ECONOMIC IMPORTANCE OF

THE IOWA EGG INDUSTRY

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Executive Summary

Iowa has regained the distinction of being the number one egg producing state for the first time since 1958. The Iowa Egg Council estimates that currently there are over 40 million layers producing over 9.5 billion eggs. Based on the latest published U.S. Department of Agriculture statistics for 2001, Iowa had over 32 million layers producing 8.7 billion eggs and consuming 34 million bushels of corn and 370,000 tons of soybean meal. In addition, the egg industry is an important value-added activity in Iowa, employing over 2600 production and processing workers in 2000 and generating over $60 million in direct payroll. The multiplier impacts on the Iowa economy are even more impressive with total labor income of $160 million and value added of $224 million attributable to direct and indirect impacts of the egg industry on the Iowa economy.

A number of factors account for the phenomenal growth of the egg industry in Iowa during the last decade. First, per capita egg consumption increased from 235 in 1991 to 257 eggs per year in 2001. Growing population and per capita egg consumption have supported a 2.1 percent annual expansion rate in egg production over the last decade. During this same period, Iowa egg production has increased almost four-fold. Second, Iowa has a competitive advantage due to low feed costs. Feed costs represent 60 percent of production costs to produce a dozen eggs with most competing states facing a feed cost disadvantage. Third, although Iowa is at a transportation cost disadvantage in shipping shell eggs to major metropolitan centers on the East and West Coasts, Iowa has capitalized on the rapidly growing market for breaker or "processed" eggs (now accounting for about 70% of Iowa's production), which encounter lower transportation costs.

If demand conditions allow the egg industry to expand profitably, Iowa is in a favorable position to benefit from this expansion. The advantages Iowa producers enjoy over their counterparts in other regions are relatively stable. Threats to Iowa's production cost advantage would likely be through technological advances that improve feed efficiency or by industry shifts that reduce pullet costs. Any advantages created by these changes would likely be short-lived, as Iowa producers would be able to adopt these changes as well.

There are other factors that create uncertainties in the egg industry. Animal health issues, e.g., the current outbreak of Exotic Newcastle Disease in the Southwest, always pose risks and costs of risk management to Iowa egg producers. Another important factor for the Iowa egg industry is the new animal welfare guidelines and how the flock certification process is implemented. The new animal welfare guidelines for shell egg producers will have a major impact on production capacity in all parts of the country over the next five years. Expansion of capacity may be easier in less densely populated parts of the nation like Iowa, increasing Iowa's competitive advantage in egg production. Alternatively, if the certification process requires a shell/breaker egg producer to certify all flocks/operations regardless of whether the eggs are bound for the shell or breaker market, then shell/breaker egg producers could be put at a major disadvantage in the breaker market or forced out of the certified shell market. These factors are beyond the scope of this study but raise interesting questions for future analyses when appropriate data are available to evaluate the market and industry impacts.

Chapter 1

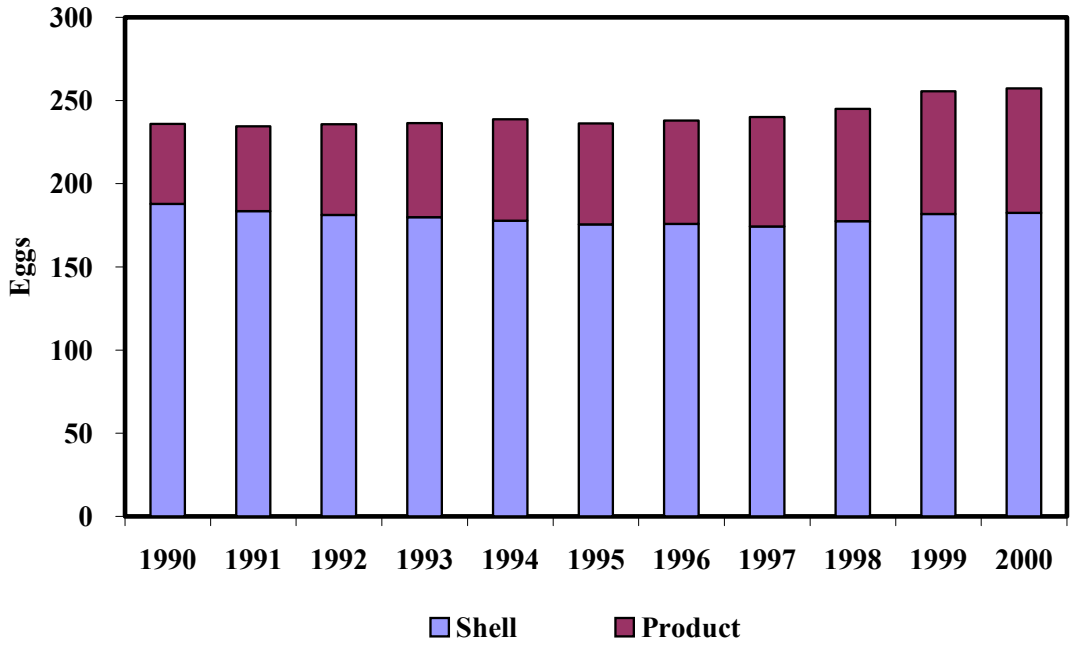
Egg Industry Situation and Outlook

The egg industry is an important value-added industry for the state of Iowa. According to the U.S. Department of Agriculture, more than 32 million layers in Iowa consumed an estimated 34 million bushels of corn and 370,000 tons of soybean meal during 2001. Iowa was the largest egg producing state as recently as 1958 when farm flocks dominated the industry, but new production technology allowed the industry to grow near population centers on the East and West Coast and production in Iowa declined.

