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## DETERMINATION OF CONTRACT BASE PAYMENTS TO FEEDER-PIG FINISHERS

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*J. L. Parcell<sup>1</sup> and M. R. Langemeier<sup>1</sup>*

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### Summary

Risks associated with independent feeder-pig finishing have prompted finishers to seek alternative finishing and marketing methods. A means of reducing risk has developed through contract feeder-pig finishing. Research results indicated that slightly risk-averse finishers required contract base payments ranging from \$11.00 to \$30.00 per head. Strongly risk-averse finishers required contract base payments ranging from \$8.50 to \$19.00 per head. The lower end of the ranges is for a low-profit finisher. The upper end of the ranges is for a high-profit finisher.

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

### Introduction

Contractors and feeder-pig finishers are interested in contract relationships for several reasons. Contract finishing is an effective way for contractors to rapidly expand finishing. By using contracts, contractors shift costs associated with facilities to feeder-pig finishers 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 finishers enter contracts to reduce finishing risk, to reduce price risk, and to obtain financing for facilities. Risks associated with changes in feed costs, feeder-pig prices, and market hog 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 finishing provides a more stable cash flow per pig.

Given the variety of finishing contracts used to finish feeder pigs, how do contractors and finishers 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 finisher. 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 finisher. Providing contract feeder-pig finishers with a fixed payment per head and/or per pound does not effectively address the moral hazard problem. However, finishers who have not finished feeder pigs before, or do not know what level of finishing 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 finisher.

Contract payment provisions vary widely among finishers. Contract finisher fees range from receiving a set fee with no performance incentives to receiving most of the fee in the form of performance incentives. Performance incentives typically involve feed conversion and/or death loss.

Realization of low hog prices in 1994 may have temporarily slowed contract hog

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<sup>1</sup>Department of Agricultural Economics.

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

### Procedures

Three feeder-pig finishing contracts and independent feeder-pig finishing were evaluated. Contract A stipulated that the feeder-pig finisher receive a base payment at the time of marketing, based on the number of finished pigs marketed (per pig payment). No bonus payments were offered. Contract B offered the feeder-pig finisher a relatively high base payment at the time of marketing and relatively low bonus payments. Table 1 summarizes the bonus schedule for this contract. Contract C offered the feeder-pig finisher a relatively low base payment at the time of marketing and relatively high bonus payments. Table 2 summarizes the bonus schedule for this contract.

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 finishers were computed for the period 1986 to 1995. Data were used to estimate costs for independent and contract finishing. Total costs incurred by the low-, average-, and high-profit independent feeder-pig finishers in Iowa (Kansas) were \$79.76, \$71.22 (\$76.62), and \$63.13, respectively (Table 3). Average total costs for an average profit contract feeder-pig finisher were calculated to be \$19.53/pig in Iowa and \$16.23/pig in Kansas. Total costs for low- and high-profit feeder-pig finishers averaged 1.12 and 0.89, respectively, times the costs incurred by average-profit finishers 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 finishers and stochastic dominance to compare contract and independent feeder-pig finishing for a slightly risk-averse (profit maximizer), moderately risk-averse, and strongly risk-averse finisher. Stochastic dominance is a technical procedure used to evaluate potential alternative strategies, whether it be feeder-pig finishing or any other production activity, for alternative risk levels.

Although the risk level of the finisher may be ambiguous, most finishers would be slightly to moderately risk averse. A risk-averse finisher would prefer a low level of variability in annual profits or a low probability of negative returns. Average profits for independent feeder-pig finishing are substantially higher than those for contract feeder-pig finishing. However, independent feeder-pig finishing profits are considerably more variable, and negative profits occur periodically (Table 3). Thus, risk-averse finishers or those wanting to better manage cash flows may prefer contract finishing.

### Results and Discussion

Table 4 provides a summary of base payments at which feeder-pig finishers would switch from independent to contract finishing for alternative risk levels. Note that performance premiums were not included in base payments for contract B and contract C. An average-profit finisher who is strongly risk averse would require base payments of \$12.50/pig for contract A and \$10.00/pig for contract C. A slightly risk-averse finisher would require base payments of \$21.50/pig for contract A and \$18.50/pig for contract C.

Contract rates for low- and high-profit finishers are included in Table 4. Deviations from the value obtained for the average-profit finisher are functions of the management practices of the finisher. High-profit finishers would require contract payments in excess of current rates. Thus, these finishers will not finish hogs under contract.

Table 5 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 finishers. As the level of expected profits declines, the required contract payment declines. For instance, a finisher entering into a multi-year contract may require payments less than

historical computed payments, if profitability is expected to be lower in the future. Contract payments differ little between the moderately and strongly risk-averse Kansas feeder-pig finisher. This is indicative of the low variability in returns realized by these groups.

**Table 1. Bonus Payment Schedule for Contract B**

Feed Efficiency (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 C**

Feed Efficiency (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. Summary Statistics of Selected Cost and Profit Characteristics (1986-1995)**

		Profits			
Profit Level	Total Costs	Average	Min	Max	
Independent Feeder-Pig Finishing (1995 real dollars/per pig)					
Iowa	Low	79.76	-2.78	-11.86	6.84
	Average	71.22	8.50	-4.97	25.79
	High	63.13	19.68	4.40	50.45
Kansas	Average	76.62	1.57	-7.27	13.25

**Table 4. Minimum Base Payment Levels (\$/pig) for Which Feeder-Pig Finishers Will Be Indifferent between Independent and Contract Finishing (Iowa)**

Contract	Slightly Risk Averse <sup>a</sup>	Moderately Risk Averse <sup>a</sup>	Strongly Risk Averse <sup>a</sup>
<b>Low-profit finisher</b>			
Contract A	13.75	10.75	10.75
Contract B	13.50	10.50	10.50
Contract C	11.00	8.50	8.50
<b>Average-profit finisher</b>			
Contract A	21.50	14.50	12.50
Contract B	21.00	14.25	12.25
Contract C	18.50	11.75	10.00
<b>High-profit finisher</b>			
Contract A	30.00	21.25	19.00
Contract B	28.75	20.00	17.75
Contract C	26.50	17.75	15.50

<sup>a</sup>If the base payment is higher than the level indicated, a finisher would prefer contract finishing over independent finishing. If the base payment is lower than the level indicated, a finisher would prefer independent finishing over contract finishing.

**Table 5. Sensitivity Analysis of the Flat Contract to Variations in Expected Profit Levels for Average Profit Finishers in Iowa and Kansas**

Expected Level of Economic Profits		Slightly Risk Averse	Moderately Risk Averse	Strongly Risk Averse
<b>Feeder-Pig Finishing per Pig Contract (\$/pig)</b>				
<b>Iowa</b>				
historical		21.25	14.50	12.50
half		17.00	10.25	8.00
zero		12.75	6.00	3.75
<b>Kansas</b>				
historical		18.00	16.25	16.25
half		17.00	15.50	15.50
zero		16.25	14.25	14.25