Kansas Agricultural Experiment Station Research Reports

1996

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Abstract

Risks associated with independent feeder-pig production have prompted producers to seek alternative production and marketing methods. A means of reducing risk has developed through contract feeder-pig producing. Research results indicate that slightly risk-averse producers required contract base payments ranging from $7.50 to $28.50 per head. Strongly risk-averse producers required contract base payments ranging from $2.50 to $17.75 per head. The lower end of the ranges is for a low-profit producer. The upper end of the ranges is for a high-profit producer.; Swine Day, Manhattan, KS, November 21, 1996

Keywords

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DETERMINATION OF CONTRACT BASE PAYMENTS TO FEEDER-PIG PRODUCERS

J. L. Parcell[1] and M. R. Langemeier[1]

Summary

Risks associated with independent feeder-pig production have prompted producers to seek alternative production and marketing methods. A means of reducing risk has developed through contract feeder-pig producing. Research results indicate that slightly risk-averse producers required contract base payments ranging from $7.50 to $28.50 per head. Strongly risk-averse producers required contract base payments ranging from $2.50 to $17.75 per head. The lower end of the ranges is for a low-profit producer. The upper end of the ranges is for a high-profit producer.

(Key Words: Risk Management, Contract Feeder-Pig Production.)

Introduction

Contractors and feeder-pig producers are interested in contract relationships for several reasons. Contract production is an effective way for contractors to rapidly expand production. By using contracts, contractors shift costs associated with facilities to feeder-pig producers and mitigate risk associated with owning facilities. In addition, contracting enables contractors to produce the volume and quality of pigs that attract packer premiums. Feeder-pig producers enter contracts to reduce production risk, to reduce price risk, and to obtain financing for facilities. Risks associated with changes in feed costs, breeding stock prices, and feeder-pig prices typically remain with the contractor. Depending on the type of contract used, fixed payment or base payment plus performance, risk also can be reduced substantially through contracts. By reducing production risk and price risk, contract production provides a more stable cash flow per pig.

Given the variety of production contracts used to produce feeder pigs, how do contractors and producers arrive at optimal contracts? The optimal contract depends on the extent to which moral hazard is a problem and the risk attitudes of the contractor and feeder-pig producer. Moral hazard occurs when one party in the contract has imperfect information pertaining to actions of the other party. In contract feeder-pig arrangements, moral hazard is related to the potential lack of effort put forth by the feeder-pig producer. Providing contract feeder-pig producers with a fixed payment per head, per pound, or per litter does not effectively address the moral hazard problem. However, producers who have not produced feeder pigs before or do not know what level of production performance to expect may prefer fixed payment contracts. To address the moral hazard problem, many contractors offer incentives and discounts to induce effort by the producer.

Contract payment provisions vary widely among producers. Contract producer fees range from receiving a set fee with no performance incentives to receiving most of the fee in the form of performance incentives. Pigs weaned per litter and average feeder-pig weights commonly are used as a basis for contract feeder-pig performance incentives.

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Realization of low hog prices in 1994 may have temporarily slowed contract hog expansion. However, hog prices during 1995 and 1996 have again offered profits to growers. Increased expansion in contract hog production is already under way, as investors realize the potential for high returns on investment historically realized for hog production. With the increasing supply of contracts available, feeder-pig producers need to be aware of the cost/profit relationship between independent and contract production. The objective of this study was to determine the level of contract payments at which producers would switch from independent to contract feeder-pig production.

Procedures

Three feeder-pig production contracts and independent feeder-pig production were evaluated. Contract **A** stipulated that the feeder-pig producer receive a base payment at time of marketing based on the number of feeder-pigs produced. No bonus payments were offered. Contract **B** stipulated that the feeder-pig producer receive a base payment at time of marketing plus bonus payments of $0.20/pig for every 0.5 increase above 18.00 pigs/female/year. Deductions in contract **B** occurred at a rate of $0.10/pound for average pig weights below 42.5 pounds/pig. Contract **C** stipulated that the feeder-pig producer receive a base payment at time of marketing plus bonus payments of $0.60/pig for every 0.5 increase above 12 pigs/female/year and $0.08/pounds/pig for average pig weights above 50 pounds. Deductions for contract **C** occurred for pigs under 50 pounds at a rate of $0.08/pound/pig.

Using data obtained through the Iowa State Swine Enterprise Analysis Reports and Kansas State University Farm Management Data Base, yearly profits to independent feeder-pig producers were computed for the period 1986 to 1995. Data were used to compute costs for independent and contract production for alternative profit groups. Total costs incurred by the low-, average-, and high-profit independent feeder-pig producers in Iowa (Kansas) were $44.92, $38.27 ($54.49), and $33.66, respectively (Table 1).