In recent years, the trend to increased processed eggs, improved transportation, and modern facilities has encouraged investment in Iowa egg production to capture its significant feed cost advantage. This chapter will examine recent national trends in egg supply and demand and look at Iowa's recent growth in production made it once again the leader in 2001.

Per capita U.S. egg consumption peaked in 1945 at 403 eggs per year, reached its lowest level in 1991 at 235 eggs per year, and has increased steadily since (Figure 1.1). By 2001, per capita egg consumption reached 257 eggs per year, a 10.4 percent increase over 1991. Increasing population and rising per capita consumption has enabled the industry to expand production by an average of 2.1 percent per year since 1991.

Figure 1.1. US per capita egg consumption by processing type



The growth in egg consumption over the past decade occurred primarily in egg products rather than shell eggs (Figure 1.1). In 1990 approximately 20 percent of egg production was consumed as egg products. By 2000 this figure had grown to 29 percent. On a per capita basis, annual shell egg consumption declined 3 percent since 1990 while product egg consumption increased 55 percent. The total number of eggs diverted into the product market increased 73 percent from 1990 to 2000. Since Iowa's primary competitive disadvantage is distance to major population centers, this trend benefits Iowa as processing reduces transportation costs relative to shipping whole eggs for retail sales. Food manufacturers that utilize egg products are less likely to locate in highly populated areas, further reducing shipping distances.

Historically, exports have played a minor role in marketing U.S. egg production. In 2000 less than 1 percent of shell eggs produced were sold in the export market. Canada was the

largest single importer of U.S. eggs, accounting for 32 percent of US exports. Japan was a distant second at 5 percent of US exports.

Industry Size and Location

Iowa regained its status as the largest egg producing state in the nation during 2001. Pennsylvania, the leading producer in 1990, saw its production share remain relatively constant during the 1990s while Ohio and Iowa expanded their respective shares considerably. Ohio and Iowa surpassed Pennsylvania in 1994 and 1998, respectively. By 2002, Iowa surpassed Ohio both in number of laying hens and egg production (Figure 1.2). Currently, Pennsylvania and California rank third and fourth, while Indiana ranks fifth. These top five egg producing states account for 41 percent of the total U.S. egg production (Figure 1.3). Texas, Nebraska, Minnesota, Georgia, and Florida round out the top 10. The top 10 states account for 64 percent of total egg production.

The Iowa egg industry experienced rapid expansion over the past decade (Table 1.1). Figure 1.4 shows the 11-year trends in Iowa egg production and the share of US production. Since 1988, Iowa's layer inventory increased 11.2 percent each year and egg production increased 11.7 percent per year. This expansion caused Iowa's production share to increase from slightly more than 2 percent in 1990, to more than 10 percent by 2002.

Figure 1.2. Production shares of top five and top 10 egg producing states, 2001.

