

Comparison of Premiums and Returns in Organic Pork Production

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Introduction

Organic pork production is a relatively new and expanding segment of the pork industry. Similar to some other niche markets, it has experienced a relatively rapid growth during recent years.

It is well known that cost of organic pork production is greater than traditional pork production due to increased feed costs and decreased swine performance. The industry has dealt with this by paying premiums to producers who produce the product. However, it is not clear on what levels or how the premiums should be paid to give producers an incentive to provide a steadier product flow throughout the year. With premium structures currently used for organic pork there are more hogs being produced using summer farrowing than by winter farrowing. This uneven pig flow causes an instability of supply and product flow problems throughout the industry. This instability can lead to problems of slaughter capacity scheduling utilization as the industry grows and matures. Also, at certain time periods the demand for fresh organic pork products may not be met.

During other times, the availability of fresh organic pork may exceed demand. These issues create problems for a developing industry, which is attempting to establish and maintain a reliable consumer base.

The objective of this report is to evaluate alternative premium payments and structures for organic pork production. Structured properly, premiums provide adequate incentives for increased winter farrowing and a more even flow of fresh pork products available to consumers throughout the year. This report addresses the issue by examining the increase of costs involved in expanding a seasonal (summer only farrowing) organic pork production system to continuous production of organic hogs. A seasonal and a continuous system of production are

used to provide a basis to determine cost differences between the two types of production systems. It is also necessary to examine the production cost differences between the summer and winter periods of a continuous system to establish a basis for differences in premiums paid between winter and summer farrowed hogs. The final issue addressed is a comparison of premium payment alternatives.

Materials and Methods

Prediction costs for two organic pork production system are provided: a seasonal system and a continuous production system. The seasonal system has spring and summer only farrowing. Farrowing occurs in April, June/July, and September. One group is farrowed in April and again in September/October, whereas another group is farrowed in June/July. The April and September/October farrowing are sows retained from the June/July gilt farrowings of the previous year. With continuous farrowing, there are six groups of females farrowed twice per year. Farrowing occurs every month. Facility and breeding herd investment levels are determine for each system. The seasonal system has two groups of 80 females, whereas the continuous system has six groups of 27 females each.

Gilt prices were \$175 and boar prices were \$750.00. When breeding herd investment is adjusted for sow and boar cull values the net investment is \$19,681 for the seasonal organic system and \$16,970 for the continuous system.

Ration costs per pound are as follows: 10.9 cents for the nursery phase, 9.3 cents for the grower phase, 8.0 cents for the finishing phase, 8.8 cents for the lactation phase, and 7.3 cents for the gestation phase. Winter feeding uses 10% more feed to produce a pound of gain. This result is what has been shown over time at the Iowa Sate University Rhodes Research/Demonstration Farm. The overall feed efficiency used for the seasonal system is 3.89 lbs. of feed per pound of gain. It is 4.00 for the continuous system.

Information on organic pork production system investment levels, pig flow, and labor needs is provided in other articles in the 2001 Swine Research Report. Death loss and pigs per litter is provided in Table 1. As seen, the number of pigs per litter is lower for the winter farrowing than summer farrowing period.

Table 1. Death loss and pigs per litter by organic production system.

Item	Seasonal	Continuous	Continuous Summer	Continuous Winter
Pigs per litter	8.61	8.46	8.61	8.32
Pre wean mortality	9.1%	9.9%	9.1%	10.7%
Pigs weaned per litter	7.83	7.63	7.83	7.43
Nursery mortality	7.41%	8.23%	7.41%	9.09%
Grower mortality	7.00%	8.00%	7.00%	9.07%
Finishing mortality	1.08%	1.09%	1.08%	1.10%
Pig finished per litter	6.67	6.37	6.67	6.07

Results and Discussion

Cost of producing pork in a continuous system is shown in Table 2. The annual production cost for the continuous system was \$63.88 per hundred pounds. This cost compared with \$59.45 per hundred pounds for the seasonal system or a difference of \$4.43 per hundred pounds.

