

## **Assessing Supermarket Food Shopper Reaction to Horsemeat Scandal in the UK**

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**ABSTRACT:** Consumer reaction to food scares has been given considerable research attention but insights into specific shopper segments' reactions to food scares, especially those that do not pose direct health risk to the public is limited. This paper examines how different life-stage shopper segments reacted to the horsemeat scandal in the UK. This paper draws on the analysis of supermarket loyalty card dataset of 1.7 million beef burger shoppers to establish the effect of the horsemeat scandal on retail sales value and volume as well as the rate of withdrawal of life-stage shopper segments from the affected products. The results show consistent weekly decline in retail sales value and volume across all life-stage segments over six consecutive weeks after the first horsemeat scandal announcement. Young families, pensioners and young adults segments withdrew from affected products in accordance with their typical perception and attitudes to risk. Contrary to expectation older adults withdrew faster than young families from the affected products. The findings of the study offer useful insights and strategic direction for managers working to ensure that food scares are managed to the benefit of the public and the food industry.

**Keywords:** Horsemeat food scare; perception and attitude to risk; life-stage shopper segments; shopper behaviour; food safety management.

**JEL Classification:** M31

### **1. Introduction**

Food scare exposes consumers to potential harm from the offending product and it creates public apprehension when widely publicised. Reported food scare of any kind, being it an isolated case or widespread incident, affects shopper confidence to buy and/or consume the affected product (Yeung and Yee, 2012, Knowles et al. 2007, Tiltman, 2007 and MAFF, 2000). Food scares are often characterized by sudden escalation of consumer anxiety as the public tries to assess the magnitude of risk they face from a food scare incident. Increased level of anxiety often results in a shift in purchasing behaviour from the affected product towards perceived safer alternatives on the market (Knowles et al. 2007, Rigby and Wiggins, 2007).

Consumer food safety perception and action during periods of food scares may differ among shopper segments; especially in a case where the source of the scare does not pose a direct risk to health. Whilst, there is much extant academic research covering various food scares and consumer reactions to them (Knowles et al. 2007), few, if any, research has been undertaken to show how different consumer segments respond to food scare, particularly the different rate at which shopper segments withdraw from the affected products due to loss of trust from deceptive product content as in the case of the horsemeat scandal in the UK.

Studies exploring the influence of food scares on the food industry generally recommend the need for stakeholders to take into account consumers' food safety perceptions (Yeung et al. 2010) to enable them segregate the market according to risk perceptions or behaviour. It is therefore critical to

the success of any intervention aimed at managing such food scare crisis to be based on distinct consumer segment reaction. The aim of this paper is to find out how different consumer segments react to food scares that bother on mistrust, such as horsemeat scandal, rather than risk to health.

Insight into the rate of withdrawal from the offending product category will help find the best way to address consumer concerns with a more targeted risk management responses rather than relying on a general food safety management strategy. Understanding consumer segments' withdrawal rates offer important understanding for post food scare marketing strategy. Firstly, it will provide fundamental information to guide the management of withdrawing affected products from supermarket shelves, communication across the supply chain and inform appropriate re-introduction plan. Secondly, such information will help develop appropriate communication strategies to rebuild and maintain public confidence and restore the image of affected brands and retailers and the whole food sector.

## **2. Food Safety and Shopper Behaviour**

Interest in food safety has grown as food supply chains around the world have suffered one form of food scare or the other (Kaferstein et al., 1997, Mørkbak et al. 2010). Although, the Food Standard Agency (FSA) UK, reported a 19.2% reduction in food borne illnesses between 2000 and 2006, there were still more than 53,000 laboratory-reported cases of food borne pathogens in the UK in 2005 (FSA, 2007). In 2006, the Agency conducted 1,342 investigations of food-related incidents including high profile cases like the salmonella outbreak associated with chocolate, benzene in soft drinks and the unauthorized genetically modified organism (GMO) contamination of U.S. rice (FSA, 2007).