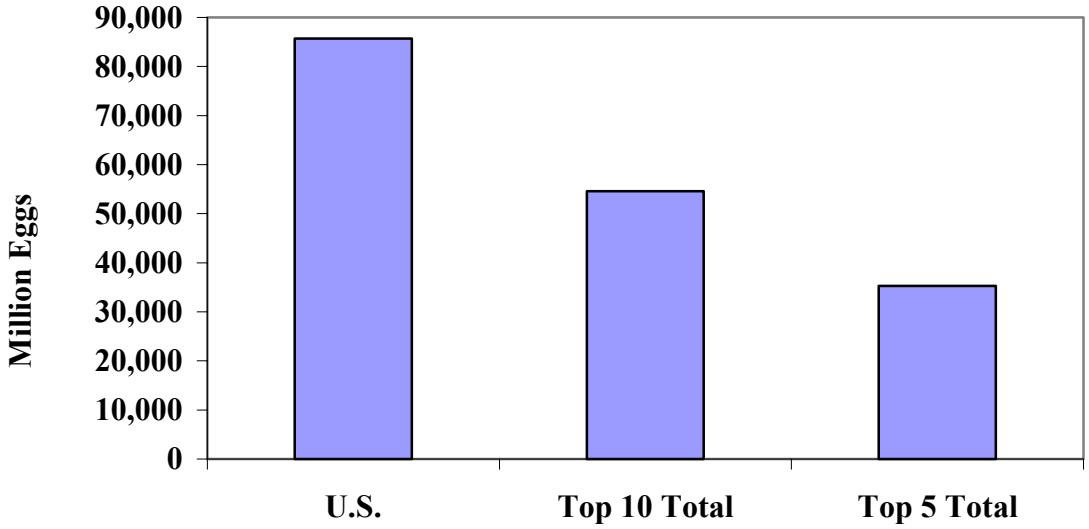


Figure 1.3. Market share of the top 3 egg producing states, 1990-2001

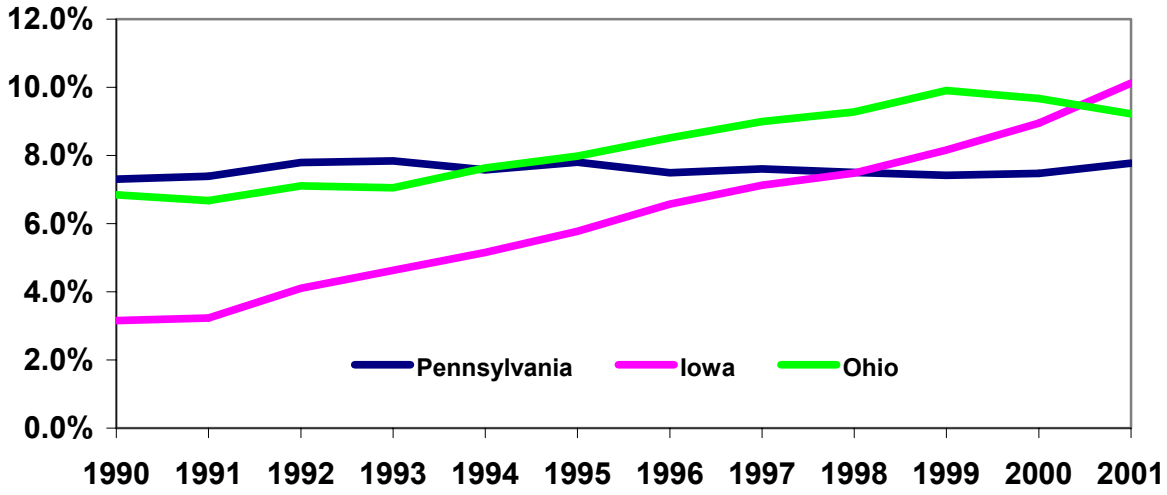
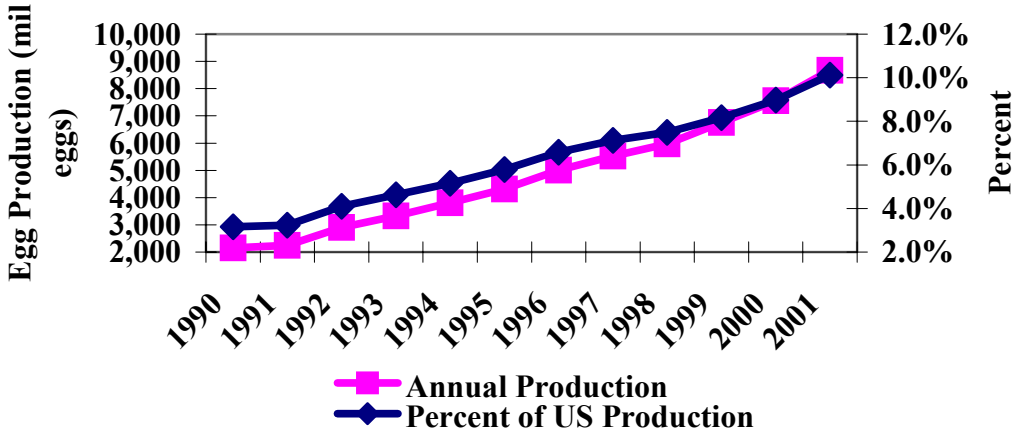


Figure 1.4. Iowa egg production and share of US production



Prices and Profits

Table 1.1 shows Iowa and U.S production and average prices and U.S. average production costs. Iowa egg prices are consistently below the national average, recently fluctuating between 35 cents and 60 cents per dozen and displaying a slight upward trend. The spread between the Iowa price and the national average price ranged from 6 cents to 9 cents per dozen, and averaged 7.2 cents per dozen. According to estimates by the U.S. Department of Agriculture, egg production costs appear to follow corn prices, trending upward and peaking in 1996 at 57 cents per dozen, then declining to 42.8 cents per dozen by 2000. The industry has been relatively profitable in recent years with the prices producers received higher than estimated cost of production. While the USDA does not estimate cost of production for Iowa specifically, analysis in Chapter 2 indicates that Iowa has the lowest cost of production among the major producing states.

Table 1.1. Iowa and United States Layers and Egg Production Information

	Iowa				United States				
	Average No. Layers 1,000	Annual Eggs per Layer	Total Egg Production Million	Price, Cents/Doz.	Average No. Layers 1,000	Annual Eggs per Layer	Total Egg Production Million	Price, Cents/Doz	Production Cost Cents/Doz.
1988	8,073	255	2,059	35.2	278,587	251	69,878	43.1	48.4
1989	8,505	252	2,140	54.4	270,415	250	67,503	60.5	49.4
1990	8,261	260	2,151	53.6	270,946	251	68,134	60.4	46.8
1991	9,047	248	2,247	49.9	275,451	252	69,465	57.1	46.6
1992	11,091	262	2,902	36.0	278,824	254	70,749	45.5	46.0
1993	13,221	252	3,328	43.1	284,770	253	71,936	51.6	45.6
1994	14,686	259	3,808	37.1	291,035	254	73,903	49.2	46.8
1995	16,717	258	4,318	40.2	294,350	254	74,764	50.6	47.1
1996	19,066	264	5,023	55.6	298,270	256	76,377	64.3	57.7
1997	21,187	261	5,527	49.6	303,604	255	77,532	58.7	51.6
1998	23,044	259	5,969	42.0	312,035	255	79,690	52.4	45.2
1999	25,623	264	6,754	34.9	322,354	257	82,715	45.2	41.9
2000	28,098	269	7,554	35.9	327,908	257	84,412	44.6	42.8
2001	32,075	270	8,676	36.5	333,798	257	85,702	45.4	N/A

Source: U.S. Department of Agriculture, National Agricultural Statistics Service and Economic Research Service.

Chapter 2

Competitiveness of the Iowa Egg Industry

The U.S. egg industry is experiencing limited annual growth due to increasing population and rising egg product consumption. However, future sustained growth in the Iowa egg industry depends largely on its competitive position compared to other egg producing regions. Iowa's competitive outlook depends not only on the size, but also the nature of any cost advantage or disadvantages. Some regional cost differences, such as feed costs and availability, climate, and distance to major markets are dictated by geography or other natural characteristics that cannot be reversed in a short period of time. Consequently, these types of cost advantages remain relatively stable over time. Other cost advantages, such as production technology, or economies of size from industry structure, can more readily be adopted in other areas.