Table 2 shows that the winter and summer production costs for the continuous organic pork production system are

\$66.92 and \$61.11, respectively, per hundred pounds. A summary of production costs and difference is provided in Table 3. These production cost differences are used in developing the comparison of premiums required to offset the added production costs for a continuous production system.

Table 2. Organic pork production costs for continuous production winter versus summer.

Variable Costs	Total	Per Head	Variable Costs	Total	Per Head	Difference
Feed	\$85,977	\$87.43	Feed	\$93,513	\$86.54	\$0.89
Health costs	671	0.68	Health costs	361	0.33	0.35
Bedding	5,418	5.51	Bedding	4,902	4.54	0.97
Repairs	1,921	1.95	Repairs	1,921	1.78	0.18
Record keeping	2,500	2.54	Record keeping	2,500	2.31	0.23
Fuel/Utilities	2,476.66	2.52	Fuel/Utilities	1,651.10	1.53	0.99
Subtotal	\$98,963	\$100.64	Subtotal	\$104,849	\$97.03	\$3.61
Interest	4,948	5.03	Interest	5,242	4.85	0.18
Labor	22,680	23.06	Labor	19,440	17.99	5.07
Breeding herd	8,485	8.63	Breeding herd	8,485	7.85	0.78
Trucking	2,458	2.50	Trucking	2,701	2.50	0.00
Total	\$137,535	\$139.86	Total	\$140,718	\$130.23	\$9.64
Fixed Costs	\$26,970	\$27.43	Fixed Costs	\$24,370	\$22.55	\$4.87
Total	\$164,505	\$167.29	Total	\$165,088	\$152.78	\$14.51
Total hogs sold	983		Total hogs sold	1,081		
Total weight sold	245,835		Total weight sold	270,135		
Break even	\$66.92		Break even	\$61.11		
Total cost difference per hundred weight		\$5.80				

Table 3. Cost of organic pork production.

System or Season	Per Pig (\$)	Per CWT (\$)	Difference From Seasonal (\$)
Seasonal	148.61	59.45	
Continuous	159.70	63.88	4.43
Winter continuous	167.29	66.92	7.47
Summer continuous	152.03	61.11	1.67

As shown above, organic pork production costs vary by season of the year and by type of production system. Given these differences in production, the premium structure established could encourage or discourage a more even supply of fresh organic pork throughout the year. The cost structure can provide insight into the necessary premium structure which would encourage production during the high-cost periods. There are several issues involved in determining how and when to pay premiums to organic swine producers:

- ! Establishing a premium that would encourage producers to adapt to continuous organic pork production providing a more even supply of fresh organic pork products.
- ! Establishing a premium that would minimize the chances or opportunities for producers to abuse the system.
- ! Establishing a premium that adjusts or moves with changes in production costs.
- ! Establishing a premium system that provides benefits to the producers as well as the processor

Tables 4-7 examine several organic pork production premium scenarios by examining the return to management and the return to labor and management for the selected premium systems for selected base prices. Tables 4 and 5 provide information on the premiums with the premiums being applied to all the pigs within the system, whereas Tables 6 and 7 restrict the premiums to 150 pigs per month. With the second scenario 150 pigs represents the number of pigs sold during the lowest pig flow month with the continuous production system. The continuous system as structured could provide at least that many pigs per month but would require some allowances for variability within the system. Restriction of the number of pigs per month available for the premiums would prevent producers from abusing the system by producing additional hogs during the summer and taking advantage of any additional premiums offered during that time of the year. Additionally, fixing the number of pigs to be marketed with the additional premiums corresponds with the goal of providing a uniform supply of organic pork.

Premiums are analyzed first with a constant or net premium for all the months of the year. They also are compared using premiums that are determined as a set

percentage for all the months of the year. Finally, they are compared using set and percentage premiums that vary by the season (winter or summer). Constant premiums are premiums that remain the same throughout the year regardless of season. Although these systems provide a more steady level of cash receipts, they also provide the opportunity for producers to take advantage of the system by over producing hogs farrowed in the summer or during any period, which is easier. When setting an average premium and holding it constant for the year it will be higher than needed for summer farrowed pigs and lower than needed for winter farrowed pigs. This in effect encourages over production of summer farrowed pigs and under production of winter farrowed pigs.