Beyond these reports the European Commission's confirmation of the outbreak of avian influenza due to infection of poultry birds with the lethal H5N1 strain (BBC News, 2007) was the first time the avian flu was linked to a prominent consumer brand name - Bernard Matthews. Despite assurances from the UK government and Bernard Matthews that poultry products were safe when cooked properly, a sharp drop in sales was reported as consumers reacted to the news. Tesco, the largest supermarket chain in the UK reported an immediate shift by shoppers from poultry to beef in the weekend following the announcement (Rigby and Wiggins, 2007). The sudden drift of shopper does not presuppose that all shopper segments withdrew as the same rate to the reported avian influenza crisis. This is an important subject for future research which this paper explores in the case of horsemeat scandal which broke out early 2013.

Food is an essential need that people make careful decisions about the risk associated with the options of food available on the market. Food scare outbreaks compound the food risk and the complexity of food selection decision. A significant amount of research has looked at how the public assesses the information they receive about food safety (De Jonge et al. 2012). Studies have shown that food purchasing behaviour is affected as when shoppers react to food scares and seek to reduce the perceived risks linked with the consumption of potentially contaminated food products by reducing or eliminating exposure (Huang, 1993; Verbeke, 2001 and Smed and Jensen, 2005). Predicting the level of consumer response is complicated by the public's tendency to overestimate some risks while underestimating others, leaving little relationship between the actual level of risk in a food scare and the perceived risk to the consumer (Verbeke et al. 2007).

Examining consumer's risk perception and attitude can help in the prediction of consumer reaction to food safety risks (Pennings et al. 2002). Risk perception represents an individual's perceived likelihood of exposure to the food safety risk. Risk attitude represents an individual's general perception of risk. It is anticipated that the higher the risk perception and/or the higher the risk attitude, the more significant the behavioural response. Wansink (2004) identifies four segments namely, the accountable, the conservative, the alarmist and the risk-averse consumer segments, that are defined by their overall pre-existing attitudes toward risk and their perception of the specific food safety risk (see figure 1). Accountable consumer segment refers to those who have a low aversion to risk and a low perception of the specific food-safety risk presented. They see themselves as responsible for their behaviours and any resulting issues. The concerned segment also has a low aversion to risk but they see the chance of the specific food safety risk as high. Since they had a low

pre-existing attitude toward risk in general, it is assumed that their behaviour regarding the food safety matter is resulting from their perception of the risk at hand.

The conservative segment is highly risk-averse and will avoid unnecessary risk while the alarmist segment tends to overreact to risk, as they are averse to risk and perceive personal danger in the specific food safety risk. This framework of Wansink (2004) portrays that those consumers who perceive no risk from the food safety situation will not change their behaviour regarding the food product. However, if there is a perceived personal risk, the behaviour toward consumption of the product in question will additionally be affected by the consumer's general attitude toward risk. Risk-averse consumers who also perceive a personal risk would demonstrate the largest decrease in the behaviours that might expose them to the product.

In a survey, Schroeder et al. (2007) measured the magnitude of the relationships between perceptions and attitudes to risk and consumer behaviour towards food scare. The study found risk perceptions and attitudes influenced food safety concerns with beef. In this case, a person's negative perception of the food safety resulted in a reduced willingness to consume beef and a negative risk attitude produced a stronger disagreement that eating beef was worth the risk. Similar to Pennings et al. (2002) the study further reported that the magnitude of the consumer reaction varied across countries represented in the survey. Specifically, Schroeder et al. (2007) found that German consumers, who as a group demonstrated the highest level of risk attitude and perception, reacted most strongly to the ovine spongiform encephalopathy (BSE) crisis. This difference in the sensitivity to risk from BSE resulted in different behaviour among consumers of different countries who were actually at similar risk for contracting CJD (Creutzfeldt-Jacob disease) from eating contaminated beef. German consumers expressed more concerns about eating beef, with nearly 60% of those surveyed reporting a decrease in beef consumption because of the BSE crisis. By comparison, in the Netherlands and in the United States, 23% and 18% of respondents from these two countries reported a decrease in beef consumption as a result of BSE outbreak respectively.