The primary advantage Iowa producers enjoy over other egg producing regions is access to low cost feed. Feed is the largest component in the cost of egg production, representing 60 percent of production costs (Figure 2.1). Consequently, lower feed prices carry a relatively large weight in the production budget. Since Iowa's feed price advantage is rooted in its natural endowment of farmland, Iowa likely will maintain its feed cost advantage for the foreseeable future.

Figure 2.1. Composition of total egg production cost

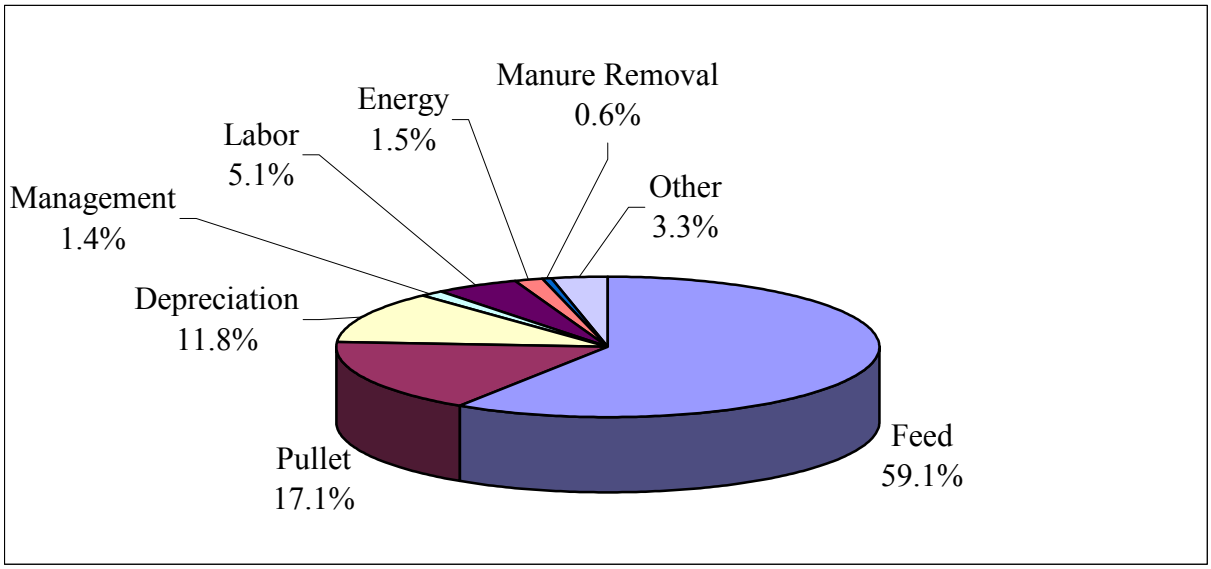


Table 2.1 reveals the magnitude of Iowa's corn price advantage over the states considered in this study. The values in the table represent the frequency that Iowa's monthly average corn price advantage is within the ranges listed in the column on the left. For example, the difference between Iowa and Georgia monthly average corn prices was between 45 and 60 cents per bushel 23.5 percent of the time, between 60 and 75 cents 33.8 percent of the time, and greater than 75 cents 20.6 percent of the time. A large majority of Ohio's price observations (86.5 percent) were within 30 cents per bushel of Iowa's corn price. Over 90 percent of Pennsylvania's monthly corn price observations were at least 45 cents higher than Iowa and over 50 percent at least 60 cents per bushel higher than Iowa.

Monthly average California corn prices were not reported in the data series. However, periodic price comparisons suggest premiums of 75 to 100 cents per bushel over Iowa prices are common.

Table 2.1. Corn basis distribution between Iowa and selected states, monthly average price, 1995 to 2001.

Iowa's Corn Price Advantage	Georgia	Ohio	Pennsylvania
($/bu.)	----------(%)----------		
< 0.00	2.9	2.9	0.0
0.00 – 0.15	1.5	40.6	2.9
0.15 – 0.30	8.8	44.9	1.5
0.30 – 0.45	8.8	5.8	4.4
0.45 – 0.60	23.5	2.9	38.2
0.60 – 0.75	33.8	1.4	33.8
> 0.75	20.6	1.4	19.1

Source: United States Department of Agriculture

Table 2.2 presents a snapshot comparison of Iowa feed and total production cost estimates to other leading egg producing states using 2000 data. The table values represent a cost index, with Iowa costs normalized to a value of one. Values greater than one indicate the percent that prices in comparison states are higher than Iowa, and values less than one indicate the percent that their prices lower than Iowa's prices. Iowa has the lowest feed cost and total cost of the states considered in the comparison. Iowa producers have a 22 percent feed cost and 11 percent total cost advantage over California producers. Ohio, the second leading egg producing state, was Iowa's closest feed cost competitor with an estimated 6 percent higher feed costs and 2 percent higher total costs. Pennsylvania and Georgia incurred a 7 percent higher feed cost and 3 percent higher total costs. Iowa's only cost disadvantage is a higher wage rate in Iowa than for the more eastern states. Labor, however, represents only 5 percent of total egg production costs.

