Are Consumers Willing to Pay for Organic When the Food is Already Local?

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Abstract

The emergence of community supported agriculture (CSA) farms has provided a new way for small farms to remain competitive while engaging their local community through direct marketing. In this study, we report on some of the first revealed preference valuation of CSA attributes, including the willingness to pay for competing organic certification programs. Using data on the prices and attributes of 188 CSA farms spanning Ohio and Pennsylvania we estimate willingness to pay measures from both hedonic and nearest-neighbor matching methods. Results from a semi-log hedonic reveal a willingness to pay of approximately 9% for organic branding compared to natural, which translates into an additional $48 per summer season share. We also find a statistically significant premium associated with longer seasons, delivery, and the provision of additional products beyond fruits and vegetables. In contrast we find no premium associated with competing certification programs.

Keywords: Organic; Local; Matching; Hedonic; Community supported agriculture

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I. Introduction

The number of small and medium sized farms across the United States has decreased substantially over the past 20 years. A variety of explanations is given for this trend, including increased competition from larger multi-farm corporations and the expansion of food retailers able to provide a large variety of fresh food offerings at low prices. Recently local production, and specifically organically grown produce, has taken on a more prominent role in the marketing of food products and has provided additional revenue streams for small, local farms specializing in these commodities. The emergence of community supported agriculture (CSA) farms has created a direct marketing link between local consumers and local farmers and provided new, often niche, markets for small farms. As the local foods and CSA industry matures, it is important for CSA owners to understand what attributes of their CSA are attractive to potential customers to enable them to better tailor their products to consumers. In this paper we provide some of the first empirical evidence of the willingness to pay for various characteristics of CSAs and the products they produce with a particular focus on the role of organic food production and certification.

A CSA operation allows individuals to purchase shares of a local farm's production at the beginning of a growing season in exchange for produce realized later in the season. This risk-sharing model benefits both farmers, who receive an up-front influx of capital, and consumers, who are entitled to fresh, local produce that may be difficult to obtain through traditional retailing markets.[2] In addition to the local connection provided by these farms, many CSAs also

[2] In a single period, the consumer would take on the production risk. However, over multiple repeated seasons failure to provide adequate product would result in declining membership and place some risk on the producer.

advertise the natural aspects of their farming practices, including claims of natural, certified naturally grown, certified organic, and organic exempt produce. These certifications often come at considerable cost to the local farms in terms of both time required for certification and accreditation fees and it is important for farmers to accurately understand the return to these certifications to justify their costs.[3]

Within the existing revealed preference literature, there is substantial evidence that consumers are willing to pay a premium for organically labeled produce; however, few studies have been able to disentangle the role of organic labeling from that of local food production. Focusing on CSAs allows us to isolate the willingness to pay for various attributes of CSA farms, including organic certification, while controlling for local food production since by construction the CSAs in our study only provide locally produced foods. As a result, our findings of a positive and significant willingness to pay for organic produce are immune from potentially confounding issues associated with differentiating local and organic willingness to pay that could complicate econometric identification.

In the current paper we perform both hedonic and nearest-neighbor matching analyses to examine the willingness to pay for attributes associated with CSA farms. We find a substantial premium is associated with farms advertising organic produce, but that a similar benefit is absent from farms advertising certified naturally grown produce. In addition, we find intuitive results for other attributes of CSA farms suggesting consumers are aware of the different attributes offered by CSAs and make tradeoffs when selecting among CSAs with differentiated characteristics. The next section provides additional background on local foods and the associated literature on organic products. Section three discusses our dataset on CSA farms and

[3] While pecuniary costs are generally low, the bureaucratic costs may be substantial for small farms.

prices for the 2011 summer season while sections four and five outline our estimation strategy and discuss our results. Lastly section six concludes.

II. A Review of Organic and Local Foods

Local, direct marketing has become increasingly popular for small farms. The number of farmers markets has grown from 1,755 in 1994 to 7,175 in 2011 (USDA Farmers), while there were 12,549 farms that advertised CSA's in the USDA Ag Census conducted in 2007. One explanation for the rapid growth in local, direct-marketed farms can be attributed to the wide variety of benefits presumed to accrue to both farmers, through the creation of new markets for products, and consumers, who may place value on local foods, associated with these activities. As outlined in a recent review of review of the local foods literature, Brown and Miller (2008) highlight the perceived positive impacts on consumers from CSA farms including, improved health from eating fresh produce and increased variety of produce (Oberholtzer, 2004).

