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Avian Influenza Economic Impacts in Iowa

Abstract

The avian influenza (**AI**) outbreak in Iowa has resulted in the loss of as much as a third of the state's current egg producing capacity along with smaller, but still significant, losses among some turkey and pullet producers. As with any disaster, there will be losses to those operations, to the suppliers to those operations, and, ultimately, to the regions of the state where those operations are located. This analysis assumes a 34 percent reduction in poultry sector output for one full year.

Keywords

Avian influenza, economic impacts, input-output analysis

Disciplines

Health Economics | Other Economics | Public Economics | Regional Economics

Avian Influenza Economic Impacts in Iowa

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Introduction

The avian influenza (**AI**) outbreak in Iowa has resulted in the loss of as much as a third of the state's current egg producing capacity along with smaller, but still significant, losses among some turkey and pullet producers. As with any disaster, there will be losses to those operations, to the suppliers to those operations, and, ultimately, to the regions of the state where those operations are located. While there have been reports of economic impacts to be expected in Iowa, and in Minnesota to the north where the outbreak has affected around 8 percent of their turkey flocks, economic impact summaries for Iowa's current situation need to be prepared with caution:

- As the outbreak is ongoing, the production loss magnitude in Iowa is yet to be fully determined and will not be known for some time yet
- There is uncertainty as to how long it will take to disinfect contaminated facilities and to repopulate those operations with laying hens
- Contaminated operations, though not producing eggs, still retain much of their labor for clean-up and operational remediation for a period of time
- There are substantial USDA indemnity payments allocated for the turkey and laying operations which will soften losses
- There will also be private insurance coverage for some of the losses
- Many laid off workers will qualify for unemployment assistance and other means-tested aid, which will dampen household-spending impacts in the affected regions
- Modeling systems that are used to estimate economic impacts must be applied carefully so as to not over-describe regional losses
- It may also be the case that there is surplus production capacity in unaffected operations*
- And increased egg prices as a result of supply reductions will increase financial returns to operations that were unaffected by **AI**.

There are other economic concerns, as well, that need to be put into proper perspective. The affected operations will not be consuming grain and oilseed feeds, which will have a minor dampening effect on local prices. That grain, however, will ultimately be marketed somewhere and there will not be any changes in farming activities as a result of the **AI** outbreak. Further, the traditional supply chain into and

* An early news report on the **AI** outbreak noted that 3.8 million animals out of a plant capacity of 5.3 million were to be exterminated. That plant was, therefore, operating at 70 percent capacity. If surplus capacity exists among other operations not subject to quarantine and not producing for special markets like California, then it is reasonable to assume some of those operations may expand production to meet demand.

out of the operations will be affected, and impact modeling structures will capture those temporary losses. For example, grain transport into the laying operations as well as trucking of egg products from the farms to breaking facilities or to other egg processing and distribution facilities will, by definition, cease to exist for the duration of the shutdowns. The same would be true of milled feed supplies.

While temporary losses can be counted at the operations and along their entire up-stream supply chains, there are also positive economic impacts that will result from remediation. As mentioned already, these operations have to dispose of the dead animals, they have to disinfect the facilities, and in many instances, there may be capital investment to bolster biosecurity. All of these activities are counted as pluses in the regional economy even though the farms are not making sales – they are still making expenditures, and those expenditures, in turn, will have a multiplier effect. We do not know, however, the amounts of expenditures involved with remediation, just that they exist.

Lastly, the **AI** outbreak needs to be put into context regarding the overall agricultural economy and the state's economy as a whole. Our best estimates are that Iowa's total poultry and egg production sector employs about 3,030 persons and generates nearly \$500 million in Gross Domestic Product (GDP). Respectively, the poultry industry accounts for 0.15 percent of Iowa jobs and 0.3 percent of total Iowa GDP.

There are other dimensions to discuss, as well. According to 2012 Census of Agriculture counts, just 40 operations had more than 100,000 laying hens, and those operations accounted for 97 percent of all laying hen inventory in Iowa. This industry is highly concentrated in terms of the number of operations and spatially. The farms are chiefly located in the northwest quadrant of the state, and within that quadrant highly concentrated in just a comparatively few counties. Regarding short-term economic impacts, they may well be substantial in, say, Wright County or Sioux County where there is a high concentration of producers versus other counties where egg production is a much smaller subset of total agricultural activity.

