Journal of Food Distribution Research
Volume 46 Issue 3

Comparing Consumer's Willingness to Pay for Conventional, Non-Certified Organic and Organic Milk from Small and Large Farms

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Abstract

Considering local milk, data from auction experiments was used to determine whether farm size affects consumer willingness to pay (WTP) for conventional, non-certified organic, and organic versions. Tobit models including socio-demographics and variables from the theory of planned behavior were used to examine WTP for each. While farm size was insignificant for each type, WTP for large farm non-certified organic was not higher than small farm conventional. Further, WTP for small farm non-certified organic was not significantly less than large farm organic. Small farms could potentially use these differences in attempts to compete with large farms.

Keywords: small farm, organic, conventional, non-certified organic, willingness to pay, milk

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Introduction

The U.S. Department of Agriculture (USDA) classifies 91% of farms as small, meaning having gross sales under $250,000 (Hoppe et al. 2010). Within this group, those with gross revenues under $50,000 constitute the vast majority, with the EPA reporting that less than 1 in 4 produce higher gross revenues (EPA 2013). For dairy, smaller operations also represent the majority with 67.7% owning less than 100 cows, 18.1% owning 100-199 cows, 7.8% having between 200 and 499 cows, and only 6.6% owning 500 or more cows (Hoard's Dairyman 2012). Actual dairy production though is dominated by large farms, accounting for approximately 86.4% of milk in the U.S., leaving small dairy operations with little market share despite their numbers (Progressive Dairyman 2012). This has created a difficult competitive position for small licensed dairy operations and their numbers have fallen from 131,509 in 1992 to 51,481 in 2011 (Hoard's Dairyman 2012). Dairy is thus following the typical farm trend of fewer, larger operations with the number of dairies overall declining 39% from 1998 to 2007 (Mosheim and Lovell 2009), and the average median for milking herds increasing from 140 cows in 1997 to 570 cows in 2007 (Hoppe et al. 2010, MacDonald et al. 2009).

The competition issues for small dairy farms are fueled by issues such as their typical lower efficiency and declining milk consumption. MacDonald et al. (2007) suggested significant economies of scale in dairy operations and noted that as herd size increases, average costs of production fall. This advantage for large farms helps them be more profitable than their smaller competitors, especially during adverse market conditions. As Barrett (2012) noted, profit margins on beverage milk are often low and sometimes negative profits are unavoidable. While these margins impact all dairy farms, larger ones are often better equipped to remain viable in such periods than small operations.

All dairy operations have needed to adjust for the decline in average per capita milk consumption. Consumption has fallen from 0.96 cup-equivalents per day in the 1970s to 0.61 and is expected to continue to decline as a new generation with a reduced demand enters the market (Stewart et al. 2013). Much of this change stems from consumers' increased desire for healthier and environmentally friendly foods, non-dairy options, and animal welfare considerations (Mosheim and Lovell 2009). A slow response to these changing consumer demands has begun lowering profit margins and endangering many dairy farms.

The rise in local and organic foods are two consumer demand trends that dairy farmers could take advantage of. The former has quickly risen from a small niche market to one that now may rival the latter in consumer interest. Local should be an especially inviting avenue for small operations in that consumers mostly view foods from outlets such as farmers markets' as being from smaller scale farms. Many consumers further view local as a way to help smaller farms, making it an area where their size may benefit them in competing with large dairies.

Organic is an option already pursued by several dairy farmers. In 2014 organic dairy sales reached $5.46 billion (McNeil 2015). However, the move to organic entails a certification cost that could be too high for many small operations. A related option would be to follow the organic standards and note they are being followed without becoming certified. While this would prevent

the use of the term organic[1], it still may be possible to achieve a premium for such milk, especially if sold locally or at a farmers market. If an extra premium for small farms existed for either of these types it could open a new avenue for them to be more competitive in the market.

The goal of this research was therefore to identify and compare willingness to pay (WTP) for local milk from a small dairy farm and a large dairy farm marketed as conventional, non-certified organic, and organic. Given their large numbers noted above and the risks they are under, small farms are here considered under $50,000 gross sales with large ones those over $250,000. This study will allow small milk producers to see if a "from a small farm" marketing focus could help them increase demand and profit margins, and large operations to better understand different possible premiums and how a small farm campaign could impact them on the local level. An accompanying goal was to determine for both farm sizes the premiums possible when moving either to non-certified organic from conventional, or from either of those to certified organic. If the non-certified organic claim is enough to increase consumer WTP, it could drastically cut certification costs, which may or may not benefit small farmers more.

