

Animal Disease and Financial Markets : A Stock Price Analysis in an Emerging Economy

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Abstract

Purpose : Abnormal events affected the whole of the economy or specific sectors. The research dwelled into one of such unexpected events, viz. animal disease outbreak. The basic purpose was to analyze its effect on the stock prices of the allied businesses.

Methodology : We compared the stock prices of these companies during the two months of January 2021 and February 2021 to analyze the changes in returns and identify any potential abnormal (negative) returns during the bird flu outbreak. We collected stock price data for listed poultry companies on the National Stock Exchange (NSE) and Bombay Stock Exchange (BSE).

Findings : The results revealed negative abnormal returns associated with the event for around one month. In fact, the next month even saw a bounce back in stock prices of larger companies.

Practical Implications : The implications were useful for investors looking to make investment decisions concerning these stocks in the wake of such events. At the same time, the results provided insights for the promoters and managers of related businesses regarding shareholder wealth erosion during such events, reinforcing upon them the need for food safety measures and risk management strategies in this context.

Originality : This study is the first of its kind in the Indian context to examine stock price reactions in the event of an animal disease outbreak, viz., bird flu.

Keywords : bird flu, animal disease, stock market, unexpected events, abnormal returns

JEL Classification Codes : G0, G1

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The stock market is a place where companies get listed in order to garner capital from the public through the issue of equity shares (Menkhoff & Westermann, 2024; Sharma & Chander, 2010). The trading of these shares and the accompanying price discovery are facilitated by the stock markets (Patil et al., 2024). Stock market prices change continuously during trading hours depending upon a variety of factors, such as policy changes, demand conditions, and market sentiment (Jabeen et al., 2022; Madani, 2024; Ranjan et al., 2018). Research studies have revealed unexpected and abnormal events to have abnormal returns associated with stock prices of related businesses or the economy as a whole (Brounen & Derwall, 2010; Frey & Kucher, 2000; Saad, 2024; Yousaf et al., 2022). Poultry and related firms grapple with a unique set of challenges stemming from factors beyond their control, notably animal disease outbreaks (Asfaw et al., 2021). These inherent risks, although managed through best practices, can severely impact the agribusiness supply chain, ultimately

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influencing the overall firm value (Jin et al., 2009). The duration of these effects on market value varies; in some instances, they might be transient, while in more severe cases, they can precipitate business closures.

At the beginning of 2021, the bird flu pandemic started surfacing in India. Bird flu, also referred to as avian influenza, is a condition brought on by infection with Type A viruses (Sharma, 2021). Around the world, these viruses naturally spread among aquatic wild birds. They frequently infect other birds, animals, and chickens. In January 2021, the state government in Kerala was the first in India to declare bird flu as a state disaster. The disease slowly entered a few more states, thereby emerging as a national concern. Thus, avian flu occurred in India in January 2021 (Sharma, 2021). In January 2021, we looked at the shares of poultry companies listed on Indian stock exchanges to see how this occurrence affected them.

There is a scarcity of research examining the financial impact of contagious animal disease outbreaks on the stock prices of allied agribusinesses. While previous studies have explored stock market reactions to animal diseases, the impact on agribusinesses specifically remains under investigation. This research gap is further highlighted by the absence of studies in the Indian context, particularly regarding bird flu's effects. This article aims to address this gap by investigating how unexpected events like animal disease outbreaks influence the stock prices of firms within the related agribusiness sector. The stock market's response to animal diseases can change depending on a number of variables, including the disease's severity, possible economic impact, and the particular businesses or industries affected. In this context, we address the following key questions:

🔗 **RQ1 :** How do the stock process of poultry firms react in response to events related to animal diseases such as bird flu?

🔗 **RQ2 :** Does the stock prices in such events immediately reflect associated information, as implied by market efficiency theory?

