Non-Commercial Aspect of CSA Operations

The presence of a core-group may help a CSA operation run more efficiently. However, as mentioned before, CSA is not just about profitability. There are a number of non-commercial benefits associated with CSA operations. Many of these benefits were recorded by CSA operators in response to an open ended question regarding benefit. On the survey, respondents were asked to identify benefits they and/or their community received through the CSA operation. This question was not about profits and, not surprisingly, the responses were about non-economic gains. The most common response was increased community interactions through farm-oriented activities and educational programs. Many respondents mentioned a feeling of stewardship towards the land, primarily through decreased environmental impact of alternative agricultural production. Finally, most CSA operators valued providing fresh, healthy food to their shareholders. The non-commercial aspects of these benefits make it difficult to quantify the benefits. Instead, Table 14 simply lists four of the most common benefits mentioned by CSA survey respondents. About 63% (in 1995) and 44% (in 1996) of the respondents felt that appreciation and concern over the environment was extremely important. Building a more integrated community through the CSA operation (47% in 1995 and 40% in 1996), providing

Table 14. Non-commercial Benefits of CSA.

	% of farms that responded	
Benefits	1995	1996
1. Providing food to local food pantries as well as to low income families.	37%	28%
2. Appreciation and concern over the environment and health, both in the present and for future generations.	63%	44%
3. Helping to integrate the community.	47%	40%
4. Preserving and spreading knowledge through educational opportunities and using CSA as an outreach tool.	63%	40%

educational opportunities about the environment and agriculture to shareholders and local schools (63% in 1995 and 40% in 1996), and donating food to local food pantries (37% in 1995 and 28% in 1996) were some of the other major benefits cited by survey respondents. The study by Cooley and Lass also identified other benefits to shareholders that could not be included in cost savings. They found that shareholders reap many of the same benefits, including quality of produce, support for local farmers, environmental concerns and community service provided by the CSA operation.

Behavioral Models for CSA Operations

The seemingly lower profitability of organic farms makes it interesting to study farmers who practice alternative or organic forms of agricultural production. It is an opportunity to study how profitability and incentives other than profits enter the farmers' decision making process. A farmer's decision to operate as a CSA farm is not necessarily profit maximizing behavior and it may be insufficient to build a model based on profit maximization. Alternative behavioral models may be applicable to CSA operator behavior. Traditional neoclassical models, such as cost minimization and profit maximization, and alternative motives for behavior, such as commitment, sympathy, reciprocity, and the warm glow effect, are considered below. Interactions between the CSA operator and the CSA shareholder involves some bargaining. This bargaining along with the "no-profit" motives of CSA operations lead to the conclusion that a game theoretic framework of cooperative games may be appropriate as an alternative model of CSA behavior. The players of this game, the CSA operator and the CSA shareholder can be modeled as playing a cooperative game, or more specifically, a simple bargaining game.

Basic behavioral assumptions of many economic models are that firms act to minimize costs and/or maximize profits. Short-run and long-run cost functions derived from the cost minimization problem may be used to derive conclusions about economies of size and scale, and farm characteristics that influence costs. The cost minimization approach is applied when a firm chooses levels of inputs in order to produce a given level of output at minimum cost. CSA farms operate by selling their product prior to the beginning of the growing season. If the CSA farm share price and output have been determined prior to the growing season, then the cost minimization problem may represent a possibility for the CSA farm operator. CSA output (q) is predetermined and the farmer operates during the growing season so as to minimize the cost of producing, subject to the constraint of producing that level of output. Conditional input demands are functions of input prices, CSA output quantity and other exogenous factors, E. A cost function may be derived and should relate minimum costs to input prices, r_1 and r_2, output q, and a vector of exogenous factors, E. That is, $C^* = C^*(r_1, r_2, q; E)$. Such a cost function is one means of describing the economic possibilities of a CSA farm.

