A comparison of risk and return for contract and independent hog finishing (1995)

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A COMPARISON OF RISK AND RETURN FOR CONTRACT AND INDEPENDENT HOG FINISHING

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Summary

Risks associated with independent hog finishing have prompted producers to seek alternative production and marketing methods. A means of reducing risk has developed through contract hog finishing. Research results indicate that risk-neutral producers require contract base payments ranging from $11.25 to $14.00 per head. Strongly risk-averse producers require contract base payments ranging from $4.75 to $7.75 per head. The lower ends of the ranges are for a contract with performance incentives. The upper ends of the ranges are for a flat contract without performance incentives. Calculated required base payments are similar to those payments currently received by contract hog finishers.

(Key Words: Risk Management, Contract Hog Production.)

Introduction

Growth in contract hog production has been documented through surveys initiated by James Rhodes and Glen Grimes at the University of Missouri. Survey results for 1992 indicated that contract hog producers marketed 14 to 16 million head of hogs. This number is an increase from a 1986 survey estimating contract marketings at 9.5 million head of hogs. The 1992 survey indicated that 79% of all contract hog operations existed in the North Central region of the U.S. A 1993 survey indicated an increase in contract hog producers of 27.8% over 1992 survey findings. Of the 10,995 producers entering contract hog production for 1993, 7,337 of these producers were finishing contractors. Producers responding to the 1993 survey marketed over 50,000 head of hogs annually and anticipated a growth rate of 30% between 1993 and 1994. Furthermore, large producers anticipated doubling 1993 marketings by 1996.

Farms marketing less than 1,000 hogs annually have dropped from an estimated 670,000 in 1970 to the most recent estimate of 213,000 farms in 1993, whereas the amount of pork produced has actually increased in recent years. This trend is due to economies of size for larger herds. USDA estimates show that average hog production costs decline from $60/cwt for inventories of 140 head to $43/cwt for inventories of 10,000 head. Increasing herd size to capture economies of size requires a large capital outlay. As herd size increases, management needs also increase. Hog production contracts are potential means of alleviating management constraints and capital constraints.

Several advantages and disadvantages exist for contract hog production. Publications by James Rhodes indicate advantages, including access to new technology, access to market information, increased specialization, equal or superior access to all inputs including capital, and the production of volume and quality of hogs that attract packer premiums rather than discounts. Disadvantages to producers from contract finishing include reduction in management flexibility, contract risk, limited returns, and commingling of

pigs. Contract risk involves costs associated with the contract not being renewed by the contractee and litigation costs from a failed contract.

Realization of low hog prices in 1994 may have temporarily slowed contract hog expansion. However, hog prices during 1995 have again offered profits for producers. Scheduled openings of packing plants by IBP in Indiana and Seaboard in Oklahoma will create an additional 15,000 head/daily of killing capacity and potentially push hog prices higher. Increased expansion in contract hog production will soon follow as investors recognize the potential for high returns on investment historically realized for hog production. With the increasing supply of contracts available, hog finishers need be aware of the relationship between independent and contract costs and profits. The objective of this study was to determine the level of contract payments for which producers would switch from independent to contract hog finishing.

Procedures

Three individual hog-finishing contracts and independent hog production were evaluated to determine the level of contract payments for which producers would switch from independent to contract hog finishing.
Contract A offers finishers a relatively low base payment and high performance premiums (Table 1). Contract B offers finishers a relatively high base payment and low performance premiums (Table 2). Contract C offers finishers a flat per/pig rate with no performance premiums. Performance payment schedules were determined using F/G and death loss values from Iowa State Swine Enterprise Reports. Average performance payments for contract A were $2.80/pig for F/G and ($0.10)/pig for death loss efficiency, and average performance payments for contract B were $0.33/pig for F/G and $0.05/pig for death loss.

Using data obtained through the Kansas State University Farm Management Data Base, yearly returns over variable costs to independent hog finishing were computed for

the period 1986 to 1994. Data were used to estimate costs for independent and contract production. Variable costs ($5.98/pig) incurred by contract producers included: labor, repairs-tools-supplies, gas-fuel-oil, personal property tax, general farm insurance, utilities, and interest paid. Independent producers incurred variable costs ($59.72/pig) of: labor, repairs-tools-supplies, feed purchased, farm organization fees, veterinary-medicine, livestock marketing and breeding fees, gas-fuel-oil, personal property tax, general farm insurance, utilities, auto expense, and interest paid.

This study used calculated returns over variable costs to hog finishing and stochastic dominance to compare contract and independent hog finishing for risk-neutral (profit maximizer), slightly risk-averse, and strongly risk-averse producers. Stochastic dominance is a technical procedure used to evaluate potential alternative production strategies.

Although the risk level (i.e., risk neutral, slightly risk averse, and strongly risk averse) of the producer may be ambiguous, most producers would be risk neutral to slightly risk averse. A risk-averse producer would prefer a low level of variability in annual returns or a low probability of negative returns. Average returns for independent hog finishing are substantially higher than those for contract finishing. However, independent hog returns are considerably more variable, and negative returns occur periodically. Thus, risk-averse producers or those wanting to better manage cash flows may prefer contract production.