Literature Review

Market efficiency theory is based on the premise that stock prices promptly incorporate anticipated changes in the cash flows of individual businesses or sectors due to newly available information, often in the form of significant events. This fundamental theory informs the concept of an informationally efficient market, in which prices properly and quickly reflect all available information (Ashraf & Baig, 2019; Malkiel & Fama, 1970). This rapid assimilation of data leads to price adjustments, resulting in abnormal stock returns that mirror underlying shifts in the revenues and costs of related firms (Pozo & Schroeder, 2016). The key factor is the element of surprise. According to the seminal research of Brown and Warner (1980), these price shifts take place to the extent that the event is unexpected by investors.

Economists typically seek to determine how economic events affect firm values, a difficult endeavor that appears to involve detailed assessments of characteristics such as individual firm productivity. Sudden unexpected events can lead to a drastic change in stock prices (Sharma et al., 2023). These unexpected events could be economy-wide, sector-specific, or concerning a particular firm. Some of these events have been the global financial crisis of 2008 (Singh & Shrivastav, 2018), the Asian financial crisis of 1997, the COVID-19 pandemic (Safeeda & Ganesh, 2024), the Y2K event in the information technology sector, technological or environmental changes in a particular sector (Kowsalya et al., 2024), corporate frauds, terrorism, and others. Event studies offer a more transparent method by using data from financial markets. The fundamental idea is predicated on the effectiveness of financial markets, which swiftly adjust securities prices to reflect the impact of economic events. This method is based on the idea that in well-functioning financial markets, any economic event, favorable or otherwise, is quickly reflected in financial instrument price. The instantaneous changes in security prices, whether upward or downward, effectively capture the collective market reaction to these events. Consequently, event studies are a useful resource for researchers and economists. Further, they allow them to

gauge the direct and rapid reactions of financial markets to economic events, shedding light on their impact on firm values without delving into the complexities of individual firm productivity or performance.

Globally, concerns about food safety in the meat industry are widespread. Scares are more harmful because there may be little time for enterprises to respond. To add to this, the resulting economic losses are typically substantial. Any associated events, such as animal disease outbreaks and recalls in this industry, could indicate inferior quality goods, which could have an immediate effect on customer demand for meat (McCluskey et al., 2005; Shang & Tonsor, 2017). This effect is statistically significant but economically minor and transient as regards consumer meat purchases (Yim & Katare, 2023). A hypothetical disease outbreak regarding the pork industry in Canada can lead to economic costs of around 3.6 billion USD (Biden et al., 2024). Research has pointed to the decrease in meat prices during animal disease outbreaks (Lloyd et al., 2001; Pritchett et al., 2005), as well as estimated the duration of this impact (Park et al., 2008).

In terms of the financial impact, a number of studies have linked these occurrences to cumulative anomalous returns in the stock prices of companies (Thompson et al., 2019; Xiong et al., 2021). Abnormal returns are estimated for individual businesses and subsectors over an eight-day event window (Henson & Mazzocchi, 2002). Significant cumulative abnormal returns were found for around two months since the outbreak of food safety events (Seo et al., 2013).

With respect to the reaction of stock prices to animal disease outbreaks, some studies on the Korean market related to Foot-and-mouth disease (FMD) have been conducted. FMD is an extremely contagious viral illness that affects cloven-hoofed mammals such as cattle, pigs, and sheep. In general, these events are associated with increased riskiness in related sectors stock prices owing to higher induced volatility (Cho, 2012). The Korean Government announced five FMD outbreaks between 2000 and 2010. Pendell and Cho (2013) examined the stock market reactions to this event on Korean allied agribusiness companies after the announcement. The actual daily stock returns were compared with the estimated returns. We found market reactions to be gradual in 2002 rather than instantaneous. These results contrast with the efficient market theory, which calls for the rapid reaction of stock markets to such changes. FMD outbreaks appeared to increase the volatility of daily returns, with smaller companies seeing the most noticeable effects, according to another important study conclusion.

