



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

## Abstract

A case study is presented about the financing arrangements, contract terms, and business relationships of a set of contract hog producers whose loans from community banks have been guaranteed by the Illinois Farm Development Authority. The results reflect the maturity and stability of contract hog production, although agribusiness and farmer integrators largely fill different market niches and contract with different types of producers.

## Contract Hog Production: A Case Study of Financial Arrangements

By R. Brent Ross and Peter J. Barry

Contract production in the hog industry has increased substantially in recent years to reach 53.4 percent of hog production in 2001 (Economic Research Service, U.S. Department of Agriculture). Among other industry classes, only poultry and egg production, at 81.3 percent, exceed this level. The drivers of this major structural change include consumer preferences, institutional change in the food system, new technologies, efficiency and size economies, and risk considerations (Barkema and Cook; Lawrence et al.). Such increases in vertical coordination and consolidation can profoundly affect the allocation of risk and returns in the food system, management and control responsibilities, and the extent of market information and concentration (Barry).



**R. Brent Ross** is completing a Ph.D. degree in Agribusiness Management at the University of Illinois. His master's degree also came from the University of Illinois, while his B.Sc. was completed at the University of Guelph, Ontario, Canada. He also returned recently from a study leave at the University of Sydney, Australia.

**Peter J. Barry** is a professor at the University of Illinois where he holds the Distinguished Chair in Agricultural Finance and serves as the Director of the Center for Farm and Rural Business Finance. He has worked extensively with agricultural lenders and producer groups through conferences, workshops, schools, and publications. He is also a past-President and Fellow of the American Agricultural Economics Association.

Contract hog production can operate in various ways, but the binding element is the contractual arrangement between the producer and the integrator. Typically, the producer supplies labor, buildings and facilities, and waste disposal, and receives compensation from a fixed payment per unit plus incentives. The integrator supplies management, feed, animals, genetics and related technologies, marketing, health maintenance, producer training, and other operating inputs. The producer, thus, relinquishes management autonomy as well as price risk and part of the production risks, in exchange for an investment in fixed assets (buildings, facilities, etc.), higher financial leverage, and potential uncertainties about the continuation of the contractual relationship. In financial terms, the fixed assets are on the producer's balance sheet and off the integrator's balance sheet, while current assets (i.e., operating inputs) are off the producer's balance sheet and on the integrator's. In some cases, the contractor may assist in providing or arranging financing.

While the general features of contract hog production are well known, less information is available about the financing arrangements, contract terms, and characteristics of, and relationships between, the contracting parties. Our goal in this article is to provide a case study addressing these issues for hog production contracts in Illinois, in which producer loans for buildings and facilities are guaranteed by the Illinois Farm Development Authority (IFDA). The case study, thus, focuses on operations unable to obtain commercial financing without the credit enhancement offered by the guarantee.<sup>1</sup> In some cases the guarantee is utilized for borrowers with high credit risk. In others, the lenders prefer a guarantee because of their lack of familiarity with contract production. Relevant questions for lenders are arising from these relationships, and involve the organizational structures of contract producers, their ability to obtain and service debt, and the capacity of community banks and other lenders to deal with specialized hog production.

### Producer Profiles and Contract Characteristics

The IFDA specialized livestock guarantee program was developed in 1996, and by 2002, 53 loans were guaranteed for hog farmers who established a contractual relationship with an integrator (Table 1). The IFDA credit files for these loans provided the primary database for this study, with most of the data items representing values at the time of loan origination.

Financial data for independent Illinois hog farms are also presented for comparisons.

The average age of the producers was 40, considerably lower than the 54 years of age average for farmers nationwide (NASS). In 41 of the 53 loans, the producer had non-farm income averaging \$28,000, suggesting that the contract production arrangements allow the farm family considerable time for alternative employment. The farm enterprises averaged 471 acres with a relatively high (for Illinois) ratio of land owned to total land operated of 46 percent.

The enterprise was typically organized as a sole proprietorship (28 loans), although partnerships (18 loans) were also common, while 6 units were incorporated. Of the partnerships and corporations, family relationships within and across generations dominated.

Most of the producers had sought external financing to establish, expand, and/or improve facilities for non-farrowing operations (i.e., wean-to-finish, feeder-to-finish). The average sizes of the proposed hog operations were 3,095 market hogs and 850 sows for non-farrowing and farrowing operations, respectively. Regarding the financial characteristics, the producers on average had a pro forma net worth of \$395,766 and total assets of \$1,062,164. The producer's debt-to-asset ratios averaged 0.70 and current assets comprised 9 percent of total assets. In spite of the high proportion of fixed assets, liquidity was relatively high, as evidenced by an average current ratio of 2.38. These financial measures directly reflect the producer's reduced business risk and, thus, higher debt capacity of the contract production arrangement compared to independent production.

