larger Price}} \times 100,$$

noting that this procedure of calculating *savings* – rather than computing differences in terms of price *increases*, that is, by how much the supermarket price exceeded the farmers market price – was more conservative and more meaningful for a consumer research project.

Using a t-test to assess differences in the average unit cost, the authors found that the overall unit cost at the farmers markets is 34% less than at the supermarkets (i.e. 46¢ versus 70¢). During peak season, the median price saving at the farmers markets was 39% (the modal price savings being between 40-49%), and supermarket prices were higher 91% of the time. The authors also noted that, despite the price savings, customers shopped at farmers’ markets because of the better quality of the fruits and vegetables sold there compared to those sold at the supermarket (a finding which is consistent with more recent studies that investigate reasons for buying locally grown food).

However, these findings conflict with consumer perceptions about local food. A general consensus in the literature appears to be that consumers think local food (although fresher and of higher quality) costs more than non-local or imported food. Chambers et. al. (2007), who conducted their study in the U.K. using focus groups differentiated by socioeconomic status and comprised mostly of women, found that many of the participants believed that local food was more expensive than national or imported food, mainly because small farmers cannot produce at the appropriate economies of scale to keep prices down. After coding the data from these discussions, the authors utilized thematic content analysis to determine which themes came up most often in the focus groups. The analysis revealed six themes: cost, lifestyle, food quality, consumer ethnocentrism (i.e., the desire to buy British products over imported products), choice, and farmers. Consumers indicated a willingness to support British farmers in an effort to stimulate the local economy, and discussed the “power” of the supermarkets in driving small retailers out of business. This finding supports the idea of the “anti-corporate” attitude discussed in the introduction. Participants also identified higher quality, freshness, and better taste as

beneficial characteristics of local food, but also indicated that a lack of convenience (which, in economic terms, can be thought of as a higher opportunity cost associated with buying local food), in addition to perceived higher explicit prices, stands in the way of purchasing more local food.

Weatherell et. al. (2003), also in the U.K., discovered similar patterns of thought in consumer focus groups and surveys. Focus group participants, all of whom had some responsibility in buying food for the family, claimed that price, quality, and convenience were the most important factors in deciding whether (and where) to buy local food. In face-to-face surveys, however, consumers revealed that taste, freshness, and appearance trumped price and convenience in terms of importance. Unsurprisingly, rural respondents placed importance on different factors than urban respondents. In particular, rural participants claimed that the origin of the food, freshness, animal welfare, and environmental issues played bigger roles in deciding what food to buy than they did for urban participants (ANOVA, $p\text{-value} < 0.05$). The rural group was also more concerned with issues of food provisioning, such as minimizing the “food miles” of their food (i.e., how far the food traveled to get to the consumer). Nevertheless, the authors found that the preferred place to buy local food for all respondents was the supermarket, indicating that convenience and price play an important role in consumers’ decisions to buy local food.

Despite the fact that many consumers think that locally produced food is more expensive, some studies have indicated that consumers are willing to pay more for local food. Darby et. al. (2008) performed a conjoint analysis on various attributes thought to influence consumer behavior in regard to local food purchases, such as location of production, price, and name of the producer (specifically, “Berries, Inc.” or “Fred’s Berry Farm”). This last attribute – designed to hint at the size of the farm – elicited a higher willingness to pay for strawberries produced by supposedly smaller and more local farms. This finding supports the assertion that some consumers may be willing to pay more for food produced by, and thus support, independent growers, rather than large, corporate agribusinesses.

Additionally, consumers indicated a higher willingness to pay for strawberries that were locally grown, with direct market shoppers willing to pay twice as much. Loureiro and Hine (2002) found that consumers would pay a potential 9.37¢ premium per pound of locally grown

potatoes (a 10% increase). The authors note that only one variable was associated with the higher willingness to pay - nutrition (consumers must be assured that the local product will be of somewhat high quality in order to pay more for it). Additionally, Weatherell et. al. (2003) found that 30% of respondents indicated that they would be willing to pay up to 10% more for local food, although few would pay more than that.