Bovine Spongiform Encephalopathy (BSE), also called mad cow disease, is a cattle endemic. Henson and Mazzocchi (2002) conducted an event study to examine the effects of the Government's BSE announcements on UK agricultural economies. The key findings of the study revealed that these government pronouncements had a significant and adverse impact on several industries, including beef processors, as well as those involved in dairy products, animal feed, and pet food production. The anomalous stock returns that were displayed during this time frame demonstrated how the market immediately assessed the future worth of these companies. To put it simply, the negative abnormal returns functioned as a warning indicator to the market about the negative impact that food safety incidents had on the assessed companies. This study's key recommendation was to consider a longer evaluation time rather than confining the analysis to a single day. This was because food safety-related information had a delayed influence on customer demand. Because of the ongoing process of information gathering and absorption, as well as the element of uncertainty, a longer-term perspective was required for a comprehensive understanding of market judgments in response to such events. Jin and Kim (2008) investigated the impact of the 2003 BSE outbreak on US agribusiness and related business enterprises. The security prices of the businesses in the meat and poultry sector experienced negative effects from the event. Even, some firms in the farm machinery and equipment sector were significantly and negatively affected. Such negative effect in related firms specialized in red meat was pronounced amid a significant change in consumer demand.

However, the results of the research by Xiong et al. (2021) regarding an outbreak of African Swine Fever (ASF), an extremely contagious and lethal disease that affects pigs, differed significantly from other studies. In this study, they reveal positive cumulative abnormal returns for hog firms listed on China's stock exchanges as a result of this event. Within 15 days of the announcement of an ASF event, these companies witnessed a 10–40%

increase in cumulative abnormal returns. The COVID-19 pandemic outbreak had a markedly negative impact on stock markets worldwide, particularly during its initial months (Pandey & Kumari, 2021).

In general, there is abundant literature examining the influences of food safety events (de Menezes et al., 2022; Maynard et al., 2008; Piggott & Marsh, 2004). Further, in an international context, many of the studies talk about the diseases of cows, swine, and other animals (Pritchett et al., 2005) but do not consider the bird flu specifically. At the same time, no research has been done in India, specifically looking at how animal diseases affect financial markets. The studies dedicated to evaluating the impact of such events on the stock market performance of connected firms are few. To fill the research gap, this study examines whether events concerning the outbreak of animal disease, viz., bird flu, have a significant impact on the stock returns of poultry firms in India.

Research Methodology

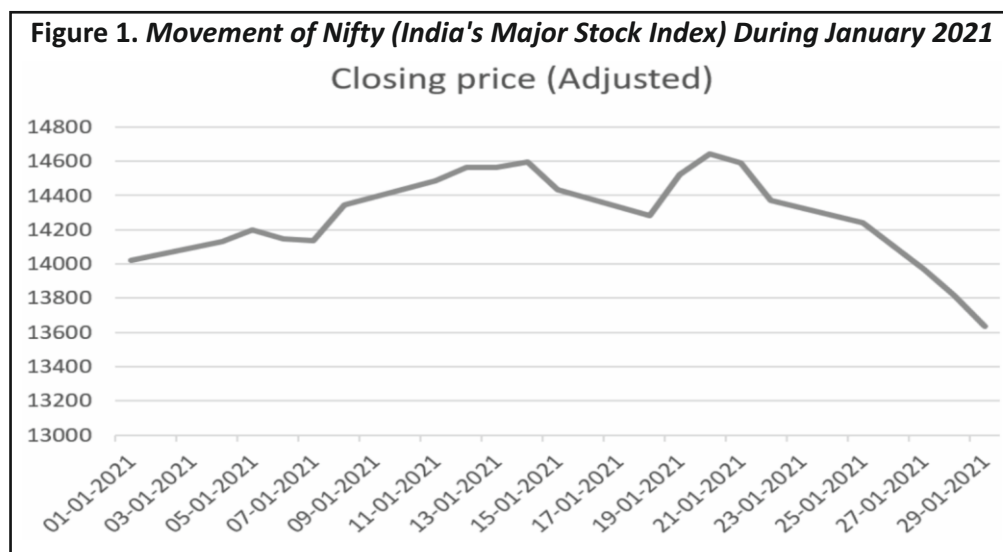
To investigate the impact of bird flu on the Indian poultry sector, we collected stock price data for listed poultry companies on the National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) for the periods January 2021 and February 2021. The stock prices of these companies during these two months are compared to analyze the changes in returns and identify any potential abnormal (negative) returns during the bird flu outbreak in January 2021. The data used in this study is secondary, obtained from the websites of NSE and BSE.

