Introduction

The risk to the global economy from a pandemic outbreak of "bird flu," the H5N1 virus, has received considerable attention of late as the virus has spread to wild birds in Europe.1. In this brief, we review some of that literature and then focus on the potential impact of bird flu on the Australian economy in particular. Our analysis roughly outlines the impact of four basic scenarios:

1. Bird flu remains confined to bird stocks outside Australia;
2. Bird flu is found among birds in Australia;
3. Bird flu becomes transmissible through human to human contact but is contained offshore; and

What is bird flu?

Bird flu, also known as avian influenza, refers to a large group of different influenza viruses that primarily affect birds. On some rare occasions, these bird viruses can infect other species, including pigs and humans. The first case of the current H5N1 avian flu was identified in South Africa in 1961. The H5N1 virus has emerged from time to time over the years, but its first known human victims were killed in Hong Kong in 1997. That outbreak and the human fatalities resulted in the culling of 1.5 million poultry in three days.

H5N1 re-emerged in Korea in 2003, and there have been several thousand outbreaks since then. By mid-October 2005, the virus had spread to birds in Cambodia, China, Greece, Indonesia, Japan, Kazakhstan, Korea, Laos Malaysia, Mongolia, Philippines, Romania, Russia, Taiwan, Thailand and Vietnam. 2005 has seen the largest and most severe outbreak of bird flu on record. Millions of birds have caught the disease and 150m poultry have been killed. Despite ongoing efforts to cull infected stocks, the spread of the virus to wild birds implies it is now endemic. Birds that survive infection with H5N1 excrete the virus for at least 10 days, making it highly contagious. Migratory birds, usually wild ducks, are the natural "reservoir" of bird flu viruses, but usually do not become sick when infected.

Why it is of concern

The major concern is that the H5N1 strain of bird flu is highly virulent and has the ability to transform quickly to infect other species, including humans. The outbreak in Hong Kong in 1997 infected 18 humans, 6 of whom died. In the latest outbreak since December 2003, 124 people have been infected with the H5N1 strain, 63 of whom have died. In all cases thus far, people became infected following close contact with live infected poultry. There have been no reported cases of transmission between humans. Most cases have occurred in previously healthy children and young adults. Unlike other flus that seem to affect either the very young or the very old with greater severity, the H5N1 is thought to affect otherwise healthy adults because of the body’s autoimmune response. The completely unknown virus sends the immune system into overdrive, in what is known as a cytokine storm that in and of itself leads to death. The phenomenon was last seen in the Spanish influenza pandemic of 1918-1919.

Health experts fear that the avian virus will rub up against a human flu virus and transmute into a new human influenza virus to which humans have no immunity. It hasn’t happened yet, but there is a view in official health circles that it is only a matter of time.

If a new human influenza virus emerges and starts spreading as easily as normal influenza – by coughing and sneezing – a pandemic will occur. While influenza pandemics are considered to be rare, they are a recurring event, with historical evidence suggesting that 3 or 4 happen every century. Three flu pandemics have occurred in the past 100 years:

- Spanish influenza in 1918
- Asian influenza in 1957
- Hong Kong influenza in 1968

The 1918 pandemic killed 40-50 million people worldwide. The subsequent pandemics were smaller, with an estimated 1 million people killed in 1957 and 2 million people killed in 1968. These pandemics all began in South-East Asia. The Spanish influenza was so-called because it had a particularly heavy impact in that country.

1 For more information, please refer to documents listed at the end of this report.
Once a fully contagious virus develops, its global spread is considered inevitable. Countries might, through measures such as border closures and travel restrictions, delay the arrival of the virus, but cannot stop it.

Previous flu pandemics occurred when most international travel was by ship and “encircled” the globe in 6 to 9 months. With most travel now by air, given current speed and volume, the WHO estimates that a new virus could reach all continents in less than 3 months.

In addition, because infected people can spread the virus before they show symptoms, it will not be possible to use quarantine to halt its spread.

There have been some alarming figures circulating on the likely death toll from a new flu pandemic, but the bottom line is no one really knows. The lethality of a new disease can only be assessed after the event.

The risk of a human pandemic is not short term – it exists until the avian flu is eliminated in wild bird populations (virtually impossible, although flu viruses seem to naturally come and go) or a human vaccine or more effective management is developed.

