Economic Impact of Nipah Virus Infection Outbreak in Malaysia

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Abstract

Nipah Virus is recognized as a fatal zoonotic paramyxovirus which provoked more than 100 human death and about 1 million pigs slaughter during the outbreak in 1998-99 in Peninsular Malaysia. Since the outbreak, Malaysian hog industry has experienced enormous damage and structural changes. Therefore, we tried to estimate the ripple effect on affiliated industry applying input-output analysis along with interview on farmers and government authority. The results shown that the ripple effect of hog raising sector degradation is almost double and it spills not only over material providing industries but also over wide range of service industry. Moreover, the ripple effect by swine industry degradation is significantly large compared to the case study in other agricultural industry (1.09-1.34). Possibility of Nipah outbreak is indicated in other Asian countries where fruit bats distributing. Therefore, surrounding countries should learn the Malaysian experience, and it is expected to construct the hog industry development policy regarding geographical and environmental factors.

Introduction

The encephalitis outbreak that occurred in Malaysia from 1998 to 1999 is a zoonosis caused by a new kind of virus. According to the results of an antibody response test, the fruit bat is assumed to be its natural host. The virus was named the Nipah virus, after the village that the patient from whom the virus was first identified lived. The Nipah virus epidemic resulted in more than 100 deaths, mainly Malaysian hog raising farmers and Singaporean slaughterhouse workers. In addition, about 1.1 million pigs were destroyed and raising hogs is still prohibited in some areas. The Nipah virus caused enormous damage, mainly for the Malaysian hog raising business. However, economic analysis which has done so far is only limited to the direct evaluation. In this paper, we'll discuss the changes in the Malaysian hog raising business caused by the outbreak of the Nipah virus and the impact it had on the local economies. Our research is based on interviews at hog farms in the area around Ipoh, where it is believed that the Nipah virus outbreak began, and Negeri Sembilan, the state that is the largest hog raising area in Malaysia and which suffered the greatest damage, as well as Input-Output (I-O) analysis. And also the interview was conducted on Department of Veterinary Services, the Veterinary Research Institute, and the Federation of Livestock Farmers' Associations of Malaysia (FLFAM).

The Outbreak of the Nipah Virus and the Measures Taken by the Government

The outbreak of the Nipah virus in Malaysia began in Perak where is the hog raising area for domestic consumption and export, mainly to Singapore. There are three reasons that the hog raising industry became so well-developed in this state: first, Perak once prospered in strip mining of tin, and hog raising was introduced to utilize the abandoned mines that had filled with water. Second, these flooded mines were suitable to naturally purify the waste resulting from hog raising. Third, many of the residents who immigrated to mine the tin were Chinese and pork was widely used in their diet. In addition, in Malaysia, the production of pigs, which are considered by Muslims to be unclean, was required to be done apart from residential areas. Using the flooded mines for hog raising was considered the best solution. Orchards were planted between hog raising and residential areas in order to utilize the lands and ease the environmental problems such as offensive odors and waste disposal. However, it is believed that these orchards, together with the deforestation, caused the outbreak of the virus. Fruit bats, the natural host of the virus, flew over the hog raising areas to the orchards to get fruits. It is assumed that the pigs were infected through the fruit particles and urine those bats dropped.

Some hog farmers in Perak suffered hyperthermia and exhibited neurological symptoms in the beginning of October 1998. Some of them fell into a coma and died. Also, pigs displayed symptoms such as anhelation, coughs, bleeding from the mouth and nose, convulsions, and abnormal behavior such as crashing into a fence until they died. In November 1998, experts suggested, from the epidemiological point of view, the possibility

that it might not be JE; unlike JE, patients were concentrated in specific areas, and most of the patients were young men and the number of children infected was small. Also many of the patients had already received the JE vaccination. However, the Malaysian government asserted it was JE as the clinical symptoms were similar, not suspecting that the cause could have been some unknown virus. The government continued carrying out measures such as spraying insecticides and distributing vaccines for JE, however the transport of the pigs was not prohibited, and hog farmers in the infected area sold many of their pigs to wholesalers, afraid that there would be a slump in prices. The infected pigs were carried out of the area. As a result, a similar disease broke out in the state of Negeri Sembilan in January 1999 and in Selangor in February of the same year. Now the damage was spread over the whole Malay Peninsula. It was not until March 1999 that it was confirmed that this outbreak was not JE, but an emerging virus. The incorrect diagnosis that the disease was JE had magnified the damage even further because the vaccination for JE in pigs was conducted without changing needles and the prohibition of livestock transportation had not been implemented earlier.

The Malaysian government conducted two new measures from April, when it had found out that the cause was the Nipah virus. The first step was taken in the major outbreak areas from April 9 to 17, 1999. The armed forces shot and killed all the pigs and buried them. The second measure was carried out over three months from April 20. Two kinds of antibody tests were conducted at hog farms every three weeks, and if a positive reaction was found, the pigs of the affected farm were destroyed. Also, farms within a radius of 500 meters from the affected farm were acknowledged as high-risk farms, and required to be retested. In this process, approximately 1.1 million pigs were destroyed around Malaysia.

The Impact of the Outbreak of the Virus on Hog Raising and the Livestock Industry

The consumption of livestock products in Malaysia continued to increase from the 1980s to the early 1990s. However, the trend has stagnated and has almost leveled off in the late 1990s. On the other hand, the export of pigs continued to increase. Pigs were the major livestock export from Malaysia to Singapore, where domestic pig production was banned in the 1990s. After the outbreak of the Nipah virus, pork consumption dropped by approximately 30%. And Singapore banned the import of live pigs from Malaysia.

