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Fear and trust: How risk perceptions of avian influenza affect Chinese consumers' demand for chicken

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ABSTRACT

This article quantifies the impact of H7N9 bird flu on chicken demand and consumer willingness to pay (WTP) in China. We measure risk perception, fear and trust against actual reduction in consumption and stated change in WTP for safe chicken between 2012 and 2013. Through a survey conducted in each year on the same Chinese urban consumers, we found that the consumption of chicken never increased after the emergence of H7N9 in 2013, and WTP for safe chicken did not necessarily increase relative to generic risks associated with consuming chicken in 2012. Factors such as the fear of H7N9's spreading, the impact of distrust (especially the distrust in government) enhanced the deviation of consumption and WTP; and the sheer mentioning of H7N9 is more important and negative than whether it was associated with a risk-perception reducing or risk-perception elevating message given to consumers.

1. Introduction

On Feb. 19, 2013 a new type of avian influenza (AI), H7N9, was reported in Shanghai, and once again Chinese consumers were faced with a food scare. Unlike the SARS (severe acute respiratory syndrome) epidemic a decade ago, H7N9 virus showed no signs of human-to-human transmission, and the source of human infections was unclear with a lot of the patients having no obvious contact with poultry. To date no vaccine has been launched, and many Chinese consumers are fearful of this unknown risk. It is difficult to assess the potential economic impact of AI because the H7N9 virus itself is not sufficiently understood and people's response to an outbreak is uncertain.

In this paper, we have at our disposal changes in chicken consumption and changes in WTP for safe chicken, and our interest is in understanding why and when consumption of chicken decreases under a health scare (H7N9 Avian Influenza), and whether the willingness-to-pay (WTP) for safe chicken increases, decreases or remains the same. We developed questions related to the consumption of chicken before and during the H7N9 epidemic in 2013. In 2012 we surveyed 860 consumers in seven Chinese cities to gain a general understanding of safe chicken consumption by the revealed preference method, and determined their WTP for safe chicken in a generic sense. With the onset of the epidemic in 2013 we contacted the same consumers, recording again their chicken consumption, but queried their WTP with specific wording related to H7N9. Through this two-round survey

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of Chinese consumers, we are able to measure with specificity the incremental impact of H7N9 on actual quantities of chicken consumed, and changes to their WTP for safe chicken.

However, since none of our respondents actually contracted H7N9, and the risk of contraction was very small, the utility of health adjustment can only be attributed to cognitive elements and risk perception. The main objective of this article is to explore the impact of risk perceptions such as fear and trust on food consumption. This has been a topic of considerable interest to economists (e.g. Hayes, Shogren, Shin, & Kliebenstein, 1995; Brown, Longworth, & Waldron, 2002; Wang, Mao, & Gale, 2008; Turvey, Onyango, Cuite, & Hallman, 2010; Ortega, Wang, Olynk, Wu, & Bai, 2012; Lim, Hu, Maynard, & Goddard, 2014). In many cases, how consumers respond to a food risk is a matter of judgment and affect with an effective response determined by how one perceives the goodness or badness about an event or stimulus (Finucane, Alhakami, Slovic, & Johnson, 2000; Slovic, Finucane, Peters, & MacGregor, 2004), the images that they form of the disease (Jackson, 2006) or the availability of risk (Tversky & Kahneman, 1973). With a credence component, individuals need more than personal experience to judge the safety of a food item, and often rely on third-party information (e.g. the supplier or government) to regain trust and reduce uncertainty (Bocker & Hanf, 2000; Lang & Hallman, 2005). With the 2013 survey we included a number of questions to measure risk perceptions (affect) along the lines of Kraus and Slovic (1988).

