Concerns for Fairness and Preferences for Organic Food

Jae Bong Chang
Ph.D. candidate and Graduate Research Assistant
Department of Agricultural Economics, Oklahoma State University

Jayson L. Lusk
Professor and Willard Sparks Endowed Chair
Department of Agricultural Economics, Oklahoma State University

Contact: Jayson L. Lusk
Department of Agricultural Economics, 411 Ag Hall
Oklahoma State University
Stillwater, OK 75078
Phone: (405) 744-7465
Fax: (405) 744-8210
E-mail: jayson.lusk@okstate.edu

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Abstract: Recent findings from behavioral economics suggest people are concerned about the fairness and inequality in simple distribution experiments. This study sought to determine whether such considerations also carry over to food choice. A conjoint-type experiment was developed and administered to a random sample of the U.S. population via mail survey to determine whether consumers, when purchasing food products, are concerned about the distribution of benefits across the participants in the agricultural supply chain (small farmers, large farmers, agribusiness, supermarkets, and the consumer) and to determine the extent to which the fairness models proposed in the general economics literature (and variants on these models) explain food choice. Results indicate that, aside from themselves, people prefer small farmers to receive the largest benefit from food purchase. The inequality aversion models proposed in the general economics literature do not exhibit much explanatory power, unless modified in non-trivial ways to fit the context of food. Finally, we find that preferences for distribution of benefits, along with measured beliefs about the relative distribution of benefits accruing to producers of organic and conventional foods, is a significant factor explaining consumer willingness-to-pay a premium for organic food.

A common assumption in economic analysis is that people are perfectly rational and completely selfish. Psychologists and sociologists, however, have argued that such assumptions fail to explain people's actual behavior in laboratory experiments and in the field. These observations have led economists to develop alternative models of individual behavior. Developments in behavioral economics suggest people care about fairness and this particular concept has been conceptualized in a variety of different ways, e.g., see Fehr and Schmidt (1999) and Bolton and Okenfels (2000). In an abstract experimental setting, Engelmann and Strobel (2004) show that such theories, in addition to efficiency concerns and maximin preferences, can rationalize most people's choices between allocations of money to themselves and other two anonymous people. To date, such findings have primarily been limited to abstract, experimental games. It is unclear whether these same findings will hold up when the decision context is moved to a less

neutral setting such as the field or when money allocations are no longer anonymous (e.g., see List, 2006). Nevertheless, the findings on people's preferences for fairness are thus far convincing enough to raise the question of whether people's food consumption behavior might be driven, at least partially, by concerns about fairness and inequality.

Recent years have witnessed pronounced differentiation of food products, ranging from organic to non-genetically modified (GM) food products. The recent growth in food markets such as organics and farmers markets, which often claim to support small farmers, may partially be a result of preferences for fairness. For example, it is often argued that organic products yield larger benefits to farmers (especially small farmers) as compared to agribusiness firms. One of key principles of organic agriculture is the concern of fairness which emphasizes the relationships between all parties in the food chain – farmers, processors, distributors, traders and consumers (International Federation of Organic Agriculture Movements (IFOAM)).[1]

Many studies have examined consumer willingness to pay a premium for organic products (e.g., Govindasamy and Italia, 1999; Loureiro and Hine, 2002) and have investigated underlying consumers' motivations for purchasing organic foods (e.g., Durham and Andrade, 2005; Grebitus et al, 2007; Johnston et al, 2001; Zepede and Li, 2007; Zhang et al, 2006). These studies have found that demand for organic foods is primarly explained by environmental and health motivations (e.g., Cicia et al, 2006; Durham and Andrade, 2005; Johnston et al, 2001) and quality and safety concerns (e.g.,

[1] 'Fairness' has many meanings in different contexts. For example, the principle of fairness of organic agriculture defined by IFOAM argues that organic farming should provide not only to all levels and parties involved in supply and marketing channels with a good quality of life and reduction of poverty, but also to animals with the living condition that accord with natural behavior and well-being, and natural and environmental resources with socially and ecologically just manages. In this study, we focus on the former meaning which ensures equity and loyalty of benefits in the organic supply chain.

