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Potential Economic Impact
of an Avian Flu Pandemic
on Asia

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Potential Economic Impact of an Avian Flu Pandemic on Asia

**Erik Bloom, Vincent de Wit,
and Mary Jane Carangal-San Jose**

November 2005

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Introduction

A flu pandemic would put at risk the health of millions and have serious economic consequences. The recent outbreak of the avian influenza H5N1 (avian flu), which started in late 2003, has raised concerns about a new global pandemic. The outbreak has already severely damaged poultry production in several countries. Coming one year after the outbreak of SARS¹ in 2003, the public was quite alert and governments took action to cull and destroy poultry at risk. However, the reappearance of the disease in 2005 shows that this action was not sufficient and there is continued risk of human infection.

This brief looks at the possible economic consequences for Asia of a mutation of avian flu leading to human-to-human transmission, using different assumptions about the duration and virulence of the flu pandemic. The analysis looks at a relatively mild outbreak, based on the historical experience of previous flu outbreaks and SARS. It focuses on the short-run impact of a pandemic on aggregate economic activity. A pandemic will likely slow or halt economic growth in Asia and lead to a significant reduction in trade, particularly of services. In the long run, potential economic growth will be lower and poverty will increase.

Background

The outbreak of SARS in 2003 showed that even a disease with a relatively small health impact can have a major economic effect. Globally, SARS is believed to have infected around 8,000 people, killing 800 (Cooper and Coxe 2005). The Asian Development Bank estimated that the economic impact of SARS was around \$18 billion in East Asia, around 0.6% of gross domestic product (Fan 2003, Asian Development Bank 2003).

¹ Severe Acute Respiratory Syndrome.

A flu pandemic could be substantially more damaging in both human and economic terms. The World Health Organization (WHO) estimates 2–7 million people could die (WHO 2005), while other estimates are much higher, exceeding 100 million deaths (Osterholm 2005). The 20th century saw three major flu pandemics. The largest, the “Spanish flu” (1918–1919) is believed to have killed between 50–100 million people (Barry 2005). No other influenza in history has been this deadly and the high virulence may be due to the specific public health conditions that existed during the First World War (Byeryl 2005). Despite the human cost, the long-run impact of Spanish flu is unclear (Brainerd and Siegler 2003, Almond 2005). The two other flu pandemics (in 1957–1958 and 1968–1969) killed substantially fewer people (around 1–3 million each). All three flu pandemics mutated from forms of avian influenza and at least two of the three originated in Asia (Taubenberger 2005). The risk of a mutation in the H5N1 virus that spreads easily among humans is quite real.

Even in its early stages, avian flu has already caused significant economic damage. This is primarily due to the damage to the agricultural sector, particularly poultry production (Verbiest and Castillo 2004). As the outbreak is ongoing, estimates of the cost vary. One estimate puts the direct cost to the livestock sector in Cambodia, Thailand, and Viet Nam at \$560 million (McLeod 2005). However, with the loss of trade, the estimates rise substantially.

Estimating the Economic Costs of Avian Flu

Conjectures about the possible human and economic cost of an influenza pandemic are fraught with uncertainty. There is uncertainty about the nature of such pandemic and its economic fallout. There have been few economic studies on the impact of flu (Meltzer et al. 1999), although there are several estimates of the cost of SARS (Fan 2003, Lee and McKibbin 2003, Knapp et al. 2004). There is considerable **epidemiological uncertainty** about how many people will be infected and the severity of the disease, and **economic uncertainty** about how an outbreak will affect economic activity.

The **gross attack rate** (infection rate) expresses the percentage of the population that is likely to become clinically ill. The potential range is quite high. Typically influenza pandemics have a gross attack rate of 20–40% (Taubenberger 2005). The percentage of the infected that succumbs to influenza is the **case fatality rate**. The **mortality rate** is determined by multiplying the gross attack rate with the case fatality rate. In the case of Spanish flu, it is estimated that the total

mortality rate was between 2.5–5% of the world population (Barry 2005). However, the 1957 outbreak had a mortality rate of 0.024% in the United States. Typically the very young and the old are at the greatest risk of mortality, however each flu outbreak is different and it is not possible to predict what groups will be most vulnerable (Simonsen et al. 2005).

