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An econometric analysis of SARS and Avian Flu on international tourist arrivals to Asia

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ABSTRACT

This paper compares the impacts of SARS and human deaths arising from Avian Flu on international tourist arrivals to Asia. The effects of SARS and human deaths from Avian Flu are compared directly according to the number of human deaths. The nature of the short run and long run relationship is examined empirically by estimating a static line fixed effect model and a difference transformation dynamic model, respectively. Empirical results from the static fixed effect and difference transformation dynamic models are consistent, and indicate that both the short run and long run SARS effect have a more significant impact on international tourist arrivals than does Avian Flu. In addition, the effects of deaths arising from both SARS and Avian Flu suggest that SARS is more important to international tourist arrivals than is Avian Flu. Thus, while Avian Flu is here to stay, its effect is currently not as significant as that of SARS.

1. Introduction

Two diseases with their genesis in Asia, namely the Severe Acute Respiratory Syndrome (hereafter SARS) epidemic, which received worldwide attention in 2003, and the H5N1 Avian Influenza (hereafter Avian Flu) epidemic (see, for example, http://www.un-influenza.org/node/79), which has received worldwide attention since 2004, have significantly damaged the image of international tourism to Asia as a safe tourist destination. According to the World Travel and Tourism Council (2003a,b,c,d), the outbreak of the SARS disease led to the collapse of the tourism industry in the most severely affected Asian countries, namely China, Hong Kong, Singapore and Vietnam. SARS is estimated to have cost these four countries over US $20 billion in lost GDP, and a reduction of more than 70% across the rest of Asia, even in countries that were totally disease free (Mckercher and Chon, 2004).

Table 1 presents the number of SARS infections, deaths and the death to infection ratio worldwide in 2003. As shown in Table 1, 8096 people worldwide were infected by the potentially fatal SARS disease, while 774 deaths were caused by SARS. Of the 8096 infections, 7783 (or 96%) have occurred in Asia and only 313 (or 4%) in the rest of the world. Moreover, 729 (or 94%) human deaths have been caused by SARS in Asia, while only 45 (or 6%) human deaths have arisen in the rest of the world. China has accounted for the greatest number of SARS infections and deaths arising from SARS, followed by Hong Kong. However, Malaysia has the highest death ratio at 40%, while Thailand, Hong Kong, Taiwan, Singapore and the Philippines have a death ratio in excess of 10%.

Table 2 presents the Avian Flu spread and infections worldwide from December 2003 to July 2007. As shown in Table 2, Avian Flu epidemics were initially detected in East and South-East Asia, and were subsequently spread worldwide. For Avian Flu confirmed in humans, Vietnam was the first country to report data in both human infections and human deaths to the World Health Organization (WHO). The cumulative number of infections of Avian Flu worldwide was 319, with 192 human deaths from Avian Flu. Of the 319 human infections, 279 cases (or 87.46%) have occurred in Asia, while 40 infections (or 12%) occurred in Africa. This is similar to the number of deaths in humans, with 176 deaths (or 92%) in Asia, and only 16 deaths (or 8%) in Africa.

In Asia, Cambodia and Laos had the highest death rate, while Thailand and Indonesia had death rates in excess of 70%. Nevertheless, the death rates in China, Iraq and Azerbaijan exceeded 60%,

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Table 1
SARS spread and infections worldwide in 2003.

Continent	Country	Confirmed human cases		
		Cases	Deaths	Death rate (%)
Asia	China	5327	349	6.55
	Hong Kong	1755	299	17.04
	Taiwan	346	37	10.69
	Singapore	238	33	13.87
	Vietnam	63	5	7.94
	Philippines	14	2	14.29
	Thailand	9	2	22.22
	Mongolia	9	0	0.00
	Australia	6	0	0.00
	Malaysia	5	2	40.00
	Korea	3	0	0.00
	India	3	0	0.00
	Indonesia	2	0	0.00
	Macao	1	0	0.00
	New Zealand	1	0	0.00
	Kuwait	1	0	0.00
Asia		7783	729	9.37
North America		278	43	15.47
Europe		34	1	2.94
Africa		1	1	100.00
World		8096	774	9.56

Source: World Health Organization (2004).

while Vietnam and Turkey had death rates of 44% and 33%, respectively. Overall, Asia is the most seriously affected region by Avian Flu, both in humans and poultry. Furthermore, the mortality rate in Asia is very high at 62.72%, which is higher than the average death rate worldwide at 60.25%.

The transmission routes are different between SARS and Avian Flu. SARS is a respiratory illness with pneumonia-like symptoms, so its transmission route is directly through person-to-person contact, while Avian Flu is consistent with animal-to-human, and possible environment-to-human, but is still limited in unsustained human-to-human transmission (Beigel et al., 2005).

In spite of Avian Flu, the disease can be transmitted from animals-to-humans, not by close person-to-person contact. However, Avian Flu still presents a very high mortality rate among humans, as shown in Table 2, which represents a potential risk arising from the Avian Flu epidemic. Moreover, Page et al. (2006) indicate that Avian Flu at this stage is not transmitted among humans. The critical link between Avian Flu and the tourism industry has a potential global reach in that Avian Flu can be spread through international travel. The concern among health professionals is that Avian Flu may create a new flu virus from animal reservoirs, which will then infect humans who will not have antibodies to resist infection.

