

Avian and Human Pandemic Influenza – Economic and Social Impacts

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I have been asked to comment on economic and social issues raised by avian flu and by a potential human influenza pandemic. Right at the outset it is worth asking why analysis of economic and social aspects is relevant in what appears to be mainly an issue for animal and human public health policy.

The more obvious part of the answer is of course that the illness and death caused by these diseases will have economic and social costs. So far, with the principal transmission of the H5N1 virus occurring between animals, and, to a limited extent from animals to humans, the principal costs are being felt in the rural areas of several East Asian economies. However, as these outbreaks continue and spread to other regions, they also increase the probability of a second stage, with human-to-human transmission and a global influenza pandemic, with enormously greater costs on a world scale.

The less obvious part of the answer is that disease prevention and control strategies themselves have various economic and social costs and impacts. The success of these strategies can sometimes be affected by their impact on the economic incentives facing people. There is thus a natural role for analysis of costs, benefits and incentives in helping frame effective health strategies.

Avian Flu in East Asia

Let me turn first to where much of the focus of attention is right now, the rural sector in East Asia. At the overall macroeconomic level, costs so far have been fairly limited, but could

rise significantly going forward, and have already been high for specific sectors and communities.

Direct economic costs have included losses of poultry due to the disease and to control measures such as culling birds, with impacts extending not only to farmers but also to upstream and downstream sectors such as poultry traders, feed mills, breeding farms etc. The largest declines have occurred in Vietnam and Thailand, where they were equal to 15-20% of the stock of poultry. Other relatively smaller losses of poultry have also occurred in other economies.

The size of the poultry sector in the national economies of the region before the epidemic ranged from around 0.6 percent of GDP at the low end in countries like Vietnam and Thailand, to a high of a little over 2 percent in the Philippines, with most countries centering a little over 1 percent of GDP. In an economy like Vietnam, where poultry output was down by around 15 percent, this part of economic loss was worth about 0.1 percent of GDP. Additional losses have occurred because of lower egg production and reduced activity in distribution channels. The costs of prevention and control also need to be taken into account, including costs to the government of purchase of poultry vaccines, medications and other inputs, hiring workers for culling, cleanup, surveillance and diagnosis, and so on. All told, these direct costs likely cost 0.1-0.2 percent of GDP in an economy like Vietnam.

These losses, while perhaps limited in overall macroeconomic terms, have been severe in the poultry sector and on particular communities. In economies like Vietnam where the bulk of poultry production is still by backyard producers, the impact has been felt by individual rural households, and has only partly been offset by government compensation to farmers. Survey data show that in Vietnam the poorest quintile of households relies more than 3 times as much on poultry income than does the richest quintile, so there are also adverse distributional effects. On

the other hand, in economies like Thailand and Indonesia, where more of production is undertaken by industrial and large commercial producers, the impact may be felt in greater unemployment of wage laborers, lost profits and corporate bankruptcies. Governments also face needs to at least partially compensate poultry owners, an important factor in persuading owners not to conceal outbreaks of bird flu. While compensation is in the nature of a transfer payment for the economy as a whole, it can impose a significant fiscal burden on the government.

Secondary or indirect economic costs could also arise, for example, if there is a fall in international tourism because of disease fears or travel restrictions. This does not appear to have occurred so far, with tourist numbers continuing to grow in 2004 and so far in 2005. But this could change, since it only recently that global media have started prominent reporting on avian influenza.

Threat of a human influenza pandemic

Let me now turn to everyone's central concern, a potential human flu pandemic. There are great uncertainties about the timing, virulence, and general scope of a future human flu pandemic. The WHO observes that "Best case scenarios, modeled on the mild pandemic of 1968, project global excess deaths in the range 2 million to 7.4 million. Other estimates that factor in a more virulent virus, similar to that responsible for the deadly 1918 pandemic, estimate much higher numbers of deaths. Both scenarios are scientifically valid. The differences arise from the assumptions about the inherent lethality of the virus, which past experience has shown to vary greatly."¹ Other experts go further to argue that clinical, epidemiologic, and laboratory evidence