The three premium system comparisons provided are the summer versus winter, continuous versus seasonal, and seasonal versus winter difference in premiums. The set amount premiums are calculated by comparing the differences in the per hundred weight break-even production costs for each of the systems as provided in Table 3. For example, subtracting the continuous system's per hundred pound break-even from the seasonal system's per hundred pound break-even ($\$63.88 - \$59.45 = \$4.43$) the \$4.43 per hundred weight difference is established as the premium to be paid in the winter and the summer. Comparisons of the returns for each scenario can be made with the seasonal system, which is displayed on the bottom line of the respective tables. It is important to realize that these are premiums over and above the usual organic market price. As expected, premiums based upon summer versus winter differences as well as seasonal versus winter differences surpass the return to management as well as return to management and labor that is required to make up for the costs that are required to make up for the additional costs of production. These premiums should be adequate to promote changes in producer behavior but may be more than the market is willing or able to pay. Additionally, impacts on processor profits are needed. These impacts would include the cost saving that occurs due to the better control of costs that occurs with an even flow of product.

An alternative to the constant premium is to alter the premium according to season. Two systems are examined here with the altered base system and continuous versus seasonal production. The altered base is calculated by taking seasonal versus continuous premium and subtracting 50% of the summer versus winter premiums ($\$4.43 - (63.88 - 59.45)/2$) and adding the same amount for the winter ($\$4.43 + (63.88 - 59.45)/2$). The seasonal versus continuous is calculated by subtracting the break-even of the seasonal by the break-even of each of the seasons within the

continuous. Both of these systems have nearly the same return to management as the seasonal system but superior return to labor and management with prices at the respective selected market prices. For example, with a market price of \$60.00 for seasonal organic production the per pig return to management was \$1.39 (Table 4). The continuous production system receiving a premium of \$7.47 for the summer and \$1.67 for the winter was \$1.41 per pig. Per pig return to labor and management was \$16.38 and \$21.82 respectively for the same scenario (Table 5).

Payments based upon a set amount annually do not take into account changes in production costs throughout the year. These cost changes need to be reflected in the product price with the market price adjusted to reflect the changes in order to encourage a more even flow of organically produced pork.

As the cost of production increases due to input price increases, an approach that has a constant premium will, by design, lead to lower rates of return similarly production cost decreases will increase returns. Examining the premiums based upon the percentages of the cost difference can account for this issue. Percentage premiums are determined by dividing the break even production cost for the respective scenarios being compared and then subtracting it from one to calculate the percentage premiums. For example, 1 - seasonal/continuous ($1 - 63.88/59.45 = .0694$). The net return to management and labor and management are again shown in Tables 4 & 7 for the

percentage premiums with the tables differing only in premiums paid and no assumption of cost differences.

It is shown that as the base organic market price increases the return differences increase. For example, as shown in Table 4, the altered base system established as set amounts provides a loss of \$11.43 per pig with a market price of \$55, a positive return of \$1.07 per pig with a \$60 market price, and a positive \$13.57 per pig at a \$65 market price. But the altered base when established by the percent difference in costs provides a negative \$12.92 per pig with a \$55 market price, a positive \$.45 per pig with a \$60 market price, and a positive \$13.77 per pig at \$65 market price. As can be seen, the return to management goes from a \$1.49 difference in favor of the set premiums to a \$.20 difference in favor of the percentage based premiums. It should be pointed out that these figures were determined under the assumption that the cost structure does not shift, an assumption that may not hold if there is a shift in the base price that is being offered.

The continuous versus seasonal premiums have identical returns to management when premiums are paid on all hogs but the return to management is lower for continuous production when premiums are restricted to 150 hogs per month. But with both premium systems, the return to labor and management is greater for the continuous system than for the seasonal system.

Table 4. Per pig return to management from organic pork production when premiums are received on all hogs.

