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Potential Economic Effects of Avian Influenza on the Poultry Industry in Mississippi

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An input-output model was used to estimate the potential economic impact of Avian Influenza (AI) on the Mississippi poultry industry. Research suggests consumer responses to the discovery of the H5NI virus (or AI) in birds have been immediate and dramatic, resulting in significant economic losses. To model this behavior, the authors used input-output analysis. This technique measures the effect of an outbreak of AI in the poultry industry on other sectors in the state that depend on this industry for incomes, jobs, sales, and taxes.

Avian influenza¹ is on the national agenda. Most Americans (93 percent) indicate they have heard of avian influenza. Nearly three-quarters of Americans say they have discussed avian influenza with someone else. Still, most Americans don't know much about avian influenza. More than half of Americans say they know "little" or "nothing" about avian influenza.

Most Americans currently view chicken as safe and continue to eat it. More than nine out of ten Americans say they currently eat chicken. Americans believe chicken products are safe to eat in the U.S.

However, the closeness of avian influenza cases affects Americans' likelihood of eating chicken. The nearer avian influenza comes to the U.S., the less likely Americans are to eat chicken. Avian influenza does not necessarily have to emerge in the U.S. to affect poultry consumption.

Many Americans are unlikely to eat chicken if the avian influenza virus is found inside the U.S. Even with a strong, specific assurance of safety, many Americans report that they would be unlikely to eat chicken again if the avian influenza virus is found inside the U.S. One-fifth (20 percent) say they would never eat chicken again. Those participants who said they would eat chicken again report that it would take an average of 144 days for them to start eating it again.

Research suggests that in most countries in Asia, Europe, and Africa, the detection of H5N1 avian influenza in either wild or domestic birds

has resulted in sharp declines in sales, prices, and consumption of poultry. In Europe, the resulting declines in consumption ranged from 20 percent in Germany, Ireland, and Slovenia to 30 percent in France, Cyprus, and Austria, and even dramatic 50-percent decreases in poultry consumption in Greece and Italy.

In the past, the economic impacts of avian influenza in birds have extended beyond the shores of the countries where infected birds have been discovered. For example, in the United States, export prices dropped 13 percent as the result of declining shipments to Eastern Europe and Central Asia in November and December of 2005 (Condry et al. 2007).

The concentration of poultry production in about 18 Mississippi counties means that an outbreak of AI in the poultry industry potentially would be disastrous, perhaps even eliminating a significant portion of this industry, affecting the regional and state economies (Myles et al. 2005). An outbreak or perceived attack could cause significant economic harm to the Mississippi economy from lost income, employment, output, and taxes. Thus this sector was selected for economic evaluation of AI mainly because of its importance to the state's agricultural economy and to the overall economy in Mississippi.

This paper measures the economic effects on the poultry industry and the Mississippi economy of a 1.2 million-bird reduction in broilers due to Avian Influenza (AI).

Industry Facts

The Mississippi poultry industry ranked about fourth in the nation in broiler production and boasted two of the top ten broiler-producing counties in the

¹Much of the information in this section is taken from Condry et al. (2007).

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United States in 2006. Poultry is the largest agricultural commodity in the state, and has ranked number one in farm-gate value for the past 13 years (MPA 2006). About 18 percent of all poultry exported from the U.S in 2007 moved through Mississippi ports, mainly Gulfport and Pascagoula. This industry directly employed 24,606 people and paid wages and salaries totaling \$1.07 billion in 2007. This is significant since Mississippi produced about nine percent of U.S. broilers in 2007 (Kidd et al. 2007). However, this industry affects many groups in the state, such as construction workers who build the broiler houses, port workers, transportation firms, utility companies, corn and soybean growers, and others outlined in the various tables in this study.

There is no easy treatment for avian influenza (AI) except through quarantine, humanely destroying the infected poultry flock, and disinfecting the area. Public reaction to news about broilers infected with AI usually leads to reduced consumption of these products.