To provide an economic measure of the value associated with CSA farms, several authors have compared the cost of purchasing the quantity of organic produce received through a CSA membership with the cost of purchasing a similar quantity of organic produce from traditional retailers. The majority of this literature has shown that a CSA offers a better return for the money than purchasing the produce from retailers (Farnsworth et al., 1996).[4] In a more recent analysis of CSA farms in New York, Conner (2003) found that the value of a CSA relative to retail purchase was in one case dependent on the options chosen by the member over whether or not to pick their own produce at the farm. This study highlights the need to examine the attributes of CSA farms as key distinguishing features may impact their attractiveness to consumers. While

[4] Of course, this does not consider that a household shopping solely in a retail environment may not choose to consumer the same quantity or variety of produce.

much of the existing economic evaluation of CSA farms compares the value of CSA produce to organic retail purchases, there is relatively little existing literature that provides evidence of consumers' actual willingness to pay for types of produce offered by CSA farms and the differences between CSA farm experiences.

The literature on pricing of CSA farms suggests that farm operators consider their operating costs and farm expenses in determining optimal pricing while they often ignore the value of the opportunity costs of their own labor (Tegtmeier and Duffy, 2005). This implies the pricing of CSA shares is likely to vary over the attributes of the CSA itself, particularly if those attributes are costly to produce. Examples of these would include items such as food delivery, quantity of deliveries, non-produce offerings, as well as expenses related to organic certification. In order to attract customers, the prices set by the farmers must match the consumer's willingness to pay, which is also likely to vary along observable attributes of CSA farms that compete with each other for shareholders. Invariably this competition will lead to product and price differentiation among CSAs in close proximity to each other.

One aspect in which differentiation is likely is the organic status of the produce. The decision of a CSA farm to provide certified organic produce is likely to impact costs and yields to the farmer as well as the perceptions of the produce received by consumers. Organic food often has a higher cost of production compared to conventionally grown produce due both to the costs of certification as well as potential decreases in yield. Park (1996) found that price differences between organic and conventional produce could be explained in large part by demand, suggesting that advertising of organic produce was a key means of improving farmer profit. This finding is consistent with the expansion of organic marketing across all food sectors and the associated increase in sales from \$3.6 billion in 1997 to \$21.1 billion in 2008 (Dimitri and Oberholtzer, 2012) despite the lack of a widely accepted organic certification program during much of this time period.

To address the lack of standards across organic producers, the USDA established the National Organic Program in order to design uniform procedures to be certified as organic. The USDA organic certification process begins with a lengthy application that includes an Organic System Plan that describes the practices, substances, monitoring procedures and management practices the farm intends to employ in order to maintain organic production, as well as land use for the previous three years. This is then analyzed by a 3rd-party certification agency that must ensure that all NOP standards are met. Each farm also partakes in an on-site inspection, and if accepted the farm must continue updating their information annually. In order to be certified organic by the USDA there are several fees that must be paid to the certifying agent. One such agent employed by several of the farms in our current study, the OEFFA, lists fees ranging from $725-$825.[5]

In an effort to avoid the lengthy and expensive USDA organic certification process, other competing certification programs have arisen. Certified naturally grown is a program run by a non-profit organization that follows the NOP standards but is a local response to the national USDA certification which can be onerous for small farms that specialize in direct marketing. Its goal is to allow farms to signal to consumers their pesticide-free status while avoiding the lengthy USDA process. Members may choose their own certification donation, though produce certification requires a minimum annual fee of $125. An application must be completed, but it is significantly less involved than that for certified organic. Inspections are done by nearby CNG

[5] A farm with less than $5,000 in annual, gross organic agricultural sales may file for exempt status. These farms must still follow all NOP guidelines and maintain records for relevant state agencies.

farmers, and each member is expected to conduct at least one inspection of any farm within a one-hour drive.