Naspetti and Zanoli, 2006). Despite the arguments by some that fairness and support for small farms is a key benefit of organic products, we are unaware of any empirical research actually linking fairness motivations with consumer demand for organic food.

In this study, we determine whether consumers, when purchasing food products, are concerned about the distribution of benefits across the participants in the agricultural supply chain. In addition to people's concerns for particular participants in the supply chain (small farmers, large farmers, agribusinesses, supermarkets, and the consumer), we investigate the following fairness motives: a) the standard concept of distribution of benefits represented by standard deviation, b) aversion to deviations from the average payoff as suggested by Bolton and Okenfels (2000), c) the two-dimensional inequity aversion model proposed by Fehr and Schmidt (1999), and d) efficiency concerns. Most of these models entail a comparison of how well off the consumer is as compared to other participants in the supply chain; however, in a food purchasing context, where the consumer's benefit is less transparent (i.e., the consumer surplus), we also investigate variations on these models that omit the relative comparisons. In addition to these underlying preferences, we also determine consumers' beliefs about the distribution of benefits for organic and conventional food and determine the extent to which preferences for the distribution of benefits can explain preferences for organic food vs. conventional food.

Background

It has been observed that people often act altruistically and are concerned about equity. Evidence of such "social preferences" have been found in field (e.g., Andreoni, Erard,

and Feinstein, 1998; Babcock, Wang, and Loewenstein, 1996; Blinder and Choi, 1990), in experiment (e.g., Camerer, 2003; Charness, 2004; Fehr, Kirchsteiger, and Riedl, 1993; Güth, Schmittberger, and Schwarze, 1982), and in both environments (e.g., List, 2006; Levitt and List, 2007). List (2006) conducted a series of gift change games in both laboratory and filed environments to explore the behavioral differences across two environments and found that social preferences is more likely observed in laboratory experiments than in fields.

Such findings have led to the development of theoretical models which incorporate preferences over the distribution of consequences or outcomes. Fehr and Schmidt (1999) modeled fairness as self-interested inequality aversion whereby people get disutility from unequal allocation of outcomes. Their model is two dimensional in these sense that one parameter characterizes disutility from others being better off than self, and another parameter that characterizes disutility from others being worse off than self. Bolton and Ockenfels (2000) developed more parsimonious model of inequality aversion. They assumed disutility is caused by differences between one's own and the average payoff. In this model, disutility from inequity is at a minimum when people received the average payoff. Engelmann and Strobel (2004) conducted simple distribution experiments to compare the relative performance of these fairness theories. They compared the relative importance of efficiency concerns, maximin preferences, and inequality aversion and showed that these motivations, together, can explain most of people's behavior.

In this study, we investigate consumer preferences for the distribution of benefits across the food supply chain. Like Engelmann and Strobel (2004), we compare the

relative performance of fairness concerns – simple deviation, inequality aversion, and efficiency concerns.

Methods and Procedures

To determine the effect of fairness concerns on consumers' behavior for food products, a mail survey was developed. The survey was designed to people to determine the extent to which people perceive foods from alternative production practices as having different effects on participants in the food supply chain and to provide evidence on consumers' preferences for distribution of benefits across the marketing channel. In April 2007, a total of 2,000 surveys were mailed to a random sample of consumers in the U.S. Addresses and names which were randomly selected from the telephone directory were purchased from a private company. 219 completed surveys were returned. After accounting for undeliverable addresses, a response rate of 11.5% was achieved. Several people did not completely answer all the questions required to complete our analysis, and as such, our final analysis is carried out on 207 observations.