The example of SARS

The outbreak of SARS (Severe Acute Respiratory Syndrome) in 2003 provides some telling signals as to the possible impact of a flu pandemic. SARS is not classed as an influenza virus, but its origin, symptoms, propagation and economic effects provide a relevant example of what to expect should a flu pandemic arise.

SARS was first identified in rural China in February 2003. It crossed the species barrier when infected animals were eaten by humans, and spread to 5 countries within 24 hours. More than two dozen countries experienced SARS within months. It spread in a similar fashion to flu – air borne transmission through coughs and sneezes, close contact, or through touching a contaminated surface. Ultimately an estimated 8,098 people were infected in 28 countries, with 774 deaths. Health officials declared the epidemic over in July 2003, for a duration of less than six months.

The economic impact of the SARS epidemic on the affected countries was significant at the height of the epidemic in Q2 2003. The economic impact was felt most in the services-oriented and tourism-dependent economies of Hong Kong, Singapore and Taiwan. Real GDP contracted in the second quarter in these three economies, costing roughly US$80 bn at the macro level and wiping perhaps a half of a percentage point off of regional real GDP growth in the second quarter.

SARS impact was significant, but short-lived

The rapid resolution of SARS, however, allowed these economies to bounce back in the second half of the year, leaving 2003 real GDP growth rates as a whole relatively unaffected by the disease outbreak.

The experience of Canada, the only developed economy where there were SARS deaths, may be an instructive case for Australia. Following the WHO’s advisory to avoid travelling to Toronto in April 2003, numerous conferences and events were cancelled. Tourism in Toronto, the second largest local industry sector, lost an estimated C$500 mn and 28,000 jobs. The Province of Ontario lost more than C$2 bn in tourism receipts. Mass transit use plummeted as did attendance at sports and recreation facilities. More than 15,000 people in Toronto were confined to their homes for 10 days of quarantine and one high school was closed. The health system fell into disarray with numerous anecdotes of an inability to provide basic care, for example in oncology. The Bank of Canada estimated that SARS reduced national second quarter GDP by 0.6 percentage points, with a far larger impact on Toronto and the surrounding area.

SARS also had a small short-lived negative impact on Australia, even though there were no avian or human cases in the country. There was reduced inbound tourism; there was a reduction in the number of foreign students; and there were reduced exports of fish, crustaceans, meat and dairy to affected Asian counties, reflecting a decline in the restaurant trade.

2 BMO Nesbitt Burns
**Bird flu in Asia**

Thus far, outbreaks of bird flu have not had a significant macroeconomic impact on Asia. Bird flu decimates the poultry industry in the regions it infects, partly because of a high mortality rate and partly because of widespread destruction of flocks as a containment measure.

This is a large economic negative for the people and businesses involved in the poultry industry; in Asia there is no compensation for producers. The macroeconomic affect is slight, however, because agriculture’s contribution to GDP is low in most economies. The size of the poultry sector in particular is generally around 1% of GDP, reaching around 2% of GDP for the Philippines. At the same time, the social impact is more significant because formal and informal employment in poultry is more significant than the contribution that the sector makes to the economy.

**Agriculture in Asia’s large economies**

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<tr>
<th>Agriculture’s contribution to GDP growth</th>
<th>Employment by sector</th>
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<td>China</td>
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<td>44</td>
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<td>Singapore</td>
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<td>Thailand</td>
<td>42</td>
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</tbody>
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Should the H1N5 virus become a human flu pandemic, the economic impact would be much greater than is currently the case, and most likely much more severe than the SARS episode given the mortality rate among humans infected thus far. The Asian Development Bank estimates the cost of a relatively mild pandemic at US$114 to US$296 bn for all of Asia, depending on the length of the outbreak. The World Bank points out that a single quarter of zero global growth is equivalent to US$200 bn, or US$800 bn for a year.

The estimate for a longer-term economic impact of a human pandemic on Asia thus depends upon the assumed length of the epidemic – an assumption that is impossible to make at this stage. What can be forecast is that the longer the outbreak, the greater the impact on Asia’s manufacturing base as demand for Asian exports in the United States and Europe would likely decline with falling levels of economic activity. China in particular would be negatively affected under this scenario, although manufacturing industries across the whole region would be affected. Paradoxically, the countries likely to be least affected at the macroeconomic level would be the least developed countries that are less vulnerable to a downturn in external demand for goods and services, such as Vietnam, Cambodia and Indonesia.

**The economic and financial market impacts of bird flu in Australia**

The economic and financial impacts of the avian flu virus are assessed under four scenarios (the Australian Government "Australian Management Plan for Pandemic Influenza" June 2005 has 15 scenarios!).