The original loan balances averaged \$473,151. The resulting loan-to-value ratio was 0.96, indicating that the guarantee allowed the commercial bank to finance the entire project. The contract length ranged from 7 to 10 years, with a median value of 7.5 years. Repayments were rescheduled on a monthly basis for 38 loans, quarterly for 10 loans, and semi-annually or annually for 5 loans.

The average production contract length of 7.5 years reflects a long-term commitment by the integrator, commensurate with the long-term financial obligations for fixed assets incurred by

the producer. Shorter-term contracts were associated with older, remodeled buildings. As contract hog production began in the early 1990s, shorter term, annual contracts often predominated. Thus, considerable progress in gaining contract stability has occurred. The longer-term contracts generally, however, compensate the producers in terms of a fixed base payment per pig space (averaging \$35.62) that remains constant over the term of the contract. No mechanism is in place in these contracts to adjust this level for inflation. An annual inflation rate of 3 percent, for example, would reduce the real value of the payment at year 7.5 by about 20 percent.

### Integrator Characteristics

Two major types of integrators were parties to these contract production arrangements: agribusinesses and farmer integrators. Agribusinesses are those companies that specialize in hog production and the related building design, genetics, and production technologies. They may engage in processing operations or have close contractual arrangements with processors. In contrast, farmer integrators are larger-scale independent hog producers who contract with neighbors or other local acquaintances to perform one of the hog production stages in a fashion that mimics the contract terms of the agribusiness integrator. Among the 53 contract production loans in this study, 37 involved 6 agribusiness integrators and 16 involved farmer integrators.

The agribusiness integrators tended to associate with a lead financial institution of their own, and often worked to facilitate the fixed asset financing by the producers. One of the integrators directly assists producer financing by loaning 15 percent of the building costs, and receiving repayments through reduced fees paid to the producer for a four-year period. The 15 percent "down payment" together with a 85 percent loan guarantee by IFDA puts the contract producer in a zero equity position at the outset. At least one other of the agribusiness integrators in this study had arranged with a life insurance company to provide group policies for their contract producers. This arrangement yields a cost effective approach to meeting IFDA's requirement for the producer to have insurance equal to one half of the loan balance, with the indemnity assigned to the loan.

The agribusiness integrators tend to have more formal and detailed contractual arrangements with producers than do farmer integrators. The farmer integrators themselves generally are in a greater risk position and may experience greater difficulties in sustaining their involvement in contractual relationships over all of the phases of the hog cycle.

The integrators generally prefer to contract with experienced hog producers. The shift by producers to contract production, however, is an all-or-none situation. Animal health is a major consideration. Mixing a producer's own herd with the integrator's stock is not permitted. Thus, farmers who shift to contract production must relinquish their status as independent hog producers.

### Structural Characteristics

The producer and integrator profiles can be further characterized by type of integrator, age of producer, and type and size of hog operation. These categories provide further insight on different approaches to formulating and financing contract arrangements.

Table 1 reports averages of selected producer characteristics categorized by type of integrator. For comparison, certified financial data for 128 independent hog operations participating in the Illinois FBFM system loans are included. These categorizations show substantial differences in producer characteristics between the two types of integrator. In particular, the agribusiness integrators contract with producers who are older (42 years versus 35 years), farm large acreages (569 acres versus 203 acres), and have larger hog enterprises (e.g., more buildings and animals). Producers who contract with agribusiness integrators also have lower financial risk, evidenced by a lower average debt-to-asset ratio and a higher current ratio. Furthermore, producers who choose to establish farrowing operations consistently affiliated with the agribusiness integrators. The independent producers on average are older than contract producers, have lower leverage, larger acreages, and likely have greater income from crop operations. Liquidity as indicated by the current ratio and ratio of current to fixed assets also differs from that of IFDA-funded contract producers, consistent with the feed and animal ownership by the independents.

These characteristics suggest that the agribusiness integrators are preferred by producers relative to farmer integrators and that such preferences are reflected in a producer's tendency to gravitate toward affiliation with agribusiness integrators. The latter may offer a higher quality of services, greater likelihood of survival, more tightly controlled operations, and other preferred attributes. At the same time, the agribusiness integrators may prefer to contract with larger, more experienced, and more financially secure producers.

Table 2 reports the contract producer profiles for different age classes of the principal-operator. The producers are broadly dispersed across the three age categories with 21 farms owned by operators under 35 years of age, 18 producers were in the 36 to 45 year range, and 14 were older than 45. The average acreage controlled by each category increases modestly with age. In contrast, the mean size of the hog operation decreases with age in both farrow (915; 900; and 720 sows, respectively) and non-farrow operations (3,339; 2,838; and 3,050 market hogs, respectively).