An alternative behavioral model is that of profit maximization. The profit function can be viewed from the output side, with cost-minimizing factor levels implicit in the cost function. The firm seeks to maximize:

$$\Pi = p \cdot q - C^*(r_1, r_2, q; E) \quad .$$

The supply function is derived from the first-order conditions:

$$q^* = q^*(r_1, r_2, p; E) \ .$$

Optimal level of output for profit maximization is now a function of input prices, r_1 and r_2, price of output, p, and E, the vector of exogenous factors. Here we assume again that CSA share price is exogenous, but that output is determined within the optimization problem. Substituting the optimal level of output, q^*, into the direct objective function gives optimal profits:

$$\Pi^* = p \cdot q^* - C^*(r_1, r_2, q^*) = \Pi^*(p, r_1, r_2; E)\ .$$

This profit function defines optimal profits for different input and output prices and the vector *E*. The arguments differ from those of the cost function providing a crude test for CSA behavior.

Regression Results for Cost and Profit Functions

CSA survey data on costs and returns for the years 1995, 1996 and 1997 were used to estimate the cost and profit functions discussed above. Summary statistics for the data used in estimation are presented in the first column of Table 15. The summary statistics presented are for the pooled data from the three survey years. Hypothesis tests for pooling of observations for both the average cost function and the profit function led to the conclusion that parameters did not differ across years. Thus, we present only results from the pooled data here. There were a total of 82 observations available for estimation.

Two models were estimated, an average cost function and a profit or net income function. While input prices are typically arguments of both functions, we presume prices remained constant during a given year and over the three year time period. Obtaining useful input price data was not possible and average wage rates reported were constant for the three years. Of the two models estimated, summary statistics for the average cost model were more encouraging. The model explained 42% of the variation in average costs while only 15% of the variation in net income was explained by the variables included.

The average cost function was estimated in log-log form for the continuous variables, acres of CSA cropland and total CSA output. The regression analyses provide some noteworthy results. The average cost function appears to indicate increasing returns to size. A one percent increase in output results in a 0.539% decrease in average costs. An additional year of operator experience results in a reduction in average costs of about 1.7 percent. Increasing the scale of the operation, in terms of acreage, results in an increase in costs; a 1% increase in acreage results in a 0.47% increase in costs. In the analysis above, costs for CSA farms with core-groups appeared greater than those of farms without core-groups. However, average cost, when analyzed using multivariate methods, were not found to be statistically different. Operator education and soil organic matter were also found to have little statistical impact on average costs.

If the CSA farms were seeking to optimize net income, price per share would be expected to have a positive effect on net income or profits. The effect of share price was found to be negative although not statistically different from zero. Operator education had little effect on net income, while operator experience had a significant positive effect. As discussed above, farms with core-groups were found to have statistically greater net incomes; the estimated coefficient for the binary variable was $8,822.85. This result supports the conjectures made earlier using univariate statistical methods. These data suggest that CSA farms with core-groups were more successful than farms that operated without core-groups.

Table 15: Summary Statistics and Estimated Average Cost and Net Income Functions for 1995, 1996 and 1997 CSA Farms.

		Estimated Regression Coefficients	
Variable	Means	Average Costs [a]	Net Income
CSA Net Income ($)	$ 6,030.69 (17,339.10)	- -	-9,876.20 [b] (5,925.15)
CSA Costs ($)	$ 27,565.70 (34,095.84)	4.791 [b] (0.698)	- -
Number of CSA Acres	9.83 (18.80)	0.474** (0.104)	29.75 (109.07)
Core Group (Yes = 1)	0.46 (0.50)	0.110 (0.235)	8,822.85** (4079.33)
Operator Education (College Degree or higher = 1)	0.71 (0.46)	- 0.052 (0.213)	942.82 (4275.35)
Number of Years of Operator Experience	11.39 (7.69)	- 0.017* (0.013)	635.81** (261.30)
Soil Organic Matter (%)	0.05 (0.02)	- -	- 28,522 (80,430)
CSA Share Price ($ per Share)	$ 378.13 (189.69)	NA	-2.09 (2.73)
Total CSA Output (Annual lbs.)	37,490.80 (52,286.28)	- 0.539** (0.082)	- -

Standard deviations/errors are presented in parentheses.
* Statistically different from zero at the 10% level of significance.
** Statistically different from zero at the 5% level of significance or better.
[a] The natural logarithms of *Average Costs*, *Number of CSA Acres* and *Total CSA Output* were used in estimating the cost function.
[b] Estimated intercepts for the regression models.