¹ World Health Organization. "Avian Influenza: Assessing the Pandemic Threat." January, 2005. WHO/CDS/2005.29.

suggests that a pandemic caused by the current H5N1 strain would be more likely to mimic the 1918 pandemic than those that occurred more recently, resulting in far higher death totals.²

Interestingly, the most immediate economic impacts of a pandemic might arise not from actual death or sickness but from the uncoordinated efforts of people to avoid becoming infected. This at least was the experience during SARS, when people tried to avoid infection by minimizing face-to-face interactions, resulting in a severe demand shock for services sectors such as tourism, mass transportation, retail sales, hotels and restaurants, as well as a supply shock due to workplace absenteeism, disruption of production processes and shifts to more costly procedures. To these results of private action could be added economic disruption and costs caused by emergency public policy measures such as quarantines and restrictions on domestic and international travel and trade, resulting in – among other things - a breakdown, at least temporarily, of international and domestic supply chains and logistics. Obviously, a highly trade dependent economy such as East Asia could be severely affected by these kinds of developments.

To get a very broad idea of the kinds of economic costs that might arise, one can note that the disruptions associated with SARS led to an immediate economic loss of perhaps 2 percent of East Asian regional GDP in the second quarter of 2003, even though only about 800 people ultimately died from this disease. Note that a 2 percent loss of global GDP during an influenza pandemic would represent around \$800 billion over a whole year. This may not be an unreasonable initial estimate, since, unlike SARS, a flu pandemic would affect the whole world not just one region, and would last longer than SARS. The 1918 epidemic, for example, came in three waves, spread over two years. If anything, this scenario of a 2% loss of world GDP based

² Michael T. Osterholm. “*Preparing for the Next Pandemic.*” *New England Journal of Medicine.* 352: 1839-42. May 5, 2005.

on SARS is likely to be an underestimate. For one thing the impact of SARS was mitigated by its being mainly restricted to East Asia, so that East Asia's exports were not depressed by a 'SARS shock' in the rest of the world. With a global flu pandemic, on the other hand, there would be simultaneous declines in aggregate demand and international trade all over the world, generating larger declines in national income and output. The consulting firm Oxford Economic Forecasting, for example, develops a scenario of a global shock including a downturn in world trade which could, they believe, entail a 4-5% fall in world GDP over one year, i.e. \$1.5-2.0 trillion.

In addition to these immediate costs of disruption, a serious global flu pandemic could also entail a sizeable loss of potential world output through a reduction in the size and productivity of the world labor force due to illness and death. The effect of disease on the size of the labor force would depend on the virulence and spread of the disease and on how it affected different age groups, among other factors. There would also be a general decline in labor productivity due to illness among the labor force at large, as well as costs of hospitalization and medical treatment.

There is a lack of detailed studies of what these costs of a flu pandemic might amount to at a global level. However one 1999 study of the United States calculated that, based on the disease patterns of post World War 2 pandemics, a new flu pandemic could lead to between 100000 and 200000 deaths in the US, together with 700000 or more hospitalizations, up to 40 million outpatient visits and 50 million additional illnesses.³ The present value of the economic losses associated with this level of death and sickness was estimated at between \$100 and \$200

³ Martin I. Meltzer, Nancy J. Cox and Keiji Fukuda. (1999). "*The Economic Impact of Pandemic Influenza in the United States: Priorities for Intervention.*" *Emerging Infectious Diseases*. Volume 5, No. 5. Sept.-Oct. <http://www.cdc.gov/ncidod/EID/vol5no5/meltzer.htm> Oxford Economic Forecasting.

billion for the US (in 2004 dollars). If we extrapolate from the US to all high income countries, there could be a present value loss of \$550 billion. The loss for the world would of course be significantly larger, because of the impact in the developing world. Note however that it would be inappropriate to make a simple extrapolation from studies of rich countries to poor countries, where health systems are much less developed and mortality could be much higher. Note also that these estimates for the US assume a mortality rate of less than 0.1 percent of the US population, much lower than mortality in either the US or the world in the 1918-19 pandemic.