Considering these factors, econometric analysis should seek to identify the impact of international tourist arrivals on two recent significant crises in Asia, namely SARS and Avian Flu. Moreover, the effects of SARS and human deaths arising from Avian Flu are directly comparable because both refer to human deaths, although this does not seem to have been examined rigorously from the perspective of international tourism demand.

There has been little attention paid in the economic literature to the effect on international tourist arrivals of the SARS crisis. Much of the literature has relied on a description of the severe impact of SARS on international tourist arrivals (see, for example, Chien and Law (2003), Mckercher and Chon (2004), and Wilder-Smith (2006)), and few papers have focused on a particular Asian country, such as Hong Kong or Taiwan (see, for example, Min (2005) and Chen et al. (2007)). Although these studies have all reported a negative effect of SARS on tourism, they have not been based on a clear econometric methodology.

Table 2
Humans cases of avian flu worldwide, December 2003–July 2007.

Continent	Country	First report in poultry	Outbreaks of poultry	Confirmed human cases		
				Infections	Deaths	Death rate (%)
Asia	Vietnam	Jan. 8, 2004	2402	95	42	44.21
	Thailand	Jan. 23, 2004	1137	25	17	68.00
	Indonesia	Feb. 2, 2004	261	102	81	79.41
	Turkey	Oct. 10, 2005	212	12	4	33.33
	China	Jan. 23, 2004	88	25	16	64.00
	Myanmar	Mar. 12, 2006	90	0	0	0.00
	Pakistan	Mar. 2, 2006	40	0	0	0.00
	Korea	Dec. 12, 2003	26	0	0	0.00
	Bangladesh	Mar. 30, 2007	23	0	0	0.00
	Afghanistan	Mar. 20, 2006	22	0	0	0.00
	Cambodia	Jan. 24, 2004	20	7	7	100.00
	Kuwait	Feb. 26, 2007	20	0	0	0.00
	Malaysia	Aug. 19, 2004	16	0	0	0.00
	Laos	Jan. 27, 2004	9	2	2	100.00
	Japan	Jan. 13, 2004	9	0	0	0.00
	Israel	Mar. 17, 2006	9	0	0	0.00
	Occupied Palestinian Territory	Apr. 5, 2006	8	0	0	0.00
	India	Feb. 18, 2006	8	0	0	0.00
	Iraq	Feb. 2, 2006	3	3	2	66.67
	Azerbaijan	Feb. 24, 2006	2	8	5	62.50
	Kazakhstan	Aug. 2, 2005	1	0	0	0.00
	Jordan	Mar. 24, 2006	1	0	0	0.00
Africa	Egypt	Feb. 19, 2006	346	38	15	39.47
	Nigeria	Feb. 8, 2006	60	1	1	100.00
	Sudan	Apr. 18, 2006	18	0	0	0.00
	Burkina Faso	Mar. 3, 2006	4	0	0	0.00
	Côte d'Ivoire	Apr. 25, 2006	4	0	0	0.00
	Ghana	May 3, 2007	6	0	0	0.00
	Niger	Feb 28, 2006	2	0	0	0.00
	Cameroon	Mar. 12, 2006	1	0	0	0.00
	Djibouti	May 27, 2006	1	0	0	0.00
	Togo	Jun. 22, 2006	3	1	0	0.00
Asia			4407	279	176	63.08
Europe			365	0	0	0.00
Africa			445	40	16	40.00
World			5217	319	192	60.19

Source: 1. World health organization (WHO) (2004), 2. Office international des epizooties, now the world organization for animal health (2007), 3. The rows highlighted in grey denote countries that have confirmed human cases.

Compared with SARS, much recent discussion has concentrated on the damage caused by Avian Flu, whereby infected countries have suffered significant reductions in international tourist arrivals and in tourism competitiveness. As suggested by Brahmbhatt (2005), the immediate economic impacts of a pandemic disease might arise, not from actual sickness or death, but from the efforts of the public and private sectors to avoid becoming infected rapidly. Consequently, this might lead to a severe demand shock for service sectors, such as tourism, mass transportation, hotels, restaurants and retail sales (see also Page et al., 2006).

Avian Flu might also damage destination marketing, as emphasized by Buhalis (2000) and Mohsin (2005). International tourism could be seriously affected, or possibly even restricted, to prevent the spread of Avian Flu and pandemic influenza. Page et al. (2006) observed that Avian Flu could have significant shocks on tourism. For instance, Brahmbhatt (2005) estimated that the 2004 Avian Flu outbreak in Vietnam led to a 1.8% decline in GDP, while a 5% decline in international tourist arrivals could lead to a 0.4% decline in GDP. Furthermore, the World Bank estimated that the global economic influence of an outbreak of Avian Flu could be US $800 billion, or 2% of world economic output (Brahmbhatt, 2005).

Avian Flu could also lead to a high mortality rate among humans while the disease is transmitted from animals-to-humans,