The multivariate regression models support several of the conjectures made earlier based on univariate methods. While the models specified lacked some of the elements of properly specified average cost and profit functions, the application of regression techniques allowed us to consider the effects of factor on CSA success while holding other factors constant and offer the following observations. The regression results support the hypothesis that core-group farms were more successful. The lack of significant share price effects in the net income function suggests that the neoclassical model of profit maximization is not an appropriate model for CSA farms as we expected. Of the two models estimated, the average cost function appeared better suited for CSA farms based on correct signs and goodness of fit. Human capital in the form of CSA farm experience was important for lowering costs and raising net income. The binary education variable had little impact, but this may reflect a lack of variation in the data. Seventy-one percent of the farm operators surveyed held a college degree.

An Alternative Model of CSA Operator Behavior

The survey data presented above suggest that it is common for CSA farm operators to offer their shares below costs of production and below market costs for the same bundle. Their behavior does fit well into the neoclassical models of the firm that are often used in agriculture. In this section, a simple bargaining model is presented that offers explanations based on non-monetary benefits to the operator of selling produce as a CSA, termed warm-glow effects for convenience.

The players in the game, the CSA operator and consumer, are assigned certain payoffs as a result of their interactions with each other. In the model, these payoffs are referred to as utility payoffs and are a linear combination of payoffs. The interaction consists of the operator/farmer's decision to sell a share to the consumer and the consumer's decision to buy a share. The two players bargain over the price of the share, reach a successful agreement, and receive a payoff. There is also a linear combination of payoffs associated with the failure of either one or both players to reach an agreement. These payoffs are called disagreement payoffs.

Selling a share accrues the following payoff to the CSA operator

$$U_f = (p + w_f - c). \qquad (1)$$

where U_f is the farmer's utility payoff. The endogenous variable in the equation is p, the price of the CSA share. Both w_f, the warm-glow felt by the farmers, and c, the cost of production per share (including full opportunity costs), are parameters.

The share price, p, will be determined through a bargaining process with the shareholder. It is assumed that the operator's revenue is determined by the price of the share. In addition to the price of the share, p, the operator also accrues non-monetary benefits. The non-monetary benefits felt by the farmer are included under 'warm-glow', w_f. The concept of 'warm-glow' is a possible reason why CSA operators choose to practice this particular type of agricultural production. Non-monetary benefits to the operator include fulfillment of a desire to provide 'healthy' organic food and practice production methods that are less harmful to the environment (Van En and Roth 1992; Karr 1993). Rather than individually incorporate these benefits into the utility function, they are collectively called 'warm-glow' and are included as w_f. To put it in another way, the operator experiences a good feeling from practicing organic farming and providing the community with what he/she feels is healthy food and a better environment.

The cost of production, including full opportunity costs, is denoted as c. For the CSA operator, costs are incurred through the production process. Included in the cost are farm management, production, labor, as well as full opportunity costs.

For the sake of simplicity, one shareholder will represent all shareholders (consumers) of a CSA farm. In this way, the behaviors of the operator and shareholders can be modeled within the framework of a 2 person cooperative game. This convenient simplification of the model may also be assumed to represent a core-group for farms organized in that way. The consumer agrees to buy a share in the CSA and receives the following payoff

$$U_c = (b + w_c - p)\,. \tag{2}$$

Here U_c is the utility payoff of the consumer. It is linearly dependent on two parameters, the consumption benefit of the produce in the share (b) and the 'warm-glow' felt by the consumer (w_c), as well as on the variable p, the CSA share price .

The shareholder receives a specific amount of product (a share) and derives some benefit from this product. The parameter b covers the benefit derived from the pure consumption aspect of the share. The 'warm-glow' part of the function is a consolidation of the benefits that a shareholder derives from being a part of a CSA operation. These benefits may include education on organic gardening and farming provided by the CSA operator, the feeling that organic agriculture reduces social and environmental costs, and satisfaction in helping to reduce the impact of conventional agricultural production on the environment (Cooley 1996). These benefits are all included in the term w_c.