Data, Methods, and Procedures

Because linkages between poultry and the rest of Mississippi's economy are complex, analysts often try to measure direct and spillover contributions from one or more industries (Spurlock 2003). This analysis used the IMPLAN Input-Output model for the Mississippi poultry industry. The IMPLAN model was used mainly because it contains details on the economic transactions of agriculture and related sectors in the Mississippi economy. The immediate impact of Avian Influenza (AI) on the poultry sector was modeled by reducing output by 1.2 million broilers in the state. This could cause demand for poultry to decline among consumers in Mississippi, the U.S., and in foreign countries. Since we assumed nine percent of Mississippi poultry meat is exported to foreign countries, the study expected all imports of these products would be eliminated. These shocks were applied on top of the reductions in domestic output because of an AI attack (Allen et al. 2004).

Results

This analysis focuses specifically on the economic impact of a tabletop exercise requested by the Mississippi Homeland Security Council (MHSC 2007).

It only addresses the immediate impacts of a 1.2 million-bird decline in poultry production (approximately a \$15.2 million decline in poultry sales) in Mississippi. This presentation does not incorporate the long-term impacts of AI on this industry because that was not the first focus of the request. The final paper will include these impacts to show the long-term losses associated with an AI outbreak in the Mississippi poultry industry.

The following discussions center around the economic impact of Avian Influenza on the poultry industry in Mississippi because of the elimination of 1.2 million broilers (or \$15,259,400² in poultry output). This report also analyzes expenditures³ for destroying, disposing, cleaning, disinfecting, and monitoring (DDC&DM) resulting from an AI outbreak in the Mississippi poultry industry. Finally, the report analyzes how DDC&DM expenditures on infected poultry farms might affect the poultry sector and the rest of the Mississippi economy.

Output

Table 1 gives some baseline statistics on the industry and how the economic impact of an AI outbreak on the poultry industry might affect other sectors of the Mississippi economy. The table shows that an AI outbreak in the poultry industry would cause gross output to decline almost \$20.3 million in the industry and Mississippi economy in 2008. The ban on poultry and poultry products from Mississippi suggests this industry would lose another \$1.4 million in gross output, while the rest of the Mississippi economy would lose about \$581,950 in total gross output.

DDC&DM expenditures associated with the infected poultry farms under this scenario would produce about \$6.5 million in revenues for firms cleaning up and disposing of the infected birds. These impacts are positive since they would create jobs for cleaning, disinfecting, and disposing crews and retail sales for suppliers of compounds used to destroy the AI virus. The net effect of these losses suggests total gross output would decline almost \$15.2 million in the poultry and eggs sector in Mississippi.

² This figure estimated as 1,200,400 * \$12.79 (estimated farm-gate and retail value per broiler).

³ Calculated as 30 percent of the output value (\$15.2 million) of 1.2 million broilers.

Income

Table 2 presents an understandable and useful method of examining the impact of selected reductions in poultry output on income resulting from an outbreak of Avian Influenza. The effects of a \$15.2 million cut (because of AI) in poultry output on income would produce \$4.15 million in lost household income in the poultry industry and \$1.4 million in the rest of the economy. These results suggest that an AI outbreak in the poultry and eggs sector will have financial implications not only for that sector but the state as a whole.

Like many other sectors in the Mississippi economy, the export market is important to the survival and the success of the poultry and eggs sector. Therefore an outbreak of AI on the poultry and egg sector could cause our trading partners to impose a ban on imports of these products from the state. To model this situation, the study assumed that our trading partners would impose a total ban

on imports of poultry and poultry products from Mississippi to foreign markets.

Results show the poultry and egg sector would lose \$167,618 in household income because of the export ban of Mississippi products by the state's trading partners. Results also suggest that other sectors in the Mississippi economy would lose an estimated \$211,043 because of the export ban on poultry products to foreign markets.

The results of the 30-percent spending on destroying, disposing, cleaning, disinfecting, and monitoring infected poultry farms show the poultry and eggs sector would gain almost \$822,730 in household income. This is because the state and poultry stakeholders would have to clean up, get rid of infected birds, and monitor the industry until it returns to full production. Other sectors in the Mississippi economy would gain an estimated \$837,288 if the federal government paid for all the DDC&DM expenses associated with destroying 1.2 million chickens.

Table 1. Economic Effect on Output From a 1.2 Million-Broiler Loss on the Poultry Sector and Mississippi Economies, 2008.

Descriptor	Direct	Indirect	Total
1.2 million-bird loss	(15,259,400)	(5,009,604)	(20,269,004)
DDC&DM	4,577,820	1,934,665	6,512,485
Export losses	(1,373,346)	(581,950)	(1,955,296)
Net output gain (loss)			(15,711,815)

Table 2. Economic Effect on Income of a 1.2 Million-Broiler Loss on the Poultry Sector and Mississippi Economies, 2008.