A final question is who actually buys local food. Based on the above findings, one might assume that, if consumers perceive local food to be more expensive, then consumers of a higher socioeconomic bracket would be those who buy local food. However, several studies have established that demographics do not play a significant role in determining who purchases local food. For example, Thilmany et. al. (2008) found that respondents who placed importance on buying pesticide-free produce indicated a higher willingness to pay in buying food directly from the source (e.g., the farmers' market). Zepeda and Li (2006) investigated consumer behaviors and attitudes toward buying local food and also concluded that income was a poor indicator of consumers who bought local food; rather, the enjoyment of cooking was the most important factor when buying local. The presence of another adult in the household also increased the probability of purchasing locally grown food. (Interestingly, individuals with the highest income in this study were less likely to buy local, possibly because they are more likely to buy products at specialty stores). Finally, LaTrobe (2001) revealed that consumers at a farmers market in the UK were at the market to buy fresh, healthy and/or organic food. It appears that the quality and nutritional content of local food influences consumers' decision to buy local more than (perceived higher) price.

III. Methodology

Based on the methodology of Pirog and McCann (2009), I made five visits to the Fulton St. Farmers Market in Grand Rapids, MI (the city's oldest and largest farmers market, located near the downtown area) between July and October 2011 and recorded prices for common fruits, vegetables, and dairy products that were also readily available at local supermarkets. These products were not "specialty" varieties (e.g. "heirloom" tomatoes), but rather the most 'generic' or 'common' varieties. To make more valid price comparisons, I did not record prices for anything labeled "organic"; supermarkets generally did not carry comparable organic products –

indeed, even at the farmers market certified organic produce was scarce² - and as such this study focuses on conventional produce. Products sourced from Michigan were considered local; anything grown outside of Michigan or the United States was considered non-local (for more on the debate on what constitutes local food, see Darby et. al. (2008) and Dunne et. al. (2010). For each product data was collected from two vendors chosen at random for each visit (as in Pirog and McCann (2009)).³

To choose what supermarkets to visit, I did a Google search of all the chain supermarket stores within 3 miles of the Fulton St. Farmers Market. As a result, I surveyed the Fulton St. Family Fare (.2 mile from the farmers market), the Wealthy St. D&W Fresh Market (1.5 miles), and the Leonard St. Save-A-Lot (1.7 miles). Supermarket prices were recorded on the same day as the farmers market prices.

IV. Results

The data was analyzed using the Kruskal-Wallis test, with the Wilcoxon Rank-Sum test as a post-hoc procedure. The Kruskal-Wallis test is the non-parametric alternative to the one-way ANOVA (Analysis of Variance) procedure; that is, it is used when the sample sizes are small and/or it cannot be assumed that the data are normally distributed. However, both procedures are used to test if there is any significant difference in the distribution of the quantitative variable within each categorical variable. More specifically, the Wilcoxon Rank-Sum test analyzes whether the prices for each product differ significantly based on where the product was grown (locally or non-locally), and where the product was sold (at the farmers market or at the supermarket). For the results, see Tables 1 and 2, respectively.

Local vs. Non-Local Prices

As can be seen from Table 1 and Figure 1, six out of the nine products selected significantly differed in regard to local and non-local prices. The lower the p-value is for any

² The organic certification process can be lengthy and expensive. Organic producers must have been using organic production techniques for at least three years before certification, and the fees associated with certification (which can vary greatly, depending on the certification agent) can be steep, up to \$1,500. For more information, visit www.usda.gov.

³ The price for each product was recorded using the same unit at all locations. Specifically, the prices shown in Tables 1 and 2 reflect the cost of one zucchini, one pound of tomatoes, one pint of blueberries, one cucumber, one pound of string beans, one green pepper, one ear of sweet corn, one loaf of bread, and one gallon of milk.

product, the stronger the evidence is that there is a true difference in prices. In other words, the p-value represents the probability that the difference in prices would be as extreme or more extreme, if the true difference is zero. Zucchini, blueberries, cucumbers, green peppers, sweet corn, and bread all exhibited significant difference in regard to prices. For almost every product except for the bread, farmers market prices⁴ were lower than the non-local supermarket prices. It should be noted that for several of the products, the sample size was small – in some cases, less than five products were surveyed – but nonetheless, significant price differences were found.