The consumer also pays a cost, p. This is the price of the CSA share itself. The price, p, does not include other costs associated with the share. For example, the time and money costs of picking up the share at the farm or at a distribution center are not included.

In the event that the CSA operator and/or the shareholder fail to reach an agreement, their payoff is determined by the disagreement point. This point is a constant and is pre-defined as the payoff each player will receive if the bargaining process over the price breaks down. For the CSA operator, the disagreement payoff is simply zero. If the farmer and the shareholder disagree, the farmer gets nothing:

$$d_f = 0\,. \tag{3}$$

The shareholder, on the other hand, has the option of buying the product somewhere else, for example, at a local grocery store thereby deriving the same benefit b. Thus, for the shareholder, the disagreement point can be defined as

$$d_c = (b - p_m)\,. \tag{4}$$

where p_m is the market price of the share. It is assumed that the same bundle can be obtained at the local grocery store.

The framework of a 2-person cooperative game and the Nash bargaining solution is applied to obtain an optimal solution. Cooperative games, defined as those in which the players have either identical or mixed interests and make agreements and/or unilateral commitments that are enforceable and binding (Harsanyi, 1977), are applicable to CSA operators and shareholders. Both have a common interest in organic produce and an environmentally 'friendly' means of production. The two players will bargain over the price of the produce and decide on a price that is mutually agreeable. The bargaining process enables the use of the simple bargaining game in modeling. The optimal price, determined via the Nash bargaining solution, involves maximizing the product of the payoffs of the two players. The details of this method are as follows:

$$\max_{U_f, U_c} \Pi = (U_f - d_f)(U_c - d_c) \tag{5}$$

$$s.t. \qquad U_i \in P \qquad where\ i = f, c \tag{5a}$$

$$and \qquad U_i \geq d_i. \tag{5b}$$

Π is the product of the payoffs of the two players. U_i are the utility payoffs of the two players and d_i are the disagreement points. The terms $(U_f - d_f)$ and $(U_c - d_c)$ are the net payoffs of the two players. P is defined as the convex payoff space.

Substituting equations (1) through (4) into equation (5) provides:

$$\Pi = (w_f + p - c - 0)(w_c + b - p - (b - p_m))$$

$$\max_{U_f, U_c} \Pi = (w_f + p - c)(w_c - p + p_m) \tag{6}$$

The necessary and sufficient condition to determine a solution is

$$(U_f - d_f) = (U_c - d_c). \tag{7}$$

The convexity of P, the payoff space, assures that the second order conditions are always satisfied. In other words, the second order conditions are greater than or equal to zero.

There is one endogenous variable in equation (6), p. Therefore, solving for p from the first-order condition:

$$\frac{\partial \Pi}{\partial p} = (w_f + p - c)(-1) + (w_c - p + p_m) = 0\,; \tag{8}$$

we find:

$$p^{*} = \tfrac{1}{2}[w_c - w_f + p_m + c]. \qquad (9)$$

The necessary and sufficient condition, (7), evaluated at p^* satisfies the necessary and sufficient condition for the Nash bargaining solution, that is, Π is maximized.

Comparative static results can be derived from equation (9). For example,

$$\frac{\partial p^*}{\partial w_c} > 0 \; ; \; \frac{\partial p^*}{\partial w_f} < 0 \; ; \; \frac{\partial p^*}{\partial p_m} > 0 \; ; \text{ and } \frac{\partial p^*}{\partial c} > 0 \, . \qquad (10)$$

Equations (10) imply that greater warm-glow felt by the consumer, will lead to a higher optimal share price, p^*. On the other hand, greater warm-glow of the farmer, will lead to a lower optimal price, p^*. Both market price, p_m, and cost of production, c, positively affect share price, p^*.

Cooley and Lass (1998) suggest that the CSA prices for produce are lower than the prices of comparable produce at local grocery stores. In other words, they found $p^* - p_m < 0$. Equation (9) can be used to consider results when p^* might be less than p_m. Subtracting p_m from both sides of equation (9), results in the following:

$$p^{*} - p_m = \tfrac{1}{2}[(w_c - w_f) + (c - p_m)] \, . \qquad (11)$$

There are two components on the right hand side of equation (11) to evaluate. The warm-glow effects of the consumer and farmer can be combined as (w_c - w_f). The warm-glow effects can then be compared to the second component, (c - p_m), to determine the sign (p^* - p_m).