Valuation of Preferences for Foods with Fairness Concerns

To determine people's preferences for the distribution of outcomes across the food supply chain, a conjoint experiment was conducted where people were asked to rate the relative desirability of several loafs of bread that differed by price and the amount of profit resulting from the purchase that went to the following parties in the food supply chain: small farmer, large farmer, agribusiness, and grocery stores. In the survey, small and large farmers are defined as those farming less than 500 acres and 500 or more acres,

respectively, agribusiness processors represent wheat millers and bakers. In each of the conjoint experiment questions, people were asked to indicate how likely they were (to buy a loaf of bread at varying price and profit levels on a scale of 0 to 10 where 0 means no chance of purchase, 50/50 chance of purchasing, and 10 meant 100% chance of purchasing.. Prices of a loaf of bread were varied between $1.99, $2.99, and $3.99. Profits to each link in the food production system were varied between $0.01, $0.07, and $0.15. Each people answered 12 questions, where the prices and dollar amounts assigned to each participant in the food supply chain were randomly varied across survey. Two sample questions are illustrated in figure 1.

A random utility model is utilized to determine whether people care about the distribution of benefits and which participant people most cared about including consumers' profit. Ignoring preferences for fairness or inequality, the utility from the purchase a loaf of bread can be written as

$$U = a_0 - a_1 Price + a_2 Profit_{small\ farmer} + a_3 Profit_{large\ farmer} + a_4 Profit_{agribusiness} + a_5 Profit_{grocery}, \quad (1)$$

where α_1 is the marginal utility of income. To determine the purely selfish value of bread to consumers, , we need to find the *Price* that makes a person indifferent to buying when all other parties in the food supply chain do not benefit (α_2=α_3=α_4=α_5=0). Given tour scale, a person is indifferent to buying when a rating of 5 is given. Thus, willingness to pay for a loaf of bread when α_2=α_3=α_4=α_5=0 is $WTP = (\alpha_0 - 5) / \alpha_1$ or $\alpha_0 = \alpha_1 WTP + 5$. Substituting this expression into equation (1) and re-arranging yields the following:

$$U = a_1(WTP - Price) + UI + a_2 Profit_{small\ farmer} + a_3 Profit_{large\ farmer} + a_4 Profit_{agribusiness} + a_5 Profit_{grocery} \quad (2)$$

where (*WTP- Price*) is the consumer's "benefit" or consumer surplus. In this model, then, *WTP* is a parameter to estimate then the consumer's benefit from buying food can be determined as the difference between estimated willingness-to-pay and price.

To investigate the fairness concerns on food purchase behavior, we applied fairness and equity theories from behavioral economics. First, inequality aversion concern advocated by Fehr and Schmidt (1999, henceforth FS) and used by Engelmann and Strobel (2004) was considered. Their fairness concerns measure the utility loss from advantageous and disadvantageous inequality and these can be expressed respectively as

$$FSa = -\frac{1}{4}[\max(profit_{small\ farmer} - profit_{consumer}, 0) + \max(profit_{large\ farmer} - profit_{consumer}, 0) + \max(profit_{agribusiness} - profit_{consumer}, 0) + \max(profit_{grocery} - profit_{consumer}, 0)] \quad (4)$$

and

$$FSb = -\frac{1}{4}[\max(profit_{consumer} - profit_{small\ farmer}, 0) + \max(profit_{consumer} - profit_{large\ farmer}, 0) + \max(profit_{consumer} - profit_{agribusiness}, 0) + \max(profit_{consumer} - profit_{grocery}, 0)] \quad (5)$$

where *FSa* is a dislike from negative actions toward others and *FSb* is a dislike from positive actions toward others based on deviation from self-interest, and where $profit_{consumer} = WTP - Price$. Thus, clearly, *FSa* and *FSb* assume people prefer all parties in the marketing channel get the same profits. In our application, like Engelmann and Strobel (2004), a strict version of *FSa* and *FSb*, $FS = FSa + FSb$ was include, thus *FS* equally weights advantageous and disadvantageous inequality. Second, following Bolton and Ockenfels (2000, henceforth ERC), fairness concern which assumes people dislike a profit difference between their own and the average profit was applied which can be written as

$$(6) \qquad ERC = -100 \times \left| \frac{1}{5} - \frac{profit_{consumer}}{Efficiency} \right|$$

where *Efficiency* is simply the sum of profits for all five participants in the chain. Third, we treated concerns for efficiency (*EFF*) as one important fairness motivations as shown in Charness and Rabin (2002) and Engelmann and Strobel (2004). Finally, the simple standard deviation (*SD*) of profits across all supply chain participants was incorporated to test.