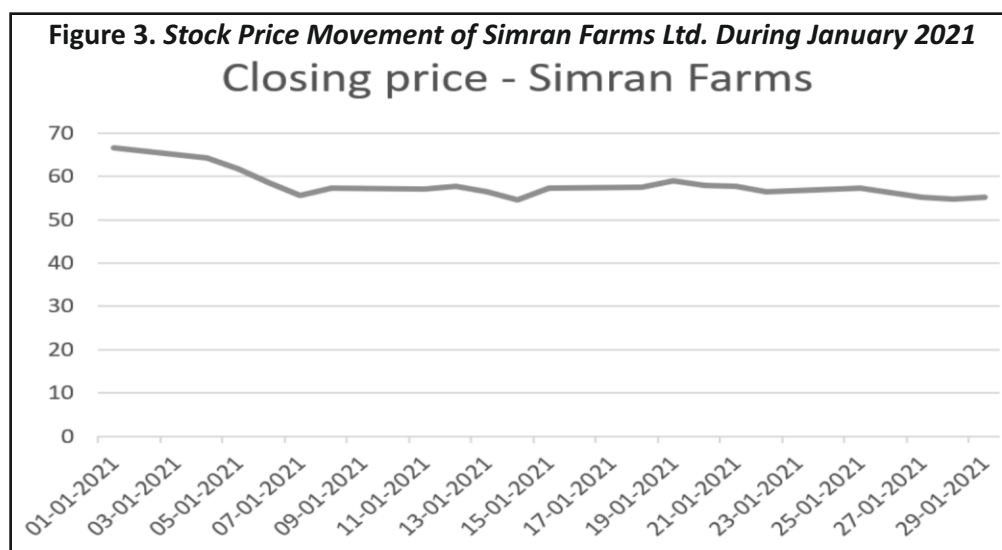
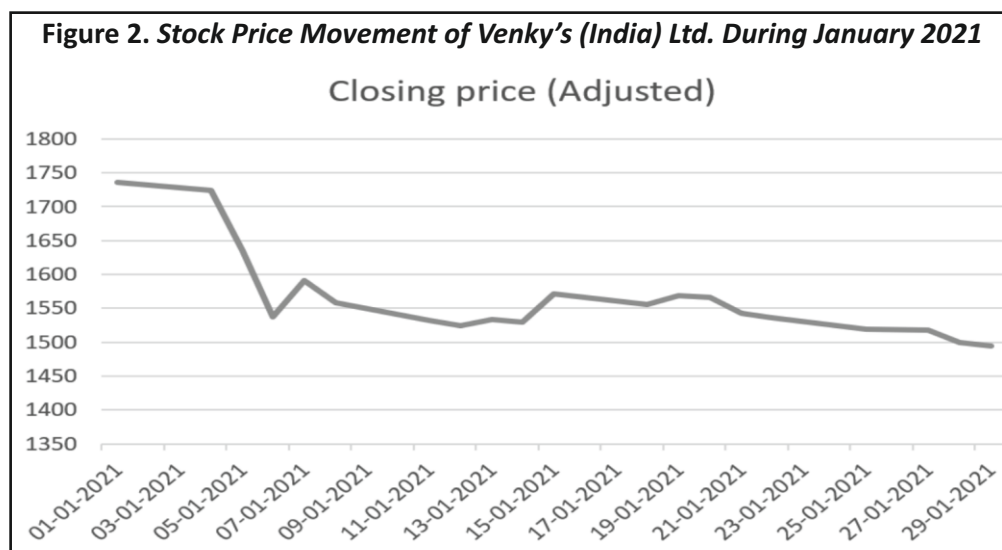
Due to the predominantly unorganized nature of the Indian poultry sector, only a limited number of companies in this sector are listed on the stock exchanges. Therefore, our analysis focused on the four publicly traded poultry companies: Venky's (India) Ltd., Simran Farms Ltd., SKM Egg Products Export (India) Ltd., and Ovobel Foods Ltd. We analyzed the stock prices in these months to observe possible cumulative abnormal returns as a result of bird flu event.