Literature Review

Large vs. Small Farms

Consumers have very different perceptions of small and large farms. Large scale farms, including dairy, are generally viewed as having negative impacts on water, soil and air quality (Center for Food Safety 2013). In contrast Lohr (2012) noted consumers view small farms as the main drivers behind the growing "Buy Fresh-Buy Local" movement that they see as advantageous and as providers of fresher foods with more nutrients.

There is little known about consumer demand and premiums for milk produced on small versus large farms. Wolf et al. (2011) conducted a choice experiment to evaluate consumers' value for milk produced on a "family farm" with and without enhanced food safety labels. The results suggested a premium for a half gallon of milk produced on a family farm of $0.39 for milk with enhanced food safety claims, and a premium of $0.46 for milk without enhanced food safety claims, compared to that of no claims about the farm. Though they did not directly examine WTP for "small" versus "large" farms, 75% of the respondents stated that in their opinion the typical "family farm" was a smaller than average size operation (although most large farms are also family operated). This finding suggests that a similar premium may be found for milk produced on a farm specifically noted as small.

While approximately one in four small commercial farms show good financial returns (MacDonald et al. 2009), they still may be unable to fully compensate operators for the time they devote to the farm (Hoppe et al. 2010). MacDonald et al. (2007) stated that in 2005 dairy farms with at least 999 cows had average net profits of nearly $3 per cwt. of milk, those with 500-999 cows showed average net profits of $0.50 per cwt. of milk, but smaller dairy farms had negative net returns on average. Small dairy operations are clearly at a disadvantage and could benefit greatly from any potential premiums they can obtain by promoting their size.

Organic

[1] Dairy operations small enough to be exempt from requiring certification could still use the term organic.

Dairy products and beverages occupy the second largest segment in the organic foods market, following fruits and vegetables. While organic milk only represented approximately 4% of total milk sales in 2011, the amount has been growing rapidly (Huntrods and Schultz 2013). For example in 2005, when conventional milk sales were flat, organic dairy products had sales of $2.1 billion – a 23% increase from the previous year (USDA 2012a). The USDA National Organic Program (NOP) standards with respect to milk state that organic milk is (a) made from the milk of animals raised under organic management where cows are raised in a herd separate from conventional dairy cows, (b) animals are not given growth hormones or antibiotics, but can be given preventive medical care including vaccines and dietary, and (c) organic dairy cows must have access to pasture (NOP 2011).

There are many motivations for consumers to buy organic. Organic products are thought to have a better taste and be of higher quality and freshness (Fotopoulos and Krystallis 2002, O'Donovan and McCarthy 2002, Kalogeras et al. 2009). Organic products are regarded as being healthier and more nutritious for the consumer (Akaichi et. al. 2012, Fotopoulos and Krystallis 2002, O'Donovan and McCarty 2002, Roitner-Schobesberger et al. 2008). Consumers who are also concerned about animal welfare and environmental health prefer organic over conventional (O'Donovan and McCarthy 2002, Chen 2007, Roitner-Schobesberger et al. 2008, Whole Foods Market 2005).

Organic certification though comes at a high cost for farmers and can influence negatively small farmers' ability and willingness to participate in the certification program (Constance et al. 2008). CCOF, one of the certifiers for USDA organic, stated that for a small farm, the average certification for the first year is $700, and each additional year would cost between $300 and $500 (CCOF 2013). The National Organic Cost Share Program supplied producers who obtained USDA organic certification with a reimbursement of up to 75% of costs, not to exceed $750 per year (CFSA 2013). However, this funding ran out in 2013 leaving dairies with few options to aid with the costs of certification.

Non-Certified Organic

Due to the high cost of certification, the idea of producing and marketing foods as "non-certified organic" has gown. Constance et al. (2008) noted that both certified and non-certified organic farmers have claimed that the organic certification process has been complicated by the NOP standards. They state that each group agrees there is a better price premium when it comes to certified organic products, but disagree on the necessity of certification. Also, they found that certification seems unnecessary for non-certified organic producers (often small farmers or those selling at farmer's markets) who believe there is a level of trust between them and their customers. Campbell and Liepens (2001) noted that in New Zealand, some farmers dropped their certification due to rising fees and instead relied on the 'trust' system to market their non-certified organic products in local markets.