Table 2.2. Iowa input cost index comparison to other leading egg producing states

	Iowa	California	Pennsylvania	Ohio	Georgia
Feed Cost	1.00	1.22	1.07	1.06	1.07
Electricity Rate[1]	1.00	1.39	1.00	1.12	1.15
Wage Rate[2]	1.00	1.06	0.86	0.81	0.96
Total Cost	1.00	1.11	1.03	1.02	1.03

1. Based on 2000 average commercial electricity rates reported by U.S. Department of Energy
2. Based on 2000 average wage rates paid by livestock operations reported by U.S. Department of Agriculture

Actual inter-regional feed price differences may vary both seasonally and annually. Table 2.3 presents production cost estimates for various combinations of corn and soybean meal prices. The shaded areas represent recent corn and soybean meal price ranges observed in each state. For example, Iowa corn prices have recently ranged from $1.60 to $2 per bushel while soybean meal prices ranged from $160 to $190 per ton. At these prices, Iowa's total egg production costs range from 27.6 to 30.3 cents per dozen.

Table 2.3. Estimated total cost per dozen eggs at alternative corn and soybean meal prices

Soybean Meal Price	Corn Price $/bushel										
$/ton	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00	3.20	3.40	3.60
	Cents/Doz.										
140	26.7	27.6	28.3	29.1	29.8	30.6	31.3	32.1	32.9	33.6	34.4
150	27.2	28.0	28.7	29.5	30.2	31.0	31.8	32.5	33.3	34.0	34.8
160	27.6	28.4	29.1	29.9	30.6	31.4	32.2	32.9	33.7	34.4	35.2
170	28.0	28.8	29.5	30.3	31.0	31.8	32.6	33.3	34.1	34.8	35.6
180	28.4	29.2	29.9	30.7	31.4	32.2	33.0	33.7	34.5	35.2	36.0
190	28.8	29.6	30.3	31.1	31.8	32.6	33.4	34.1	34.9	35.6	36.4
200	29.2	30.0	30.7	31.5	32.3	33.0	33.8	34.5	35.3	36.0	36.8
210	29.6	30.4	31.1	31.9	32.7	33.4	34.2	34.9	35.7	36.4	37.2
220	30.0	30.8	31.5	32.3	33.1	33.8	34.6	35.3	36.1	36.9	37.6
230	30.4	31.2	31.9	32.7	33.5	34.2	34.9	35.8	36.5	37.2	38.0
240	30.8	31.6	32.3	33.1	33.9	34.6	35.4	36.1	36.9	37.7	38.4

Iowa Ohio Pennsylvania and Georgia California

Non-feed cost items referred to in Table 2.3 include pullets, fixed asset depreciation, power, and labor. Pullets were valued at $2 per bird and were productive

over a 90-week laying/molt/laying cycle. Spent hens were disposed of at no value. The land, buildings, and equipment were valued at $700,000 for an 110,000-hen facility. Power consumption and labor requirements were constant among all states considered in the study at 200,000 kwh-hrs and 1,650 man-hours per year, for an 110,000-hen laying barn. Power costs were calculated from statewide average commercial electricity rates reported by the U.S. Department of Energy. Wage rates for each state were statewide average wages paid by livestock operations.

Since Iowa's feed price advantage is relatively stable, producers operating in other states will have to focus on improving non-feed costs to offset Iowa's advantage. Table 2.4 shows the non-feed cost reduction necessary to offset Iowa's feed cost advantage at alternative combinations of corn and soybean meal price advantages. A California producer would have to reduce non-feed costs by 4.1 cents per dozen, or 33 percent to produce eggs at the same cost as an Iowa producer. Ohio producers would need to reduce non-feed costs by an estimated 5 to 15 percent, while Pennsylvania and Georgia producers would need to reduce non-feed costs by 15 to 25 percent.

Table 2.4. Non-feed cost reduction necessary to offset Iowa's feed cost advantage

SBM Price Advantage	Corn Price Advantage (cents/bu.)					
	0	0.15	0.30	0.45	0.60	0.75
($/Ton)	----------Cents per dozen (Percent Change)----------					
0	0.0 (0.0%)	0.6 (4.6%)	1.1 (9.3%)	1.7 (13.9%)	2.3 (18.5%)	2.8 (23.2%)
5	0.2 (1.6%)	0.8 (6.3%)	1.3 (10.9%)	1.9 (15.5%)	2.5 (20.2%)	3.0 (24.8%)
10	0.4 (3.3%)	1.0 (7.9%)	1.5 (12.5%)	2.1 (17.2%)	2.7 (21.8%)	3.2 (26.4%)
15	0.6 (4.9%)	1.2 (9.6%)	1.7 (14.2%)	2.3 (18.8%)	2.9 (23.5%)	3.5 (28.1%)
20	0.8 (6.6%)	1.4 (11.2%)	1.9 (15.8%)	2.5 (20.5%)	3.1 (25.1%)	3.7 (29.7%)
25	1.0 (8.2%)	1.6 (12.8%)	2.1 (17.5%)	2.7 (22.1%)	3.3 (26.7%)	3.9 (31.4%)
30	1.2 (9.9%)	1.8 (14.5%)	2.3 (19.1%)	2.9 (23.8%)	3.5 (28.4%)	4.1 (33.0%)
35	1.4 (11.5%)	2.0 (16.1%)	2.6 (20.8%)	3.1 (25.4%)	3.7 (30.0%)	4.3 (34.7%)

Mathematically, the largest non-feed cost items provide the greatest opportunity for producers in other regions to compensate for Iowa's feed cost advantage. At 5.2 cents per dozen, pullet depreciation represents the largest non-feed cost item in the production budget, representing 17.1 percent of total production costs. Pullet development costs, however, are primarily feed related, thereby favoring Iowa producers. Furthermore, any innovations that decrease a competitor's non-feed portion of pullet development costs could also be adopted in Iowa. Therefore, any cost advantages derived from lower-cost pullets would likely be short lived. Consequently, Iowa will likely maintain an advantage in pullet production as well as in feed costs.