Consumers may differ with respect to the disutility from inequality for each rating scenario. Also, each person answered 12 questions then, there are possible effects that explain unobservable heterogeneity in a given individual. Thus, we added random effects into the econometric model as well. Thus, the general empirical model for the *i*th consumer's utility of purchase at scenario *j* is

$$(7) \qquad \begin{aligned} R_{ij} = {} & a_1(WTP_{ij} - Price_{ij}) + a_2 Profit_{small\ farmer,ij} + a_3 Profit_{large\ farmer,ij} \\ & + a_4 Profit_{agribusiness,ij} + a_5 Profit_{grocery,ij} + a_6 Fairness_{ij} + u_i + e_{ij}, \end{aligned}$$

where *Fairness* represents either *FS*, *ERC*, *EFF*, or *SD* depending on how concerns for fairness are modeled, u_i is a normally distributed random effect for consumer *i*, $N(0, \sigma^2_u)$, and ε_{ij} is a classical disturbance.

Estimating Fairness-induced Premium for Organic Food

It is also of interest to determine whether concerns for distribution of benefits across the food supply chain and concerns for fairness relate to demand for organic food. To address this issue, people were asked to indicate how much they thought participants in the marketing channel profited from the sale of a single loaf of bread. People responded for each supply chain participant with competing dollar amounts (e.g., \$0.01 to \$0.05,

$0.06 to $0.10, and $0.11 to $0.15) for both organic and conventional bread. Survey participants also were asked to indicate the largest premium they were willing to pay for organic bread over conventional bread and the price they would expect to pay for both organic and conventional, non-organic bread.

With estimated coefficients from the conjoint task, equation (7) for both organic and conventional bread can be written as

$$\begin{aligned}\hat{R}^o = {} & \hat{a}_1(WTP^o - Price^o) + \hat{a}_2 Profit^o_{small\ farmer} + \hat{a}_3 Profit^o_{large farmer} + \hat{a}_4 Profit^o_{agribusiness} \\ & + \hat{a}_5 Profit^o_{grocery} + \hat{a}_6 Fairness^o\end{aligned} \tag{8}$$

and

$$\begin{aligned}\hat{R}^c = {} & \hat{a}_1(WTP^c - Price^c) + \hat{a}_2 Profit^c_{small\ farmer} + \hat{a}_3 Profit^c_{large farmer} + \hat{a}_4 Profit^c_{agribusiness} \\ & + \hat{a}_5 Profit^c_{grocery} + \hat{a}_6 Fairness^c\end{aligned} \tag{9}$$

where *o* and *c* superscript mean organic and conventional bread. The price difference, ($Price^o - Price^c$), which generates the same utility for organic and conventional bread (i.e., $\hat{R}^o = \hat{R}^c$) is:

$$\begin{aligned}(Price^o - Price^c) = (WTP^o - WTP^c) - \frac{1}{\hat{a}_1}[& \hat{a}_2(Profit^c_{small\ farmer} - Profit^o_{small\ farmer}) \\ & + \hat{a}_3(Profit^c_{large farmer} - Profit^o_{large farmer}) \\ & + \hat{a}_4(Profit^c_{agribusiness} - Profit^o_{agribusiness}) \\ & + \hat{a}_5(Profit^c_{grocery} - Profit^o_{grocery}) + \hat{a}_6(Fairness^c - Fairness^o)]\end{aligned} \tag{10}$$

