



# Fact Sheet

Data, Information & Economic Analysis  
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## Export Market Recovery Post Livestock Disease Outbreak – Poultry<sup>1</sup>

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### Background

In some countries, the livestock sector is heavily dependent on income generated from exports. During or after disease outbreaks, trade bans may be imposed by trading partners. In addition, some countries may self-impose export bans.

The process of regaining market share is complicated. The longer a country is out of the market, the harder it may be to recover due to importers finding new sources for products. Other factors such as disease type, previously-exported product type and value, competing countries' supply available for export, disease management timeline, outbreak size and duration, and country credibility may all influence the length of market recovery. In addition, political changes (e.g. changes in ruling party), domestic price changes for inputs and products, weather changes that impact productivity, consumer response, prices for competing protein products, and many other factors can have an impact on the length of export market recovery.<sup>i</sup>

In the last 14 years, China, Hong Kong, Denmark, the Netherlands, and the United Kingdom have experienced avian influenza outbreaks and the United States experienced a Newcastle disease outbreak. The World Organization for Animal Health (OIE) guidelines suggest that a country regain avian influenza (AI) free status three months after utilizing a stamping-out policy (OIE).<sup>ii</sup> Newcastle disease has the same three month guideline.<sup>iii</sup>

An analysis of time elapsed from the announcement of a livestock disease outbreak until a country regains its international market can inform other countries of the potential impacts following an outbreak. This analysis shows that export markets can take longer than three months for export revenues to return to pre-outbreak levels. In some cases export markets may not recover.

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*State Extension Services  
in cooperation with  
USDA*

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## Methods

The export market recovery after six livestock disease outbreaks during 1997 - 2007 was determined by analyzing monthly export data for six countries (China, Denmark, Hong Kong, Netherlands, United Kingdom, and United States). Historical monthly trade data were collected from the Global Trade Atlas database<sup>iv</sup>. Poultry disease outbreaks of Exotic Newcastle disease (END), highly pathogenic avian influenza H7N7 (HPAI H7N7), and highly pathogenic avian influenza H5N1 (HPAI H5N1) were explored.

Disease outbreak situations were graphed (Figures 1-6) for each country and include monthly export revenues for live poultry and poultry products, as well as an indicator of the beginning of the outbreak. A two year running average and a forecasted trend line were included in the graphs to illustrate the differences between actual export revenues and expected levels if market conditions had remained consistent over the period of the disease outbreak.

The two year running average is defined as the average of the same month in the prior two years. For example, in September 2003, the two year running average is the average of export revenues for September 2001 and 2002. A two year running average was chosen because export revenues will include historical market conditions prior to the outbreak, and variability from more than 2 years can wash out the effects. The two year running average is calculated and graphed for the months prior to the outbreak to show if export revenues were following previous trends. The two year running average is also calculated and graphed for 11 months after the beginning of the outbreak because the 12<sup>th</sup> month would include the changes in exports during the disease outbreak. When adequate historical monthly data were available, a trend line forecasted export revenues to further illustrate where export revenues could have been in the time period after the outbreak announcement. "Export market recovery" is defined as the amount of time required for export revenue levels to reach or exceed the two year running average or forecasted export revenues after a disease outbreak.

## Results

Table 1 allows for a comparison of export market recovery times across countries. Organized by country and disease, the table includes the population of birds affected, start of an outbreak date, the months required for the export market to recover, and averages and ranges of the difference between the pre-outbreak and post-outbreak export revenue levels.

Overall recovery times range from 0 to 29 months. Denmark, the Netherlands, and the United Kingdom have shorter export revenue recovery times (five or six months). The United States took longer to recover from Exotic Newcastle disease (11 months). China recovered 11 months after its announcement of HPAI H5N1 in wild birds, then two months later announced HPAI H5N1 in domestic poultry, extending their full recovery another four months (15 months total for both outbreaks). Hong Kong never fully recovered from HPAI H5N1.

The monthly difference in export levels is calculated by subtracting actual export revenues from the two year running average or forecasted export revenues. The cumulative monthly difference between export revenue levels ranged from \$18.4 million to \$394 million. Calculating the percentage difference in these levels allows for direct comparison across countries. Denmark, the Netherlands, and the United Kingdom, experienced an average percent difference in export revenues after an outbreak of negative 14 percent or lower. China experienced negative 23 percent. The United States' average monthly difference of negative 15 percent is lower than the Asian countries, and comparable to the European countries. The range of the percent difference also shows the volatility of the difference in export revenues with the smallest range being Denmark and the Netherlands with a ten percentage points difference and China with the largest range of a 61

percentage points difference. The difference in the Netherlands was six percent in March 2003, which is when their outbreak was announced.