As the sale of local produce becomes more prevalent, understanding the drivers of demand is of increasing importance to local farmers and policymakers. Local is a vague term and can be confused with a variety of attributes, including freshness and organic. In order to differentiate consumer WTP for local strawberries Darby et al (2008) used a choice-based conjoint analysis and found that consumers showed a preference for locally grown produce, though there was no distinction for a specific state vs. region label. Consumers also preferred smaller farms, though this effect was limited. Toler (2009) used an experiment of bidding on different distributions of a monetary sum ($11) to show that participants were more willing to allocate funds to local vs. non-local farmers, and that some portion could be attributed to a preference for fairness.

In early evidence on consumers' willingness to pay for organic, Thompson and Kidwell (1998) conducted a consumer survey at retailers that offered both organic and conventional products and found an organic price premium that ranged from 40% to 175%. Loureiro (2001) measured WTP of Colorado consumers and found they were willing to pay a premium of 5 cents per pound for local potatoes, compared to 3 cents for organic. Misra (1991) found that 46% of household survey respondents were willing to pay a premium for certified pesticide-free food. Roosen (1998) used an auction where consumers could bid to exchange their endowed bag of conventionally-grown apples in order to measure consumer WTP for insecticide reduction. He found consumers were willing to pay on average 9%-18% more for produce that was not grown with certain pesticides.

To disentangle the value of local from organic, several authors have turned to survey methods. Lusk (2009) used a best-worst scale to measure how consumers valued different food attributes, and then followed up with questions about WTP. He found that food safety mattered most, followed by nutrition, taste and price, while origin was one of the least important values. He also found that consumers most willing to pay for organic tended to be concerned with naturalness and environment, but not so much with safety, and that organic purchasers were less concerned with price. Batte (2006) measured WTP for organic multi-ingredient processed foods, and found that not only was there a WTP for organic cereal but that WTP increased as the percentage labeled organic increased. This WTP differed between consumers of traditional grocery stores and specialty natural stores.

While the existing literature has largely found a positive willingness to pay for organic and locally produced foods, the use of revealed preference methods to uncover the willingness to pay for a wide variety of attributes associated with CSA farms is surprisingly lacking. In what follows we describe and report what we believe to be one of the first studies using actual pricing and attributes of CSA farms to uncover the willingness to pay for a large variety of attributes commonly associated with CSA farms. These results will help to guide local producers facing uncertain demand for costly features of their farm offerings as well as provide evidence of the potential responsiveness of consumers to non-traditional organic certification programs.

III. Data

The primary data source on CSA characteristics used in our analysis was obtained from Local Harvest, an independent website that maintains a database of CSA's across the United States. We collected data covering both Ohio and Pennsylvania for the 2011 summer growing season. This data is entered by the CSAs themselves and includes a wide range of attributes and pricing. Using the Local Harvest website, we collected data on CSA pricing and attributes between the October, 2011 and November, 2011 which contained the most up-to-date information entered by CSAs into the database. Lastly, we updated and verified the attributes obtained from Local Harvest using data from CSA websites and shareholder agreements which were obtained online.

In total, we collected data on 264 CSAs containing both address and pricing information. We restricted our attention to direct marketing CSAs, eliminating 26 farms which were part of 3rd-party marketing efforts.   We further restricted the set of CSAs to only those with either current websites or those who had updated their Local Harvest listing in 2009, 2010, or 2011. These restrictions removed 15 CSAs which we were unable to verify still exist and as such did not include them in the subsequent analysis. To focus solely on the summer growing season, we removed CSAs with delivery dates spanning the winter months of September through February resulting in a further reduction of 32 CSAs. Lastly, we removed 3 additional CSAs as a result of missing attribute data resulting in a final dataset of 188 CSA farms.

Combining data from Local Harvest with websites of the individual CSAs provided a wide range of attributes. In addition to the price of a full summer share and number of weeks[6] in the summer season, we also obtained information on the number of pickup locations and pickup days, whether delivery was provided, work on farm options, whether the CSA provides products beyond fruits and vegetables, if the CSA provides food from more than one farm, the use of a pest management plan, as well as location information and detailed information on farming practices. Using ArcGIS, we geocoded the location of each CSA and calculated the distance to

[6] Only 78 CSAs reported week information directly, while the remainder provided start and end months. To impute weeks, we estimated a regression of start and end months on total weeks and used those estimates to predict total weeks.

nearest city with populations over 100,000 as of the 2000 census and assigned each CSA to one of 12 regions, defined in relation to major population centers. The locations of CSAs, municipal areas, and regions are shown in figure 1.