Constance et al. (2008) studied certified and non-certified organic farmers in Texas and found approximately half of certified producers brought in gross organic sales of $50,000 or more annually, whereas 55% of non-certified organic producers brought in less than $5,000. However, non-certified organic sales may continue to grow due to the increase in the development of farmers markets and local food avenues which reduce the need for certification due to the direct

connection between farmers and consumers (Lockie et al. 2004). Determining if non-certified organic would work well for small dairy farms selling in local markets was in part what this research was designed to examine.

Experimental Design and Data

A series of experimental auctions was conducted using consumers from the general population. Experimental auctions were chosen to elicit subjects' WTP since auctions use real products and real money to create a setting where participants have the greatest incentive to reveal their true values. The auctions were accompanied by surveys to obtain information on the subjects to be used in modeling their WTP.

Specifically, eleven sessions of economic experiments were conducted between July 28th and August 19th, 2010, with a total of 128 subjects. Subjects were recruited by handing out flyers at area supermarkets and during Ag Day, which is an annual University of Delaware event designed for the surrounding community, as well as through local classified ads and Craig's List. During recruiting, the experiment was described as a "food marketing study" to avoid mentioning phrases like local or organic that could influence people prior to their participation and the only requirement was that participants be over 18. Most subjects were from Northern Delaware with a few from nearby Maryland and Pennsylvania.

Each session lasted about one and a half hours and consisted of eight to nineteen subjects. Sessions were held in the Experimental Economics Laboratory for Policy and Behavioral Research at the University of Delaware. Each person received $45 for participation, minus the expense for purchasing food in the auctions if applicable. Within each session there were multiple rounds of questionnaires and food auctions. The entire experiment was conducted on computers using Qualtrics. To begin, subjects were asked to complete a questionnaire on their shopping habits and demographic information.

In the second part, the commonly employed incentive-compatible Vickrey fourth-price auction was used to collect WTP for each version of the food products from the subjects.[2] To be sure subjects grasped the principles and workings of the auction, there was a brief presentation explaining the optimal strategy of bidding your value and examples of potential problems if that strategy was not used. This was followed by a real money practice auction using induced values where each subject went against computer bidders. After making sure everyone understood the mechanism, the series of food auctions were conducted. For the milk products, three different local versions were auctioned (conventional, non-certified organic, and organic) for both large and small farms for a total of six auctions. The order of the products to bid on was randomized on people's screens to control for order effects.

As many studies have shown that information can influence WTP significantly (see for example Gifford and Bernard 2004, 2006) factual and neutral definitions for all the terms were provided to the subjects. Organic food was defined according to the USDA standards. Non-certified organic was explained as farmers having followed the requirements of organic but not having been certified. Farm size was defined as discussed earlier. For local food, no definition was provided, but the products were noted to have been purchased that day from relatively close by.

[2] Complete details of the experiment are available from the authors on request.

Subjects were informed that only one auction would be binding, and that the binding auction had been pre-determined and sealed in an envelope visible to all, following Bernard and Bernard (2009). The envelope was opened by a volunteer after the end of a session.

After the auctions, subjects were given another questionnaire that contained questions designed using the theory of planned behavior (TPB). As developed by Ajzen (1987, 1991), the TPB is a commonly used behavioral model for investigating the determinants of an individual's decisions. Components of it have been used on studies of the food industry, including purchasing fair trade grocery products, GM foods, and consumer choices of organic and local food (Sparks et al. 1995, Shaw et al. 2000; Michaelidou and Hassan 2008, Nurse et al. 2010). Elements here included purchasing behavior and perceptions, outcome beliefs and evaluations, and self-identity and norms.

To begin the TPB components, consumers' future purchase intentions were asked as these could be a good indicator of behavior and, correspondingly, a subjects' WTP. This was addressed alongside a question regarding past purchasing habits. To determine the role price may play in purchasing behavior, subjects were asked if they viewed organic foods as too expensive. These were accompanied by general perception questions regarding conventional and organic farming practices.

Two outcome belief questions were designed to examine whether consumers pay much attention to supporting small farms and sustainable practices, with the latter geared towards capturing some of the motivation for organic food purchases. These were paired with two outcome evaluation questions to determine if subjects believed their purchases could actually support these elements. Three self-identity items asked subjects to judge how they viewed themselves and their purchasing habits. Personal norm was also measured by three items. The first regarded a subject's own ethical feelings towards purchasing organic food. The second was regarding how buying organic makes the subject feel. To these, a newly proposed norm was added asking each subject if they felt an obligation to pay more for organic food.