Descriptor	Direct	Indirect	Total
1.2 million-bird loss	(4,154,269)	(1,379,128)	(5,533,397)
DDC&DM	822,730	837,288	1,660,018
Export losses	(167,618)	(211,043)	(378,661)
Net income gain (loss)			(4,252,040)

Employment

Employment changes in the Mississippi economy resulting from a 1.2 million-bird change in broiler production are shown in Table 3. The table also contains employment changes in the economy resulting from an export ban from the state and a 30-percent change in spending for destroying, disposing, cleaning, disinfecting, and monitoring (DDC&DM) affected poultry operations.

Eliminating 1.2 million broilers would reduce employment by 49 people in this sector, while other sectors in the state would lose 46 employees under this scenario. The effects of an export ban on poultry and poultry products from Mississippi would eliminate three jobs in this industry, while the rest of the state would lose six jobs because of the export ban by Mississippi's trading partners.

Employment changes in the economy resulting from the 30-percent spending on destroying, disposing, cleaning, disinfecting, and monitoring

(DDC&DM) infected poultry farms would increase employment by 15 workers in the poultry industry. Employment in the rest of the state would rise by 13 employees during the DDC&DM phase of the recovery.

Taxes

The effects of a 1.2 million-bird decline in broiler production suggest the state could potentially lose more than \$220,991 in tax revenues (Table 4). The export ban on poultry and poultry products from Mississippi would cause the state to lose an estimated \$55,117 in taxes. The tax losses from these two scenarios would total almost \$276,108 in Mississippi.

The 30-percent spending for destroying, disposing, cleaning, disinfecting, and monitoring (DDC&DM) infected poultry farms would generate positive tax revenues of \$66,293 for local and state governments.

Table 3. Economic Effect on Employment From a 1.2 Million-Broiler Reduction on the Poultry Sector and Mississippi Economies, 2008.

Descriptor	Direct	Indirect	Total
1.2 million-bird loss	(49)	(46)	(95)
DDC&DM	15	13	28
Export losses	(3)	(6)	(9)
Net job gain (loss)			(76)

Table 4. Economic Effect on Taxes of a 1.2 Million-Broiler Loss on the Poultry Sector and Mississippi Economies, 2008.

Descriptor	Direct	Indirect	Total
1.2 million-bird loss			(220,991)
DDC&DM			66,297
Export losses			(55,117)
Net tax gain (loss)			(209,811)

Summary

Tables 1–4 show that a 1.2 million-bird decline in broiler production because of Avian Influenza would negatively affect the poultry industry. The short-term effect on the state economy would include a \$20.3 million reduction in output, \$5.53 million in lost income, loss of 95 jobs, and a loss of \$220,991 in tax revenue. The results from spending 30 percent on destroying, disposing, cleaning, disinfecting, and monitoring (DDC&DM) infected poultry farms suggest that total output would increase by \$6.5 million, income by \$1.6 million, employment by 28 employees, and taxes by almost \$66,297 during the AI recovery. Finally, a ban on exports of poultry and poultry products from Mississippi would cause total output to decrease by \$1.96 million, income to decrease by \$378,661, employment to decrease by nine jobs, and taxes to decline by almost \$55,117.

The net economic effect on the Mississippi economy of a 1.2 million-bird decline in broiler production because of Avian Influenza suggests total output, will decrease \$15.7 million, income by \$4.25 million, employment by 76 jobs, and taxes by \$209,811.

Conclusion

Results from this analysis suggest the Mississippi poultry industry would be affected by a 1.2 million-bird decline in broiler production because of Avian Influenza. Results also show that not only the poultry industry would be harmed, but other sectors on which the poultry industry depends for its inputs and firms who purchase the poultry industry's outputs, as well. An outbreak of AI that reduced poultry output by 1.2 million broilers (or \$15.2 million in sales), coupled with a ban on exports (\$1.4 million) to the state's trading partners, would cause direct

output to decline by \$16.63 million. The indirect and induced effects of these changes would further reduce output, income, employment, and taxes. For example, the direct, indirect, and induced effects reveal that total output would decline by \$20.27 million and foreign exports would decrease by \$1.96 million in the Mississippi economy.

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