**Scenario 1: Avian flu virus continues to spread around the world but does not reach Australia.**

This is the scenario we are currently in.

The virus is devastating the domestic poultry industry in localised regions of south east Asia, and up through central Asia into eastern Europe and the ex Soviet region.

Under this scenario the Australian poultry industry would be unaffected. Domestic production and consumption would not change. There might be an opportunity for Australian producers to export “clean” Australian produce to replace production lost in affected countries offshore, although the Australian poultry industry is not geared for exports.

Australia could incur some slight negative impacts to the extent that tourism inflows are disrupted. As well as Asians perhaps being more reluctant to travel, Asia is a hub for transit to Australia from Europe, which may discourage some Europeans from travelling to Australia. Again there is little evidence of this occurring to date.

**Scenario II: Avian flu infects domestic poultry in Australia.**

Authorities would move quickly to quarantine and cull flocks. These measures appear to have been unable to prevent the spread of the disease offshore, as they don’t address the wild bird reservoir.

Any outbreak in Australia would be devastating to the poultry industry, but the impacts on the Australian economy would not be large. The poultry industry is an important part of the rural sector, but is not a large contributor to overall economic activity.
The Australian poultry industry produces chicken meat, eggs, turkey, ducks, quails and other game birds. Chicken products (meat and eggs) comprise around 95% of poultry production and consumption. In 2001-02, there were 773 enterprises engaged in poultry meat farming, 481 enterprises engaged in egg farming and 82 in poultry meat processing. Up to 40,000 people were employed across all sectors of the poultry industry (farming, processing and related activities) in 2003-04. This was forecast to rise to 830kt in 2005-06. 

In 2004-05, the industry produced 792kt of poultry meat. This was forecast to rise to 830kt in 2005-06. At an average price of $3.99/kg (retail frozen), the final value of this output was around $3b in 2004-05.

To put the poultry industry’s size into perspective, the farm value of poultry meat in 2002-03 ($1.2b) was equivalent to 7% of the gross value of livestock farm production, or 3.7% of the gross value of all farm production ($32.5b in 2002-03). The value of eggs to producers was $286m in 2002-03. The whole agriculture sector, in turn, is worth 3 to 4% of GDP per year (depending on seasonal output). So the poultry industry represents about 0.1% of GDP. The net impact on economic growth would be lessened to the extent that other foodstuffs were substituted for lost poultry production (although the loss of egg production would be less easy to replace).

There would be negligible impact on exports because the poultry industry is highly geared to the domestic market. In 2004-05, only 20kt of poultry meat was exported (2.5% of total output). Poultry imports are also relatively small. ABARE and the Australian Egg Corporation estimate that exports of eggs and egg products were worth only $2m in 2002-03 (less than 1% of output by value), while imports were worth $3m.  

Scenario III: The virus transmutes into a virus capable of human to human transmission and spreads offshore but not in Australia.

The economic impacts of this scenario depend in part on whether and how quickly a human outbreak can be contained. As noted earlier, there is one view that containment is essentially impossible because the disease is contagious before symptoms appear.

The economic impacts also depend on the extent to which normal economic activities are disrupted by authorities’ efforts to quarantine the outbreak and individuals’ responses to the fear of contracting the disease.

In the first instance, non-essential mass human gatherings would be deeply impacted. There would be negative impacts on domestic tourism, theme parks, movies, theatres, restaurants, and public transport. Authorities may choose to close schools and other “non essential” services such as some government departments. Some essential services and utilities would need to be maintained – power, water, sewerage, gas, health, police, emergency services – and that might entail a programme of inoculation or quarantining for essential service workers.

Non-essential parts of consumer industries would be affected – furniture stores, other household goods, motor vehicle retailers, clothing and footwear, electrical goods. The areas least affected would be essential consumption such as food and groceries and in fact consumption of such goods might initially increase as households stockpiled for the future. Online retailers and other internet businesses might benefit.

Australia would be impacted through two channels. First, international tourist and business inflows into Australia would fall substantially. There is a possibility of the Australian Government shutting down air and sea transport to prevent transmission of the disease to Australia. There may be regional considerations, with for example areas which are relatively more dependent on tourism – such as far north Queensland – being particularly hard hit.

Second, even if routes of commerce remain open, the significant slowing in Asian and global economic activity would negatively impact Australia through reduced demand for exports of goods and non tourism services.