Fixed asset depreciation is the second largest non-feed item in the production budget at an estimated 11.8 percent of total costs. Fixed assets include buildings, cages,

and other production equipment. Annual depreciation costs are primarily determined by the initial cost and expected useful life of the assets. Iowa's climate may require more expensive laying facilities to maintain an ideal production environment. This could be due to costs of materials, additional materials (e.g., footings, rafters) needed in cold climates, or higher construction costs because crews and equipment are idle through much of the winter and wet spring months. If this were the case, higher initial construction costs would impose greater annual depreciation costs on Iowa producers.

Combined labor and energy costs comprise 6.5 percent of egg production costs. Consequently, access to a relatively inexpensive labor pool or low utility rates offers little potential for producers in competing regions to offset Iowa's feed cost advantage. Producers in Sunbelt states may enjoy a climate more favorable to egg production relative to the Midwest in the winter months but may be at a disadvantage during summer months. Any climate-related cost advantage would be realized through lower energy requirements or lower construction costs to maintain an ideal laying environment in the building. Because region-specific electrical or natural gas utilization values were not available, the production cost estimates in Table 2.2 assume constant power consumption among all regions of the country. The total electric bill is substantially less than the feed cost advantage. Furthermore, any labor saving innovations adopted in competing states would be available in Iowa. At prevailing corn and soybean meal prices, California and Georgia producers could completely eliminate their electricity and labor costs and still not offset the feed cost advantage enjoyed by Iowa producers.

Feed conversion exerts a significant influence over production costs. Feed efficiency improvements achieved in other states could threaten Iowa's cost advantage.

Table 2.5 shows total production costs using Iowa feed prices for various feed conversion ratios. A reduction in feed efficiency from 2.9 to 3.1 pounds per dozen eggs increases total production costs from 27.5 to 28.6 cents per dozen eggs. For example, California producers would need to improve feed conversion efficiency by 19 percent to offset Iowa's feed cost advantage. Pennsylvania, Ohio, and Georgia producers would only need to improve feed conversion efficiency by 5 to 6 percent to offset Iowa's feed cost advantage. Feed conversion efficiency is primarily related to diet, environmental conditions, genetics, and other factors controlled by management. Consequently, feed conversion improvements in other states would be adopted by Iowa producers, implying that any competitive gains in other states would be short lived.

Table 2.5. Total production costs at various feed conversion ratios (pounds of feed per dozen eggs)

Sensitivity of total production costs to feed efficiency ratios					
Feed Conversion:	2.90	3.10	3.30	3.50	3.70
Production Costs:	27.5¢	28.6¢	29.6¢	30.7¢	31.7¢

A major disadvantage for Iowa producers is proximity to population centers. Indiana, Ohio, and Pennsylvania producers are closer to the urban areas on the East Coast. Nebraska, Texas, and California producers are closer to the population centers on the West Coast. Table 2.6 provides estimates of mileage and transportation costs from central Iowa and other production areas to New York City and Los Angeles. Freight rates are based on commercial rates in mid-December 2001 for refrigerated trucks. The rate from Des Moines to the West Coast was $1.24/mile plus a $.02/mile fuel adjustment.

The rate from Des Moines to the East Coast was higher, $1.75/ mile plus $.02/mile fuel adjustment plus a $300/load destination charge for tolls and other costs.

Table 2.6. Estimated transportation cost per dozen eggs from production areas to New York City and Los Angeles*

	One Way Miles		Cents/Dozen	
	NYC	LA	NYC	LA
Des Moines	1,107	1,684	9.41	8.70
Columbus, OH	532		5.17	-
Atlanta, GA	863		7.61	-
Lancaster, PA	156		2.55	-
Bakersfield, CA		112	-	0.93

* December 2001 freight rates.

On short hauls of 200 miles or less the cost is based on a flat rate and the charge per mile is even higher. Based on 30 dozen eggs per case and 800 cases per load, the estimated cost per dozen eggs from Des Moines to New York City is 9.4 cents and to Los Angeles is 8.7 cents. States to the East of Iowa have a shipping cost advantage for New York City delivery and states to the West of Iowa have a cost advantage for Los Angeles delivery.

A $.10/bushel change in corn price is equal to approximately $.035 cents/dozen in the cost of producing eggs. It is doubtful that Iowa's corn price will be sufficiently below Ohio or Pennsylvania to compensate for their freight advantage to New York City. However, it is very likely that Iowa can put eggs in New York City at a lower cost than Georgia in most years. When competing against most of these states for the table egg market, Iowa faces a transportation cost disadvantage. Viewed from another perspective, a $0.10/bushel increase in corn price has the same impact on the cost of eggs delivered to Los Angeles as a $0.50/mile change in freight rates. Iowa is compensating for this

freight cost disadvantage in shipping to major cities on the East and West Coast by further processing eggs in the breaker market rather than by competing solely to the table egg market.

Political opposition, through zoning or other regulation, represents another potential barrier to expansion. New construction projects often are controversial and frequently contested before state or local authorities. Opportunities for unopposed expansion depend largely on the rural population density and the availability of sites with sufficient distance from potential neighbors. Table 2.7 shows the rural population density of each state considered in the study. California had the lowest rural population density at 26.2 persons per square mile. Iowa was ranked second lowest at 32.7 persons per square mile. Ohio and Pennsylvania were the top two states in rural population density at 106.9 and 98.4 persons per square mile, respectively. In general, population density increases from west to east. Consequently, Iowa egg producers considering expansion may encounter less regulatory and local opposition than their counterparts in Ohio, Pennsylvania, and Georgia, but may be at a disadvantage relative to states to the west and southwest of Iowa.