Analysis and Results

We first see any possible movement of the broader stock exchange, Nifty 50 of the NSE, to see for possible cumulative abnormal returns. Considering the stock exchange as a barometer of the economy, we expect the Nifty index to fall in case of any economy-wide negative event during January 2021.

When it comes to the broader stock market index Nifty, no such fall is witnessed during the event (Figure 1), implying hardly any occurrence of an economy-wide negative event during this period. Next, we analyze the



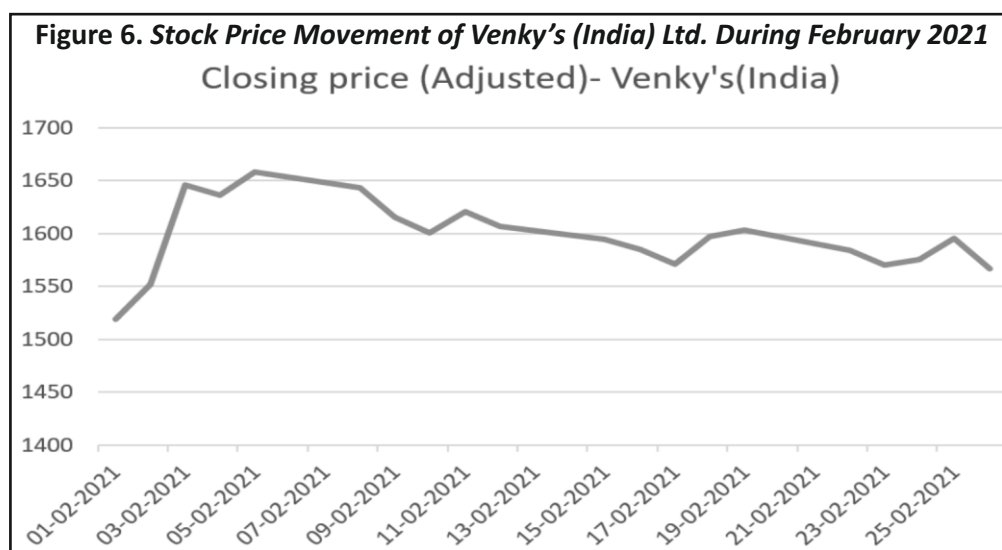
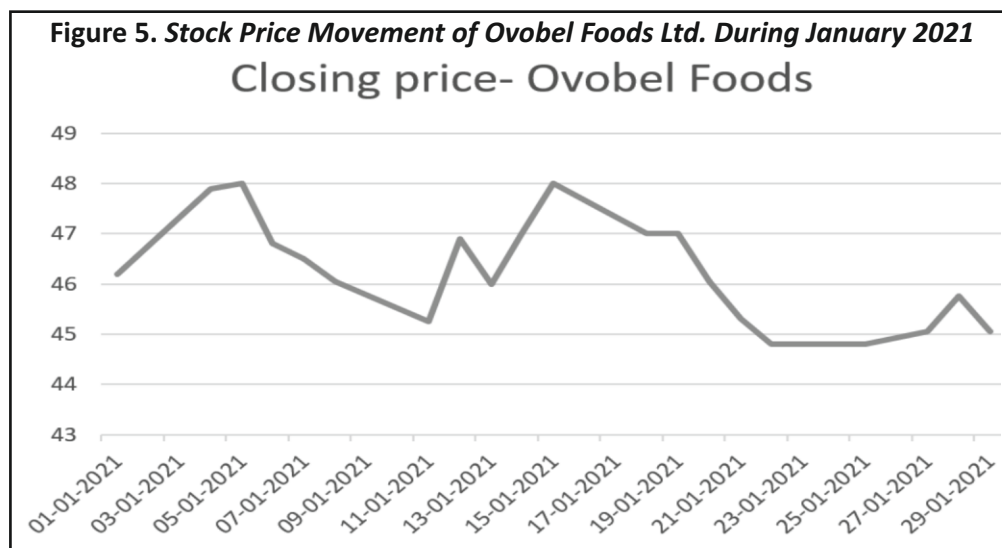
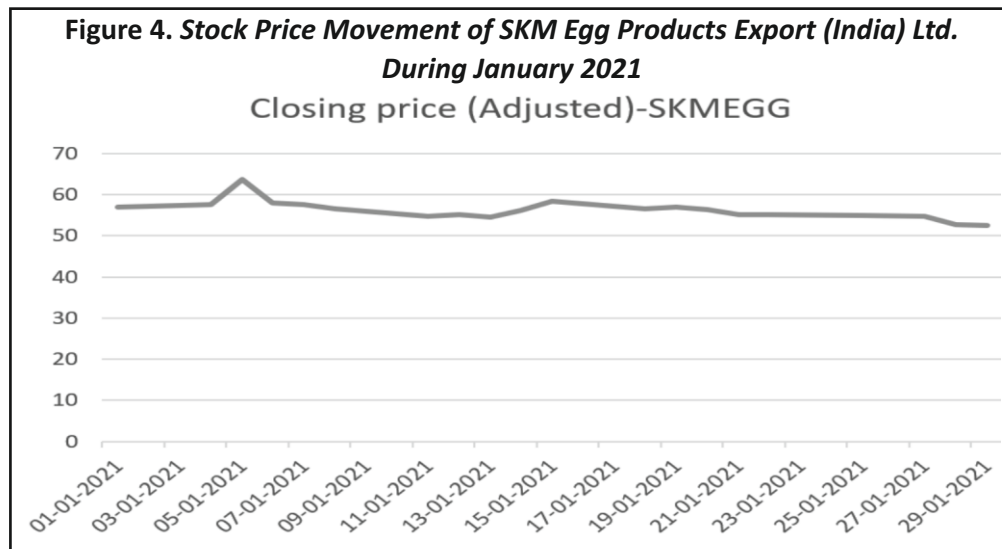