Using data on farming practices, we created several mutually exclusive farming practice categories. Categories available included naturally grown, organic exempt, certified organic, certified naturally grown, and conventional. As numerous farms classified themselves as both conventional and naturally grown, we combined those two categories. Several farms also classified themselves as certified organic, organic exempt, or certified naturally grown and categorized themselves as naturally grown. For these farms, we chose to assign them based on the former classifications to ensure a mutually exclusive classification. No farms identified themselves as combinations of certified naturally grown, certified organic and organic exempt. Summary statistics for the farms falling within each category as well as the additional attributes of those farms are shown in table 1.

Across all farms, the average price of a 21.5 week summer season was approximately \$535. The average farm had slightly over 2 pickup locations and 1.6 pickup days. Only 2.1% of farms delivered food directly to their members while fewer than 10% allowed members to pick their own produce. Turning to farming practices, 19% of farms advertised that a pest management program existed on their farm. Nearly 25% of the farms identified themselves as either certified organic or organic exempt while a further 6.3% participated in the certified naturally grown program.

Figure 1 also shows the locations of each farm based on their farming practices, with certified naturally grown farms shown as squares and both certified organic and organic exempt farms as triangles. It appears that the organic farms are, on average, located closer to large metropolitan areas than other CSA farms. The same pattern is not as obvious for certified naturally grown farms, which tend to be located slightly further from large metro regions than organic farms. Taken together, this examination suggests that there is a wide variety of farming practices in most regions which will aid in econometric identification.

IV. Econometric Model

To recover consumers' valuations for the various attributes and farming practices of CSAs we performed both a first-stage hedonic estimation as well as nearest neighbor matching estimation to recover the willingness to pay for organic. Rosen's (1974) first-stage hedonic model has been used extensively to decompose the price of bundled goods into their various attributes. In the context of food and agriculture, Nimon and Behin (1999) estimated a hedonic model of eco-labeled clothing and found a premium of over 30% associated with the use of organic fibers. However, they were unable to find a benefit in relation to other environmentally friendly production. In the context of organic foods, Maguire et al (2004) found evidence of an organic price premium for baby foods in the range of 16% to 27%. Estes and Smith (2003) examined the willingness to pay for organic produce in Tucson, AZ supermarkets during the early 1990s using hedonic models and found a price premium of over 100% for organic apples. Taken together, these examples provide a robust history of hedonic analysis targeting the willingness to pay for attributes of foods and organic labeling.

The first stage hedonic is derived from a utility maximizing process with heterogeneous households assumed to receive utility from consumption of a composite good made up of attributes, in this case the attributes of the CSA farm share, as well as numeraire consumption according to equation (1)

(1) $U^i = U^i(\boldsymbol{X_j}, c, \boldsymbol{\alpha^i})$,

where i is an index for household, $\boldsymbol{X_j}$ are the set of attributes associated with each of $j = 1 \ldots J$ CSA farms, c is a numeraire good, and $\boldsymbol{\alpha^i}$ are household specific preference parameters. The bid function is an implicit function of the characteristics contained in the utility specification in equation (1) as well as household income and a reference utility level and is written as shown in equation (2)

(2) $\theta^i = \theta^i(\boldsymbol{X_j}, m^i, \boldsymbol{\alpha^i})$

where u^i is the utility level and m^i is household income.

An equilibrium price schedule is obtained from equation (2) which is the well-known first-stage hedonic. Assigning a functional form to this price schedule has taken on a voluminous amount of interest in the early hedonic literature. Following Cropper et al (1988), we estimate a semi-log hedonic and include region specific fixed effects to control for unobservable location varying components of equilibrium prices as shown in equation (3)

(3) $\ln P_j = \beta_0 + \sum_{k=1}^{K} \beta_k X_{jk} + \sum_{r=1}^{R} \delta_r + \epsilon_j$

where $k = 1 \ldots K$ is an index for attributes of each CSA, $r = 1 \ldots R$ are region specific fixed effects, and ϵ_j is an idiosyncratic unobservable

