

**The 84th Annual Conference of the Agricultural Economics Society at  
Edinburgh**

Mon 29th March to Wed. 31st March 2010

**The Impact of Avian Influenza on Vertical Price Transmission in  
the Egyptian Poultry Sector**

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CREDA-UPC-IRTA

Edifici ESAB. Parc Mediterrani de la Tecnologia.

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In recent years, health risks have received increasing attention among consumers and created an interest in analysing the relationship between food scares and food consumption and prices. One of the most relevant food scares occurred recently has been the avian influenza crisis. Apart from the obvious impact on human health, there have been also worries about its effects on price transmission along the food marketing chain. Egypt is considered one of the most affected countries by this crisis, with the total recorded number of infections in humans being 87, out of which 27 died. In spite of the strong impact of this food crisis on the Egyptian poultry sector, no studies have tried to quantify this effect. In this study, we focus on this issue. A vector error correction model that includes a food safety information index as an exogenous variable is applied to monthly poultry price data to assess the effects of avian influenza on price transmission along the food marketing chain within the Egyptian poultry sector. Our results suggest that while consumer prices are weakly exogenous and do not react to deviations from the long-run parity between consumer and producer prices, producer prices respond to these deviations and adjust accordingly.

*Key words:* Food scare, avian influenza, price transmission, Egypt.

JEL classification: C22, Q13

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## **The Impact of Avian Influenza on Vertical Price Transmission in the Egyptian Poultry Sector**

Food safety has become a key issue in consumers' demand and, consequently, a basic objective of food policy in many countries. The increasing food scares that have appeared in the last years (dioxins, Bovine Spongiform Encephalopathy (BSE), food and mouth disease, avian influenza...) have contributed to increase public awareness on this problem. Also, the increasing globalisation and international opening of the economies, as well as the increasing speed of information dissemination, have amplified these concerns to a worldwide dimension. As a result, consumers have become more critical and have changed their consumption habits as a consequence of an increasing loss of confidence. While this once was a phenomenon specific to developed countries, nowadays it has generalised to developing countries which, moreover, are facing food security problems.

Although Egypt was not affected by the food scares that shook Europe in the 90's and at the beginning of the present decade, the problem of the avian influenza has involved a hard reverse for the animal production sector of this country. The avian influenza, originated in Southeast Asia, has quickly extended world-wide. In most developed countries, there already existed mechanisms of defence set forth mainly as a result of the mad cow and the foot and mouth disease scares, which have helped to mitigate the impact of avian influenza. Nevertheless, this has not been the case in countries like Egypt which, with the advent of the avian influenza, faced a food scare for the first time. The crisis dramatically affected the animal production sector and, more specifically, the Egyptian poultry sector which in 2003 generated around 8.5 billion of Egyptian pounds (LE) (24.5% of the Final Animal Production and 8.8% of the Final Agricultural Production). The first case of avian influenza in Egypt took place in February 2006. From this date, 87 cases of infection in humans have been reported, out of which 27 were fatal. Following WHO, Egypt is the third most affected country by this crisis all over the world, following Indonesia and Vietnam, and the most affected country during 2009. The consequences on the poultry sector have been evident. Approximate estimates of the economic damages owing to the avian influenza in Egypt are above 2 billion LE. Apart from the obvious impact that Avian Influenza (AI) has had on human health, there were also worries about the effects that the crisis may have on price transmission along the food marketing chain.

The purpose of this paper is to assess the effects of avian influenza on price transmission along the food marketing chain within the Egyptian poultry sector. Until now and to our knowledge, no previous study has tried to quantify the effect of the AI crisis on the Egyptian poultry market. Over the world, a few recent studies have investigated this issue. Saghaian *et al.* (2008) were the first to investigate the impact of AI on price transmission within the Turkish food marketing chain. These authors

provide evidence that the AI crisis has had an impact on vertical price transmission processes along the supply chain. Despite their attempt to characterize price transmission responses to the AI food scare, they did not develop a food scare information index that reflected the consumer awareness of the avian influenza crisis, which represents a contribution of our work to the literature. Our analysis also contributes to previous literature in that we focus on studying the effects of avian influenza on price transmission along the food marketing chain within the Egyptian poultry market, a market that has not been investigated yet, although, as we have mentioned, it is one of the most affected markets by the AI crisis.

To achieve the aforementioned objective, we estimate a Vector Error Correction Model (VECM) that studies the dynamics of price transmission along the food chain. An avian influenza food scare index is developed and used as an exogenous variable in order to reflect to what extent the varying magnitude of the crisis over time can affect price transmission along the Egyptian food marketing chain. In order to take into account the consumer awareness of the avian influenza crisis, we use a monthly count of newspaper articles published in the most read Egyptian newspaper, Alahram, from January 2003 to December 2006. We then build the avian influenza scare index following Chern and Zuo (1997) who assume that published articles should have a finite duration and decaying effects as a source of consumer information. Our empirical model also utilizes two series of monthly wholesale and retail poultry prices obtained from the Central Agency for Public Mobilization and Statistics (CAPMAS).

Our specific estimation strategy can be summarized as follows. First, standard unit root and cointegration tests are conducted in order to determine whether price series are stationary and whether they are cointegrated, respectively. We next estimate a VECM where, as noted, a food scare information index is included as an exogenous explanatory variable. Ng and Perron (2001) and KPSS (Kwiatkowski *et al.*, 1992) tests confirm the presence of a unit root in each price series. Johansen (1988) tests provide evidence of a long-run equilibrium relationship between poultry prices at different levels of food marketing chain. The estimated vector error correction model suggests that only producer prices adjust to deviations from the long-run equilibrium relationship, while consumer prices are exogenous and do not adjust to correct departures from the long-run parity at the 5% significance level. These results are expected and are compatible with previous research that has suggested upstream prices in the marketing chain do the majority of the adjustment, while downstream prices are sticky and slowly responsive to shocks occurring at other levels (see, for example, Heien 1980, Ward 1982, Serra and Goodwin, 2003, Lloyd *et al.* 2001 and Hassouneh *et al.* 2009). Moreover, this result is consistent with the Egyptian context. After the advent of the AI crisis, the government established some rules to control the crisis such as forbidding the selling of live birds and obligating all producers to sell their production through slaughtering houses, which have reduced capacity to absorb all production, resulting in excess supply at the producer level and pushing prices down. Conversely, the effect on retail prices was quite small because consumers were very well informed that eating chicken was safe. Moreover, taking into account the low income and that chicken is the cheapest meat in Egypt, consumers do not have much alternatives to substitute for poultry consumption. Another interesting result is that none of the price series adjust to the changing magnitude of the food scare information index. This result is quite consistent with the Egyptian context and may also be consistent for similar developing countries. This is the first attempt to apply a food scare information index to

assess food scares' impacts on developing countries. While information indices have been shown to have a significant effect, not only on price transmission but also in demand studies in developed countries such as United States and Spain (see Hassouneh *et al.* 2009 and Radwan *et al.* 2009 among others), the information indices do not have a significant effect in developing countries, such as Egypt, because of the characteristics of these countries that include a high level of illiteracy (27% in Egypt in 2009), a low income that does not allow most people to buy newspapers (there are only about 250,000 newspaper readers in Egypt), and a lack of trust in public authorities and media due to corruption.