The specific definitions and mean and standard deviations for these questions and all the other variables can be found in Table 1 (see Appendix). The average age of the participants was 39 years old with an income of $61,874.57. Caucasians were 77.3 percent of the sample while 6.3 percent were vegetarians, 37.3 percent had farming experience, 71.9 percent were the primary grocery shoppers for their household and 28.1 percent had children living in the household. Females and college educated consumers were slightly overrepresented at 57 percent for each category. The latter might be because the experiment was conducted in a college town.

Model and Hypotheses

Consumer bids were modeled using the variables described above. Given the restricted bid range from 0 to 10, a censored regression approach was needed for this analysis. The Tobit model was selected as it is commonly used in the literature and yields parameter estimates that are very easy to understand (see Lusk and Shogren (2007) for more details). Three Tobit models, one each for the bids on conventional, non-certified organic, and organic local milk. Modeling each separately allows for the clearest understanding of the factors influencing each, especially those from the

theory of planned behavior. All three were run using Stata (StataCorp. 2011) with the consistent form:

$$\begin{aligned} Bid_{ij} = {} & \beta_0 + \beta_1 \text{Small} + \beta_2 \text{Collegedeg} + \beta_3 \text{Caucasian} + \beta_4 \text{Children} + \beta_5 \text{Age} + \beta_6 \text{Income} \\ & + \beta_7 \text{Female} + \beta_8 \text{Vegetarian} + \beta_9 \text{Farmexp} + \beta_{10} \text{Primshopper} + \beta_{11} \text{Shopfarmmkt} \\ & + \beta_{12} \text{Pastpur} + \beta_{13} \text{Futpur} + \beta_{14} \text{Orgexp} + \beta_{15} \text{Confarmnw} + \beta_{16} \text{Confarmeff} \\ & + \beta_{17} \text{Importanceorg} + \beta_{18} \text{Confidenceorg} + \beta_{19} \text{Ifbuysupfam} + \beta_{20} \text{Ifbuysupsus} \\ & + \beta_{21} \text{Imsupfamfarm} + \beta_{22} \text{Imsupsusfarm} + \beta_{23} \text{Green} + \beta_{24} \text{Typorgbuy} \\ & + \beta_{25} \text{Healthconscious} + \beta_{26} \text{Healthydiet} + \beta_{27} \text{Ethical} + \beta_{28} \text{Betterpers} \\ & + \beta_{29} \text{Bidmore} + \beta_{30} \text{Small} + u \end{aligned}$$

Where:
i = small farm, large farm
j = organic, non-certified organic, conventional

The key variable for this study was the size of farm producing the milk, where it was expected that a premium would exist for milk labeled as being from a small farm for all three types. Demographic variables were also expected to influence consumer WTP for the different types of milk. For instance, it was hypothesized that females would have a higher WTP for organic milk following studies such as He and Bernard (2011). Caucasians were expected to have lower WTP for organic and non-certified organic products as Onozaka and Mcfadden (2011) found such shoppers valued organic products less than other ethnicities. Income level was hypothesized to have a positive relation on WTP for organic and non-certified organic milk following Loureiro and Hine (2001) and Angulo et al. (2003).

Past findings regarding other demographic characteristics have been mixed. Age has been shown to have a positive impact on WTP for organic products, as found by Gil and Soler (2007) for Spanish consumers, while Loureiro and Hine (2002) and Govindasamy and Italia (1999) found the reverse. Education was found to be positively correlated with WTP for organic foods in Cranfield and Magnusson (2003), Rodriguez et al. (2006), Lin et al. (2009), and Loureiro and Hine (2002) while Govindasamy and Italia (1999) and Krystallis and Chryssohoidis (2005) found the impact to be insignificant. Presence of children was expected to have a positive influence on consumers' WTP for organic and non-certified organic milk. Consumers have become increasingly concerned with what their children eat, and studies have connected this trend with an increase in organic purchases (Cranfield and Magnusson 2003, Krystallis et al. 2006, Laroche et al. 2001). Magnusson et al. (2001) provided conflicting results though, suggesting no difference between households with and without children.

Farming experience was predicted to have a positive influence on consumers' WTP a premium for organic as they may understand the effort and expense required, although it could also be that conventional farmers harbor negative feelings toward organic production. Vegetarians were expected to be willing to pay higher premiums for organic and non-certified organic foods while primary shoppers may bid differently simply due to a better knowledge of market prices.

Purchasing behavior and perceptions were hypothesized to have a substantial impact on consumer WTP. Those who purchase organic products routinely, or plan to purchase such products in the future were believed to have a higher WTP for organic. Based on Botonaki et al. (2006), consumers with greater confidence in organic production methods were also expected to have a significantly greater WTP for organic while those who placed a high importance on

organic standards, or shop routinely at farmers markets were expected to have a higher WTP for organic and non-certified organic products.

