Economic Impacts from Increasing Pig Farrowing in Iowa

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Summary and Implications

Hog production has historically been a significant, value-adding industry in Iowa. Sales of finishing hogs can result in gross income in the range of $2.5 billion annually. The economic activity would be greater as there are impacts on upstream and downstream sectors of the economy. Accounting for these impacts leads to a generation of more than $3 billion of annual gross product in Iowa. Throughout the past three decades, the swine breeding herd in Iowa has experienced a decreasing trend, with relatively sharp declines coming since the early 1990's. Producers have increasingly looked to other parts of North America for a supply of feeder pigs. This reflects a lost opportunity for the Iowa pork production industry.

This study evaluates the viability and economic impact of expanding the number of sows farrowed in Iowa. We estimate the impacts to the aggregate state economy from a revival of pig farrowing. Our estimates of costs and returns to farrowing show the potential to generate much value added profit. These profits would benefit farm owners, managers, input suppliers, and processors, etc. These impacts will ripple throughout the economy including rural communities. A 5 million head increase in SEW pig production would require approximately 238,000 additional sows. The feed bill would be about $30 million while the labor bill would be about $35 million. The income earned by employees and to those that sold the feed etc. goes toward buying other goods and services, multiplying the overall economic impact. In aggregate the addition of 5 million feeder/SEW pigs would produce $270 million of economic activity. A large part of this would occur in rural communities.

Introduction

Hog production has historically been a significant, value-adding industry in Iowa. According to the USDA Census of Agriculture, over 41 million hogs were sold throughout the state in 2002, involving an estimated 11,275 farms. Among these transactions, almost 30 million were for finished hogs, generating an estimated $2.46 billion in gross receipts. Of course, hog production generates more economic activity than is revealed by these figures. The industry maintains numerous linkages to upstream and downstream sectors of the Iowa economy. In particular, swine production in Iowa is the dominant consumer of corn and soybean based livestock feed. Other inputs include contractors for buildings and equipment, transportation and logistics work, and veterinary services. These inputs generate a market product that is delivered to the many pork processing facilities located in the state, then ultimately to consumers throughout the world. All told, the pork industry generates more than $3 billion of annual gross product in Iowa.

Certainly, pork production plays a vital role in the state's economy, albeit a role that is continually evolving. Despite maintaining its position as the nations leading finisher of market hogs, Iowa has been losing portions of its breeding herd and farrowing capacity. Throughout the past three decades, the breeding herd in Iowa has experienced a decreasing trend, with relatively sharp declines coming since the early 1990's. With fewer sows farrowing in state, producers have increasingly finished hogs delivered from other parts of North America. Currently, Iowa imports roughly half of SEW and feeder pigs from out-of-state producers. Furthermore, many of the finishing facilities are operated under contract, whereby the finisher does not own the hog, and is therefore subject to less of the value-added profit.

These developments reflect a lost opportunity for the Iowa pork industry, especially since farrowing is a more labor-intensive, value-adding process than is finishing. However, this pattern need not continue. In this paper, we consider the viability of building farrowing operations in the state by constructing budgets of the economic costs and returns a skilled producer is likely to experience. Our conclusions are favorable, indicating the potential for a larger breeding herd in Iowa. We then use IMPLAN to estimate the impacts to the aggregate state economy of a large-scale revival of farrowing, paying particular attention to the potential benefits to rural Iowa communities. Finally, we discuss farrowing in context of its likelihood for an increase and the strategies for development that could make such growth a reality.

Materials and Methods

Assumptions

Before launching into a discussion of the relevant dollar estimates, it is first worthwhile to discuss the assumptions upon which these estimates are based. After presentation of the budget, we will then return to the assumptions again, so as to conduct sensitivity analysis.

First, we evaluate a 1200-sow farrow-to-wean operation with a deep pit manure system and separate facilities for gestation and farrowing. The operation uses artificial insemination (AI) and purchases all doses of semen from an external source (i.e. no boars on site). Furthermore, we assume the use of SEW technology, whereby pigs are weaned after 17-21 days, then shipped to a separate nursery

location. We assume segregated early wean (SEW) technology because of its increasing popularity, productive efficiency, and ability to control disease outbreaks within the breeding herd.