This is the estimated consumer premium for organic bread over conventional bread. Equation (10) can be decomposed into two parts. First part of right hand side of equation (10), ($WTP^o - WTP^c$), represents the premium for organic bread that results from concerns for motivations such as the environment, health, and quality, and the second term is the premium for organic bread that results solely from fairness and distributional

concerns. We can calculate the portion that how much of the organic premium can be explained by the consumers' fairness motivation as

$$
\begin{aligned}
(11) \qquad portion = & \\
& \frac{-\frac{1}{\hat{a}_1}[\hat{a}_2(Profit^c_{small\ farmer} - Profit^o_{small\ farmer}) \\
& + \hat{a}_3(Profit^c_{large farmer} - Profit^o_{large farmer}) + \hat{a}_4(Profit^c_{agribusiness} - Profit^o_{agribusiness}) \\
& + \hat{a}_5(Profit^c_{grocery} - Profit^o_{grocery}) + \hat{a}_6(Fairness^c - Fairness^o)]}{(WTP^o - WTP^c) - \frac{1}{\hat{a}_1}[\hat{a}_2(Profit^c_{small\ farmer} - Profit^o_{small\ farmer}) \\
& + \hat{a}_3(Profit^c_{large farmer} - Profit^o_{large farmer}) + \hat{a}_4(Profit^c_{agribusiness} - Profit^o_{agribusiness}) \\
& + \hat{a}_5(Profit^c_{grocery} - Profit^o_{grocery}) + \hat{a}_6(Fairness^c - Fairness^o)]}
\end{aligned}
$$

Reconsidering Fairness Motivations

The *FS, ERC, EFF, and SD* were included in our estimation model as fairness concern variables. These variables contain all profits across the marketing channel. That is, *FS* and *ERC* measure inequality aversion between consumers' own outcome and others. *SD* measures the spread of the outcomes about the mean value and *EFF* is the sum of all outcomes including consumer own payoff. Although, however, people care about the fairness and equity in purchasing foods, people may give more weight to their own. Thus, we excluded 'self-interest' value, consumers' outcome, from each fairness concerns. Instead of self-interest, now, *FS* assumes consumer dislike a profit difference to small farmer's profits and *ERC* assumes consumers like the average profit of large farmers, agribusiness, and grocery stores to be as close as possible to small farmers' profit. *EFF* is just aggregate amount of profits of four participants, small farmers, large farmers, agribusiness, and grocery stores and *SD* is the standard deviation of profits of these four participants.

To test the relative performance of the fairness models, we calculate the mean squared error (MSE) and the out-of-sample log likelihood function (OSLLF) values (Norwood, Lusk, and Brorsen 2004). The MSE is the average of the square of the difference between the estimated rate and the actual rate for desirability of bread. The OSLLF ranks models by likelihood function values observed at out of sample observations and the highest values are preferred. The sample is randomly divided by two parts and each set of sample is used as out of sample observations. Using one set of observation we estimate the parameters of each model and calculate the probability density function for each model at each out-of-sample observation. To get improved statistical fit, we use cross validation method. Thus, we use the aggregated values of MSE and OSLLF from two sets to compare the models.

Results

Table 1 reports summary statistics and variable definitions. 38% of the survey respondents were male and 56 years of age on average. 55% of the sample had a bachelor's degree and 17% had children under the age of 12 in the household. Respondents who had near family member who farmed or ranched for a living were 15% and population in the county in which they live was on average less than 100,000 people.

People's beliefs about how the distribution of profits across the supply chain differed for organic and conventional, non-organic loaves of bread are shown in table 2. People believe small farmers, as a whole, to receive the least profit of all participants in the supply chain and the more downstream the marketing channel, the more profit that is made. That is, grocery store chains are believed to be more profitable than agribusiness

processors, who are in turn believed to be more profitable than large farmers. Results in table 2 also suggest that people believe that all supply chain participants benefit more from selling organics than conventional, non-organics. People believe that small farmers are the greatest beneficiaries from selling organic by increasing their profit by $0.014 per loaf of bread, implying a 23.73% increase over selling non-organics.