Those who believed organic milk was too expensive were expected to have a lower WTP for it. Similarly, if the subject believed that conventional farming was the most efficient, or that there was nothing wrong with conventional farming, it was expected that his or her WTP for organic milk would be negatively impacted.

Consumers' beliefs and evaluations about outcomes from their purchases were also examined. If it was important to them that they support family farms or sustainable farming practices or if they are confident that buying organic allows them to do so, it was expected that they would pay significantly more for organic and non-certified organic products. Finally, self-identity and social norms were expected to influence WTP. Consumers who believed they have a healthy diet, are health conscious, to be a typical buyer of organics, or green consumer may be more willing to devote additional money to buying organic and non-certified organic milk. Those who felt they ought to bid more for organic, felt they had an ethical obligation to purchase organics, or that doing so made them a better person were further expected to have higher WTP for organic and non-certified organic milk.

Results and Discussion

Mean Bids Comparison

First, comparisons were made of the bids for each different type of milk for each farm size. In terms of the former it was hypothesized, based on past studies and market observations, that organic milk would receive the highest bids, followed by non-certified milk, with the lowest bids for conventional milk. For the latter question, it was expected that small farms could gain an additional premium for each milk production practice, with the possibility that it may become more pronounced at the non-certified organic and organic levels. As the bids were not normally distributed, the relationships between them were tested using the nonparametric Wilcoxon test to see if any were significantly different from each other.

The mean bids for each different local milk type and test results can be found in Table 2. Note that milk types that are not significantly different from each other have the same group letter. Two results were quickly evident. First, as expected, there is a premium for switching from conventional to non-certified organic and then again for switching from non-certified organic to organic. Between conventional and non-certified organic for small dairy farms there was a 12.6 percent premium, and between non-certified organic and organic there was a 10.2 percent premium. There was a slightly smaller premium between conventional and non-certified organic milk (9.4 percent) from large dairy farms compared to that for small farms. However, the premium between non-certified organic and organic milk for large dairy operations (12.2 percent) was higher than for small dairy operations. For both large and small farms, these premiums for switching between production practices could be highly beneficial. Small dairy farms in particular would obtain a significant premium if they followed organic standards even if they were not certified. This could be their best option considering the costs required to become USDA certified organic. Each small dairy would have to determine whether the extra 10.2

percent premium between non-certified organic and organic milk would be worth the USDA certification costs.

Table 2. Mean Bid Prices per Milk Type and Significant Relations

Milk Type	Mean Bid ($)	S.D.	Group
Small Farm – Organic	$3.25	1.452	A
Large Farm – Organic	$3.12	1.338	A, B
Small Farm – Non Certified Organic	$2.95	1.251	B, C
Large Farm – Non Certified Organic	$2.78	1.241	C, D
Small Farm – Conventional	$2.62	1.205	D, E
Large Farm – Conventional	$2.54	1.146	E

Note. Milk types with the same group letter are not significantly different from each other.

The second result was that bids between corresponding milk types for small and large farms were not significantly different, suggesting there may not be extra value for small dairies in promoting themselves as such. However, it was found that farm size did make a difference when comparing bids across production practices. The bids small farms received for non-certified organic milk were not significantly less than the bids for large farm organic milk. This implied that small farms could be competitive with large organic dairy farms by following the less expensive non-certified organic route. Additionally, bids for small farm conventional milk were not significantly different than those for large farm non-certified organic milk. Perhaps consumers expect larger farms to be able to complete the certification process, given their likely extra resources. It is therefore questionable if large farms should choose a non-certified organic path, despite the significant premium over conventional milk, especially if they face competition from milk marketed as being from small farms.

Model Results

Table 3 contains results from the heteroskedasticity-robust tobit models for conventional, non-certified organic, and organic milk. Results for the main variable of interest, small farm, followed the findings above by not being significant for any of the three production types. It was noteworthy however that the small farm premium only narrowly missed a 10% significance level for non-certified organic milk (p-value 0.1085). Such a finding corresponds to what appears to be a greater overall benefit for small farms in following this practice relative to large farms and may warrant further consideration.