Due to the relatively thin coverage of CSAs and their wide geographic dispersion, the extent to which the market, and the associated equilibrium price schedule, for CSA farms is linked remains unclear. It is certainly reasonable to assume that CSAs within a relatively tight geographic area surrounding a municipality are in competition with each other, and that through their offer and consumer bid prices an equilibrium price schedule is obtained. However, it is possible that the equilibrium price schedule varies over large areas.[7] Shifts in this price equilibrium over space would be captured through the inclusion of region specific fixed effects in the hedonic regression in equation (3). However, due to the relatively low number of observations in our dataset it is infeasible to include region-specific interactions with all attributes in the hedonic, as would be required to account for more complex changes in the underlying price schedule.[8]

In order to both provide a robustness check for our hedonic estimates and to avoid some of the challenges facing hedonics when using relatively small sample sizes, we perform nearest neighbor matching to estimate the value of organic certification. While unable to recover the marginal valuation for all CSA attributes, matching on observable attributes of CSA farms allows us to identify whether a price premium for organic is present in the CSA market. Following Imbens and Wooldridge (2009), we estimated the average treatment effect on the treated in order to recover the willingness to pay associated with implementing organic farming practices. In our case, the treatment effect is the change in CSA price arising from the treatment of employing organic production. The use of nearest neighbor matching relaxes several strong identifying assumptions present in hedonic estimation and provides a flexible alternative to hedonic regression (Kuminoff et al, 2010).

The appeal of matching estimators lies in their ability to form a counterfactual (non-organic) outcome associated with each treated (organic labeled) CSA. Because each observation is observed uniquely as either treated or untreated, there is no directly observable counterfactual associated with a treated observation. Consider an observation denoted by Y_i, where $Y_i(1)$

[7] Other theoretical concerns are that continuous quantities of attributes and large numbers of attribute combinations are unlikely to be present in the CSA market.

[8] Despite these concerns the use of hedonics applied across large spatial scales, and even national scales in the case of recent quasi experimental work, is widespread.

indicates a treated outcome (organic) and $Y_i(0)$ indicates an untreated outcome (non-organic). For each treated outcome, $Y_i(1)$ we need to impute the unobserved counterfactual, $\hat{Y}_i(0)$ using a set of control observations which are observationally similar to the treated outcome. The matching estimator provides one means to impute this value. The average treatment effect of the treated is obtained as shown in equation (4)

$$(4) \quad ATT = \frac{1}{N_1} \sum_{i:Y_i=1} Y_i - \hat{Y}_i(0)$$

where N_1 is the quantity of treated observations and $\hat{Y}_i(0)$ are the imputed counterfactuals for the treated observations. Following Abadie and Imbens (2011) we measure the distance between treated and control observations using Euclidean distance obtained from the diagonal elements of the sample covariance weighted by the inverse of their standard errors. We also matched each treated observation to the nearest 2 control observations. Matching to more than one nearest neighbor improves precision, although potentially at the cost of introducing some bias if the quality of matches deteriorates substantially, and is a common practice in the matching literature.[9]

In addition to requiring overlap in observable characteristics, an additional identifying assumption for the consistency of matching estimators is rooted in discussions on the selection on observables. That is, we are relying on the assumption that after matching on observable attributes there are no unobservable differences in CSA farms between treated and control observations that systematically affect the price of those farms. To the extent that these factors may exist, they are likely to vary across spatial region. As with hedonic estimation, we control for unobservables across space by forcing matches to come from within the same spatial region, which is akin to the inclusion of region specific fixed effects in the first-stage hedonic. Taken

[9] We found little qualitative difference from increasing the number of matches to 4, however at that scale we were unable to exactly match on region due to limited observations in some areas.

together, the hedonic provides estimates for a wide range of CSA attributes while we additionally use matching estimators to focus more narrowly on the role of organic production and as a robustness check to our hedonic estimates.

V. Results

First-stage hedonic results for two separate semi-log specifications of equation (3) are reported in table 2. The left-hand panel contains results for a model specification that includes farming practices of certified organic, organic exempt, and certified naturally grown, compared to an omitted baseline category of natural/no certification. For the second specification on the right side of table 2, we have combined organic and organic exempt into a single organic category. All other variables in the two regressions are the same. Comparing the two model specifications we find virtually identical coefficients and significance across both specifications, with slight changes in significance (although not magnitude) associated with the combining of organic produce categories. This is likely a result of the small number of observations and degrees of freedom present as these regressions only incorporate 188 observations.