Table 3 reports estimates for four fairness models, specified as originally proposed in the literature, with inequity concerns relating to comparisons of self to others payoffs For each model, the self coefficient is positive, except for FS, meaning consumers care about their own benefit or "profit." Parameters for small farmer are all positive and statistically significant, meaning people primarily care about the benefits to small farmers. However, all coefficients for large farmers and grocery stores are negative, implying consumers dislike for these participants to receive large returns. The variance of random effect is significant in each model, indicating between-subject heterogeneity. Although it is not statistically significant, only fairness concern of FS model provides evidence that preferences for fairness affect consumers' preferences for food.

Table 3 also represents the premium for organic bread over conventional bread, which results from fairness and distributional concerns only and other motivations. The portion of premium by fairness or equity is relatively high, and ranges from 39.7% to 43.2%. One might question why these values are so large when none of the fairness parameters are statistically significant. The answer is because people care about small farms (and this parameter is large) and they perceive small farms to derive a large benefit from organic foods. Two criteria, MSE and OSLLF, are used to compare models. For MSE values, ERC model has lowest, 9.596 and FS has highest, 9.610. For the OSLLF

values, ERC has highest value and EFF has lowest value, -5339.478 and -5341.046 respectively. Thus, ERC model exhibits better out-of-sample predictive performance in explaining the ratings of bread products

We revised fairness concerns by excluding self-interest profits and results of estimation and calculation are reported in table 4. All coefficients for self are significant and positive, implying consumers care about themselves. Positive parameters for small farmers reveal that consumers care about the profits to small farmers. For large farmers and grocery stores, coefficients of all models are negative. This result indicates consumers do not favor large farmers and grocery stores. Coefficients of agribusiness are positive in the SD and FS models, but negative in the ERC and EFF models. The results also indicate that consumers do care about the fairness/equity. For SD model, the coefficient of standard deviation of profits across supply chain excluding consumers' profits is negative and statistically significant, meaning consumer prefer equal distribution of profits among the agents in marketing channel. That the coefficients of fairness variables of the ERC and FS models are positive is indicative of the fact that consumers clearly favor all participants would receive the same profits across the production systems. Finally, positive coefficient of the EFF model represents that people prefer higher total profits.

The effect of fairness motivation on premium for organic bread is calculated and shown in table 4. From 38.8% to 42.3% of total premium of organic foods can be explained by consumers' concerns for distribution or fairness. The correlation between estimated premium and people's stated willingness to pay price premium is calculated. For all models, there are significantly positive relations. To compare the relative

performance of models, the model selection criteria, MSE and OSLLF, are applied again. For the MSE values, the FS model has lowest value (9.537) and the EFF model has highest value (9.609). For the OSLLF method, the FS model has highest and the EFF model has lowest values, -5331.771 and -5341.041 respectively. The simple distributional model, SD, relatively performs well (the MSE and OSLLF values are 9.557 and -5334.278 respectively). Overall, the FS model is better model of distributional concerns.

In general, our findings suggest consumers care about themselves and small farmers. For inequality aversion, fairness, and distribution concern, we found some interesting results. If consumers consider the distribution of returns including their own benefits, fairness concerns do not have important effects. However, if they take into account only others, consumers actually care about fairness and equality issues. This might be reasonable to explain the real consumer behavior. They care about themselves with more weight, but also they do care about social preferences.

Conclusions

This study investigates whether people do care about the distribution of benefits across the food marketing channel and which fairness and equity concerns may be important stimulus of food consumption. A nationwide mail survey was conducted and a total of 207 completed data was used.

Results of this study provide that consumers place premium on organic foods and both self-interest and fairness/equity concerns are significantly affect people's preferences for food choice. That is, when people make decisions in buying food they

care about not only themselves but also small farmers. They clearly prefer that all participants, excluding themselves, of the food production chain get the same outcomes. Results also suggest that the FS model which assumes that people despise a benefit difference between any other stakeholders in the food marketing channel exhibits the best fit to explain consumer shopping behavior. The simple distributional model which incorporates the standard distribution performs well.