Table 1: Comparison of Wild Bird and Domestic Poultry Disease Outbreaks

Country Disease	Population Affected	Start of Outbreak	Market Recovery Time (months)	Cumulative Monthly Difference (\$US million)	Average Monthly Difference (\$US million)	Range of Monthly Difference (\$US million)	Average Monthly Difference (percent)	Range of Monthly Difference (percent)
China HPAI H5N1	Wild Birds	01/2003	11	\$394.0	\$26.2	\$2.8 to \$74	-23%	-64% to -3%
	Domestic Poultry	02/2004	4					
Hong Kong HPAI H5N1	Both	05/1997	Never recovered					
Denmark HPAI H5N1	Wild Birds	03/2006	5	\$18.4	\$3.7	\$2.7 to \$5.6	-11%	-18% to -8%
	Domestic Poultry	05/2006						
Netherlands HPAI H7N7	Domestic Poultry	03/2006	6	\$48.0	\$8.0	\$4.8 to \$22.6	-5%	-13% to -3%
United Kingdom HPAI H5N1	Wild Birds	04/2006	6	\$50.1	\$8.36	\$1 to \$14.4	-14%	-25% to -2%
	Domestic Poultry	02/2007	0					
United States END	Domestic Poultry	10/2002	11	\$322.7	\$29.3	\$4 to \$59.6	-15%	-30% to -4%

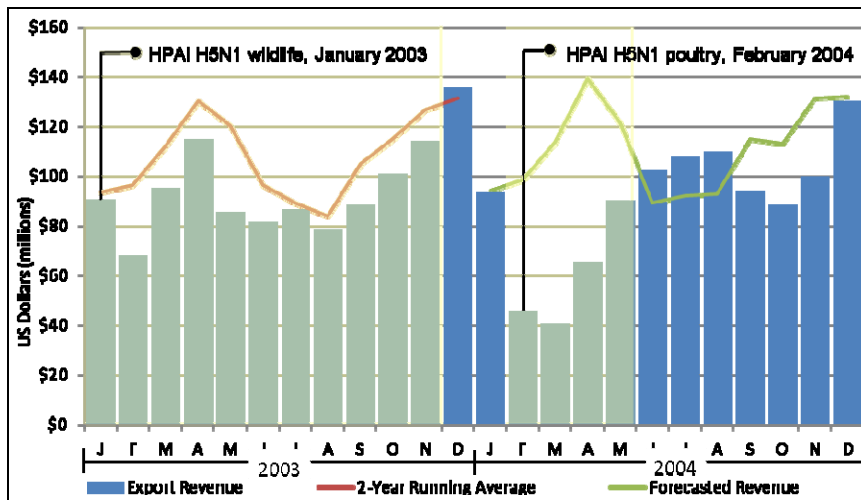
### Analysis by Country

The blue columns represent the export revenue for each month, the red line on the left side of the graph is the two year running average, and the green on the right side of the graph is the forecasted revenue. Market recovery is achieved when the blue column reaches or exceeds the red or green lines post outbreak announcement. The time to export market recovery is highlighted in the yellow on some graphs.

#### China

China has a volatile export market for birds and poultry products. China's first outbreak of HPAI H5N1 occurred in January 2003 in wild birds, and they continue to have outbreaks. If you combine the two outbreaks, even though they have a temporary recovery in December 2004, market recovery occurs in the 15<sup>th</sup> month (Figure 1). It is interesting to note that the impact of the disease outbreak is greater with the domestic poultry outbreak, as opposed to the wild bird outbreak. This could happen because they were exporting domestic poultry products and international customers perceive this as more of a risk when compared to the wildlife outbreak. Another reason could be that learning experiences from the first outbreak applied to the second outbreak quickened responses to the situation. Lastly, perhaps an outbreak in domestic flocks is easier to control and manage.