Media broadcast and publications are major sources of information that consumers consult for insight into the unfolding events to assess the risk of food scare to enable them decide on a suitable response. A model developed by Richards and Patterson (1999) showed that while positive and negative media attention influence the behaviour of consumers their reactions are more pronounced with negative publicity compared to the positive alternative. The finding that consumers place more weight on negative media reports was also reported in research regarding the 1982 milk contamination scare in Hawaii (Smith et al. 1988). The indication that positive media messages carry less weight with consumers presents a significant challenge to governments and food industry stakeholders tasked with managing public confidence when food safety concerns are reported (Smith, 1988). Indeed, Verbeke et al. (2000) found that more than 90% of the television broadcast meat messages portrayed a negative relationship between fresh meat safety and human health.

In a similar study on USA media articles influence on meat demand Piggott and Marsh (2004) reported that significant reduction in demand for an affected meat product following publication of food safety information. While major food safety events, measured by the number of newspaper articles related to the event, caused significantly larger demand responses in the short term, there appeared to be only minor long-term impact on demand. In another study, Smed and Jensen (2005) considered the amount of negative radio and newspaper coverage regarding shell egg contamination in a given week in tandem with consumer reported purchase data for a 'safe' alternative product – pasteurized eggs – during the same time period. Results from this study showed significant differences in the magnitude of the shift toward purchasing pasteurized eggs during the scare for various groups of consumers. Age and education were two important factors found to influence consumer reaction to food scare. Whilst age was found to have a direct relationship with reduction in demand due to food scare, the level of education of respondents showed a negative relationship. The direct relationship reported between age and shell eggs demand due to food scare is consistent with Verbeke et al. (2000) that reported that households with older adults or children were more likely to decrease their meat consumption after the BSE crisis.

The horsemeat contamination scandal in winter 2013 in the UK resulted in over ten million burgers taken off the shelves by major UK retailers such as Tesco, Iceland and Lidl (The Guardian, 2013). These withdrawals had a huge impact on the UK Supermarket industry and supply chains with

sales of frozen foods and frozen ready meals slumping by 43% and 13% respectively in a matter of weeks (The Times, 2013, BBC News, 2013, Neville, 2013, Press Association, 2013).

Questions have been raised about the health implications of consuming horsemeat. The Food Standard Agency (FSA) UK released a statement declaring it had detected a prohibited veterinary drug ‘phenylbutazone’ for humans in horses slaughtered in the UK. Although these carcasses never found their way into the food chain, the same cannot be said for others outside the UK which may have entered the food chain. The National Health Service (NHS) played down the health risks of phenylbutazone with a rare 1 in 30,000 suffering from severe side effects (National Health Service, 2013). Although deemed low risk to health, it is a concern nonetheless as horses in the UK are held in high esteem as pets and racing animals rather than being a culinary ingredient. In effect, UK consumers’ withdrawal from the affected products has more to do with mistrust as a result of deceptive product content than health risk.

### 3. Mapping Risk Disposition Attributes of Life-stage Shopper Segments to Wansink’s Model of Risk Perception and Attitudes

The paper superimposes the risk characteristics of shopper life-stage segments of dunnhumby – Tesco Clubcard segmentation on Wansink’s (2004) model of risk perception and attitude (see table 1 and figures 1 and 2 for dunnhumby life-stage segments, Wansink model, and the mapped framework respectively). The adoption of this mapping process is informed by the fact there is ample theoretical basis for associations between risk perceptions and attitudes and the risk disposition characteristics of the five dunnhumby life stage segments.

**Table 1. Definition of Life-stage Segments**

Life-stage Segment	% of Shoppers	Age & Family
Young Adults including Students	16%	Adults aged 20-39 with no children
Older Adults	14%	Adults aged 40-59 with no children
Young Families	15%	Adults with all children under 10
Older Families	16%	Adults with one or more child over 10
Pensioners	9%	Adults over 60 with no children
Mixed	28%	Multigenerational household

Source: @dunnhumby (2011)

**Figure 1. Perception and attitude to risk model (Wansink, 2004)**

		Risk Attitude	
		Low	High
Risk Perception (of food safety risk)	Low	<i>Accountable</i>	<i>Conservative</i>
	High	<i>Concerned</i>	<i>Alarmist</i> Young Families