Although this study provides initial evidence and better understanding of consumers' food consumption with respect to fairness and equity concerns, consumer preferences might be distorted in the hypothetical mail survey. Future research might be necessary in non-hypothetical environments. Also, future study might focus on different farm types, for example, farms based on location, income sources, and crops.

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Product	Definitely Would Not Buy				Equal Chance of Buying and Not Buying						Definitely Would Buy
Price of bread loaf: **$2.99** Profit to small farmers: **$0.01** Profit to large farmers: **$0.15** Profit to agribusinesses: **$0.01** Profit to grocery store: **$0.15**	0	1	2	3	4	5	6	7	8	9	10
Price of bread loaf: **$1.99** Profit to small farmers: **$0.15** Profit to large farmers: **$0.01** Profit to agribusinesses: **$0.01** Profit to grocery store: **$0.15**	0	1	2	3	4	5	6	7	8	9	10

Figure 1. Example conjoint experiment questions

Table 1. Variable Definitions and Summary Statistics

Variable	Definition	Mean
Gender	1 if female; 0 if male	0.38 (0.49)[a]
Age	Age in years	56.15 (15.27)
Education	1 if Bachelor's degree; 0 otherwise	0.55 (0.50)
Income	Household income level 1.5 = less than $20,000; 3 = $20,000 to $39,999; 5 = $40,000 to $59,999; 7 = $60,000 to $79,999; 9 = $80,000 to $99,999; 11 = $100,000 or more	3.79 (1.64)
Family	1 if immediate family member farm or ranch for a living; 0 otherwise	0.15 (0.36)
Population	Population in the county 1 = fewer than 10,000 people; 2 = between 10,000 and 99,999 people; 3 = between 100,000 and 499,999 people; 4 = more than 500,000 people	2.75 (0.93)
Child	1 if children under the age of 12 in the household; 0 = otherwise	0.17 (0.37)
Number of respondents		207

[a] The numbers in parentheses are standard deviations.

Table 2. Consumer's Beliefs about the Distribution of Profits across the Supply Chain Resulting from the Sale of a Single Organic and Non-Organic Loaf of Bread

Supply Chain Participants	Conventional Non-Organic	Organic	Difference in Organic and Non-Organic	Percent Increase from Non-Organic to Organic
Small farmers	$0.059	$0.073	$0.014	23.73%
Large farmers	$0.079	$0.089	$0.010	12.66%
Agribusiness	$0.089	$0.094	$0.005	5.62%
Grocery store	$0.100	$0.108	$0.008	8.00%

Table 3. Model Estimates by Fairness Models with Self-Interest

	Models			
Variables	SD	ERC	FS	EFF
Self	1.596	1.280**	-2.404	2.261**
	(1.888)[a]	(0.055)	(3.343)	(0.841)
WTP	1.475**	1.422**	1.474**	1.474**
	(0.145)	(0.019)	(0.145)	(0.145)
Small farmer	14.298**	13.981**	15.301**	15.301**
	(0.956)	(0.824)	(1.180)	(1.180)
Large farmer	-0.993	-1.344	-	-
	(0.936)	(0.835)		
Agribusiness	-0.554	-0.465	0.538	0.538
	(1.226)	(0.491)	(0.959)	(0.959)
Grocery	-1.499	-1.768**	-0.491	-0.491
	(0.975)	(0.817)	(1.170)	(1.170)
Fairness[b]	0.604	-0.001*	3.732	-0.933
	(4.253)	(0.000)	(3.345)	(0.836)
s_u^2	2.729**	2.734**	2.729**	2.729**
	(0.312)	(0.312)	(0.312)	(0.312)
Portion[c]	0.410	0.488	0.397	0.432
Part A	0.407	0.404	0.407	0.404
Part B	0.140	0.114	0.260	0.184
Correlation[d]	0.324**	-0.026	0.104	0.251**
	(0.000)	(0.727)	(0.160)	(0.001)
MSE[e]	9.609	9.596	9.610	9.609
OSLLF[f]	-5340.913	-5339.478	-5341.041	-5341.046
No. of Respondents	207	207	207	207