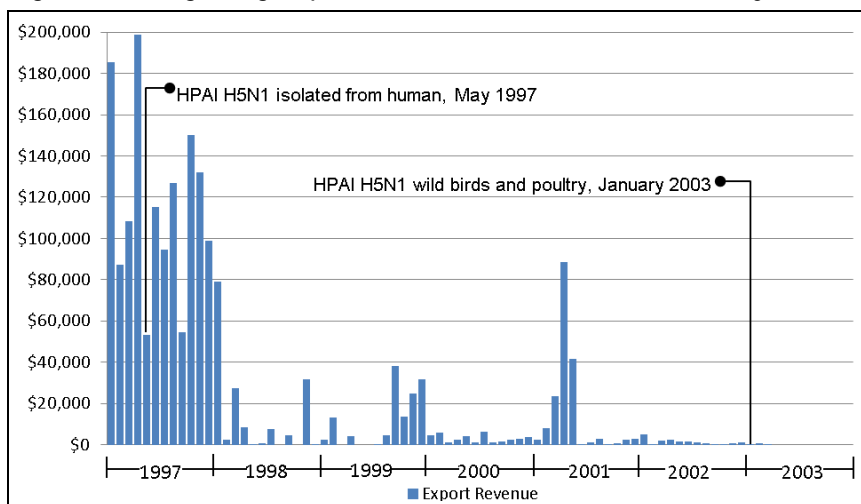
Figure 1. China Export Revenue and Market Recovery after HPAI H5N1



Hong Kong

Poultry die offs brought on by HPAI H5N1 began in February 1997. In May 1997, a 3-year-old boy was reportedly the first human to die after being infected with HPAI H5N1. In response to increasing human and poultry cases, the Hong Kong Department of Agriculture and Fisheries ordered a complete slaughter of all 1.3 million chickens in December 1997. Within a few days, the entire chicken population was slaughtered and live chickens were not permitted entry into Hong Kong until February 7, 1998.<sup>v</sup> Figure 2 illustrates how this complete depopulation forced Hong Kong's exit from the international market starting in February 1998. While Hong Kong has rebuilt their poultry population, they were never able to regain a consistent position as an exporter in the international market. In addition, Hong Kong continues to experience outbreaks of HPAI H5N1.

Figure 2. Hong Kong Export Revenue and Market Recovery after HPAI H5N1



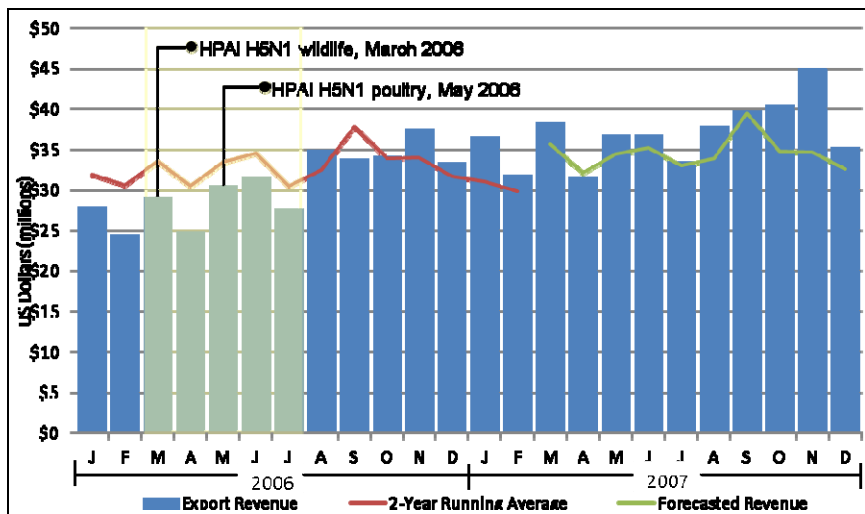
It is important to note that Figure 2 only shows Hong Kong's domestic exports (poultry exports originating in Hong Kong). Nearly all of Hong Kong's total poultry exports originate in other countries and were primarily destined for China. China did not report their first outbreak of HPAI H5N1 in poultry until February 2004. China's exports dipped slightly after their wild bird outbreak, but declined markedly after the outbreak in the domestic poultry population. Since China was not able

to export as much of their product, they had more poultry products staying on the domestic market. Consequently, China’s imports from Hong Kong declined as well.

Denmark

Denmark had its first outbreak of HPAI H5N1 in March 2006 in 12 wild birds, then two months later had an outbreak in one domestic poultry flock consisting of 102 birds. Denmark has not reported another case of HPAI H5N1 since May 2006. Denmark recovered in the fifth month after the disease outbreak (Figure 3). This could be attributed to the transparency of the situation, as well as their main trading partners were other EU countries that have the same disease management policies. The small decrease in export revenues lasting one month could be normal monthly variation of export revenue levels.