The objective of this paper is to quantify the effect of consumer risk perceptions induced by H7N9 on their demand. It sheds light on these issues with several important contributions. First, we measure the actual reduction in consumption and stated change in WTP due to an observed contemporaneous AI shock. By exploiting the 2013 outbreak of H7N9 and replicating the 2012 survey with the same respondents, we provide a rare glimpse into consumer behavior that can't easily be replicated in a laboratory setting. Second, we take advantage of the change in measured WTP between 2012 and 2013 to identify relative welfare shifts amongst consumers. In our context WTP represents the amount of income that the consumer is willing to give up to consume a given quantity of safe chicken equivalent to what is normally purchased or consumed under normal conditions. Because the WTP captures the compensating variation required to return the consumer to a steady-state chicken consumption level, the WTP measure reflects the relative change in utility between the 2012 and 2013 states of nature. It therefore captures an indirect and relative measure of welfare loss. The third contribution, and perhaps most important, is the econometric investigation of the effects of risk perceptions and trust on changes in chicken consumption and changes in WTP. We find that with the introduction of H7N9, the correspondence between chicken demands (actual consumption) and safe chicken demands (WTP) is not conforming for some individuals, and that changes in consumption and changes in WTP can be linked directly to perceptions of risk. These results suggest that food safety cannot be remedied by market forces alone, and to consider problems of food safety in the absence of psychological considerations may prove fruitless. The fourth contribution is a finding that consumers' heterogeneous responses to food safety risks in different cities appear to support psychological models of risk attenuation and amplification.

2. Literature review

At the consumer level, fear, risk and vulnerability are important economic determinants of response to food safety. Feeling good or bad about a particular risk is referred to by Slovic et al. (2004) as “affect”. If fear is defined at the level of cognition, then affect represents an impact that can exacerbate or countenance the more logical reasoning of cognition. The effect is measured by its degree of amplification which may or may not be attenuated or rational (Pidgeon, Kasperson, & Slovic, 2003) and may linger far longer than the life of the stimuli. In other words, the economic implication of a food safety incident is dynamic (Liu, Huang, & Brown, 1998; Caswell & Mojduszka, 1996) and may display properties of hysteresis (Turvey et al., 2010). While not often used to investigate risk perceptions related to food quality or food scares, Hallman, Hebden, Aquino, Cuite, and Lang (2003) have used similar queries to understand consumer attitudes towards genetically modified food, Turvey, Onyango, Schilling, and Hallman (2009) to investigate consumer response to Mad Cow disease, Lim et al. (2014) to examine the interaction between consumer risk perceptions and their preference for beef from different countries, and Turvey et al. (2010) to investigate risk perceptions on hypothetical incidents of agro-terrorism and bird flu.

Animal disease epidemics and consumer food safety concerns can negatively influence meat markets. Much research has been conducted on this topic, including, for example, Burton and Young (1997) on bovine spongiform encephalopathy (BSE) in the beef market in Great Britain, Lim, Hu, Maynard, and Goddard (2013) on a similar issue in Canada, and the AI in the U.S. by Turvey et al. (2009). Some studies showed that the marginal impact of risk on meat demand was small, with short-lived lagged effects on demand (Smith, van Ravenswaay, & Thompson, 1988; Dahlgran & Fairchild, 1987; Robenstein & Thurman, 1996; Lusk & Schroeder, 2004; Piggott & Marsh, 2004). Dahlgran and Fairchild (1987) tested the marginal effect of negative information about salmonella contamination on chicken demand, and found the effects were $<1\%$, with rapid recovery of consumer's demands. In the United States, the recent cases of mad cow revealed lower fear or higher trust amongst consumers and very little affect as markets rapidly returned to the initial equilibrium states (Turvey et al., 2010). However, the limited effect may have been due to the low risk level. For example, Setbon, Raude, Fischler, and Flahault (2005) found a strong correlation between the perceived risk associated with consuming beef during the BSE crisis in France and the perceived risk reduced beef consumption.

Recent studies have integrated risk perceptions such as trust and fear into economic models (e.g. Meijboom, Visak, & Brom, 2006; Hassouneh, Radwan, Serra, & Gil, 2012). Heterogeneous consumer risk perceptions have been suggested and tested in the existing literature. One study carried by Yang and Goddard (2011) found that consumer groups in Canada responded differently to a perceived BSE food safety issue. The aggregate beef consumption of BSE impacts in Canada was different than those in