Looking at impacts at the level of the individual firm, it seems clear that businesses that are the most resilient to extreme volatility are the ones more likely to survive a pandemic, or to survive it with relatively less financial damage. Thus it would be firms with strong balance sheets and capitalization that are more likely to survive steep downturns in demand and cash flow that could last from 6 months up to 2 years, especially in the sorts of services sectors noted above. Bankruptcies would likely surge among highly leveraged firms, and in particularly exposed sectors, such as airlines. Governments may need to plan for policies to facilitate corporate restructuring and getting industries relaunched promptly after the crisis. Firms also need to plan for all sort of unexpected disruptions in supply chains, logistics and the availability of key business services, for example business travel. It would make sense for firms to work with their existing suppliers on tactics to cope with potential supply chain disruptions, while also investigating alternative sources of supply and alternative means of doing business. Firms could also consider building up buffer stocks of critical inputs. That may eat into short term profit margins and runs against current “just-in-time” management philosophy, but could help ensure the very survival of the firm during this type of catastrophic event. Finally, firms obviously also

need to plan for mitigating the impact of the epidemic on their own employees, working in close concert with the public health authorities

Policy issues

Let me turn finally to policy issues, to some emerging lessons as well as questions that need further study. By any account, the benefits of preventing or even mitigating or delaying a global influenza pandemic are likely to be large indeed.

One very clear lesson is the need for governments to establish a track record of credibility through honest, accurate and timely disclosure of information to their own people and to the outside world. There is evidence that during SARS the costs arising from panic and disruption were magnified by an initial lack of public information in some countries. In the 1918 pandemic governments tried to hide the truth so as to maintain morale during wartime, although this contributed ultimately to the worldwide spread of the disease, loss of trust among the public and social chaos. We need to understand this problem better, and to consider what kinds of institutional mechanisms or incentives could help overcome it.

Second, given the close links between animal and human health, and their ties to economic and social considerations, country level responses need to be based on integrated cross-sectoral plans that draw on the best available knowledge and guidelines from the international technical agencies such as OIE, FAO and WHO. Preparation and implementation of these integrated plans needs to bring together the several concerned ministries in a country, such as agriculture, animal health, human health, finance, local governments and communities, all under strong political leadership from the highest level.

Third, there needs to be careful evaluation of results from various strategies that are currently being implemented, to judge if actual outcomes are meeting expectations. One such question might be to gain more information on the relative efficacy and implications of different control strategies, for example culling and vaccination of birds. It is noteworthy that some high income economies that have been most successful in curbing avian flu, such as Hong Kong, Korea and Japan, have relied heavily on culling. A linked question is that of the appropriate levels of compensation needed to make culling successful. Too little and farmers have an economic disincentive to comply with culling; too much and they may have an incentive to deliberately infect their flocks. Different countries have different compensation schemes. A cross-country evaluation of the results so far could throw a lot of light on this question.

Fourth, it is also important to strike a balance between short and long term measures. Avian flu is becoming endemic in parts of East Asia and will require a long effort to suppress. A human pandemic may emerge not now but later, and not from H5N1 but from some different strain of flu virus. Other zoonoses and pathogens continue to emerge. The general problem of global infectious diseases is going to be with us for a long time, and may get worse. Thus it makes sense to also undertake broader long term measures to strengthen the surveillance, institutional, regulatory and technical capacity of the animal health, human health and other relevant sectors. These will be valuable investments both in the short and long run.

Lastly, there are a critical set of questions partially grounded in economics that need to be solved at the global level, including how best to foster R&D and innovation of new types of vaccines and anti-virals, how to foster rapid growth in manufacturing capacity for anti-virals and vaccines (the latter once a human pandemic strain has been identified) and how to establish adequate stockpiles of vaccines and anti-virals that would allow 'rapid response' to a pandemic

outbreak. In recent years economists have been developing many creative new ideas about how to accomplish these objectives more effectively and cheaply than before. Some of these ideas now need to be taken off the drawing board and considered for implementation, at least in prototype forms.