In all, there are some general conclusions that can be drawn about **AI** and its economic impact in Iowa before any impact analysis is conducted:

- Just a few operations have accounted for the vast majority of the animal and production losses
- While these losses are substantial for individual operations, they are a comparatively small fraction of agricultural output in Iowa as well as in most of the affected regions
- Responses to the outbreak will impact feed and transportation suppliers to the egg laying operations, but grain production in the state will not be affected
- There will be disruptions of replacement pullet producers in the state as those animals are synchronized with ongoing demand for new laying hens – this could lead to collateral losses that have yet to be factored into expected total losses
- There will be positive economic outcomes associated with clean-up, disinfection, and other remediation measures
- Losses will also be softened from government and private indemnity payments

- The duration of the outbreak is expected to be limited, especially with the onset of warmer weather
- The full magnitude of the outbreak in terms of production losses is yet to be revealed
- All economic impact estimates at this time are preliminary and not informed with actual production change data

Measuring Economic Impacts

The economic impacts of reduced poultry product sales can be estimated using an input-output (I-O) model of the Iowa economy.* The model contains a “poultry and egg production” sector, and in Iowa the vast majority of that sector’s sales come from egg production. In 2012, 90 percent of poultry inventory in Iowa was laying hens or replacement pullets.

Recovery from this outbreak is currently uncertain: some producers have indicated it may take as long as two years to get back to normal production levels, though there does not appear to be evidence supporting such long recoveries. Other comments on recovery have indicated a 6 month or so period for quarantine. Lacking a production recovery time-table, this analysis assumes a 34 percent reduction in poultry production in Iowa for a period of one year as the initial economic impact estimate scenario.

The modeling system employed for this analysis reported the poultry industry had slightly more than \$1.532 billion in industrial output in 2013, the last year for which we have data. Reducing output by 34 percent would equate to \$521.3 million in reduced poultry sector output.

This scenario presupposes that these losses translate into job layoffs and proportionately reduced demands for inputs from suppliers, to include replacement pullets. This scenario does not, however, assume a reduction in corn or soybean production in the state of Iowa. The results are contained in the following table, but first an explanation of terms:

The types of economic impact data are

- **Output.** This is the value of industrial productivity over the course of a year. It represents the worth of what was produced whether it was sold or not.
- **Employee Compensation.** These are wage and salary payments to farm workers, including employer-provided benefits.
- **Value added.** Value added includes all employee compensation (mentioned above) plus payments to proprietors and to investors (dividends, interests, and rents), along with indirect tax payments to governments. Value added is the equivalent of Gross Domestic Product (GDP), which is the standard measure of economic activity across the states and for the nation.
- **Jobs.** There are many kinds of jobs. I-O models measure the annualized job value in different industries. Many industries have mostly full-time jobs, but many others have part-time and

* The IMPLAN modeling system is used for this analysis, and the region of analysis is the state of Iowa as this outbreak encompasses several counties. Once the full extent and the outbreak is known, it may be more appropriate to analyze the outbreak using just the affected regions. The most recent data populating the model are from 2013.

seasonal jobs. I-O models do not convert jobs into full-time equivalencies, but they do convert them into annualized equivalencies. As many people have more than one job, there are always more jobs in an economy than there are employed persons.

The levels of economic impact data are

- **Direct values.** These are the aforementioned data types for the industry that we are evaluating. In this study, they represent expected total sales in poultry operations.
- **Indirect values.** All direct firms require intermediate inputs into production. They must buy supplies, utilities, other agricultural or manufactured inputs, transportation, and services, just to name a few.
- **Induced values.** When the workers in the direct industry and those in the indirect industries (the supplying sectors) convert their labor incomes into household spending they induce a third round of economic activity. Induced values are sometimes called the household values.
- **Total values.** The sum of direct, indirect, and induced activity constitutes the total economic effect that is being measured. In short it gives us the economic sums of the studied industry, its suppliers, and all affected households.