Results and Discussion

Table 3 provides a summary of base payments for which hog finishers would switch from independent to contract finishing for alternative risk levels. Note, for contract A and contract B, performance premiums were not included in base payments. A producer who is not particularly concerned about risk would require a base payment of $11.25/pig for contract A and $14.00/pig for contract C. A producer who is extremely concerned about the variability of returns

(i.e., a risk-averse producer) would require a base payment of $4.75/pig for contract **A** and $7.75/pig for contract **C**.

Adding average premium payments to base payments for contracts **A** and **B** in Table 3 yields a relative means of comparing all contracts. Upon making these calculations, payment levels for each alternative contract were approximately equal for the risk-neutral and slightly risk-averse producer. This indicates that the contracts chosen for this study have been derived by the contractee to mirror each other based on historical performance of finishers. Payment levels for contract **C**, per pig payment, are representative of the levels currently received by finishers.

Performance- and cost-adjusted required payment levels for contracts **A** and **B** begin to noticeably differ from those of contract **C** for the strongly risk-averse producer. This is indicative of the variability observed for contracts offering performance payments relative to a flat per pig payment.

Summary statistics of returns over variable costs for a risk-averse finisher evaluating contract and independent hog finishing are listed in Table 4. Independent hog finishing realized considerably higher returns over variable costs ($11.27/pig) than did contract hog finishing ($5.49/pig for **A**, $5.08/pig for **B**, and $5.44/pig for **C**). A measure of variability between returns over variable costs for alternative finishing methods is the coefficient of variation. The coefficient of variation for contract finishing ranged from 0.079 to 0.107, whereas that for independent finishing was 1.178. That is, independent-finishing returns over variable costs yielded 11 times more variability in returns/pig than did contract-finishing returns over variable costs.

Producers seeking to continue hog finishing need to realize the risks associated with independent and contract finishing. Although contract finishing offers less variability in returns, a particular contract must be chosen to fit an individual finisher's management skills.

Table 1.   Bonus Payment Schedule for Contract A

F/G (lbs feed/lbs gain)	Dollars per head sold	Death loss (percent)	Dollars per head sold
2.80-2.89	5.10	0.00-0.00	2.10
2.90-2.99	4.80	0.01-0.50	1.80
3.00-3.09	4.50	0.51-0.99	1.50
3.10-3.19	4.20	1.00-1.50	1.20
3.20-3.29	3.90	1.51-1.99	0.90
3.30-3.39	3.60	2.00-2.50	0.60
3.40-3.49	3.30	2.51-3.00	0.30
3.50-3.59	3.00	3.01-3.99	0.00
3.60-3.69	2.70	4.00 or above	split death loss
3.70-3.79	2.40		
3.80-3.89	2.10		
3.90-3.99	1.80		
4.00-4.09	1.50		
4.10-4.19	1.20		
4.20-4.29	0.90		
4.30-4.39	0.60		
4.40-4.49	0.30		
4.50 or above	0.00		

Table 2. Bonus Payment Schedule for Contract B

F/G (lbs feed/lbs gain)	Dollars per head sold	Death loss (percent)	Dollars per head sold
0.00-2.29	7.00	0.00-0.99	1.50
2.30-2.39	6.50	1.00-1.99	1.00
2.40-2.49	6.00	2.00-2.99	0.50
2.50-2.59	5.50	3.00 or above	0.00
2.60-2.69	5.00		
2.70-2.79	4.50		
2.80-2.89	4.00		
2.90-2.99	3.50		
3.00-3.09	3.00		
3.10-3.19	2.50		
3.20-3.29	2.00		
3.30-3.39	1.50		
3.40-3.49	1.00		
3.50-3.59	0.50		
3.60 or above	0.00		

Table 3. Contract Base Payments ($/Pig/Year) Levels for Which Hog Finishers Will Switch from Independent to Contract Finishing

	Risk level		
Contract	Risk neutral[a]	Slightly risk averse[a]	Strongly risk averse[a]
Contract A	$11.25	$8.00	$4.75
Contract B	$13.50	$10.50	$7.25
Contract C	$14.00	$10.75	$7.75

[a]If the base payment is higher than the level indicated, a producer would prefer contract production over independent production. If the base payment is lower than the level indicated, a producer would prefer independent production over contract production.

Table 4. Summary Statistics of Returns over Variable Costs for a Slightly Risk-Averse Hog Finisher, $/Pig/Year

Contract	Average	Minimum	Maximum	CV[a]
Contract A	$5.49	$4.51	$6.69	0.107
Contract B	$5.68	$5.05	$6.89	0.093
Contract C	$5.54	$4.56	$6.14	0.079
Independent	$11.27	($13.62)	$28.27	1.178

[a]CV represents the coefficient of variation, which is defined to be standard deviation divided by the mean.