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Ebola, SARS, and the Economies of Southeast Asia

*By Kai Ostwald**

EXECUTIVE SUMMARY

- The Severe Acute Respiratory Syndrome (SARS) outbreak in 2002/03 was responsible for over 700 fatalities in East and Southeast Asia. Beyond this human toll, it caused widespread disruptions to economic activity, leading to significant declines in several sectors and an overall slowdown in the region's economy.
- The economic costs exacted by SARS resulted not from losses to human capital or direct medical expenses, but rather from the behavioral changes that followed fear of the virus. Several characteristics of Ebola—which is currently devastating three countries in West Africa—give it the potential to induce similar widespread behavioral changes. This has led to concerns that Ebola could have a similarly serious negative impact on economic activity in Southeast Asia.
- While sharing several characteristics, SARS and Ebola are epidemiologically distinct in important ways. Critically, differences in the way that SARS and Ebola are transmitted make it unlikely that Ebola will spread widely throughout Southeast Asia, especially given the region's relatively advanced public health and healthcare capacities.

- The low risk of a widespread Ebola outbreak in Southeast Asia has important policy implications. Specifically, since Ebola is already widely seen as a public health threat, governments can focus their efforts on containing fear and preventing costly aversion behavior. Where possible, governments should consider contributing resources and expertise to containing the outbreak in West Africa.

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INTRODUCTION[1]

The SARS epidemic of 2002/2003 imposed widespread costs across Southeast Asia and deeply shook the region. It is little wonder then, that investors, governments, and the general public throughout the region hold deep anxieties about Ebola, a virus that on initial reflection shares much in common with SARS. This paper asks whether Ebola has the potential to cause widespread economic losses in Southeast Asia, and argues that key differences between SARS and Ebola significantly limit the potential costs of Ebola relative to those incurred during the SARS crisis, conditional on appropriate policy responses from governments throughout the region.

Three broad points need to be made. First, the primary costs imposed by the SARS outbreak resulted not from direct losses to human capital or medical expenditures, but rather from the behavioral changes that the outbreak engendered. Specifically, fear of contagion prompted widespread aversion behavior, in which people significantly reduced activities that put them in close proximity with others. This included not only things like flying and eating in restaurants, but also activities like workplace and school attendance. The deep anxiety caused by Ebola creates the potential for a repeat of such behavior. Second, despite their apparent similarities, there are several key differences between SARS and Ebola. Most importantly, from an epidemiological perspective, the spread of Ebola can be contained much more readily than that of SARS, given a sufficient level of medical infrastructure and adherence to existing infectious disease containment procedures. This reduces both the chances that Ebola will reach Southeast Asia, and the chances that it will spread significantly through the population should the virus reach the region. Third, the epidemiological differences between SARS and Ebola have important policy implications for governments around the region. In addressing public health issues, governments face conflicting goals: First, they must induce sufficient concern about a disease to ensure compliance with containment measures; and second, they need to prevent excessive fear of the disease to avoid counterproductive reactions. The relatively low risk of widespread Ebola contagion means governments can tend strongly towards the latter, largely by comprehensively educating the public on actual risk levels.

[1] This paper emerged from a panel discussion entitled “Is Ebola the next SARS”, sponsored by the IAR Asia Pacific Forum at the University of British Columbia (UBC), with myself, Annalee Yassi (Professor of Public Health at UBC) and Richard Lester (Assistant Professor in Global Health, UBC). I thank especially Annalee Yassi for her insights and suggestions on the epidemiological and public health aspects of the comparison between Ebola and SARS.

SARS

The first cases of Severe Acute Respiratory Syndrome occurred in Guangdong Province in China in late 2002. By the time it was evident that SARS was more than an unusually virulent strain of the flu, it had spread to neighboring cities and Hong Kong. According to World Health Organization estimates, 8,096 cases would be reported before outbreak was brought under control in mid-2003.[2] 774 deaths were attributed to the syndrome, leading to an exceptionally high case fatality ratio of 9.6%. The outbreak was largely limited to East Asia [China 5,327; Hong Kong 1,755; Taiwan 346] and Southeast Asia [Singapore 238; Vietnam 63], with Canada [251] being the only non-Asian country to have a significant number of cases.

Estimates at the time of the outbreak suggested that the economic impact of SARS was somewhere between US$20 to 100 billion.[345] This made for a staggering per case cost of roughly US$2 to 10 million. While several analyses conducted after 2005 suggest that these preliminary figures may have overestimated the total costs,[6] it is clear that some countries—and especially some sectors—suffered significant economic losses. GDP growth in China, for example, appears to have been reduced by 3.1% in the second quarter of 2003, when the outbreak was at its peak. The loss in Hong Kong was estimated at nearly US$3.7 billion, less than Singapore's loss of nearly US$5 billion. The costs extended beyond Asia as well, exemplified by the greater than US$4 billion impact on Canada, which also resulted in an estimated 28,000 lost jobs.