If it is assumed that $w_f > w_c$ and that $c \leq p_m$, then $p^* < p_m$. That is, if the farmer feels greater warm-glow than the consumer and the cost of production of the share is less than or equal to the market price of the product in that share, then the share price, p^*, will be less than the market price, p_m. Conversely, if the warm-glow felt by the consumer exceeds the warm glow felt by the farmer ($w_c > w_f$), and the cost of production of a share is greater than or equal to the market price of the product in that share ($c \geq p_m$), then the optimal share price, p^*, will be greater than the market price, p_m.

An alternative manner of considering this result is as follows. If the cost of production of the share is equal to the market price of that share, that is, $c = p_m$, then the share price, p^*, is less than the market price, p_m, only if the farmer feels more warm-glow than the consumer. Still assuming that $c = p_m$, then the share price will be greater than the market price only if the consumer feels more warm-glow than the farmer. These results are summarized in Table 16.

Table 16. Results of the Bargaining Model.

Bargaining Model: $U_f = (p + w_f - c);\ U_c = (b + w_c - p);$ $d_f = 0;\quad d_c = (b - p_m)$		
Optimal Solution: $p^* = \frac{1}{2}[w_c - w_f + p_m + c]$		
Assumption 1	**Assumption 2**	**Result regarding p^*, p_m and c**
$w_f > w_c$	$c \leq p_m$	$p^* < p_m$
$w_f < w_c$	$c \geq p_m$	$p^* > p_m$
$w_f > w_c$	$c \geq p_m$	$p^* < c$
$w_f < w_c$	$c \leq p_m$	$p^* > c$

Now consider the relationship between the price of the share, p^*, and costs, c, incurred by the CSA operator. We found that many CSA farms sell shares at less than full economic costs. Subtracting c from both sides, equation (9) becomes

$$p^* - c = \tfrac{1}{2}[w_c - w_f + p_m - c]. \qquad (12)$$

If the farmer feels more warm-glow than the consumer and further assuming that the cost of production is greater than or equal to the market price, p_m, then the share price, p^*, will be less than the cost of production, c. If the consumer feels more warm-glow than the farmer and the cost of production is less than or equal to the market price, then the share price, p^*, will be greater than the cost of producing that share.

These results may also be interpreted as follows. If the cost of production, c, is equal to the market price, p_m, ($c = p_m$) then the share price, p^*, is less than the cost of production only if the farmer feels greater warm glow than the consumer. Still assuming that $c = p_m$, the share price, p^*, is greater than the cost of production only if the consumer feels greater warm glow than the farmer. It is quite possible that the market price, p_m, will exceed the costs of production, c. If so, the farmer will only sell the CSA share below cost if her/his own 'warm-glow' exceeds that of the consumer. These results are summarized in Table 16.

The CSA behavioral model can be extended in a straightforward manner. In the initial model, the farmer's disagreement point is zero profits, that is, $d_f = 0$. This assumption can be relaxed by allowing the CSA operator some alternative to selling through the CSA. In case of a disagreement, the farmer might sell to a wholesale market and receive price p_w. The CSA operator will now have the following disagreement payoff:

$$d_f = p_w - c_w . \tag{13}$$

where c_w is the cost of selling wholesale. One possibility is that costs differ by transportation costs, t:

$$c_w = c + t . \tag{14}$$

Given the new disagreement point for the farmer and again solving for p^* from the first-order condition:

$$\frac{\partial \Pi}{\partial p} = (-w_f - p + c + p_w - c_w) + (w_c - p + p_m) = 0 \tag{15}$$

we find:

$$p^* = \tfrac{1}{2}[w_c - w_f + p_m + p_w + c - c_w] . \tag{16}$$

Comparing the optimal price, p^*, in this model (equation 16) to the optimal price of the original model, p^* also depends upon the wholesale price of a share of produce and the cost of producing that share. In this model, the farmer must take into account not only the market price but also the wholesale price and cost. As in equation (11), the optimal price is positively affected by the warm-glow felt by the consumer and negatively affected by the warm-glow felt by the farmer. The optimal share price, p^*, is also positively affected by the market price, p_m, the wholesale price, p_w, and full cost of production, c. The wholesale cost of production, c_w, has a negative affect on the optimal share price. The comparative static results from the model are:

$$\frac{\partial p^*}{\partial w_c} > 0 \quad and \quad \frac{\partial p^*}{\partial w_f} < 0 ,$$

$$\frac{\partial p^*}{\partial p_m} > 0 \quad and \quad \frac{\partial p^*}{\partial p_w} > 0 ,$$

$$\frac{\partial p^*}{\partial c} > 0 \quad and \quad \frac{\partial p^*}{\partial c_w} < 0. \tag{17}$$

The assumed equation for the cost of selling produce wholesale, $c_w = c + t$, includes the full cost of producing a share plus the transportation cost associated with selling that produce to the wholesale market. This assumes that the cost of selling CSA produce in wholesale is greater than the cost of selling the same produce to the shareholders $(c < c_w)$. To derive useful results, some additional assumptions are made.

To explore the relationship between the optimal share price, $p*$, and the market price of the produce in that share, p_m, the following equations are derived by subtracting p_m from both sides of equation (16):

$$p^* - p_m = \tfrac{1}{2}[(w_c - w_f) + (p_w - p_m) + (c - c_w)] \quad (18)$$

$$p^* - p_m = \tfrac{1}{2}[(w_c - w_f) + (p_w - p_m) - t]. \quad (19)$$

It is reasonable to assume that $c_w = c + t$; therefore, $c - c_w = -t < 0$. It is also reasonable to assume that the market price of a share of produce is greater than or equal to the wholesale price. Thus, we can not find any cases where $w_f > w_c$ is necessary to have $p* - p_m < 0$. However, $p* > p_m$ if and only if $w_c - w_f > 0$. In other words, the share price, $p*$, will be greater than the market price, p_m, if and only if the magnitude of ($w_c - w_f > 0$) is enough to make the right hand side of equation (19) positive.

Some conclusions can also be drawn regarding the relationship between the share price of the produce and the wholesale price of the produce. Subtracting p_w from equation (16) will yield the following equation:

$$p^* - p_w = \tfrac{1}{2}[w_c - w_f + (p_m - p_w) - t]. \quad (20)$$

If we assume $(p_m - p_w) - t > 0$, then the share price, $p*$, will be less than the wholesale price, p_w if the warm-glow felt by the farmer is greater than the warm-glow felt by the consumer ($w_f > w_c$). That is, the magnitude of $w_c - w_f < 0$ must be large enough to offset the positive effect of $(p_m - p_w) - t$ so that $p* < p_w$.

The price of a share of produce and the cost of producing that share can be compared. Rearranging equation (16), we find:

$$p^* - c = \tfrac{1}{2}[(w_c - w_f) + (p_m - c) + (p_w - c_w)]. \quad (21)$$

If the farmer could sell at a profit both at the wholesale level ($p_w - c_w > 0$) and at the market level, ($p_m - c > 0$), then the share price, $p*$, will be less than the cost of producing that share, c, if and only if the farmer's warm-glow exceeds the consumer's. Table 17 summarizes the above results.

Table 17: Results of the Model Based on a New Disagreement Point for the Farmer

Extended Model 1: $U_f = (p + w_f - c)$; $U_c = (b + w_c - p)$; $d_f = p_w - c_w$; $d_c = (b - p_m)$.		
Optimal Solution: $p^* = \frac{1}{2}[w_c - w_f + (p_m - c) + (p_w - c_w)]$ Given that: $c_w = c + t$.		
Assumption 1	**Assumption 2**	**Result regarding $p^*, p_m, p_w,$ and c**
$w_f < w_c$	$(p_w - p_m) - t < 0$	$p^* > p_m$
$w_f > w_c$	$(p_m - p_w) - t > 0$	$p^* < p_w$
$w_f > w_c$	$(p_m - c) > 0$ and $(p_w - c_w) > 0$	$p^* < c$