*Local vs. Local Prices*⁵

Prices for local products from the farmers market and local products from the supermarkets did not differ as drastically. Only one product – string beans - exhibited a significant price difference, with the average supermarket price being 49¢ cheaper than the average farmers market price. Prices for local blueberries and green peppers were not significantly different (p-value = 0.1043 for blueberries, p-value = 0.1069 for peppers). The average price for local blueberries from the farmers market was 45¢ less than local blueberries from the supermarket, whereas the average price for local green peppers purchased from the farmers market was 14¢ more than the same product from the supermarket. In general, however, local food from the farmers market and local food from the supermarkets cost about the same.

V. Discussion/Implications

The findings of this study indicate that common consumer perceptions – that local food, especially local food purchased at the farmers market, is more expensive than non-local supermarket equivalents – are incorrect. Most of the products sold at the farmers market were cheaper than the non-local products sold at the supermarket. Economically, this is to be expected. Prices were taken during the late summer and early fall season, in which many of the products surveyed were in peak season. As such, the supply of tomatoes, for example, was higher than at other times during the year, and this increase in supply decreased the price for tomatoes. Despite smaller economies of scale, local food may have a cost advantage during harvest season since the supply chain that connects food from the farm to the farmers market is

⁴ All farmers market products included in this analysis were locally produced.

⁵ The list of products compared in this section is smaller because the supermarkets did not offer as many local products as did the farmers market.

much shorter than that to the supermarket. In terms of food miles, a local tomato does not have to travel nearly as far to arrive to its consumer as a non-local tomato does. Since transportation and packaging costs are much lower, the final purchase price should also be lower. These two economic ideas go a long way in explaining why much of the farmers market prices were significantly lower than the supermarket prices.

These results have implications for the popular local food movement. Since it can be shown that local farmers market food is less expensive (at least during the peak season), the Fulton St. Farmers Market, other local farmers markets, and other direct-buy outlets can use this fact to advertise their market and attract new customers. Thus, there is the potential for the local food movement to grow, which will not only stimulate the local foodshed and improve nutrition in food deserts, but will reduce the (unpriced) damage that fossil fuels have on the environment, since less greenhouse gases are emitted to get local food to the consumer's plate.

Of course, as was discussed earlier, customers do face an opportunity cost when shopping at the farmers market, namely that of sacrificing convenience. Supermarkets boast the advantage of one-stop shopping, where busy people can buy everything they need at one time. As Figure 2 indicates, the prices of local food purchased at the supermarket are comparable to the same food from the farmers market. Local grocery stores can leverage this fact by increasing the marketing of locally sourced foods to attract more customers. Nonetheless, with the growing popularity of, and therefore growth in, farmers markets all over the country, convenience is likely to become less of an issue when it comes to shopping at the farmers markets if there are more farmers markets around.

VI. Conclusion

This study found that, with many products, local food sold at the farmers market was statistically less expensive than comparable non-local food sold at nearby supermarkets. Probable reasons for this difference are (1) that the data was collected during the peak season for many fruits and vegetables in West Michigan, and (2) that the supply chain through which food travels to the farmers market is much shorter. An analysis of prices for local goods at each location – that is, farmers market and the supermarkets – indicates that, for most products, there is not a significant price difference among the locations of purchase.

However, the study did face some limitations. Because of limited time and resources, only one farmers market and its surrounding supermarkets could be surveyed, which may not provide a representative sample of the population. The small sample sizes prevented some statistical techniques, such as regression, from being used. Additionally, it proved difficult to compare products across different units. For example, green peppers are often sold at the supermarket by the pound, whereas at the farmers market they are sold by individual pepper. As a consequence, some estimation had to be made at the supermarket so that the products could be compared.

For future research, it would be interesting to expand the geographic scope of the study to include more farmers markets and more chain supermarkets, as well as locally-owned grocers and other direct-purchase outlets such as the farms themselves and perhaps even road-side stands. Ideally, sample sizes would be larger, with a greater selection of products, so that more statistical tests could be used on the data. Similarly, more research is needed to explore the presence and viability of local food in greater supply chains, such as those that source school cafeterias, hospitals, and possibly even airlines. It is certainly possible that local producers could supply such operations if the benefits outweigh the costs for both parties; supermarkets could almost certainly appeal to a broader audience by marketing a selection of locally sourced food, as discussed above. Finally, as was noted earlier, all of the products included in this study were in their peak season when their prices were recorded. While non-local varieties are likely to be either much less expensive or the only ones available during the off-season, further research is needed in order to compare prices for local and non-local food when the local food is not in season.