Note: * and ** represents statistical significance at the 10% and 5% levels, respectively.
[a] Numbers in parentheses are asymptotic standard errors.
[b] SD = standard deviation(self, small farmer, large farmer, agribusiness, grocery store),
EFF = self + small farmer + large farmer + agribusiness + grocery store,
ERC = -100×|(1/5)-(self/EFF)|,
FS = FSa + FSb = -1/4[max(small farmer–self, 0) + max(large farmer–self, 0) + max(agribusiness–self, 0) + max(grocery store–self, 0)] -1/4[max(self-small farmer, 0) + max(self-large farmer, 0) + max(self-agribusiness, 0) + max(self-grocery store, 0)].
[c] Numbers are the trimmed mean of portion of estimated people's premiums on organic over conventional that result solely from fairness concerns (part B) versus other factors, such as safety, health, or environmental concerns (part A) by discarding the five lowest and highest values.
[d] Correlation between calculated people's premium for organic versus conventional and stated people's willingness-to-pay for organic.
[e] MSE is mean squared error between predicted and stated rate.
[f] OSLLF is the estimated likelihood function value observed at stated rate values.

Table 4. Model Estimates by Fairness Model without Self-Interest

	Models			
Variables	SD	ERC	FS	EFF
Self	1.340**	1.326**	1.333**	1.328**
	(0.058)[a]	(0.057)	(0.057)	(0.058)
WTP	1.587**	1.756**	1.644**	1.474**
	(0.146)	(0.162)	(0.147)	(0.145)
Small farmer	14.565**	14.280**	14.686**	13.815**
	(0.819)	(0.817)	(0.820)	(0.709)
Large farmer	-0.854	-1.717**	-0.896	-1.486**
	(0.835)	(0.864)	(0.833)	(0.713)
Agribusiness	1.350*	-0.620	0.789	-0.948*
	(0.736)	(0.500)	(0.574)	(0.492)
Grocery	-1.113	-2.040**	-1.136	-1.977**
	(0.827)	(0.840)	(0.823)	(0.706)
Fairness[b]	-5.655**	0.016**	5.727**	0.553*
	(1.764)	(0.005)	(1.406)	(0.301)
s_u^2	2.741**	2.731**	2.738**	2.729**
	(0.313)	(0.312)	(0.312)	(0.312)
Portion[c]	0.405	0.423	0.415	0.388
Part A	0.407	0.407	0.407	0.407
Part B	0.136	0.122	0.143	0.122
Correlation[d]	0.300**	0.306**	0.286**	0.315**
	(0.000)	(0.000)	(0.000)	(0.000)
MSE[e]	9.557	9.592	9.537	9.609
OSLLF[f]	-5334.278	-5338.985	-5331.771	-5341.041
No. of Respondents	207	207	207	207

Note: * and ** represents statistical significance at the 10% and 5% levels, respectively.

[a] Numbers in parentheses are asymptotic standard errors.

[b] SD = standard deviation(small farmer, large farmer, agribusiness, grocery store),
EFF = small farmer + large farmer + agribusiness + grocery store,
ERC = -100×|(1/4)-(small farmer/EFF)|,
FS = FSa + FSb = -1/3[max(large farmer–small farmer, 0) + max(agribusiness–small farmer, 0) + max(grocery store–small farmer, 0)] -1/3[max(small farmer-large farmer, 0) + max(small farmer-agribusiness, 0) + max(small farmer-grocery store, 0)].

[c] Numbers are the trimmed mean of portion of estimated people's premiums on organic over conventional that result solely from fairness concerns (part B) versus other factors, such as safety, health, or environmental concerns (part A) by discarding the five lowest and highest values.

[d] Correlation between calculated people's premium for organic versus conventional and stated people's willingness-to-pay for organic.

[e] MSE is mean squared error between predicted and stated rate.

[f] OSLLF is the estimated likelihood function value observed at stated rate values.