It is also difficult to predict how the public will respond to a flu outbreak. Historical experience shows that even during an epidemic outbreak, the public soon adapts to the disease and economic activity continues. On **the demand side**, a pandemic is likely to affect **consumer confidence** and change consumption and social patterns. It will also affect **investor confidence**, which can have important long-term consequences. On **the supply side**, a pandemic will affect the availability of labor, as illness will force many workers to stay home. It will also continue to affect the livestock sector negatively. Governments will have to deal with an **uncertain policy environment** as they respond to the public health emergency and economic dislocation. **Markets have a tendency to overreact**, which could exacerbate the economic impact.

Economic Scenarios

Macroeconomic models can help identify the possible economic impacts on an avian flu outbreak. However, there is significant uncertainty. As there have only been three flu pandemics in the 20th century, there is not much data and most of it focuses on Europe and the United States. The recent experience with SARS provides some insight into the potential economic impact.

The main impact of SARS was on the demand side, as consumption and the demand for services contracted (Fan 2003). This reflects both the psychological impact of the outbreak and the real need to limit contact to prevent infection. However, a flu pandemic would also impact the supply side, as members of the labor force get sick and in some cases, die. Human and physical capital will also be destroyed, reducing the region's long-run economic growth potential.

Asia today is an integral part of the global economy and is a major exporter and importer of goods and services. It provides a significant percentage of total world savings and receives a significant percentage of investment. In the short run even a localized pandemic would have a significant impact on the world economy. Likewise, a global outbreak would affect Asia directly (as the likely epicenter) and indirectly as global demand and trade contract.

The analysis looks at two scenarios. These scenarios are by no means complete and are designed to illustrate the possible order of magnitude of a pandemic. The macroeconomic simulations use the Oxford Economic Forecasting² (OEF) global model, which incorporates both the demand and supply sides and adjusts to a new equilibrium after a shock.

The scenarios both assume a relatively mild pandemic, with an attack rate of 20% and a case fatality rate of 0.5 percent. The flu lasts one year and is relatively well spread out through the year. This is far less severe than the Spanish flu pandemic of 1918 but is probably more severe than the other two pandemics of the 20th century. This pandemic would cost the lives of around 3 million Asians.

The scenarios work through the demand side as aggregate consumption declines and there is a reduction in the trade of services, including tourism and through the supply side, as the disease impacts the health of the labor force.³ Historically pandemics have different locations in waves and the assumptions here on the duration of the outbreak are simplifications.

Scenario 1 assumes that the psychological impact of an avian flu pandemic is short-lived and only seriously affects demand for two quarters. During this period, the model includes an exogenous consumption shock of 3% as households avoid contact and social situations and a significant exogenous contraction in the export of services for two quarters. This is followed by six quarters of milder contraction. In addition, this exogenous demand shock only happens in Asian countries.⁴ The supply shock is caused by workers who cannot work due to the disease (assumed to be a 2-week period). If the psychological impact of the pandemic is more severe, the supply shock will be greater due to absenteeism of otherwise healthy workers.⁵

² Oxford Economic Forecasting was contracted to undertake various simulations through 6194-REG, with financing from Japan Special Fund and the Belgian Cooperation Technical Fund.

³ Details of the assumptions are available from the authors.

⁴ The results here refer to East Asia (excluding Japan), South Asia, and Southeast Asia.

⁵ The cost of culling poultry, while significant, is ignored in this analysis for the sake of simplicity. It is dwarfed by other factors.

Under this scenario, Asia faces a demand shock of around \$99.2 billion in its 2006 GDP, the equivalent of 2.3 percentage points of GDP (Table 1). The impact of the supply shock would be relatively mild in comparison, accounting for \$14.2 billion in total or another 0.3 percentage points of GDP.⁶

Scenario 2 assumes that the psychological impact of the outbreak lasts longer and seriously affects demand for four quarters with another four quarters with a smaller exogenous shock to consumption and export of services. This contraction affects Asia both directly as Asian consumers reduce their activity, and indirectly as the rest of the world reduces its consumption, impacting trade and investment.