Turning to the attributes of the CSA farms themselves, we find a small positive and significant effect associated with increasing the length of CSA season as one would expect given the additional produce provided. We also find a large and significant 17% premium associated with delivery which is likely a reflection of the enhanced convenience that direct delivery provides. Additionally, there is a positive and significant willingness to pay of 8% associated with farms that offer goods beyond vegetables and fruit. These products often consist of baked goods, dairy and/or egg products. We find very little significance for pickup locations, pickup days, and options to pick your own produce, perhaps because the near uniformity in these attributes across our sample precludes econometric identification. We find a negative, but insignificant effect associated with both pest management advertising and distance to the nearest metropolitan area, which may be explained by the use of metro-based region fixed effects. We find a positive effect of work on farm options and the use of multiple farms to provide produce, although these are not significant at the 10% level. Our region fixed effects are largely significant (with Cleveland the omitted category) suggesting that wide variation in CSA pricing is absent for our study area.

Focusing on organic and certified naturally grown produce, in specification A we find a positive and significant premium associated with certified organic produce of nearly 10%, while we find a positive but insignificant premium of nearly 8% for organic exempt. We find no significant effect of certified naturally grown labeling relative to the baseline natural/no certification category. Given the close similarity in magnitude between certified organic and certified organic exempt we combine those two categories in specification B and find a positive and significant coefficient representing a willingness to pay premium of nearly 9% while we still find no significant difference between certified naturally grown and the baseline natural/no certification category.

Nearest neighbor matching estimates for organic produce are shown in the top panel of table 3, which reports the average treatment effect of the treated for an organic treatment, combining both certified organic and certified exempt farms into the treated category. The matching covariates are identical to those used in the hedonic analysis with the addition of latitude and longitude included to provide added weight to nearby CSA farms. We force exact matching, if possible, on the region that each CSA is located in. We report the average treatment effect on the treated for matches using the nearest 1, 2, and 4 neighbors. All three measures are remarkably close to the hedonic estimates, which are reported in the bottom panel of the table for comparison. For both the 1 and 2 nearest neighbor matches, we are able to exact match each treated to control observations on region, while we are able to obtain exact matches within each region for 98% of the total observations when matching to one to four. The willingness to pay estimates range from a high of $70.22 to a low of $38.94 which covers the hedonic estimates for organic willingness to pay of $44.82.

VI. Discussion

We found clear and consistent evidence that consumers have a positive and economically significant willingness to pay for organic produce from local CSAs. We also found that not all certification is equal in the eyes of consumers, as there was no premium associated with certified naturally grown, a competing certification program. To our knowledge, this is the first empirical study of consumer's willingness to pay for CSA attributes using actual data on active CSA farms and the prices paid by consumers to be members of those operations. These results should provide valuable information to local farmers and policymakers exploring new revenue opportunities presented by local direct foods marketing.

Focusing on the market for CSA membership, which is by construction a local source of produce, allowed us to estimate consumer willingness to pay for organic produce that avoids the potentially confounding effects of local produce as would be found in a traditional retailing environment. If consumers maintain a positive willingness to pay for local produce, similar analyses that fail to account for the different sources of value in a retail setting would likely overestimate the consumer valuation of organic produce if some of that produce is perceived to be local by consumers. Perhaps surprisingly, we find no willingness to pay for competing, private, certification programs such as certified naturally grown suggesting that consumers place little value in what they may view as an inferior certification process or one in which they have little knowledge about the certification process.

For policymakers seeking to encourage local produce our estimates provide insights into the role of food access, variety and quantity. We found that consumers have a positive willingness to pay for additional products both through longer growing seasons and the bundling of non-produce products in CSA food deliveries. For small farms seeking to penetrate this market, this may suggest that forming cooperatives to provide additional products as well as extending the produce season would be advantageous marketing strategies.