Having explained terminology we can turn to the table. A 34 percent reduction in the poultry sector for a period of one year would mean \$521.3 million less direct output, which would translate into 1,084 farm job losses and \$44.1 million in earnings to those workers. Those poultry operations would demand \$327.3 million less in state-supplied inputs, which would further lead to 825 fewer jobholders making \$38.4 million in earnings. Earnings losses to the direct and to the indirect workers as well as to all of the farm proprietors would translate into \$108.5 million in reduced induced output demand from the sectors that supply goods and services to households. This would translate into a reduction of 900 jobs earning \$29.1 million. Combined, were this scenario to hold for a period of one full year, total output in Iowa would decline by \$957.2 million, which translates into a \$327.95 million reduction in value added (or gross domestic product), and \$111.1 million in lost earnings to 2,809 job holders.

Avian Influenza Economic Impacts: 30 Percent Reduction in Output for One Year

| Type of Impact | Jobs | Employee Compensation | Value Added | Total Industrial Output |
|----------------|---------|-----------------------|---------------|-------------------------|
| Direct | (1,084) | (44,362,986) | (177,869,340) | (521,333,333) |
| Indirect | (825) | (38,381,977) | (88,685,204) | (327,342,445) |
| Induced | (900) | (29,087,925) | (61,400,407) | (108,477,160) |
| Total | (2,809) | (111,832,887) | (327,954,951) | (957,152,938) |

These losses are considered temporary: once the operations resume production, the negative values become positive values and the state’s poultry production status quo is re-attained. Additionally, the values in the table are linear given the amount of reduction assumed. If annualized productivity losses were larger, say at 40 percent for a period of one year, then one would simply multiply all of the values in the table by 40/34th. If the losses were slightly less, say 20 percent for a period of one year, then one would multiply all of the values by 20/34th.

When measuring the value of potential losses, it is most appropriate to use the value added amount. That is how we measure economic activity at the state level on an annualized basis. The total industrial output value is larger, but one pays attention to the returns to labor, ownership, and to investors from that output to gauge the amount of meaningful economic change. Accordingly, this scenario supposes that as much as \$328 million in value added could be lost from the Iowa economy as a result of this outbreak considering only farm and farm-related impacts. By way of proportion, were the sector to realize a reduction in output of 34 percent for one year, the multiplied through reduction to the state's total GDP would be approximately 0.20 percent.

Other Potential Losses

This analysis has only measured short-term losses in farm production. There are other egg breaking facilities in Iowa, manufacturing firms, technically, that also may have to reduce their workforces temporarily. Additionally, there may be reductions in output in Iowa's turkey and other processing facilities as a result of this outbreak. No announcements of those sorts have been made in Iowa, though there have been employment reductions in Minnesota turkey plants. If those industries reduce output as well, then there will be additional down-stream impacts to be considered.

Conclusion

The economic impacts associated with this outbreak will not be known until AI has run its course. We will not know the full extent, types, or costs to farm operations without detailed on-site investigations. We will also not know whether unaffected operations were able to expand egg or pullet production to offset some of the expected shortages. Short of that knowledge, one can approximate production losses and their economic impacts, but there are several dimensions to this outbreak that cannot be measured well at this time, to include the positive economic impacts associated with decontamination, as well as government and private indemnity payment offsets to losses.

Readers are cautioned to remember that the results represent a scenario where 34 percent of poultry output is lost for one full year. We do not know if that will be the case, but as has already been mentioned, the values can be scaled up or down once the full animal losses are known. As it currently stands, there will be operations that will not have re-attained full production for more than one year. However, we have no evidence that restoring full production, regardless of the affected farms, may not occur within the one-year time frame, most especially if some existing excess production capacity can in fact be utilized and permitted for production before the infected farms are clear of quarantine.

Lastly, this evaluation uses the state of Iowa as the modeling foundation. The localized impacts will be more acutely felt in many of Iowa's affected counties. Small area impact studies can and should be done for those counties as well after this outbreak has run its course.