Table 2.7. Population and land area for each state considered in the study

	California	**Pennsylvania**	**Ohio**	**Georgia**	**Iowa**
Non-Urban land area	149,407	41,364	37,804	54,928	55,414
Non-Urban Population	3,921,640	4,070,069	4,041,847	3,176,336	1,811,534
Non-Urban Pop/sq mile	26.2	98.4	106.9	57.8	32.7

Source:http://quickfacts.census.gov/qfd/

In addition to be a more sparsely populated state, Iowa has another advantage in egg production. The abundant supply of highly productive agricultural land allows Iowa Producers to recycle the N, P, and K nutrients in poultry manure and replace the N, P, and K nutrients that would be import into the state in the form of commercial fertilizer. If manure from layer operations is properly applied and substitutes for commercial fertilizer, the nutrient value of the poultry manure (i.e., the cost savings in commercial fertilizer) is $8 million per year. This estimated savings is assuming a flock of 40 million layers in the state, expected N, P, and K prices for the 2003 crop year, and estimated nutrient values for layer manure (i.e., 0.37 lbs. N, 0.84 lbs. P, and .52 lbs K per layer year).

CHAPTER 3

Employment and Earnings in Egg Production and Processing

Most of Iowa's rapid expansion in egg production has taken place in large-scale, integrated laying and processing facilities. Preliminary information from the Iowa Egg Council survey indicates the current number of layers in Iowa has increased to 40 million birds with production of 9.5 billion eggs. This volume of egg production has made Iowa the leading egg producing state. The most recent U.S. Department of Agriculture statistics for 2001 indicated that 8.7 billion eggs were produced in Iowa with almost 70 percent going into egg-breaking facilities for further processing and the remaining production into retail outlets as shell eggs. The diversion of eggs to breaking facilities generates additional processing activities that add value and create jobs in Iowa, mainly in rural areas. Also, industry trends of increasing consumption of processed eggs and relatively flat consumption of shell eggs has growth implications for the future of the industry in Iowa**.**

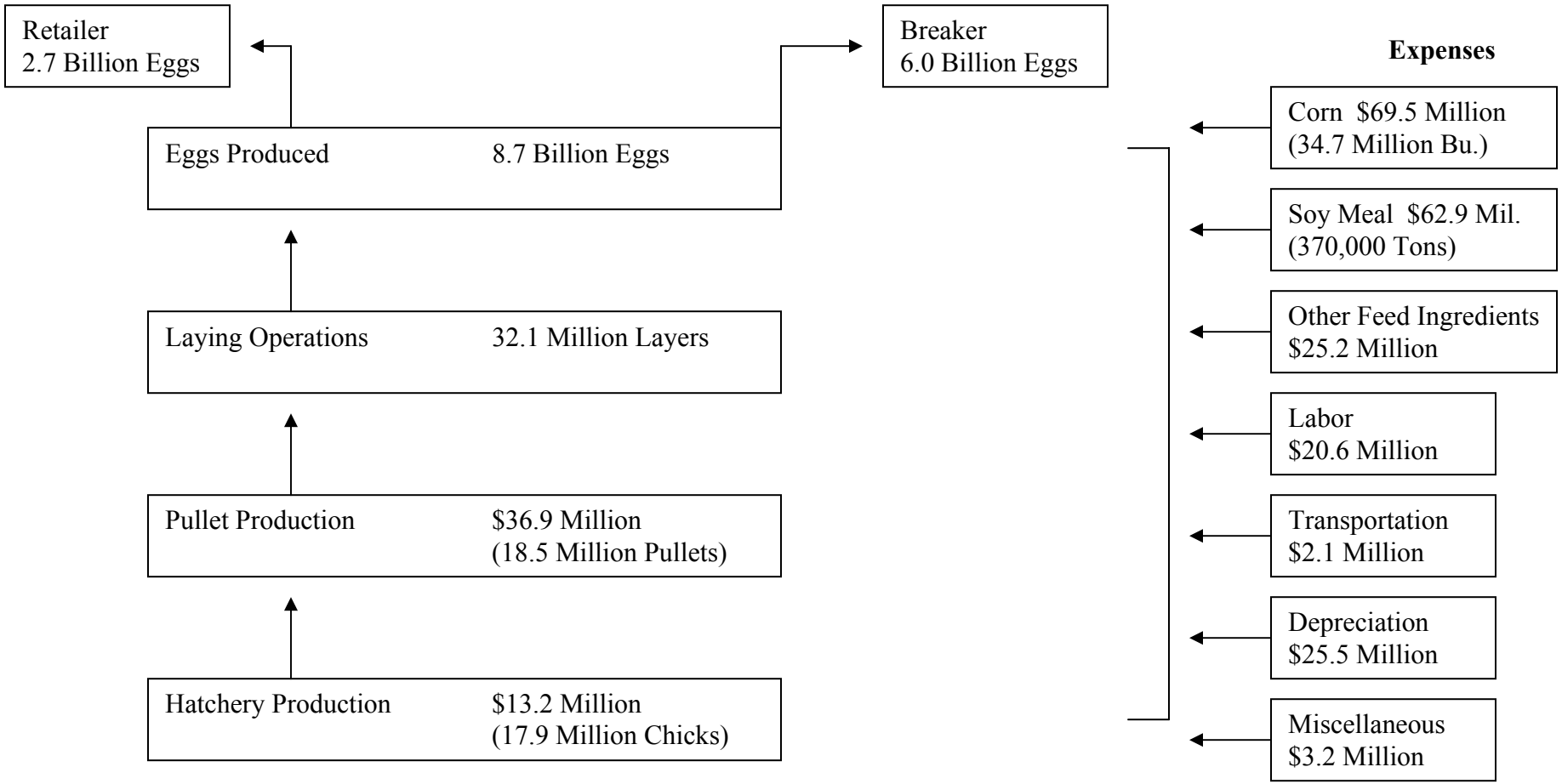
The growth of the Iowa egg industry has expanded rural employment opportunities. Based on data from Iowa's Department of Employment Services (DES), nearly 1,400 workers were employed at 11 egg processing facilities around the state in 2000. Wages and salaries paid to workers at these facilities totaled about $28 million in 2000. Poultry hatchery facilities are an integral part of the layer industry and are listed separately in DES records. In 2000, 470 workers were identified as working in 15 hatcheries in Iowa. Wages and salaries paid at these facilities totaled more than $12