For the value of input prices, we assume the following:

Corn - $2.06 per bushel;
Soybean Meal - $191.14 per ton;
Supplements - $0.187 per pound;
Processing Fee - $12 per ton;
AI Cost - $16.25 per litter;
Replacement Gilt/Sow - $240;
Cull Sow - $120;
SEW Pig - $32.00
FTE Labor - $35,000 per year;

Both the corn and soybean meal prices are based on 5-year mid-month averages calculated from 2001 to 2006. The supplements, processing fee, and AI costs are based on information from the Kansas State University "Farrow-to-Weaned Pig Cost-Return Budget." The replacement sow figure is based on an estimated $145 negotiated market price for live gilts plus an additional $65 premium for breeding stock and $30 feed cost to bring the sow up to breeding weight. Cull sow, SEW pig, and Full Time Equivalent figures are based on reasonable judgment aided again by the KSU budget. Using these prices to calculate budget costs while also using estimates from other sources, we construct the budget summary shown in Table 1.

Observing the estimates, four general categories of costs emerge. First, feed costs account for almost one-fifth of the total. With such a large portion of total costs devoted to feed, it is clear why locating in a state with generally low feed costs would be advantageous.

Variable costs (other than feed or labor) constitute the second major category of costs, followed by the fixed costs or investment. Within the fixed costs category, we distinguish between investment towards building and equipment and investment towards the breeding herd. Factored into the breeding herd depreciation are all costs and returns associated with herd upkeep, replacement, and initial purchases of breeding gilts.

In the fourth and final category - labor costs - we intended to allow flexibility in the amount of workers hired by separating this figure from the rest of the budget. Only after a net figure for returns to management and labor do we then subtract for wages. Our rationale is that labor costs can often vary significantly based on location, involvement of owner, or compensation strategy. Ultimately, there is no economic difference between the labor outsourced by management and the labor conducted by management itself. From an economic perspective, as opposed to that of cash accounting, work done by management manifests an opportunity cost, and is therefore notable in the budget. Nonetheless, use of the budget as a benchmarking tool is more convenient with labor cost as a final category. We also include the budget for a 600-sow operation as show in Table 2.

Results and Discussion

As previously mentioned, our estimates of costs and returns to farrowing in Iowa indicate the potential to generate much value-added profit for investors. Yet, the benefits resulting from growth in farrowing would not be exclusive to farm owners and management. With farrowing's linkages to input suppliers and finishing operations, the increases in welfare are likely to ripple throughout the entire Iowa economy. In particular, the effects stand to be most beneficial to rural communities due to the increasing demand for rural products and services and increased income earned from rural employment.

We aim to estimate these impacts in terms of their economic stimulus to various sectors of the economy. To do so, we posit a hypothetical development to Iowa's swine industry. Using the figures from the budget discussed in the previous section, we analyze the impacts of replacing 5 million imported feeder pigs with the same number farrowed in-state. Note, we are not suggesting an increase in Iowa's finishing capacity; the number of finished hogs remains the same in our model. Rather, the impact is limited to changes in the origin of feeder pigs. Currently, Iowa is importing close to 17 million feeder/SEW pigs from various states and regions, including Canada. The hypothetical situation we propose would reduce these imports to roughly 12 million, with Iowa producers replacing the difference or 5 million more feeder pigs produced in Iowa.

The most direct approach in estimating the impacts of such an increase is to expand the budgeted dollar amounts per sow as they apply to our hypothetical scenario. A 5 million head increase in SEW pig production would require approximately 238,000 additional sows. The feed requirement for each sow involves the consumption of 1673 lbs of corn, 367 lbs of soybean meal, and 83 lbs of minerals per year, the cost of which, when including processing, comes to $126.94. Given 238,000 additional sows, the total feed bill for the production of an additional 5 million SEW pigs in Iowa is just less than $30 million.

Similarly, we can calculate a labor estimate as a direct result of increased farrowing. According to our budget, every 240 sows warrants the employment of another full time equivalent worker earning an estimated $35,000 per year, benefits included. This estimate equates to 991 jobs paying an aggregate of $34.7 million. Furthermore, the income earned through this employment goes towards buying many goods and services within the local community, multiplying the aggregate job creation.