This study demonstrates the significant willingness to pay of consumers for certified organic produce but does not address the issue of whether such an operation should be pursued by small farms. Given the high costs associated with certification a subsequent cost-benefit analysis could provide further insights into this question. Additionally, since willingness to pay for a CSA is predicated on its existence, future research could also study the reasons behind CSA openings. Given the rapid expansion of CSAs across the United States and the seeming willingness to pay for organic and locally produced foods, this topic should be an important future area of research.

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Table 1. CSA summary statistics (N=188)

Variable	Mean	Std. Dev.	Min	Max
Price	535.26	143.96	185	1280
Weeks	21.59	3.57	10	32
Pickup Locations	2.19	1.89	1	10
Pickup Days	1.62	1.20	1	7
Distance to Metro (km)	17.38	23.33	0	133
Distance to Metro^2 (km^2)	843.49	2067.13	0	17731
Variable	**Percent**	**Number**		
Delivery (0/1)	2.13%	4		
Pick Own (0/1)	9.57%	18		
Work on Farm (0/1)	10.11%	19		
Pest Management (0/1)	19.15%	36		
Multi-Farm (0/1)	6.38%	12		
Additional Products (0/1)	31.38%	59		
Certified Naturally Grown	6.38%	12		
Certified Organic	11.17%	21		
Organic Exempt	13.83%	26		
Region - Cleveland	17.55%	33		
Region - Toledo	4.79%	9		
Region - Columbus	7.45%	14		
Region - Dayton	2.66%	5		
Region - Appalachia	2.13%	4		
Region - Cincinnati	5.32%	10		
Region - Philadelphia	14.36%	27		
Region - Scranton	7.45%	14		
Region - Harrisburg	20.21%	38		
Region - State College	6.91%	13		
Region - Pittsburgh	5.85%	11		
Region - Erie	5.32%	10		

Table 2. Hedonic model results (y = ln price; N=188)

	Specification A			Specification B		
Variable	Estimate	Std Err	t-stat	Estimate	Std Err	t-stat
# of Weeks	**0.0119**	0.0063	1.88	**0.0120**	0.0064	1.87
Pickup Locations	0.0132	0.0169	0.78	0.0132	0.0169	0.78
Pickup Days	-0.0031	0.0145	-0.22	-0.0036	0.0141	-0.25
Delivery (0/1)	**0.1719**	0.0544	3.16	**0.1720**	0.0544	3.16
Pick Own (0/1)	0.0395	0.0767	0.51	0.0411	0.0747	0.55
Work on Farm (0/1)	0.0793	0.0495	1.60	0.0798	0.0489	1.63
Pest Management (0/1)	-0.0583	0.0730	-0.80	-0.0584	0.0725	-0.81
Multi-Farm (0/1)	0.0585	0.0444	1.32	0.0581	0.0437	1.33
Additional Products (0/1)	**0.0836**	0.0424	1.97	**0.0837**	0.0425	1.97
Certified Organic	**0.0986**	0.0504	1.96	n/a	n/a	n/a
Organic Exempt	0.0778	0.0533	1.46	n/a	n/a	n/a
Organic (Any)	n/a	n/a	n/a	**0.0876**	0.0379	2.31
Certified Naturally Grown	-0.0762	0.0908	-0.84	-0.0761	0.0906	-0.84
Distance to Metro (km)	-0.0033	0.0021	-1.57	-0.0033	0.0021	-1.58
Distance to Metro^2 (km^2)	0.0000	0.0000	1.03	0.0000	0.0000	1.04
Region - Toledo	**0.1396**	0.0401	3.48	**0.1378**	0.0397	3.47
Region - Columbus	**0.0744**	0.0385	1.93	**0.0731**	0.0381	1.92
Region - Dayton	0.0198	0.0359	0.55	0.0142	0.0264	0.54
Region - Appalachia	**-0.1237**	0.0587	-2.11	-0.1234	0.0572	-2.16
Region - Cincinnati	**-0.3182**	0.0165	-19.32	**-0.3181**	0.0165	-19.31
Region - Philadelphia	**0.1295**	0.0378	3.43	**0.1271**	0.0359	3.54
Region - Scranton	**-0.1019**	0.0360	-2.83	**-0.1059**	0.0290	-3.65
Region - Harrisburg	**-0.0841**	0.0309	-2.72	**-0.0863**	0.0317	-2.72
Region - State College	-0.0099	0.0707	-0.14	-0.0130	0.0694	-0.19
Region - Pittsburgh	**-0.1418**	0.0281	-5.05	**-0.1448**	0.0311	-4.65
Region - Erie	**-0.2084**	0.0332	-6.27	**-0.2108**	0.0317	-6.65
Constant	**5.9939**	0.1207	49.65	**5.9939**	0.1222	49.07