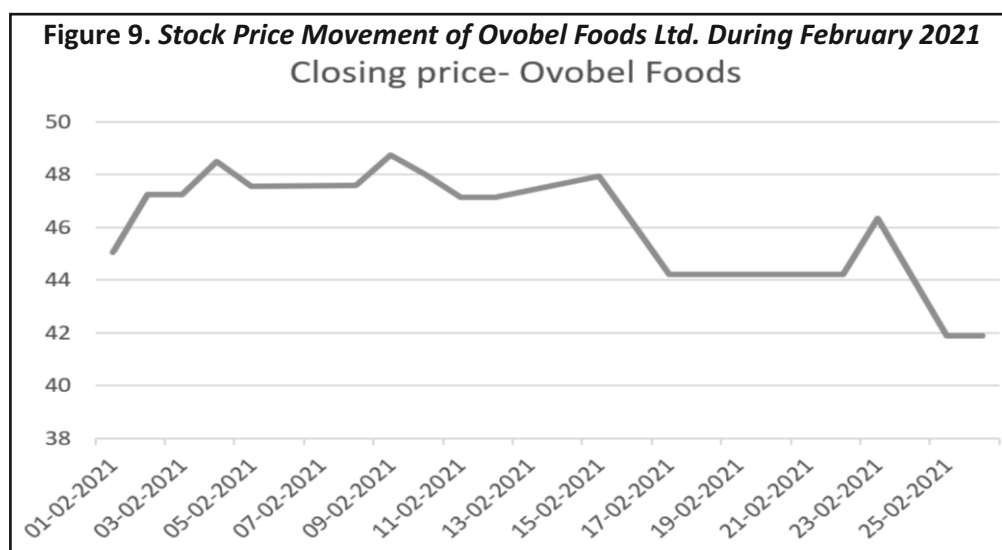
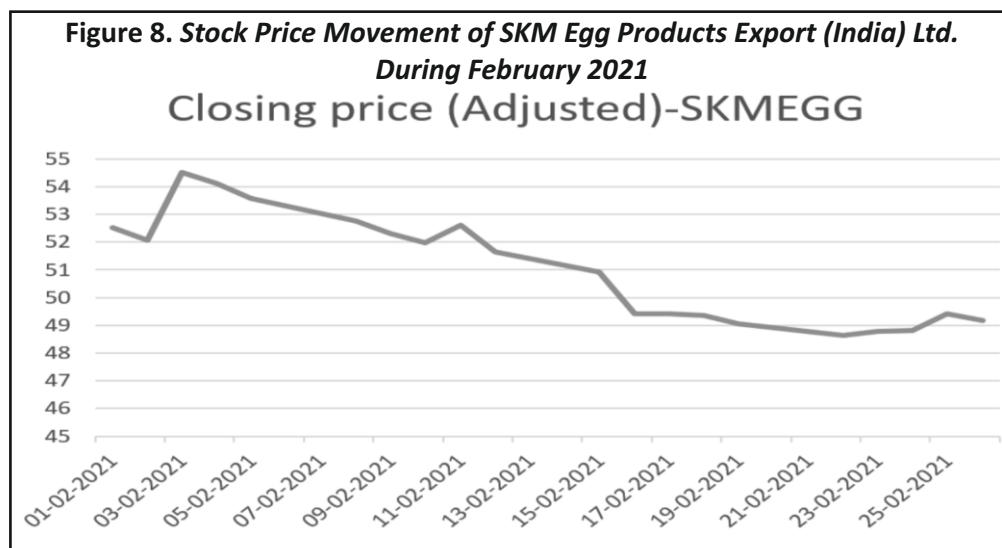
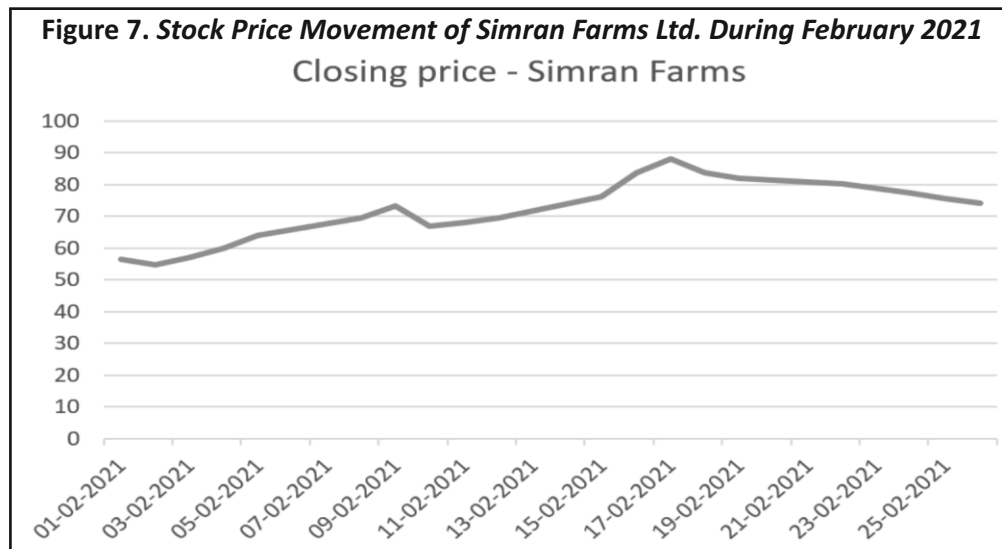
stock price movement of the four poultry firms listed on Indian stock exchanges to look for possible stock market reactions to these stocks induced due to the bird flu outbreak.