What accounts for this extensive economic impact? It is easiest to begin with what *does not* account for the costs. The fewer than 800 known fatalities do not constitute a significant loss in terms of human capital, especially in proportion to the large populations of East and Southeast Asia. For perspective, the US-based National Institute of Health's Fogarty International Center reports that pneumonia and influenza cause an estimated 11 to 18 deaths per 100,000 people in China, bringing

[2] World Health Organization (2003), "A Multicentre Collaboration to Investigate the Cause of Severe Acute Respiratory Syndrome", *Lancet* 361:1731-1733.
[3] Fan, X., Pernia, E. (2003), "SARS: Economic Impacts and Implications" in Policy Brief 15, *Asian Development Bank Economics and Research Department*.
[4] Knapp, S., Rossi, V., Walker, J. (2004), "Assessing the Impact and Costs of Public Health Risks: the Example of SARS" by *Oxford Economic Forecasting Group*.
[5] Lee, J.-W., McKibbin, J. (2004), "Globalization and Disease: The Case of SARS", *Asian Economic Papers,* 3(1): 113-131.
[6] Keogh-Brown, M., Smith, R.D. (2008), "The Economic Impact of SARS: How Does the Reality Match the Predictions?", *Health Policy* 88: 110-120.

the total to between 148,000 and 244,000 annual deaths.[7] Between 1996 and 2003, Singapore averaged well over 1,500 deaths per year due to influenza, significantly greater than the 33 SARS-attributed deaths in 2002/03.[8] Likewise, given the relatively small number of patients and the short average period of hospitalization, the direct medical costs associated with SARS do not make up a significant portion of total losses, even though precise numbers are difficult to come by.

Rather, SARS proved costly because it induced widespread behavioral changes that significantly constrained economic activity, primarily in that individuals sought to avoid close proximity to others whose SARS-status was uncertain. This struck travel-related sectors particularly hard. Tourist arrivals in East Asia broadly, for example, fell by over 40% in April 2003 relative to April 2002. According to the World Travel and Tourism Council (WTTC), the impact of SARS on travel in affected East and Southeast Asian countries was roughly 4 to 5 times greater than the impact of the September 11th terrorist attacks on travel in the United States.[9] Occupancy rates in hotels also plummeted, for example in Hong Kong where they fell from roughly 85% in the months preceding the outbreak to under 20% during its peak, or in Singapore, where they more than halved from over 75% to roughly 35% during that same period. Precise data may not be available, but workplace absenteeism also rose as employees sought to avoid public transportation and contact with co-workers. School absenteeism led to further losses in workplace productivity, as lack of alternate childcare facilities forced working parents to stay home. Underscoring the ultimately psychological factors behind the costs of SARS are data from Malaysia, which despite having only five confirmed SARS cases saw its tourism industry alone lose an estimated US$1.7 billion during the crisis;[10] constituting a staggering per-case cost of over US$300 million.

Several unique features of SARS are responsible for these strong behavioral responses, which do not appear in response to other potentially dangerous illnesses like influenza, dengue, or malaria. First, the SARS fatality rate of nearly 10% was dramatically higher than that of the other diseases endemic to the region. Importantly, the fatality rate was high even among otherwise healthy individuals, unlike with influenza, dengue, or malaria, whose fatality risks are low outside of

[7] National Institute of Health (2013): online press release available at: *http://www.nih.gov/news/health/nov2013/fic-19.htm*

[8] Chow, A., Ma, S., Ling, A.E., Chew, S.K. (2006). "Influenza-associated Deaths in Tropical Singapore" *Emerging Infectious Diseases*, 12(1): 114-121.

[9] Wilder-Smith, A. (2005), "The Severe Acute Respiratory Syndrome: Impact on Travel and Tourism, *Travel Medicine and Infectious Diseases*, (4): 53-60.

[10] Keogh-Brown, M., Smith, R.D. (2008), "The Economic Impact of SARS: How Does the Reality Match the Predictions?", *Health Policy* 88: 110-120.

especially vulnerable populations like the very young, old, or already ill. Second, SARS was poorly understood from an epidemiological perspective during the outbreak, due to it being a previously unidentified—and thus unstudied—illness. The lack of familiarity with the disease among the general population, along with the lack of established procedures for containing the outbreak, greatly heightened anxieties of affected populations. The unknown, as it is said, is a great cause of fear. Third, the striking visuals associated with containing the disease—the imposing hazmat suits and isolation wards—amplified further the anxiety surrounding SARS.

EBOLA

Anxieties about Ebola run high in significant part because the disease shares the same three basic characteristics outlined for SARS. Fatality rates during the current outbreak in the West African countries of Sierra Leone, Guinea and Liberia are a staggering 36%, with 5,177 deaths reported among the estimated 14,413 cases, as of mid-November.[11] As with SARS, fatality rates are high across all age groups, spreading feelings of vulnerability broadly. While Ebola was first identified in South Sudan in 1976, this current outbreak is the first to reach major population centers in Africa, and the first to spread beyond the continent. Thus while the name of the disease is widely familiar, the particularities of the disease are not, further increasing fear levels. Third, the gruesome realities of the disease—with death resulting from dehydration and internal hemorrhaging—and the remarkable visuals associated with the isolation wards and hazmat suits likewise reinforce the strong emotional responses. These components alone are sufficient to trigger the widespread aversion behavior responsible for the extensive costs of the SARS outbreak.