Tourism was estimated to have been worth $73bn in 2003-04 (3.9% of GDP), of which 25% was from international tourists. In a best case outcome tourism would only be impacted from countries in which there had been outbreaks. The table below shows the importance of key countries for inbound tourism (by number of arrivals, not by expenditure in Australia). An outbreak in China might reduce inbound tourism by 5%; an outbreak more widely through south east Asia might reduce tourism by a further 13%. An Asian outbreak might also dissuade Europeans from visiting (the alternative route through North America is less user friendly), discouraging another 15% or so.

There would also be some winding back of business travel.

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5 Australian Egg Corporation.
Inbound Tourism to Australia Jan-Sept 2005

<table>
<thead>
<tr>
<th>Country</th>
<th>% of Tourist Arrivals</th>
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<tbody>
<tr>
<td>NZ</td>
<td>20.0</td>
</tr>
<tr>
<td>UK</td>
<td>12.9</td>
</tr>
<tr>
<td>Japan</td>
<td>12.3</td>
</tr>
<tr>
<td>US</td>
<td>8.3</td>
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<tr>
<td>Singapore</td>
<td>5.0</td>
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<tr>
<td>China</td>
<td>5.0</td>
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<tr>
<td>Korea</td>
<td>4.6</td>
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<tr>
<td>Malaysia</td>
<td>3.0</td>
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</tbody>
</table>

But there is a chance that an outbreak anywhere would lead to a rapid shutdown of all non essential cross border movements (either through official quarantine or individual choice) in an effort to reduce contagion. This could be devastating to the global tourism industry even in disease free countries. Within disease free countries there could be some offset to the extent residents chose to holiday at home.

It is difficult to estimate the impact on other exports. By volume exports comprised about 18% of GDP in 2004 so any disruption could have a potentially very large impact.

**Scenario IV. The human flu virus reaches Australia.**

This is the worst case outcome for Australia. The bulk of the economic disruption would stem from the efforts of the population to avoid catching the disease, either through official quarantining measures or voluntary behaviour where people simply avoided public exposure wherever possible. It is difficult to quantify the impacts because it depends on the extent to which the fear factor impedes the normal course of economic activity (as distinct from actual illness and mortality).

One of the unexpected aspects of the 1918 epidemic was the high death rate among healthy males rather than the very young, and old and infirm. Some attribute this to the overly ferocious reaction of healthy immune systems to a new disease. Others have a more prosaic explanation - healthy males and to a lesser extent females - were the ones who continued to go to work and therefore were more exposed to the disease. The young and infirm stayed at home and were less exposed. Economic activity would grind to a halt were this lesson to be taken to heart.

In any event, non-essential economic activities would be deeply impacted as in (III) above.

**Financial Market Impacts.**

The financial market impacts of scenarios I and II are minor. The disruptions under scenarios III and IV are much greater.

In the short term, there would be a global flight to quality. Demand for US$ would rise, with increased demand for cash deposits and Treasury Bonds. The US$ would appreciate against most currencies. Market yields would fall globally, led by the US. Central banks around the world may cut interest rates to lower borrowing costs to support struggling businesses and to offset the decline in household and business consumption. Demand for gold might increase as a safe haven, but demand for other physical assets – property, equities – would fall. Demand for commodities and energy would fall.

Default rates on household and commercial loans would rise and the potential for recovery would be impaired to the extent there was a fall in the values of assets backing the loans. Credit risk premia would rise.

There could be a partial offset to the fall in global bond yields to the extent Asian governments and private holders sold US Treasuries to redeem funds in order to prop up their domestic economies.

Like the economic impact, the financial market impact would depend upon the length of the epidemic and, importantly, the number of deaths. Estimates for the number of deaths globally caused by a pandemic range from 7 million (extrapolating from the mild 1968 epidemic) to 360 million (extrapolating from the severe 1918 epidemic). A very large number of deaths globally would have important long-ranging demographic implications that would significantly affect the long-term price trends across all asset markets.

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**Resources**


“Potential Economic Impact of an Avian Flu Pandemic on Asia,” Eric Bloom, Vincent de Wit and Mary Jane Carangal-San Jose, ERD Policy Brief No. 42, Asian Development Bank, November 2005

“An Investor’s Guide to Avian Flu,” Sherry Cooper and Donald Coxe, BMO Nesbitt Burns, August 2005

“Australian Management Plan for Pandemic Influenza,” Australian Government Department of Health and Aging, June 2005
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