Here, the economic impact would be more severe and would likely force the world into a recession. The estimated loss would be \$282.7 billion, around 6.5 percentage points of GDP (Table 2). The demand effect would swamp the supply effect. Since the epidemiological assumption is the same, the impact of the supply shock is the same at \$14.2 billion. Growth in Asia would virtually stop, with a regional GDP growth rate of 0.1 percent. Global GDP will shrink 0.6 percent. The global trade of good and services will contract around 14%, the equivalent of \$2.5 trillion.

As an endogenous response, gross investment will drop in most countries for 2 years, along with industrial production and trade. Likewise, unemployment will increase. Commodity prices (including the price of oil) will drop, bringing down consumer prices.

As can be seen, some countries are more affected than others. Two factors stand out. First, open economies are more vulnerable to international economic shocks. Second, economies that are significant exporters of services are hard-hit. In Hong Kong, China and in Singapore, trade accounts for a significant share of total GDP and these two countries are major exporters of services. Malaysia and Thailand also are also significant exporters of goods and services. The Appendix summarizes the contribution of trade in Asian economies. These estimates do not include the cost of health expenditures, which will be substantial.

Long-run Impact

Although the analysis has focused on the immediate impact of the pandemic, the economic impact of the pandemic will be felt for

⁶ These shocks are relative to the expected growth estimated by the Asian Development Bank (2005) in the *Asian Development Outlook 2005*.

Table 1. Scenario 1: Two Quarters of Strong Demand Contraction Only in Asia

Economy	Estimated Reduction in Annual GDP Growth, 2006 (percentage point)		Estimated Reduction in Annual GDP Levels, 2006 (US\$ billion)	
	Demand Shock ^a	Supply Shock ^b	Demand Shock	Supply Shock
East Asia				
PRC	1.3	0.4	21.4	6.6
Hong Kong, China	9.2	0.2	18.3	0.4
Republic of Korea	1.5	0.3	9.1	1.8
South Asia				
India	1.5	0.3	9.3	1.9
Southeast Asia and Mekong				
Indonesia	0.5	0.2	1.0	0.4
Malaysia	7.1	0.2	7.9	0.2
Philippines	1.0	0.3	0.9	0.3
Singapore	10.4	0.4	11.1	0.4
Thailand	6.3	0.3	9.8	0.5
Total^c	2.3	0.3	99.2	14.2

^a Reduction in consumption, trade in services, and investment.

^b Reduction in the labor due to incapacity and mortality.

^c East and South Asia, excluding Japan.

Sources: Staff estimates, ADB (2005), and Oxford Economic Forecasting (financed by 6194-REG).

years to come. A flu pandemic will lead to a reduction of both human and physical capital. Investment will drop significantly, and remain low possibly over a long time. Deaths caused by avian flu will reduce the work force and lower the region's human capital. Even 5 years after the pandemic, in scenario 2 the region's GDP growth will be lower by 3.6 percentage points than in a case without a pandemic.

The pandemic will impact the region in other ways that cannot be easily modeled. The psychological impact of the disease may be long-lasting. Much of the Asian boom is built on confidence in the region's growth potential. A pandemic could shake that confidence and lower future investment. Business losses will be significant as importers, exporters, and service industry see a significant drop in demand. This will force many businesses to close, also lowering future investment and employment.

Table 2. Scenario 2: Four Quarters of Strong Demand Contraction Globally

Economy	Estimated Reduction in Annual GDP Growth, 2006 (percentage point)		Estimated Reduction in Annual GDP Levels, 2006 (US\$ billion)	
	Demand Shock ^a	Supply Shock ^b	Demand Shock	Supply Shock
East Asia				
PRC	4.9	0.4	80.6	6.6
Hong Kong, China	17.3	0.2	34.4	0.4
Republic of Korea	6.0	0.3	36.3	1.8
South Asia				
India	5.4	0.3	33.6	1.9
Southeast Asia and Mekong				
Indonesia	2.6	0.2	5.4	0.4
Malaysia	11.1	0.2	12.4	0.2
Philippines	2.7	0.3	2.5	0.3
Singapore	22.4	0.4	23.9	0.4
Thailand	11.4	0.3	17.7	0.5
Total^c	6.5	0.3	282.7	14.2

^a Reduction in consumption, trade in services, and investment.