Hog raising in Peninsular Malaysia was run mainly by Chinese Malaysians in the west coast states. At the end of 1998, before the Nipah virus was identified, the total number of pigs nationwide was 235 million and the average number per farm was 1,326. Looking at the changes in the hog raising industry due to the epidemic, both the number of farms and pigs decreased after 1999 in Negeri Sembilan, Perak, and Selangor, the states in which the number of Nipah virus patients and infected pigs was largest. The interview survey on ex-farmers revealed that many hog farms changed their business to poultry, dairy, beef cattle or frog farming while there are other farmers who are now employed on palm farms where working conditions are poor.

The ex-farm price was RM4.29/kg in September when the first encephalitis patient was identified, but dropped to RM3.81/kg in October when the number of infected hogs and encephalitis patients among hog farmers and workers in Perak increased. Until March 1999, when the virus was discovered, the ex-farm price stayed on RM3s/kg, but it dropped to RM2.47/kg in March 1999, and to RM1.29/kg the following April. On the other hand, as the Malaysian government had asserted that the epidemic was JE, there had been no conspicuous changes in the retail price until the virus was discovered in March 1999. However, it dropped to RM4.5/kg from RM9/kg in March 1999 and the lowest price of RM3.5/kg was recorded in June 1999. The ex-farm price recovered in November 1999. However the retail price was still RM7/kg at this point. It was not until April 2000 that it recovered to the same level that it was at before the outbreak, RM9s/kg.

Impact of Hog Raising Industry on Related Industries by the outbreak of the Nipah virus

In this section we explain the impact of the decrease in the hog raising industry due to the outbreak of the Nipah virus on related industries by using the I-O table of Malaysia. The I-O table is of the competition import type comprising 96 sectors. The hog raising industry is not an independent sector but included in the livestock

sector, which also includes dairy, beef cattle, and poultry farming. Therefore, we tried to separate hog raising from the livestock sector using the publicized data and interviews with FLFAM. The ex-farm price in late 1998 was approximately RM4/kg and the ex-farm weight per pig was 90-100kg. However, as pigs lighter than the shipment weight were also destroyed, therefore, we decided to use RM280 million reduction by 1.1 million pigs destruction.

Table1. Primary influence of decrease of hog raising sector to the other industries

	hog raising sector	
1	Animal Feeds	66.92
2	Oil & Fats	35.64
3	Agricultural Products	23.04
4	Wholesasle & Retail	22.28
5	Transport	14.63
6	Fish etc.	13.72
7	Grain mill Products	12.46
8	Business Services	7.73
9	Electricity & Gas	6.88
10	Industrial Chemical	5.82
11	Oil Palm primary Products	5.70
12	Building & Construction	5.44
13	Real Estate	5.08
14	Sawmill Products	3.70
15	Water	3.28

Unit: million RM.

Table 1 shows the primary influence to other industries. The analysis of the influence of hog raising when separated from the livestock sector showed little difference from that of the livestock sector in total to the related industries. The sector that suffered the greatest was the feed industry, which provides the hog raising industry with feeds. There was approximately RM67 million reduction in its production. Next, the oils and fats sector, which uses the fat of pigs, suffered an approximately RM35 million reduction. Economic influence was seen not only in the industries directly related to hog raising industry but also in a wide range of business activities such as utility and real estate. It was confirmed that the RM280 million reduction in the production of the hog raising industry resulted in RM541 million of economic damage nation-wide (considering only the primary influences), 1.93 times more than the original damage.

Table2. Influence that the decrease of each sector would have on related sectors.

	Total	Ripple Effect
Hog rising	541,673	1.93
Perm oil	344,699	1.23
Gum	309,049	1.10
Coconut	305,434	1.09
Tea	374,047	1.34
Fish	327,209	1.17
Forestry	333,162	1.19
Other	340,899	1.22

Unit: 1,000RM

"Ripple Effect" shows how much greater the total damage would be over the original RM280 million damage.

Table 2 shows the possible primary economic influence if the same RM280 million reduction in production happened in other major agricultural industries in Malaysia such as palm oil, gum, coconuts, and tea. It indicates that the influence of the decrease in the livestock sector to related industries is greater than the influence of a decrease in another agricultural sector.

Discussion

After the Nipah outbreak, Malaysian pig relating industry experienced the enormous damage. Even now, exports have not recovered, which means that the country has lost one of the major sources of foreign currency. Also, it was confirmed that the reduction in hog raising has a greater impact on related industries than a reduction in other agricultural sectors; perm oil, coconuts, and tea which also are major exporting commodities. This means livestock sector relates deeply and widely with other economic sectors. Because negative effects proliferate widely, the preventive and control measures is worth more than the direct cost.

If, at the beginning of outbreak, the Malaysian government had consider other possibilities than JE and conducted surveys with a wide range of experts they might have prohibited the transportation of livestock, the chance of the virus spreading over the southern states would have been lower. Also, the government disclosed a limited amount of information about dangers in order to avoid confusion, but this had the opposite effect, and the residents in the outbreak areas voluntarily evacuated. There are indications that the pigs left unfed ate the infected dead pigs, which further spread the infection. The case of the Nipah virus clearly shows the importance of quick risk assessment by a wide range of experts and appropriate risk communication based on facts when an outbreak of a livestock diseases or zoonosis is suspected. Also, in order to realize a quick and an effective response to outbreaks of livestock diseases it is essential to implement measures to educate livestock farmers and citizens and establish systems and regulations to compensate and penalize farmers or companies.

References

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