Premium System	Premium*		Market Price**			
	Winter	Summer	\$55	\$60	\$65	\$70
Continuous Premium Systems (Set Amounts)						
Summer Continuous vs. Winter Continuous	\$5.80	\$5.80	(\$7.69)	\$4.81	\$17.31	\$29.81
Seasonal vs. Continuous	4.43	4.43	(11.11)	1.39	13.89	26.39
Seasonal vs. Winter Continuous	7.47	7.47	(3.52)	8.98	21.48	33.98
Continuous Premium Systems (Percentages)						
Summer Continuous vs. Winter Continuous	8.67%	8.67%	(\$10.27)	\$3.31	\$16.98	\$30.48
Seasonal vs. Continuous	6.94%	6.94%	(12.65)	0.71	14.08	27.45
Seasonal vs. Winter Continuous	11.17%	11.17%	(6.84)	7.05	20.95	34.84
Base Adjustment Systems (Set Amounts)						
Altered Base \$7.33	\$1.53	(\$11.43)	\$1.07	\$13.57	\$26.07	
Seasonal vs. continuous	7.47	1.67	(11.09)	1.41	13.91	26.41
Base Adjustment Systems (Percentages)						
Altered base 11.28%	2.60%	(\$12.92)	\$0.43	\$13.77	\$27.12	
Seasonal vs. Continuous	11.17%	2.73%	(12.90)	0.45	13.79	27.14
Seasonal System 0	0	(\$11.11)	\$1.39	\$13.89	\$26.39	

*Premiums are per hundred weight.

**The market price is per hundred weight while returns shown in the table are per pig.

Table 5. Per pig return to labor and management from organic pork production when premiums are received on all hogs.

Premium System	Premium*		Market Price**			
	Winter	Summer	\$50	\$60	\$65	\$70
Continuous Premium Systems (Set Amounts)						
Summer Continuous vs. Winter Continuous	\$5.80	\$5.80	\$12.72	\$25.22	\$37.72	\$50.22
Seasonal vs. Continuous	4.43	4.43	9.30	21.80	34.30	46.80

Seasonal vs. Winter Continuous	7.47	7.47	16.89	29.39	41.89	54.39
Continuous Premium Systems (Percentages)						
Summer Continuous vs. Winter Continuous	8.67%	8.67%	\$10.14	\$23.72	\$37.31	\$50.89
Seasonal vs. Continuous	6.94%	6.94%	7.75	21.12	34.49	47.86
Seasonal vs. Winter Continuous	11.17%	11.17%	13.56	27.46	41.36	55.25
Base Adjustment Systems (Set Amounts)						
Altered Base \$7.33	\$1.53	\$8.98	\$21.48	\$33.98	\$46.48	
Seasonal vs. Continuous	7.47	1.67	9.32	21.82	34.32	46.82
Base Adjustment Systems (Percentages)						
Altered Base 11.28%	2.60%	\$7.49	\$20.84	\$34.18	\$47.52	
Seasonal vs. Continuous	11.17%	2.73%	7.51	20.86	34.20	47.55
Seasonal System 0	0	\$3.88	\$16.38	\$28.88	\$41.38	

*Premiums are per hundred weight.

**The market price is per hundred weight while returns shown in the table are per pig.

Table 6. Per pig return to management from organic pork production when premiums are received on a maximum of 150 hogs/month.