^b Reduction in the labor due to incapacity and mortality.

^c East and South Asia, excluding Japan.

Sources: Staff estimates, ADB (2005), and Oxford Economic Forecasting (financed by 6194-REG).

A pandemic will push households below the poverty line and may increase inequality if poor households are more affected. Studies show that households that experienced HIV/AIDS⁷ were more likely to suffer long-term poverty (Greener 2004). Many poor households never recover their initial income because of lost family members and sales of assets to pay health care costs (Cohen 1997).

Government and International Response

The analysis presented two possible scenarios on the impact of avian flu. Governments and international organizations can play a major role in preventing and mitigating a flu pandemic, which can make the difference between the two scenarios. The policy responses of governments will help minimize the human and economic impact of a pandemic.

⁷ Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome.

One clear lesson from the SARS outbreak was the psychological impact on economic activity. In a situation where the transmission of information is costless, overreaction is common (Fan 2003). Governments and international agencies should **act transparently and disseminate accurate and timely information**. Recent experience with SARS and other disease outbreaks have shown that the public and markets often panic in the face of uncertainty. **Governments should react to the outbreak responsibly and not contribute unnecessarily to panic**. Countries should carefully weigh the benefits of reducing contact with the rest of the world with its cost. A mild outbreak will require limited public health precautions.

All countries are vulnerable and controlling the pandemic is a global public good. All countries have an interest in ensuring that each country mounts a suitable and effective response. This requires **cooperation and coordination**. There should be a concerted effort on the part of the international community to coordinate assistance to ensure support for all major areas and limit duplication. **International organizations can play a major role in coordinating and supporting national plans**. They can provide assistance to countries to develop their capacity to respond rapidly and flexibly to an outbreak if and when it occurs. **The international community also needs to provide financing and critical commodities to the poorest countries**. Experience from past outbreaks shows that the selective distribution of drugs and vaccines can lessen the human impact and reduce the spread of the outbreak. Finally, there is a need to support research activities, which will benefit all countries.

The SARS outbreak also showed that the affected countries were able to contain the disease efficiently and treat the victims in a timely fashion. While the avian flu pandemic will probably be harder to contain, countries with well-organized public health systems are in a better position to deal with the outbreak. Given the risk of this and future communicable disease outbreaks, **countries should increase their support to the health sector**.

Conclusions

Avian flu presents a major potential challenge to the development of the region, perhaps the most serious since the financial crisis of 1997. As with the financial crisis, countries in the region will be in a better position if they cooperate and share information with each other and the public. The international community has the responsibility to ensure that all countries can respond effectively.

Nobody can predict the consequences of a new flu pandemic. There are simply too many unknowns. This analysis has shown the economic impact of a realistic and relatively mild set of assumptions similar to the conditions in recent flu pandemics. Experience shows that while social and economic impacts can be severe, people adapt quickly and life continues. The value of this exercise to show is to provide some understanding of the magnitude of a flu pandemic on Asia. The consequences could be significantly worse if the outbreak lasts longer or is more virulent. It is possible that this strain of avian flu will not mutate and spread. However, it is only a matter of time before there is a major flu pandemic. Public policy will play a key role in determining the economic outcome.

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**Appendix. Exports of Services, Export of Tourism Services,
and Total Exports as a Percentage
of Gross Domestic Product**

Economy	Export of Services as Share of GDP	Export of Tourism as Share of GDP	Total Exports as Share of GDP
PRC	3.3	1.6	45.2
Hong Kong, China	28.8	4.8	186.8
Indonesia	3.3 ^a	3.0	42.0
Korea	5.4	1.1	56.4
Malaysia	13.1	7.5	125.4
Philippines	3.7	2.2	48.9
Singapore	33.3	5.0	258.3
Thailand	11.1	6.2	68.2

^a 2002.

Note: Data on export of services are from 2003, tourism shares from 2002. Total exports are estimated amounts for 2006 using the Oxford Economic Model.

Sources: Oxford Economics Forecasting, *World Development Indicators* (World Bank 2005).

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