Appendix

Table 1: Summary Statistics for Local vs. Non-Local Prices

<u>Product</u>	<u>Local</u>	<u>Non-Local</u>	<u>Difference</u>
Zucchini	0.49	1.08	-0.59***
	0.19	0.24	<i>p-value:</i> 0.0011
	n=11	n=7	
Roma Tomatoes	1.96	1.96	0.00
	0.25	0.35	<i>p-value:</i> 0.3707
	n=6	n=10	
Blueberries	3.04	4.99	-1.95***
	0.62	0	<i>p-value:</i> 0.0075
	n=12	n=3	
Cucumbers	0.50	0.67	-0.17*
	0.16	0.16	<i>p-value:</i> 0.085
	n=9	n=5	
String Beans	1.80	1.89	-0.09
	0.49	0.17	<i>p-value:</i> 0.4376
	n=14	n=3	
Green Peppers	0.63	1.20	-0.57***
	0.18	0.51	<i>p-value:</i> 0.0009
	n=13	n=11	
Sweet Corn	0.42	0.60	-0.18*
	0.13	0	<i>p-value:</i> 0.0552
	n=8	n=2	
100% Whole Wheat Bread	3.80	2.39	1.41***
	0	0.59	<i>p-value:</i> 0.0013
	n=4	n=23	
Milk	4.25	4.99	-0.74
	0	1.03	<i>p-value:</i> 0.5463
	n=4	n=10	

Note: The first row for each product indicates the mean price and the second row indicates the standard deviation in dollars. The difference is computed by subtracting the mean price for non-local from the mean price for local products. Significance is indicated as follows: * for significance at the 10% level, ** for significance at the 5% level, and *** for significance at the 1% level. These results are based on a Wilcoxon Rank-Sum analysis, in which the null hypothesis is that the means for each group (in this case, local and non-local) are equal; the alternative hypothesis states that the means are *not* equal.