The stock market reaction was negative for all listed firms in the poultry sector on Indian stock exchanges in January 2021. As seen in Figure 2, for Venky's (India) Ltd., the closing stock price (adjusted) declined from ₹ 1,735 on the first trading day of January 2021 to ₹ 1,494 on the last day of January 2021, thus deteriorating by nearly 14%. For Simran Farms Ltd., the price declined (closing price) from ₹ 66.6 on the first trading day of January 2021 to ₹ 55.25 on the last day of January 2021 (Figure 3), thus falling by nearly 17%. In the case of SKM Egg Products Export (India) Ltd., the closing stock price (adjusted) declined from ₹ 56.9 on the first trading day of January 2021 to ₹ 52.5 on the last day of January 2021 (Figure 4), deteriorating by nearly 8 %. For Ovobel Foods Ltd., the price declined (closing price) from ₹ 46.2 on the first trading day of January 2021 to ₹ 45 on the last day of January 2021 (Figure 5), deteriorating by a marginal 2.6 %. However, a pronounced effect can be seen from January 6, 2021, to January 11, 2021.

The next question arises whether the impact continues to persist thereafter. Hence, we take similar data (stock returns) for February 2021 for these four listed poultry companies.

The data for February 2021 indicates a sharp bounce back in the stocks of Venky's India and Simran farms





(Figures 6 and 7). Though the other two stocks, viz., SKM Eggs and Ovobel Foods, delivered negative returns in February, they did witness a surge in price in the first week of February (Figures 8 and 9). These results thus indicate that the period of negative abnormal returns for poultry stocks ended within a month of the bird flu outbreak.

Conclusion

Unexpected events, such as animal disease outbreaks, tend to produce abnormal stock returns for a considerable period. The results indicate Indian stock market's reaction to the related firms in the poultry sector has been negative for around one month since the outbreak of bird flu at the beginning of year 2021. Likewise, the stock market reactions appeared to be more gradual than instantaneous, as implied by other studies in this arena (Pendell & Cho, 2013) and hence, do not confirm the efficient market hypothesis. After a month, the stocks of larger corporations even seemed to rebound with a vengeance. This duration is likewise lower as compared to that of similar animal disease events in other countries, for instance, two months in the case of the USA (Seo et al., 2013) and over four months in the case of an FMD outbreak in Korea in 2010 (Pendell & Cho, 2013).

Investors and analysts should approach events such as animal disease outbreaks with vigilance and circumspection. Even though these are disruptive, these kinds of occurrences present investing possibilities because of the abnormal returns that come from unanticipated market shocks. That being said, it is crucial to understand that abnormal returns are a sign of increased market risk. Outbreaks of animal disease add a degree of uncertainty that can dramatically raise volatility and unpredictability of returns for the related companies. Hence, investors and market players must exercise prudence and meticulous deliberation when developing or revising their investment portfolios and outlooks in light of these events. Poultry firms can take lessons from stock price reactions, as it does affect shareholders' wealth. This calls for these firms to take precautions and safety measures to prevent infection and diseases in their stock. Understanding the monetary consequences of such events is critical for both policymakers and businesses attempting to manage the complexities of the poultry and food safety sector.

Managerial and Theoretical Implications

Event studies are important from the perspective of understanding the impact of several events on the returns and volatility of stock prices so that investors are better prepared to deal with related situations. This study is useful for the agribusiness sector in understanding the impacts on a company's stock price in case of an animal disease outbreak such as bird flu. The concerned parties might use this information to create plans to safeguard their assets in the case of contagious animal disease outbreaks. Additionally, this research offers helpful insights to market professionals as to how the market responds to these events. The possibility for both opportunity and risk emphasizes the significance of rigorous research, risk management strategies, and staying attuned to market dynamics, particularly during moments of heightened volatility and uncertainty induced by events such as animal disease outbreaks.

Limitations of the Study and Scope for Further Research

The limitation of this study is mainly associated with the limited number of related companies in the sample as there are only four companies in the poultry sector listed on Indian stock exchanges. Further studies can try to gauge the impact of this event in terms of stock reactions of related businesses, using event study as well as advanced statistical models, during several other occurrences of bird flu across India and the world. The abnormal returns during the occurrence of bird flu in India during different times can be compared to gain an exhaustive

understanding of factors such as policy responses, duration of the event, and general market perceptions. Studies can be included to assess the direct and indirect economic costs associated with such events. Moreover, studies can be conducted across the supply chain regarding the impact of such events, which would involve suppliers, processors of by-products, and substitutes.

Authors' Contribution

Dr. Ameya Anil Patil conceived the idea and formulated a problem statement. Dr. Shantanu Saha extracted quality papers in the area. The literature review was done by Dr. Ameya Anil Patil and further refined by Dr. Shantanu Saha. The relevant data was extracted by Dr. Shantanu Saha and numerical computations were done by Dr. Ameya Anil Patil. Dr. Ameya Anil Patil mainly wrote the manuscript in consultation with Dr. Shantanu Saha.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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