There are, however, key differences between Ebola and SARS. First, Ebola is vastly less contagious than SARS. Evidence to date suggests that transmission of Ebola occurs only through direct contact with bodily fluids, and furthermore, only after an individual has become symptomatic. By contrast, SARS is a respiratory virus spread not only by contact with infected body fluids but also by contact with infectious respiratory droplets, including those expelled from a cough or sneeze. It can also be spread before individuals become fully symptomatic.[12] The primary consequence of this key epidemiological difference between Ebola and SARS is the potential for a significantly lower transmission rate for Ebola, at least when adequate infrastructure and necessary precautions are

[11] The 14,413 cases are based on information reported by the Ministries of Health. Of those, only 8,920 are laboratory-confirmed cases. This yields a significantly higher fatality rate of 58%. Current information available online at www.cdc.gov/vhf/ebola/

[12] Peiris, J.S., Yuen, K.Y., Osterhaus, A.D., Stohr, K. (2003), "The Severe Acute Respiratory Syndrome", *New England Journal of Medicine*, 349(25): 2431-41.

present. The high rates of transmission reported throughout West Africa are largely a reflection of poor sanitation, insufficient medical personnel, lack of personal protective equipment or training in infection control, and highly inadequate healthcare infrastructure. Second, public health and infection control procedures—especially those designed to identify, trace, and contain infectious diseases like Ebola—across Southeast Asia improved significantly through the experience with SARS. In combination with the lower contagiousness of Ebola, it is highly unlikely that Ebola would spread throughout the region in the manner that SARS did. In addition, given higher levels of public health and healthcare capacity, it is likely that fatality rates in Southeast Asia would be considerably lower than those in West Africa. Third, and very importantly, the number of passengers travelling from affected countries in West Africa to Southeast Asia is very small, reducing even the underlying risk that Ebola reaches the region. This again is in strong contrast to SARS, which emerged in major transportation hubs serving dozens, if not hundreds, of flights to Southeast Asia on a daily basis.

POLICY IMPLICATIONS

From an epidemiological perspective, Ebola presents significantly less risk to Southeast Asia than did SARS, given that a widespread outbreak is highly unlikely. Despite this, Ebola has the potential to exact extensive economic costs by inducing widespread aversion behavior, should a case of Ebola reach the region. This psychological dimension has important policy implications.

Governments face a delicate balance in directing public communications about a contagious disease. In the face of a public health crisis, some fear is necessary to ensure compliance with containment measures. Data has repeatedly shown that higher levels of concern about a disease lead to more consistent adoption of precautionary measures.[13] [14] On the other hand, and as demonstrated by SARS, excessive anxiety can lead to counterproductive behavior and extensive indirect costs. This is exacerbated by lack of information or outright misinformation on the particularities of contagion for a given disease.

The relatively low risk of a widespread Ebola outbreak in Southeast Asia should orient governments primarily towards containing fear and minimizing aversion behavior. This is

[13] Becker, M., Malman, L. (1975), "Sociobehavioral Determinants of Compliance with Health and Medical Care Recommendations", *Medical Care* 13(1): 10-24.
[14] Smith, R.D. (2006), "Responding to Global Infectious Disease Outbreaks: Lessons from SARS on the Role of Risk Perception, Communication and Management", *Social Science and Medicine* 63(12): 3113-3123.

complicated by the sensationalist tone of some media coverage, which will almost certainly reach a frenzy in the case that Ebola reaches the region. Even in countries where governments and the mass media coordinate messaging on issues of public health, widespread internet access throughout the region will expose the public to panic-inducing sensationalist discussions and news coverage. The best approach towards countering this is to preemptively engage with the public to dispel misinformation about Ebola and the manner in which it is spread, especially *vis-à-vis* other illnesses with which there is greater familiarity. This would become especially critical if cases of Ebola occur in a region that sees greater volumes of air travel to Southeast Asia, as this would likely embolden discussions and fears of the disease. The more coordinated this effort is across East and Southeast Asia, the more effective it will be, given that national boundaries are porous to psychological contagion, and costs related to reductions in travel are largely international in nature.

The ideal response of governments to the Ebola outbreak would be to extend expertise and resources toward containing the disease in West Africa. Given the experience gained through SARS, Southeast Asia's medical expertise alone could significantly contribute to mitigating the terrible human and economic toll Ebola has already inflicted on the three hardest-hit nations of Liberia, Guinea, and Sierra Leone. In addition, reducing rates of transmission in West Africa is the surest way to limit the chances of Ebola reaching Southeast Asia and other regions outside of Africa.

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