Figure 1: A graphical representation of Table 1

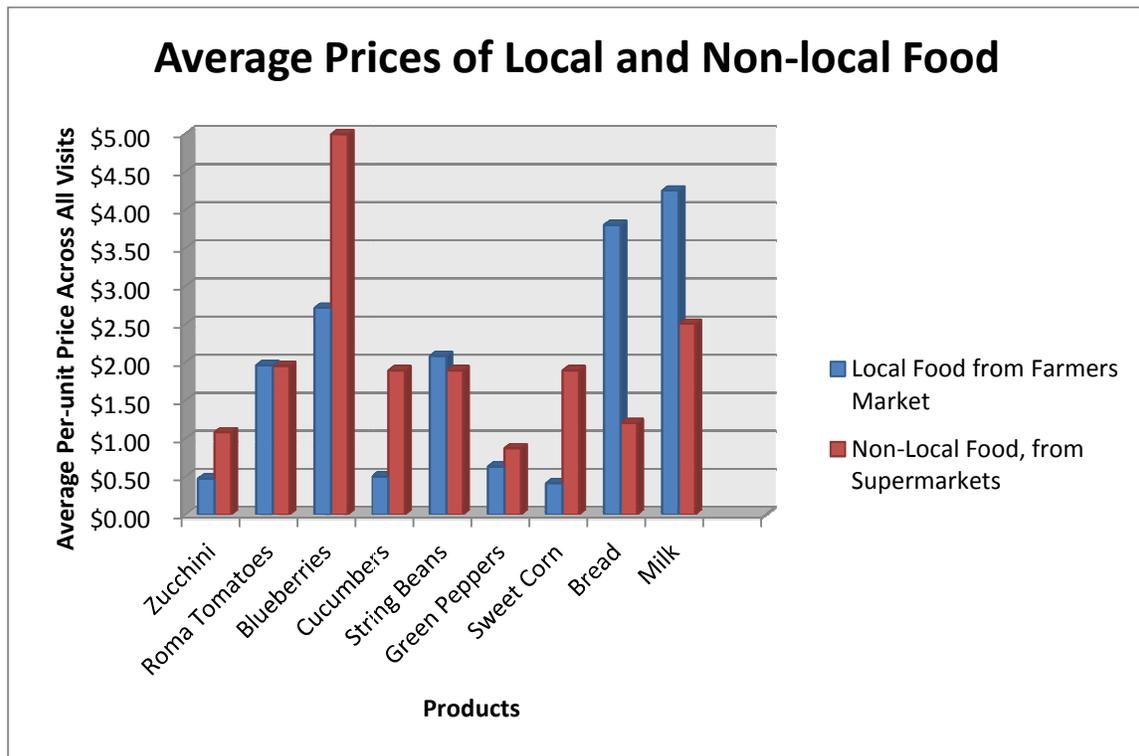
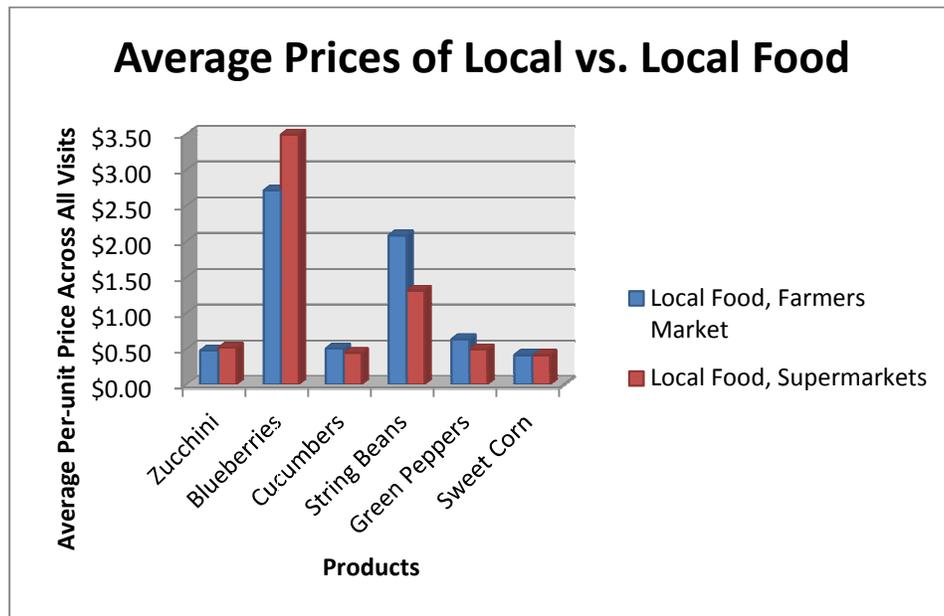


Table 2: Summary Statistics for Local vs. Local Prices

<u>Product</u>	<u>Local from FM</u>	<u>Local from SM</u>	<u>Difference</u>
Zucchini	0.49	0.51	-0.02
	0.19	0.10	<i>p-value: 0.4142</i>
	n=11	n=3	
Blueberries	3.04	3.49	-0.45
	0.62	0.70	<i>p-value: 0.1043</i>
	n=12	n=5	
Cucumbers	0.50	0.44	0.06
	0.16	0.10	<i>p-value: 0.5809</i>
	n=9	n=3	
String Beans	1.80	1.31	0.49***
	0.49	0.41	<i>p-value: 0.0027</i>
	n=14	n=5	
Green Peppers	0.63	0.49	0.14
	0.18	0.16	<i>p-value: 0.1069</i>
	n=13	n=3	
Sweet Corn	0.42	0.41	0.01
	0.13	0.32	<i>p-value: 1.000</i>
	n=8	n=2	

Note: The first row for each product indicates the mean price and the second row indicates the standard deviation in dollars. The difference is computed by subtracting the mean price for non-local from the mean price for local products. Significance is indicated as follows: * for significance at the 10% level, ** for significance at the 5% level, and *** for significance at the 1% level. These results are based on a Wilcoxon Rank-Sum analysis, in which the null hypothesis is that the means for each group (in this case, local products purchased from the farmers market and local products from the supermarket) are equal; the alternative hypothesis states that the means are *not* equal.

Figure 2: A graphical representation of Table 2



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