Table 3. Tobit Model Results

Variable	Conventional		Non-Certified Organic		Certified Organic	
Intercept	0.4116		0.0739		-0.1096	
Small Farm Premium						
Small	0.0848		0.1822		0.1292	
Socio-Demographics						
Collegedeg	0.1353		0.3533	**	0.5263	***
Caucasian	0.4928	**	0.6606	***	0.8151	***
Children	0.1427		0.2390	*	0.1524	
Age	-0.0105	**	-0.0121	**	-0.0166	**
Income	0.0044	***	0.0039	***	0.0026	*
Female	-0.6231	***	-0.3840	**	-0.4994	**
Vegetarian	-1.0193	*	-0.3431		-0.4280	
Farmexp	0.1125	*	0.0775		-0.1611	
Primshopper	-0.0352		-0.3583	**	-0.4187	**
Purchasing Behavior and Perceptions						
Shopfarmmkt	0.3489	***	0.3636	***	0.3743	***
Pastpur	0.1435	*	0.1032		0.1872	**
Futpur	0.2642	***	0.3265	***	0.3167	***
Orgexp	0.2486	***	0.2183	***	0.2502	***
Confarmnw	0.1198	**	0.0675		0.1036	*
Confarmeff	-0.0201		0.0461		-0.0617	
Importanceorg	0.0135	*	0.0063		0.0182	**
Confidenceorg	-0.0321	***	-0.0227	***	-0.0185	**
Outcome Beliefs and Evaluation						
Ifbuysupfam	0.0568		0.1085		0.0958	
Ifbuysupsus	-0.1306		-0.1379		-0.0901	
Imsupfamfarm	0.1080		0.0471		0.1125	
Imsupsusfarm	-0.0790		-0.0176		-0.0881	
Self-Identy and Norms						
Green	0.1375	*	0.1956	**	0.2007	**
Typorgbuy	-0.2901	***	-0.2167	***	-0.2814	***
Healthconscious	-0.0434		-0.0851		-0.0753	
Healthydiet	-0.0398		-0.0646		-0.0753	
Ethical	0.0431		-0.0037		-0.0017	
Betterpers	-0.0979	*	-0.0590		-0.0905	
Bidmore	0.0421		0.0561		0.1129	*

Note. *indicates significant at 10% level, **significant at 5%, and *** significant at 1%

Socio-Demographics

Several socio-demographic variables were found to have a significant impact on WTP for the milk types. Having a college degree and being Caucasian had a positive relationship on WTP at the 5% level in both the non-certified organic and organic models, but between the two only Caucasian was significant for conventional milk. Specifically, those with a college degree were

willing to pay $0.35 more for non-certified organic, and $0.53 more for organic than those without college degrees. Caucasians were willing to pay $0.49, $0.66, and $0.82 more, for conventional, non-certified organic, and organic milk respectively. This was different than expected and may reflect a growing interest in organic products among this group. Having children under 18 in the household was only significant at the 10% level for non-certified organic milk, with such consumers willing to pay $0.24 more.

Age had a negative relationship with WTP for all three models. This conflicted with the hypothesis; however, it seems plausible that a younger generation may be more concerned with environmental stewardship, health and animal welfare as this is a more recent trend. Income was significant in all models, but had little overall impact on WTP, as was also seen in Thompson and Kidwell (1998). Gender had a significant negative effect for females for all three models, with women willing to pay less than men by: -$0.62 for conventional, -$0.38 for non-certified organic and -$0.50 for organic. This conflicts with studies stating that gender either doesn't have a significant impact on WTP for organic foods or that being female has a positive effect.

Those who stated they were the primary shoppers for their household showed a significant negative effect for WTP for non-certified organic (-$0.36) and organic (-$0.42). Vegetarians displayed a significant negative impact on WTP for conventional milk (-$1.02), but this was not significant in the other two models. Having farming experience was not significant in any model.

Purchasing Behavior and Perceptions

Variables relating to purchasing behavior and perceptions had a significant impact on consumer's WTP. How often a consumer shops at farmer's markets or purchases organic milk products had a significant positive impact on consumers WTP for all milk types. As the frequency of shopping at a farmer's market increases, a consumer's WTP increases by $0.35 for conventional, $0.36 for non-certified organic and $0.37 for organic. The similar numbers likely follow directly from all three milk types being local. As the level of past organic dairy purchases increases for the consumer, his or her WTP also increased. Similarly, as the frequency of likely future purchases of organic dairy products increases, so does the consumer's WTP for all three models. This conforms to the TPB concept that behavioral intentions are important in assessing actual behavior.