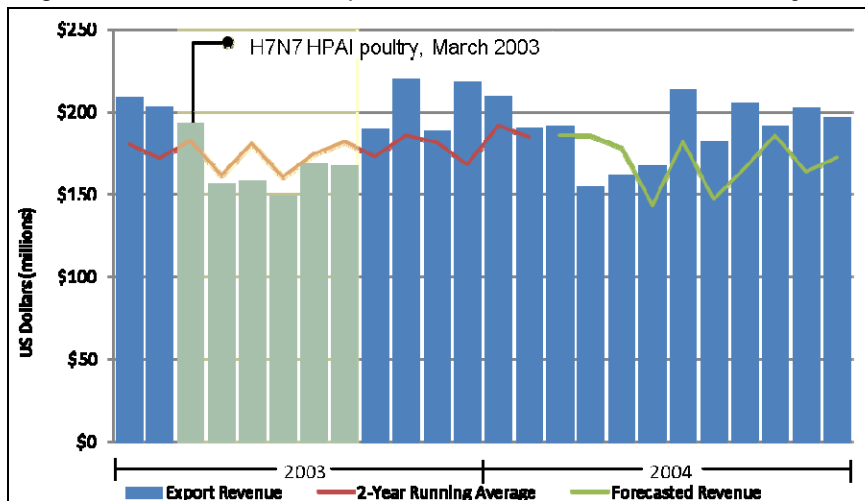
Figure 3. Denmark Export Revenue and Market Recovery after HPAI H5N1



Netherlands

The Netherlands reported HPAI H7N7 for the first time in March 2003 in 255 flocks, and reported their last case in May 2003. The Netherlands recovered after six months, similar to the experience in Denmark (Figure 4).

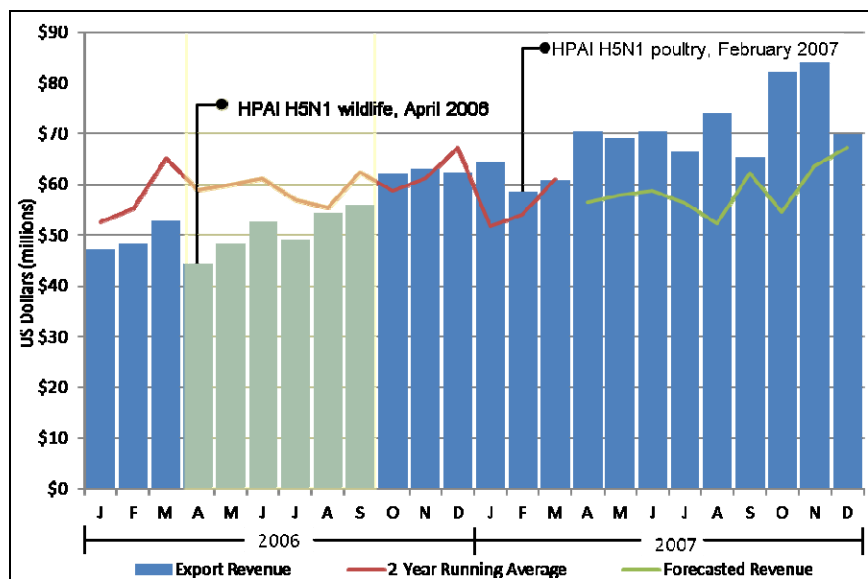
Figure 4. Netherlands Export Revenue and Market Recovery after HPAI H7N7



### United Kingdom

The United Kingdom reported its first case of HPAI H5N1 in wild birds in April 2006 and in domestic poultry in February 2007. The United Kingdom's last reported case was in February 2008. The United Kingdom export market took six months to recover from the outbreak in wild birds, but took no time to recover from their domestic poultry outbreak (Figure 5).

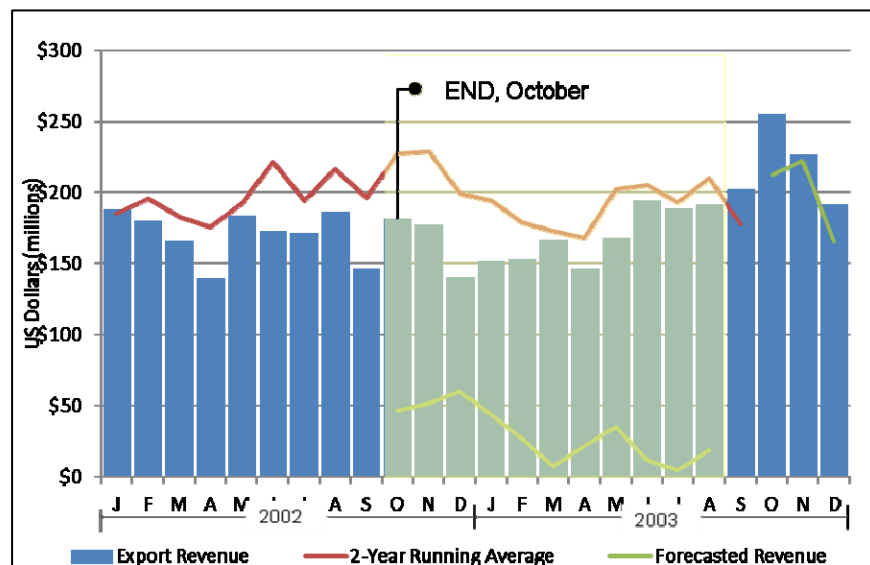
Figure 5. United Kingdom Export Revenue and Market Recovery after HPAI H5N1