Table 3. Matching and willingness to pay

Matching #	Estimate	Std Err	z-stat	% Exact
ATT (M=1)	**70.2154**	24.5911	2.86	100.0%
ATT (M=2)	**44.4800**	23.5820	1.89	100.0%
ATT (M=4)	**38.9462**	20.9045	1.86	98.4%

	Willingness to Pay ($)		
Specification	Organic	Cert Org	Org Ex
Hedonic - A		52.76	41.65
Hedonic - B	44.82		
Matching (M=1)	70.22		
Matching (M=2)	44.48		
Matching (M=4)	38.95		

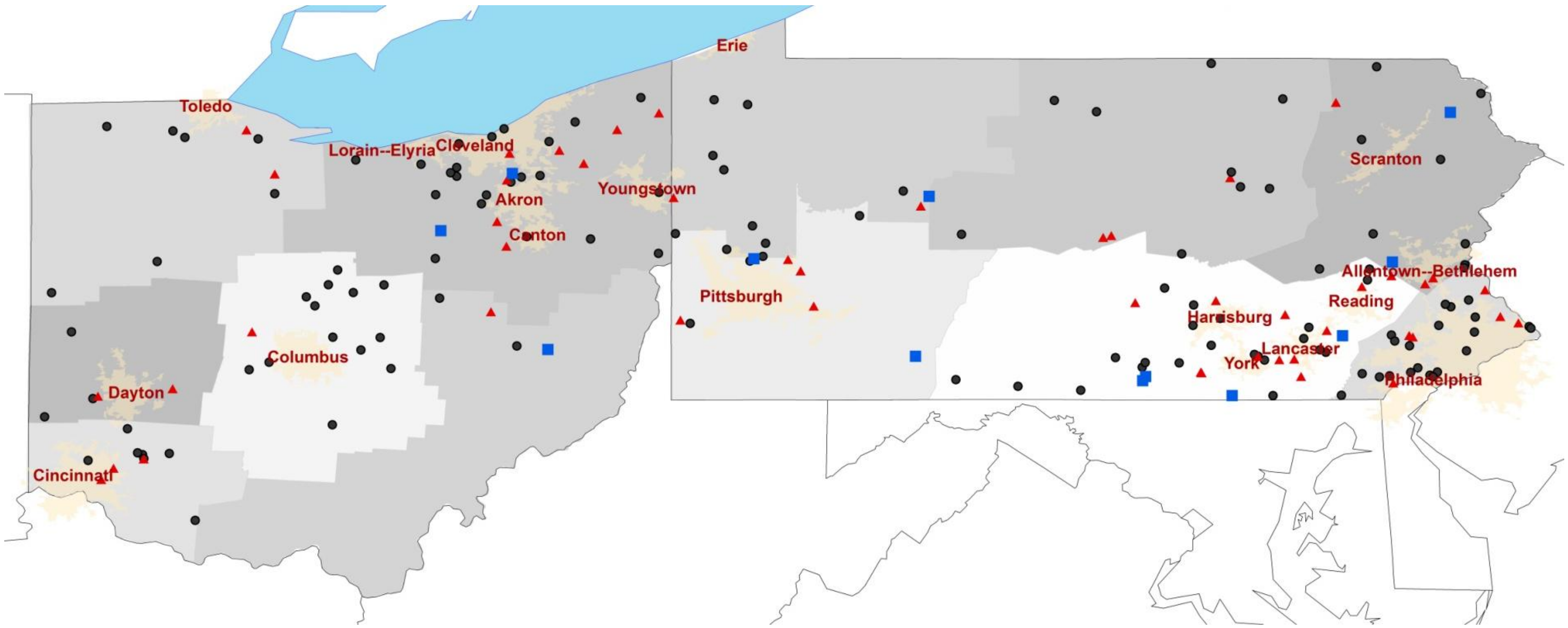

Figure 1. Locations and types of CSA farms