Consumers who believed that organic milk was too expensive exhibited a significant positive relationship with WTP for all three models. This was unexpected in the organic model, and may show that many consumers are uncertain of how much organic milk does cost. Consumers who believed there was nothing wrong with conventional farming showed a significantly positive WTP for conventional (5 percent level) as well as organic (10 percent level) at $0.12 and $0.10 respectively. This indicates that they were willing to pay similar premiums for both conventional and organic, even though they do not believe anything is wrong with conventional farming. The related variable regarding consumers' view of the efficiency of conventional farming was not significant in any model.

The variable pertaining to the importance of the organic standards showed a significant positive impact on WTP for organic milk; however the variable pertaining to the consumer's confidence in such standards showed a significant negative impact on WTP for organics. The latter was an

unexpected relationship with no clear interpretation. The role of consumers' confidence in standards as it relates to their WTP is an area in need of further examination.

Outcome Beliefs and Evaluations

None of the four variables included measuring the influence of consumers' outcome beliefs and evaluations were significant. It may be worth noting still that in several instances, they only narrowly missed being significant at the 10 percent level. This was particularly evident for the "if I purchase" questions in the non-certified organic model and the corresponding importance questions in the conventional model. Given this, it is recommended that these aspects continue to be investigated in future efforts.

Self-Identity and Norms

How consumers view themselves and their opinions of societal norms played a role in WTP. The level at which consumers considered themselves a green consumer had a significant (5 percent for non-certified organic and organic, and 10 percent for conventional) positive relationship on consumer's WTP in all models. With a coefficient of $0.14 for conventional, and $0.20 for non-certified organic and organic, it is suggested that green consumers value non-certified organic and organic milk higher than conventional milk, as expected. Typical buyers of organic showed a significant negative effect on WTP for all three models, meaning they would pay less than those who do not typically buy organic products. It was again interesting to note the similar values for conventional and organic (-$0.28 and -$0.29). The negative finding for organic may again reflect better price knowledge of organic relative to other consumers in the study. Consumers' views on their diet and shopping with regards to health, however, did not influence WTP in any model.

For norms, those who feel as if purchasing organic milk makes them feel like a better person had a significant (at 10 percent) negative relationship to WTP for conventional. Feeling you had an ethical obligation to purchase organic however did not influence WTP in any model. Lastly, those who felt they should bid more for organic milk did express a significant (10 percent) positive relationship to WTP for organic milk. This norm, which had not been explored previously to the best of the authors' knowledge, suggests that how people think they should bid may be an important factor in understanding bids in auction experiments. More research on this is suggested since if people are following their view of norms in an auction experiment, it may detract from the ability to gain true WTP values with their bids.

Conclusion

This study examined the difference between consumers' WTP for local milk products produced on small and large dairy farms. The three local milk types were conventional, non-certified organic (but follow organic standards) and USDA certified organic. The U.S. dairy industry typically exhibits a very small profit margin, which could be detrimental in the long-run for small dairy farms that are less efficient than larger operations and in return less competitive. Due to this the dairy sector has followed the common farm trend of decreasing numbers and increasing size. The goal here was thus to determine if consumers may be willing to pay a premium for local milk produced on small farms if that fact was promoted while also comparing WTP for the three different production practices.

It was found that for both large and small dairy operations there is a premium to be obtained from switching from conventional to non-certified organic production methods and from non-certified organic to organic production methods. However, it was determined that the size of the farm the milk was produced at did not significantly impact consumer's WTP for any milk type. This contradicted the hypothesis, and may suggest that consumers do not feel as if small dairy farms contain benefits over that of large dairy farms that are worth paying an extra premium. Given the design it could be that the local attribute for all versions may have reduced the influence of both farm size and organic. This likely has bearing on the results and, obviously, the findings cannot be used to make general statements about these label conditions beyond the local market segment. The increasing strength of the local food market though, arguably, could make it an easier outlet for small farms to compete in and aid in small farm survivability. Additionally, Connolly and Klaiber (2014) presented evidence that organic can have extra value over local to consumers, and small farms here were close to having a benefit in the non-certified organic category.

Notably though, when WTP for small versus large farm was compared across milk production practices some potential benefits from promoting an operation as a small farm were discovered. Most relevant was the lack of significant difference between WTP for large farm organic and small farm non-certified organic. Thus, small dairies could avoid the cost of obtaining USDA organic certification and receive a comparable premium to that of organic milk from their large farm counterparts. This could allow small farms to be more competitive and potentially profitable. Similarly, WTP for small farm conventional milk was not different from large farm non-certified organic milk. Non-certified milk from large competitors would therefore not seem to be any threat to small dairies and indeed, despite a real premium, do not appear to be a promising avenue for large dairies.