### United States

Figure 6 depicts the trade pattern for the United States (US) before, during, and after the END outbreak. The US reported its first case of END in October 2002, and their last reported case was in May 2003. The US export market recovered in 11 months. The US was already under the two year running average for exports when END was reported. One potential cause for this situation is Russia's implementation of tariff-rate quotas (TRQs) on imported poultry. The END outbreaks occurred in Western United States, which had a greater impact on egg product exports rather than broiler meat exports since there were regional bans. In addition, the proportion of export revenues from egg products is small (around 9 percent). It is possible that market recovery could have been achieved in a shorter period of time had US exports been at historical levels when the outbreak occurred. It is also possible that the decline present in these data cannot be attributed to the END outbreak since there were likely other factors involved.

Figure 6. United States Export Revenue and Market Recovery after END



### Limitations

The data used in this analysis include all animals and products that may be susceptible to the disease of concern. It is unlikely that all products included in export revenues were banned in response to disease outbreaks in respective countries. However, determining with certainty all products included in a ban is not possible as this information is not consistently reported.

While this research focuses on changes in export revenue levels, there can be significant differences between export revenue levels and the quantities of goods exported. The assortment of products exported post disease outbreaks can vary from the assortment offered to the international market prior to a disease outbreak. Importing countries may accept products that receive additional processing to mitigate disease risk. International consumers may also shift to consuming higher quantities of products they perceive as less risky, and demand less of the products they perceive as presenting a higher disease risk.

With several factors influencing the amount of time to export market recovery it is difficult to isolate the impact due to disease outbreaks. Impacts from political pressures, relationships with trading partners, global economic conditions, seasonality, and subsequent disease outbreaks are often intertwined with impacts due to a certain disease outbreak.

### Conclusions and Comments

As evidenced in this analysis, the time to export market recovery is not solely a factor of disease. Many times political factors play a much more important role in export market recovery. For example, some export markets recovered within a few months, while others took closer to a year. This illustrates that the perceived level of disease risk is different for different countries. Future research in this area should focus on the specific factors that lengthen or shorten export market recovery times.

Information from this analysis can be used to support economic modeling by providing a better estimate of the depth and duration of a trade shock. Estimates of the potential impacts of future outbreaks can be made and used to inform scenario development, emergency management planning, and surveillance planning. In addition, developing countries may find this methodology useful for

budgeting and prioritizing limited funds on mitigation and control strategies that would decrease the time to market recovery.

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<sup>i</sup> Food and Agriculture Organization (FAO) of the United Nations. (2006). Impacts of Animal Disease outbreaks on Livestock Markets. Introductory paper on Animal Disease outbreaks prepared by Committee on Commodity Problems for 21st Session of the Inter-Governmental Group on Meat and Dairy Products. Rome, Italy.

<sup>ii</sup> World Organization for Animal Health (OIE). (2010) Terrestrial Animal Health Code Article 10.4.4 accessed at [http://www.oie.int/eng/normes/Mcode/en\\_chapitre\\_1.10.4.htm](http://www.oie.int/eng/normes/Mcode/en_chapitre_1.10.4.htm) on September 13, 2010.

<sup>iii</sup> World Organization for Animal Health (OIE). (2010) Terrestrial Animal Health Code Article 10.13.3 accessed at [http://www.oie.int/eng/normes/Mcode/en\\_chapitre\\_1.10.13.htm#rubrique\\_maladie\\_de\\_newcastle\\_controle](http://www.oie.int/eng/normes/Mcode/en_chapitre_1.10.13.htm#rubrique_maladie_de_newcastle_controle) on September 13, 2010.

<sup>iv</sup> Global Trade Atlas, by Global Trade Information Services, Inc. from Statistics Canada, China Customs, Customs Committee of Russia, EuroStat, U.S. Department of Commerce, Bureau of Census accessed at <http://www.gtis.com/gta> on September 13, 2010 and April 27, 2011.

<sup>v</sup> Avian Influenza: Hong Kong Outbreak Factsheet VM138. Veterinary Medicine-Large Animal Clinical Sciences Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date December 2004. Revised May 2005. Reviewed March 2011. accessed at <http://edis.ifas.ufl.edu/vm103> on May 3, 2011.

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