Ultimately, this "multiplier effect" applies to the entire direct economic stimulus resulting from a structural change in a local or regional economy. To estimate its extent, we use IMPLAN, as developed by the Minnesota IMPLAN Group, Inc. As a software tool, IMPLAN uses input-output modeling to describe the ripple effect caused by a change in regional economic activity. Input-output modeling uses coefficients derived from industry production functions to

determine how a dollar of input will affect successive industries. In the case of our hypothetical growth in farrowing, the level of stimulus is determined by the value of final product as sold onto the next stage of pork production (in our case, the value of a SEW pig). In the budget, we estimate the price of a SEW pig at $32. Multiplied by 5 million, the economic stimulus amounts to $160 million.

Still, the sale of SEW pigs does not account for all additional revenue generated by a larger breeding herd. Many of the added sows are culled each year for $120 each. Once again, we estimate that 238,000 more sows are needed in Iowa to fulfill the increase in SEW production. Of these sows, 38% will be culled in a year, generating approximately $10,800,000 of additional revenue. Together with SEW revenue, the amount of initial stimulus to Iowa from increased revenue is roughly $170,800,000.

According to our IMPLAN estimates, this initial stimulus would end up generating close to $58 million of indirect output and $41 million of induced output. In aggregate, the in-state production of 5 million feeder/SEW pigs would produce $270 million worth of economic activity, born in large part by the rural economy.

IMPLAN also estimates the indirect and induced income impacts from labor, similar to our previous income estimate of $34.7 million. Although the initial direct income in the IMPLAN model is estimated at only $32.5 million, the estimates for indirect and induced labor income indicate an additional $28 million earned by an additional 900 employees. This stimulus would no doubt be a welcome and healthy boost to rural Iowa communities.

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Table 1. Budget for 1200 Sow Operation Costs and Returns per Sow per Year.

COSTS		
Variable Costs		
	Feed Costs	
	Corn	$62.35
	Soybean Meal	$35.85
	Supplement & Minerals	$15.81
	Feed Processing & Delivery	$12.93
	Total Feed Costs	**$126.94**
	Veternary & Medical	$20.07
	Fuel & Utilities	$37.49
	Breeding Fees	$39.00
	Marketing & Misc.	$38.19
	Professional Fees	$9.89
	Operating Interest & Other Costs	$7.48
	Total Variable Costs Without Labor	**$279.06**
Fixed Costs		
	Facilities & Equipment Depreciation	$76.88
	Facilities & Equipment Repair	$31.25
	Interest on Buildings	$50.00
	Breeding Herd Depreciation	$89.28
	Interest & Insurance on Breeding Herd	$16.09
	Total Fixed Costs	**$263.49**
TOTAL COSTS WITHOUT LABOR		**$542.56**
RETURNS		
SEW Pigs (23 per Sow per Year)		**$735.97**
NET RETURN PER SOW TO LABOR AND MANAGEMENT		**$193.42**
Projected Labor Costs Per Sow		$145.83
NET RETURN PER SOW TO MANAGEMENT		**$47.59**
TOTAL RETURN TO MANAGEMENT		**$57,103.19**

Table 2. Budget for 600 Sow Operation – Costs and Returns per Sow per Year.

COSTS		
Variable Costs		
	Feed Costs	
	Corn	$62.35
	Soybean Meal	$35.84
	Supplement & Minerals	$15.81
	Feed Processing & Delivery	$15.08
	Total Feed Costs	**$129.10**
	Veternary & Medical	$20.07
	Fuel & Utilities	$37.49
	Breeding Fees	$39.00
	Marketing & Misc.	$38.19
	Professional Fees	$9.89
	Operating Interest & Other Costs	$7.57
	Total Variable Costs Without Labor	**$281.30**
Fixed Costs		
	Facilities & Equipment Depreciation	$75.90
	Facilities & Equipment Repair	$34.38
	Interest on Buildings	$55.00
	Breeding Herd Depreciation	$89.28
	Interest & Insurance on Breeding Herd	$16.09
	Total Fixed Costs	**$270.64**
TOTAL COSTS WITHOUT LABOR		**$551.95**
RETURNS		
SEW Pigs (23 per Sow per Year)		**$735.97**
NET RETURN PER SOW TO LABOR AND MANAGEMENT		**$184.03**
Projected Labor Costs Per Sow		$145.83
NET RETURN PER SOW TO MANAGEMENT		**$38.19**
TOTAL RETURN TO MANAGEMENT		**$22,916.05**