There are several limitations and possible extensions to this research. One issue could be the small geographical area of the study, and, while a number of recruiting methods were used, having a portion of the sample from Ag Day could influence results. Expanding the geographical area with a larger, more random sample would be an obvious extension. Another area limiting the scope of this work, and offering extension opportunities, was in the definitions for local and farm size. Where participants used their own impression of local, other specific definitions could be used (e.g. within state). Also, as discussed, the definition for a small farm was smaller than official classifications. Arguably more important though is the actual distribution of sales within categories, with the vast majority of small farms in the under $50,000 sales group. This group is also the one with the most losses and thus with the greatest potential to gain from these findings. Consumer perceptions of the size of a small farm, relative to official classifications, is also worthy of future research.

For other extensions, it would be interesting to analyze what consumers view as the potential benefits of small farm production, especially in terms of environmental, animal welfare and economic benefits and how more precisely these impact their WTP. Finally, does the distance from the farm (small or large) impact consumer's WTP for milk produced from small farms or does it remain the same as that for milk produced on large farms? While this study sheds light on this topic, follow-ups with specific mileage or other measures of local could add to these findings.

Acknowledgements

The authors would like to thank Kathryn Carroll for her help running the experiments and Yinan Liu for her help with data analysis.

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Appendix

Table 1. Variable Definitions and Descriptive Statistics

Variable	Description	Mean	Std. dev.
Small Farm Premium			
Small	1 if milk came from a small farm, 0 otherwise	0.5000	0.5003
Socio-Demographics			
Collegedeg	1 if subject has college degree, 0 otherwise	0.5703	0.4954
Caucasian	1 if subject is Caucasian, 0 otherwise	0.7734	0.4189
Children	1 if children in the household, 0 otherwise	0.2813	0.4499
Age	Subject age, in years	38.9531	14.8441
Income	Income level, in thousands	61.8746	55.6569
Female	1 if subject is female, 0 otherwise	0.5703	0.4954
Vegetarian	1 if subject is vegetarian, 0 otherwise	0.0625	0.2422
Farmexp	1 if subject has farming experience, 0 otherwise	0.2734	0.4460
Primshopper	1 if subject is the primary shopper, 0 otherwise	0.7188	0.4499
Purchasing Behavior and Perceptions			
Shopfarmmkt	Shop at Farmers markets, 1= Not at all to 5= Very often	2.9531	1.0894
Pastpur	Past Purchase-Organic dairy products, 1= Not at all to 5= Very often	2.1484	1.2883
Futpur	How likely to purchase organic dairy products in the future, 1= Not at all to 5= Very often	2.3906	1.2397
Orgexp	1 if subject views organic milk as too expensive, 0 otherwise	5.5859	1.2788
Confarmnw	There is nothing wrong with conventional farming, 1= Strongly Disagree to 7= Strongly Agree	3.5234	1.6162
Confarmeff	Conventional farming practices are the most efficient, 1= Strongly Disagree to 7= Strongly Agree	3.9063	1.4610
Importanceorg	Summation for subjects' ratings (likert scale) for several questions on the importance of the key organic standards.	37.7266	9.8288
Confidenceorg	Summation for subjects' ratings (likert scale) for several questions on their confidence of the key organic standards.	31.7734	9.6420

Table 1. *Continued*

Variable	Description	Mean	Std. dev.
Outcome Beliefs and Evaluations			
Ifbuysupfam	If I purchase organic food, I'll be Supporting small family farms, 1= Strongly Disagree to 7= Strongly Agree	4.6016	1.6035
Ifbuysupsus	If I purchase organic food, I'll be Supporting sustainable farming, 1= Strongly Disagree to 7= Strongly Agree	4.9766	1.4122
Imsupfamfarm	Supporting small family farms, 1= Very Unimportant to 7= Very Important	5.1641	1.3224
Imsupsusfarm	Supporting sustainable farming practices, 1= Very Unimportant to 7= Very Important	5.1953	1.3762
Self-Identity and Norms (Seven point scale: 1= Strongly Disagree to 7=Strongly Agree)			
Green	I consider myself a green consumer	4.4063	1.4285
Typorgbuy	I consider myself a typical buyer of organic food	3.3438	1.6040
Healthconscious	I think of myself as a health conscious consumer	5.4219	1.2037
Healthydiet	I think I have a very healthy diet	4.8359	1.4521
Ethical	I feel that I have an ethical obligation to purchase organic food	3.4688	1.7950
Betterpers	Buying organic makes me feel like a better person	3.9844	1.8039
Bidmore	I felt I ought to bid more for organic food	4.8750	1.7953