million in 2000. The combined economic effects of these two segments of the Iowa egg industry total 1,770 workers and more than $40 million of wages and salaries.

The information on employment in egg production at the farm level is more scattered. DES records in 2000 indicate 870 employees at 44 units around the state with a total payroll of $20.6 million. In this context, a unit is the reporting office for a complex of laying facilities. The 1997 Census of Agriculture also identified 1,800 Iowa farmers involved in producing eggs. At the larger end of the production range, 37 producers had between 20,000 and 100,000 layers and 41 producers reporting inventories of more than 100,000 layers.

Figure 3.1 provides a schematic on the structure of the egg laying industry in Iowa, including volume of eggs produced and the levels of inputs used in the production and processing industry in 2001. Based on this level of egg production, approximately 34.7 million bushels of corn and 370,000 tons of soy meal were used by the 32.1 million layers in Iowa. Total feed costs were an estimated $158 million Costs of other inputs including labor, depreciation, transportation, and miscellaneous expenses totaled to $51 million for the layer production industry. Direct labor costs for combined production and processing total over $60 million. Given the multiplier impact on economic activity, production and processing do generate significantly more labor income (see Table 3.1) in the Iowa economy.

Figure 3.1. Iowa Egg Production Flow Chart 2002



Local Grain Price Impacts

A recent Iowa State University Department of Economics study identified changes in county level corn prices associated with changes in local livestock production. Due to a lack of data, the analysis doesn't account for changes in corn demand due to corn processing or poultry and egg production, but it does show a positive relationship between feed usage and corn price. Numbers on livestock from the Census of Agriculture were divided into three groups of counties based on the change in corn surplus (production - feed usage) between 1982 and 1997. The 32 counties with the greatest decrease in corn surplus (feed usage grew faster than production) were compared to the 32 counties with the greatest increase in corn surplus (production grew faster than feed demand). The average change in corn surplus between the two groups of counties was 4.8 million bushels per county during the 15-year period. The counties with increasing feed demand averaged 1.6 cents per bushel better basis improvement than the counties with declining feed demand. New feed demand is expected to have a positive, impact on corn prices in the county where the demand is located *and* in surrounding counties. Progressive corn producers from the surrounding area will begin selling corn to the now higher market as long as the higher price offsets transportation cost.

Economic Impacts

The egg production and processing activities identified in Figure 3.1 as the core of the egg industry in Iowa also are responsible for generating economic effects beyond the farm level. An Input-Output model for the state of Iowa was used to identify and estimate the value of these linkages. An I-O model is essentially a generalized

accounting system of a regional economy that tracks the purchases and sales of commodities between industries, businesses, and final consumers. Successive rounds of transactions stemming from the initial economic stimulus (such as a new plant or community business) are summed to provide an estimate of direct, indirect, induced (or consumer-related) and total effects of the event. The impacts are calculated using the IMPLAN Input-Output modeling system, originally developed by the U.S. Forest Service and currently maintained by the Minnesota IMPLAN Group. This modeling system is widely used by regional scientists to estimate economic impacts.

In addition to the direct effects from the 2,640 jobs and $61 million of payroll in egg production and processing, the value of inputs used in production such as feed grains, transportation, handling, and business services as well as induced effects of consumer-related spending by workers who have earned paychecks in these sectors are included as part of the overall economic effects. The results from this I-O analysis are presented in Table 3.1. Including the direct and secondary impacts, the total economic effects attributable to the Iowa egg industry include an estimated $747.4 million of total industrial sales, about 6,000 jobs, $160.1 million of personal income, and $224.4 million of value added. Based on average state tax yields relative to earnings, the Iowa egg industry generates $10.0 million of state taxes annually.

Table 3.1 Economic Effects Associated with the Iowa Egg Industry

	Total Sales ($)	Labor Income ($)	Value Added ($)	Jobs
Agriculture	184,990,384	34,758,488	45,947,228	873
Mining	68,074	18,756	45,246	1
Construction	5,760,250	3,232,334	3,406,867	96
Manufacturing	423,592,832	72,637,488	88,976,968	2958
Tran.Utilities	23,430,700	6,257,270	13,845,867	156
Trade	41,694,288	16,456,364	28,349,860	833
Fin.Ins.R.Estate	24,600,068	5,023,624	17,924,288	170
Services	39,363,176	20,293,836	24,104,692	872
Government	3,664,243	1,187,262	1,633,093	28
Other	198,926	198,926	198,926	23
Total	747,362,940	160,064,347	224,433,035	6,009

Source: IMPLAN Model for Iowa