Average total costs for an average-profit contract feeder-pig producer were calculated to be $20.49/pig in Iowa and $19.25/pig in Kansas. Total costs for low- and high-profit feeder-pig finishers averaged 1.17 and 0.88, respectively, times the costs incurred by average profit producers in Iowa. Contract costs included labor, repairs, gas-fuel-oil, property taxes, insurance, utilities, and interest and depreciation on buildings and equipment.

This study used calculated profits to feeder-pig producers and stochastic dominance to compare contract and independent feeder-pig production for a slightly risk-averse (profit maximizer), moderately risk-averse, and strongly risk-averse producer. Stochastic dominance is a technical procedure used to evaluate potential alternative strategies, whether it be feeder-pig production or any other production activity, for alternative risk levels.

Although the risk level of the producer may be ambiguous, most producers would be slightly to moderately risk averse. A risk-averse producer would prefer a low level of variability in annual profits or a low probability of negative returns. Average profits for independent feeder-pig production are substantially higher than those for contract feeder-pig production. However, independent feeder-pig profits are considerably more variable and negative profits occur periodically (Table 1). Thus, risk-averse producers or those wanting to better manage cash flows may prefer contract production.

Results and Discussion

Table 2 provides a summary of base payments at which feeder-pig producers would switch from independent to contract producing for alternative risk levels. Note that performance premiums were not included in base payments for contract **B** and contract **C**. An average-profit producer who is not particularly concerned about risk would require base payments of $19.50/pig for contract **A** and $16.75/pig for contract **C**. A producer who is extremely concerned about the variability of returns (i.e., a strong-

ly risk-averse producer) would require base payments of $11.50/pig for contract A and $9.00/pig for contract C.

As producers become more risk averse, contract values decline. The strongly risk-averse average-profit producer would require base payments of $11.50/pig for contract A and $9.00/pig for contract C. This decline in value is indicative of the producer's concern for obtaining relatively stable annual profits from contract feeder-pig producing.

Contract rates for low- and high-profit producers are included in Table 2. Deviations from the value obtained by the average-profit producers are functions of the man-agement practices of the producer. High-profit producers would require substantially higher payments than low-profit producers.

Table 3 provides a sensitivity analysis of contract A (flat per-pig contract) to variation in expected profit levels for both the Kansas and Iowa average-profit feeder-pig producers. As the level of expected profits declines, the required contract payment declines. For instance, a producer entering into a multi-year contract may require payments less than historical computed payments, if profitability is expected to decline. The moderately and strongly risk-averse Kansas feeder-pig producer would prefer contracting to independent production regardless of the payment.

Table 1.   Summary Statistics of Selected Cost and Profit Characteristics (1986-1995)

| Profit Level | Total Costs | Profits | | |
		Average	Min	Max
Independent Feeder-Pig Producing (1995 real dollars/per pig)				
Iowa				
Low	44.92	-7.54	-17.87	1.76
Average	38.27	6.01	-7.32	18.95
High	33.66	17.60	2.08	35.78
Kansas				
Average	54.49	2.54	-24.70	18.23

Table 2. Minimum Base Payment Levels ($/pig) for Which Feeder-Pig Producers Will Be Indifferent between Independent and Contract Production (Iowa)

Contract	Slightly Risk Averse[a]	Moderately Risk Averse[a]	Strongly Risk Averse[a]
Low-profit producer			
Contract A	9.75	6.00	4.50
Contract B	9.00	5.25	3.75
Contract C	7.50	3.75	2.50
Average-profit producer			
Contract A	19.50	13.75	11.50
Contract B	19.25	13.00	11.00
Contract C	16.75	10.75	9.00
High-profit producer			
Contract A	28.50	19.75	17.75
Contract B	27.50	18.75	16.75
Contract C	24.50	16.00	14.50

[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 3. Sensitivity Analysis of the Flat Contract to Variations in Expected Profit Levels for Average-Profit Producers in Iowa and Kansas

Expected Level of Economic Profits	Slightly Risk Averse	Moderately Risk Averse	Strongly Risk Averse
Feeder-Pig Producing per Pig Contract ($/pig)			
Iowa			
historical	19.50	13.75	11.50
half	16.75	10.75	8.00
zero	13.75	8.00	5.75
Kansas			
historical	22.00	Pc[a]	Pc
half	20.50	Pc	Pc
zero	17.00	Pc	Pc

[a]Moderately to strongly risk-averse producers in Kansas would prefer contracting to independent production regardless of the payment.