As one would expect, total assets and net worth both increase significantly with age. The older age categories, however, exhibit a slightly higher degree of solvency, and are in a much stronger liquidity position. The IFDA-guaranteed loan is also about the same size across the age categories. Finally, the dispersion of integrator types is similar for the first two age categories, although the over 45 group was much more likely to affiliate with agribusiness integrators than those in the two younger categories.

Table 3 reports the producer profiles by type and size of hog operation. Contract producers with non-farrowing operations earn substantially more income from non-farm sources; 38 of the 47 non-farrow operations report an average non-farm income of \$30,000 compared to four of the farrow-to-wean producers who have average non-farm incomes less than \$15,000. Clearly, the less labor-intensive feeding operations allow more time for off-farm employment.

Most of the farmer integrators (11) contract with producers who are smaller in terms of numbers of feeder animals and buildings. Feeders also have modestly larger net worths and total assets, and greater investments in the fixed asset category.

Solvency levels for the two types of operations appear comparable to each other, although the current ratio of the non-farrowing operations is relatively low.

### Other Contract Issues

A major issue with contract hog production is the loss of control and managerial autonomy experienced by the producer; independent production is foregone in exchange for substantial reductions in risk. The IFDA personnel expressed concern whether a public credit program in this case should be used to finance farmers into a "subservient" position. At the same time, however, their anecdotal observations suggest that most of their producer customers who shift to contract production ultimately welcome the change. The producers have become accustomed to the reduced labor and handling requirements, high degrees of automation, new technologies, and managerial assistance, in addition to the reduction in business risk. Other positive features of contract production include single-day deliveries of feeder pigs in contrast to multiple-day farrowings; easier scheduling of daily activities, including off-farm employment; and delivery of feed in contrast to on-farm milling.

Some tensions may arise because the past experience of producers allows them to recognize, diagnose, and treat emerging animal health problems, however they must notify the integrator for these purposes according to the terms of the contract. The scheduling of marketing times for finished animals is also at the discretion of the integrator. Feed efficiency and pounds of gain tend to decline as hogs grow heavier (i.e., from 240 to 280 lbs.). Because bonuses and incentive payments may depend on these performance factors, adverse scheduling by integrators could be harmful to producers. Integrators generally recognize these problems and try to avoid penalizing producers for adverse scheduling.

### Concluding Comments

The rapid growth and current high level of contract production in the hog industry are characterized by the emergence of different financial benchmarks and structural characteristics of the respective parties. The trade-off between business risks and financial risk for producers is clearly evident in this case study. While the IFDA-guaranteed producers likely experience greater credit risks than others engaged in contract production, the relatively large loans (averaging \$473,151) imply that others

may need external financing as well, augmented by the reallocation of risks. Longer term contracts, relatively young operators, smaller sizes of farms, relatively high non-farm income, and partnering with family members and others are additional notable attributes of producers engaged in contract production. The agribusiness and farmer integrators largely fill different market niches and contract with different types of producers.

In general, contract production has become a standard organizational arrangement in the hog industry and may continue to increase in importance. The governance structures, contracts, and financing practices have also become more predictable and stable. These conditions are characteristic of an increasingly mature industry segment. At least for these 53 producers financed by public credit guarantees, the advantages of shifting from independent to contract production appear to exceed the disadvantages. The rapid growth of contract hog production nationwide suggests similar satisfaction by other producers, and continued development of integration arrangements for other sectors of agriculture.

## References

- Barkema, A. and M.L. Cook. "The Changing U.S. Pork Industry: A Dilemma for Public Policy," *Economic Review*, Federal Reserve Bank of Kansas City. Vol. 78, No. 2 (1993): 49-66.
- Barry, P.J. "Industrialization of U.S. Agriculture: Policy, Research and Education Needs." *Agricultural and Resource Economics Review*. 24(1995): 128-135.
- Lawrence, J.D., V.J. Rhodes, G. Grimes and M. Hayanga. "Vertical Coordination in the U.S. Pork Industry," *Agribusiness: An International Journal*, 13(Jan./Feb.) 1997): 21-32.
- National Agricultural Statistics Service. *Agricultural Economics and Land Ownership Survey, 1999*. 1997 Census of Agriculture, U.S. Department of Agriculture, 2001.

---

## Endnotes

- <sup>1</sup> IFDA is an independent, self-funded agency that provides public credit programs for Illinois agriculture. Included is a specialized livestock guarantee program in which loans made by local lenders (community banks) receive an 85 percent guarantee of principal and interest.

