Economic Impact of Foreign Animal Diseases

Philip L. Paarlberg, Purdue University
Ann Hillberg Seitzinger, USDA:APHIS:VS
John G. Lee, Purdue University
Kenneth H. Mathews, Jr, USDA:ERS
Introduction

• Objective is to estimate the economic impacts of select livestock disease outbreaks and control strategies

• Method integrates animal disease simulation models with a quarterly agricultural sector model
Foot and Mouth Disease Scenario

- Outbreak initiated in four small Midwest swine operations
- Alternative control strategies
  - Destruction of direct contacts with 50% probability of successful traceback
  - Destruction of direct and indirect contacts with 50% probability of successful traceback
  - Ring destruction around infected operations of 1 km
- Export embargo for beef, pork, lamb meat, cattle, swine, lambs, and sheep extend 3 months beyond outbreak
Cattle Price

The graph shows the cattle price from Q1 2001 to Q4 2004. The price is measured in $/cwt (cents per hundredweight). The graph indicates three different scenarios:

- FMD Base
- FMD Mean
- FMD High

The FMD Base scenario is represented by a red line, the FMD Mean by a yellow line, and the FMD High by a green line. The price fluctuates over time, with a noticeable increase in the later years.
FMD – Change in Net Returns to Capital and Management

-100 -80 -60 -40 -20 0 20

Beef Cattle
Beef Processing
Swine Processing
Swine
Crops

Percent
Mean Outbreak
High Outbreak
FMD – Change in Net Returns to Capital and Management

-4000 -3000 -2000 -1000 0 1000

Million Dollars

Mean Outbreak
High Outbreak

Beef Cattle
Swine Processing
Swine
Crops
Beef Processing
Classical Swine Fever Scenario

- Patterned after Netherlands 1997 outbreak
- 11 million hogs destroyed
- 5 quarter outbreak
- Export embargo on all live hogs
CSF - Net Returns to Capital and Management for Hogs

![Graph showing net returns to capital and management for hogs from Q1 2001 to Q4 2004. The graph compares two lines labeled 'Base' and 'CSF', with 'CSF' showing significantly higher net returns in Q2 2002.](image-url)
CSF – Net Returns to Capital and Management for Pork

M$ Dollars

Q1 2001  Q2  Q3  Q4  Q1 2002  Q2  Q3  Q4  Q1 2003  Q2  Q3  Q4  Q1 2004  Q2  Q3  Q4

CSF

Base
Highly Pathogenic Avian Influenza

Scenario

• 3 percent production loss for poultrymeat and eggs
• 89 percent reduction in poultrymeat exports
• Withdrawal of poultrymeat and egg consumers
  – Q1, 20 percent
  – Q2, 10 percent
  – Q3, 5 percent
AI – Net Returns to Capital and Management for Poultrymeat

Mil Dollars

Q1 2001 | Q2 | Q3 | Q4 2001 | Q2 | Q3 | Q4 2002 | Q2 | Q3 | Q4 2003 | Q2 | Q3 | Q4 2004 | Q2 | Q3 | Q4

0 200 400 600 800 1000 1200

Base AI
## AI – Poultrymeat Producer Returns and Consumer Surplus

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss in Returns to Capital and Management</td>
<td>-$717.4 million (-7.6 percent)</td>
</tr>
<tr>
<td>Consumer Surplus Gain for Continuing Consumers</td>
<td>+$152.8 million</td>
</tr>
<tr>
<td>Consumer Surplus Loss for Nonconsuming</td>
<td>-$711.9 million</td>
</tr>
<tr>
<td>Total Consumer Surplus Loss</td>
<td>-$559.1 million (-2.5 percent)</td>
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</tbody>
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Conclusions

- FMD results highlight the role of outbreak length
- CSF results show the long run impacts of loss of breeding inventory
- AI results pick up the consumer response in addition to loss of exports