Conclusions

Community Supported Agriculture is an innovative marketing approach. CSA operations practice alternative/organic method of production and sell their product as shares of produce from the farm. The operator benefits from lower direct marketing costs and the ability to spread risk. Consumers benefit because they typically receive locally grown, quality organic produce that has been found to often be less expensive the retail alternatives. Noncommercial benefits include reduced impact on the environment as a result of sustainable production, the integration of the farm with the local community, providing educational opportunities to the local community, and providing surplus food to local food banks. The goals of this research were to examine the viability as well as behavioral aspects of this novel approach to agriculture.

One objective of this research was to investigate the viability of CSA farms. The survey results presented here suggest that CSA farms are not currently viable given our result that most operators are not paid the full value of their labor. While this may be a choice made by the operator, it would not seem to be a sustainable choice.

In CSA farms with a core group, shareholders and the farmer may bargain over the price and content of a share. The results suggest that core-group farms are more successful, possibly because of the interaction between shareholders and farmer on the CSA budget. CSA shareholders may well be much more willing to insure the farmer receives a fair wage for her/his services. Regression analyses confirmed the implications of the summary statistics; CSA farms were found to earn nearly $9,000 more in net income.

The core-group CSA farms are appropriate for the bargaining model presented and the results of the survey and bargaining model are consistent. It is reasonable to assume that greater 'warm-glow' by the shareholder would have a positive effect on the optimal share price; whereas, the 'warm-glow' of the farmer would have a negative affect on the share price. The model offers plausible explanations for some observed CSA operator behavior. Bargaining that takes place between a core-group and the farmer presents a vehicle by which consumer and farmer warm-glow effects can influence price. The core-group is a way for the farmer to realize the consumer warm glow effects on share price.

In summary, based on reported costs by CSA operators, the average CSA farm does appear to be viable. However, the results of this research give evidence that CSA operations do not take into account the full economic costs of production, especially wages for the farm operator. When the operator was paid a wage, on average, the operations surveyed earned a net negative income. If these farms were to take into account the full economic costs of production and price their share accordingly, the CSA would be a viable approach to agriculture.

Appendix: Detailed data on Average Costs for CSA Operations, 1995 and 1996.

Costs	Average ($) 1995 per Farm	Average ($) 1995 per Share	Average ($) 1996 per Farm	Average ($) 1996 per Share
Seeds, plants & seed treatments	1191.52	15.87	1335.64	17.28
Fertilizers & soil conditioners	776.99	10.35	768.7	9.95
Pest control	145.08	1.93	178.93	2.32
Custom work in 1996	267.02	3.56	235.47	3.05
All fuels, oils, LP gas, etc.	1043.64	13.9	1082.5	14.01
Total expenses for hired workers	15184.1	202.21	11619.8	150.34
Depreciation	3818.23	50.85	2775.5	35.91
Utilities	814.99	10.85	1049.97	13.58
FCIC & other crop insurance	0	0	54.66	0.71
All other insurance	950.27	12.66	926.12	11.98
Interest & fees on farmland, etc.	689.22	9.18	226.1	2.93
Interest & fees on operating loans	66.91	0.89	0	0
Fees for motor vehicles	60.58	0.81	52.65	0.68
Real estate taxes	331.02	4.41	371.87	4.81
Other property & excise taxes	0.1	0	16.52	0.21
General business expenses	1172.74	15.62	2102.57	27.2
Repairs for vehicles, equip., etc.	1579.49	21.03	2057.29	26.62
Farm supplies & hand tools	1475.49	19.65	1938.31	25.08
Rental or lease of equipment, etc.	393.15	5.24	201.77	2.61
Marketing expenses	320.35	4.27	384.52	4.98
Other miscellaneous expenses	393.2	5.24	875.45	11.32
Capital Expenditures	1363.76	18.16	3601.97	46.6
Total CSA Expenses	32037.9	426.66	31856.3	412.17
Cash Expenses (Less capital exp.)	30674.1	408.5	28254.3	365.56

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