Table 1. Farm Structure and Loan characteristics for Contract and Independent Production

	Contract Production			Independent Production <sup>a</sup> Illinois Hog Farms
	Agribusiness	Farmer	Average	
Number of farms	37	16	53	128
Number of hog buildings	3.4	2.7	3.3	NA
Acreage	569	203	471	695
Tenure ratio	0.52	0.3	0.46	0.3
Age	42	35	40	NA
Non-farm income				
Yes	27	14	41	NA
Amount	\$31,500	\$24,300	\$28,800	NA
Hog type				
Farrow	6	0	6	NA
Non-Farrow	31	16	47	NA
Size				
Farrow (sows), no.	845	0	845	NA
Market hogs, no.	3,334	2,620	3,095	NA
Net Worth	\$478,276	\$196,958	\$395,766	\$886,820
Total Assets	\$1,216,149	\$705,822	\$1,062,164	\$1,464,305
Ratio				
Debt-to-asset	0.61	0.74	0.70	0.41
Current ratio	2.99	1.17	2.38	1.37
Current assets to total assets	0.09	0.11	0.09	0.24
Loan size	\$518,838	\$373,000	\$473,151	NA

<sup>a</sup> Financial Characteristics of Illinois Farms, Center for Farm and Rural Business Finance, 2002. Hog farms are those which have the value of feed fed more than 40% of the crop returns and the hog enterprise received more than half of the value of the feed fed.

Table 2. Farm Structure and Loan characteristics by Age, Contract and Independent Production

	Age			Total/ average	FBFM
	under 35	36-45	over 45		
No. of Farms	21	18	14	53	
No. of Hog Buildings	3.43	2.94	3.5	3.28	
Total Acreage	420	478	537	471	617
Land Tenure Ratio	0.41	0.48	0.49	0.46	0.27
Non-Farm Income					
Yes	15	16	11	42	54.5%*
Amount	2.73	3.06	2.82	2.88	
Organizational Structure					
Sole Proprietorship	14	9	5	28	86%*
Partnership	5	6	7	18	8.8%*
Corporations	2	3	2	7	4%*
Hog Type					
Farrow	2	2	2	6	
Non-Farrow	19	16	12	47	
Size					
Farrow (Sows)	915	900	720	845	
Non-Farrow (Market Hogs)	3,339	2,838	3,050	3,095	
Net Worth	269,650	445,945	520,425	395,766	825,049
Total Assets	906,314	1,130,533	1,208,038	1,062,164	1,249,088
Ratios					
Debt:Asset	0.75	0.67	0.67	0.70	0.33
Current ratio	1.31	1.43	5.23	2.38	2.26
Current assets to total assets	0.1	0.12	0.07	0.09	0.27
Loan Size	475,571	474,056	468,357	473,151	
Source					
Agribusinesses	13	12	12	37	
County Integrator	7	7	2	16	

Industry averages from Financial Characteristics of Illinois Farms, 1999-2000.

\* National Average All Farms

Financial values base on pro forma data.

Table 3. Farm Structure and Loan characteristics by Type and Size of Operation

	Type and Size of Operation							
	Farrow (Sows)			Non-Farrow (Market Hogs)				Total/ average
	under 1000	over 1000	Total/ average	under 2500	2501-4500	under 4500	Total/ average	
No. of Farms	3	3	6	22	19	6	47	53
No. of Hog Buildings	3.33	4.67	4.00	2.23	3.42	6.00	3.19	3.28
Total Acreage	178	940	373	379	498	631	246	471
Land Tenure Ratio	0.31	0.56	0.44	0.42	0.45	0.65	0.46	0.46
Age	40.33	39	39.67	41.41	40.21	34.5	40.04	40
Non-Farm Income								
Yes	3	1	4	19	17	2	38	42
Amount	1	1	1	3.16	2.82	4.50	3.08	2.88
Organizational								
Sole Proprietorship	1	-	1	13	12	2	27	28
Partnership	2	1	3	8	5	2	15	18
Corporations	-	2	2	1	2	2	5	7
Net Worth	279,350	444,004	361,677	291,122	455,690	623,794	456,869	395,766
Total Assets	666,874	1,467,317	1,067,096	728,310	1,248,591	1,691,014	1,222,638	1,062,164
Ratios								
Debt:Asset	0.69	0.71	0.70	0.67	0.73	0.72	0.71	0.70
CA:CL	3.54	20.03	11.79	1.30	0.89	1.70	1.30	2.38
CA:TA	0.18	0.07	0.13	0.12	0.07	0.06	0.08	0.09
Loan Size	290,667	816,667	553,667	323,500	545,421	712,500	527,140	473,151
Source								
Agribusinesses	3	3	6	11	15	5	31	37
Farmer Integrator	-	-	-	11	4	1	16	16

Financial values base on pro forma data.