Premium System	Premium*		Market Price**			
	Winter	Summer	\$50	\$60	\$65	\$70
Continuous Premium Systems (Set Amounts)						
Summer Continuous vs. Winter continuous	\$5.80	\$5.80	(\$9.54)	\$2.96	\$15.46	\$27.96
Seasonal vs. Continuous	4.43	4.43	(12.53)	(0.03)	12.47	24.97
Seasonal vs. Winter continuous	7.47	7.47	(5.91)	6.59	19.09	31.59
Continuous Premium Systems (Percentages)						
Summer Continuous vs. Winter Continuous	8.67%	8.67%	(\$11.79)	\$1.65	\$15.10	\$28.54
Seasonal vs. Continuous	6.94%	6.94%	(13.87)	(0.62)	12.64	25.90
Seasonal vs. Winter Continuous	11.17%	11.17%	(8.81)	4.91	18.63	32.35
Base Adjustment Systems (Set Amounts)						
Altered Base \$7.33	\$1.53	(\$12.53)	(\$0.03)	\$12.47	\$24.97	
Seasonal vs. Continuous	7.47%	1.67%	(12.23)	(0.27)	12.77	25.27
Base Adjustment Systems (Percentages)						
Altered Base 11.28%	2.60%	(\$13.87)	(\$0.62)	\$12.64	\$25.90	
Seasonal vs. Continuous	11.17%	2.73%	(13.86)	(0.61)	12.65	25.91
Seasonal System 0	0	(\$11.11)	\$1.39	\$13.89	\$26.39	

*Premiums are per hundred weight.

**The market price is per hundred weight while returns shown in the table are per pig.

Table 7. Per pig return to labor and management from organic pork production when premiums are received on a maximum of 150 hogs/month.

Premium System	Premium*		Market Price**			
	Winter	Summer	\$50	\$60	\$65	\$70
Continuous Premium Systems (Set Amounts)						
Summer Continuous vs. Winter Continuous	\$5.80	\$5.80	\$10.87	\$23.37	\$35.87	\$48.37
Seasonal vs. Continuous	4.43	4.43	7.88	20.38	32.88	45.38
Seasonal vs. Continuous	7.47	7.47	14.50	27.00	39.50	52.00
Continuous Premium Systems (Percentages)						
Summer Continuous vs. Winter Continuous	8.67%	8.67%	\$8.61	\$22.06	\$35.50	\$48.95
Seasonal vs. Continuous	6.94%	6.94%	6.53	19.79	33.05	46.30
Seasonal vs. Winter Continuous	11.17%	11.17%	11.60	25.32	39.04	52.75
Base Adjustment Systems (Set Amounts)						
Altered Base \$7.33	\$1.53	\$7.88	\$20.38	\$32.88	\$45.38	
Seasonal vs. Continuous	7.47	1.67	8.18	20.68	33.18	45.68
Base Adjustment Systems (Percentages)						
Altered Base 11.28%	2.60%	\$6.53	\$19.79	\$33.05	\$46.30	
Seasonal vs. Continuous	11.17%	2.73%	6.54	19.80	33.06	46.32
Seasonal System 0	0	\$3.88	\$16.38	\$28.88	\$41.38	

*Premiums are per hundred weight.

**The market price is per hundred weight while returns shown in the table are per pig.

Summary and Conclusions

This study has shown that it costs more to produce pork organically than through conventional methods. It further shows that production costs are seasonal. Moreover, they differ by production systems. To foster a uniform supply of fresh organic pork throughout the year, premiums received by producers need to reflect the production cost differences. If not, there will be a tendency to overproduce during the summer farrow groups and underproduce during winter farrow groups. The flow of pigs to market is much more even for the continuous system ranging from approximately 155 to 181 pigs per month, a difference of 14%. For the seasonal system, it ranges from 0 to 420 pigs per month, a much larger difference. For the seasonal system, there were 2 months where there were no hogs marketed; 2 other months produced approximately 50 pigs with the seasonal system, 40% of the fresh pork is available in 2 months (December and January). The continuous system provides a much more consistent supply of fresh pork throughout the year.

To manage a stable flow of pigs, it would be best to provide premiums for an established number of pigs each month. Additionally, premiums should reflect seasonal production cost differences. If the premiums reflect differences in production costs, production costs for continuous organic production are \$4.43 per hundred pounds over seasonal organic production. Summer continuous production is \$1.67 over seasonal production, whereas winter continuous production is \$7.47 over seasonal production. Premiums, which are an established percentage, allow for automatic adjustments that follow the base cost of production. These premiums move in anticipation to changes in the base production cost. The base production cost changes with increases or decreases in input cost such as feed.