Source: Wansink (2004)

**Figure 2. The mapped framework informing research proposition formulation**

		Risk Attitude	
		Low	High
Risk Perception (of food safety risk)	Low	<i>Accountable</i> Young Adults	<i>Conservative</i> Older Families
	High	<i>Concerned</i> Older Adults	<i>Alarmist</i> Young Families Pensioners

Source: Adapted from Wansink (2004) and Dunnhumby (2011)

Young adults who commonly demonstrate a sense of invincibility and disengagement with food, in terms of its credence attributes, reflects in low risk attitude and risk perception, and therefore fits into the *accountable* quadrant of Wansink’s model. Older families exhibit behaviour which places

them in the *conservative* quadrant where, although they are sensitive to risks facing their increasingly independent children and may have anxiety over increased personal obligations, they are less concerned about passing food safety issues that are unlikely to affect them. Young families and pensioners show the highest levels of risk attitude and perception fits into the *alarmist* quadrant as they are a segment that regards health issues as top priority and there are general concerns about maintaining personal safety either for children or themselves. Finally, older adults fall in the *concerned* quadrant as their trepidation over day-to-day family concerns has dissipated as the children have left home, health concerns that could be intensified by food borne illnesses make them more sensitive to food safety risks. This framework based on the combination informed the formulation of research proposition that this paper sort to address.

#### **4. Life-stage Segments' Reaction to Horsemeat Food Scare: Research Proposition**

Undoubtedly, consumer confidence in meat based food supply chain in the UK was shaken by the horsemeat scandal. Existing studies on consumer reaction to food scares has been limited to either qualitative research dependent on self-reporting of behaviour and attitudes or the use of data which indicate changes in demand of broad product categories. Whilst it is generally accepted that consumers react negatively to food scares (Neville, 2013), it is clear that the rate of reaction may differ from one segment to another (Wansink, 2004). Such a gap in the food safety and consumer behaviour literature regarding the rate of withdrawal from food scares becomes more critical when consumer reaction to the food scare bothers on mistrust rather than risk to health, as it was in the case of the horsemeat food scare. This serves as a firm basis to seek to address the question as to whether there are significant differential withdrawal responses between the various life-stage segments from affected meat based products due to the horsemeat scandal in the UK. Did life-stage consumer segments withdraw at different rates or not, and if so were the differences significant? Drawing on the interface between the perception and attitude to risk characteristics of the four groups in Winsink's model and that of the five life-stage segments, it is proposed that the rate of shopper withdrawal from products adversely affected due to the horsemeat scandal will follow the an increasing order of: Young families, Pensioners, Older families, Older adults and Young adults.

#### **5. Methodology**

This paper used the analysis of actual supermarket purchase data which has been linked with customer life-stage demographic information to address the research question. This combination allowed tracking of consumer purchase habits before, during, and after the horsemeat food safety incident and a record of heterogeneity of the behaviour across the five life-stage segment's actual purchase data that is not influenced by respondent bias (Lee et al. 2000).

This study employed the use of loyalty card data for the paired sample t-test analysis. This data set accessed from dunnhumby UK has the benefit of providing aggregated as well as disaggregated datasets. Contrary to the characteristics of reported or claimed purchasing dataset, the loyalty card dataset alternative is based on real shopper purchasing behaviour that could objectively show extent to which life-stage shopper segments withdrew from the offending products affected by the horsemeat scandal in the UK. Dunnhumby loyalty card database holds at any given time two years of weekly supermarket transactions of about 40% of UK households (17 million).

The sample size of the dataset used for this study was 10% of the total population of loyalty card holders which was equivalent to 1.7 million shoppers. Citigroup's independent research reported that that since Tesco operates across all store formats; it appeals to all consumer demographics, and reaches 40% of UK households. Therefore, Tesco Clubcard data is representative of the UK shopper (Dunnhumby, 2010). Whilst Felgate (2011) used the dunnhumby dataset to assess the effectiveness of beef promotions across shoppers groups in the UK, Garcia (2011) employed loyalty card dataset analysis to study information search and involvement in purchase decision process in the context of fairtrade.

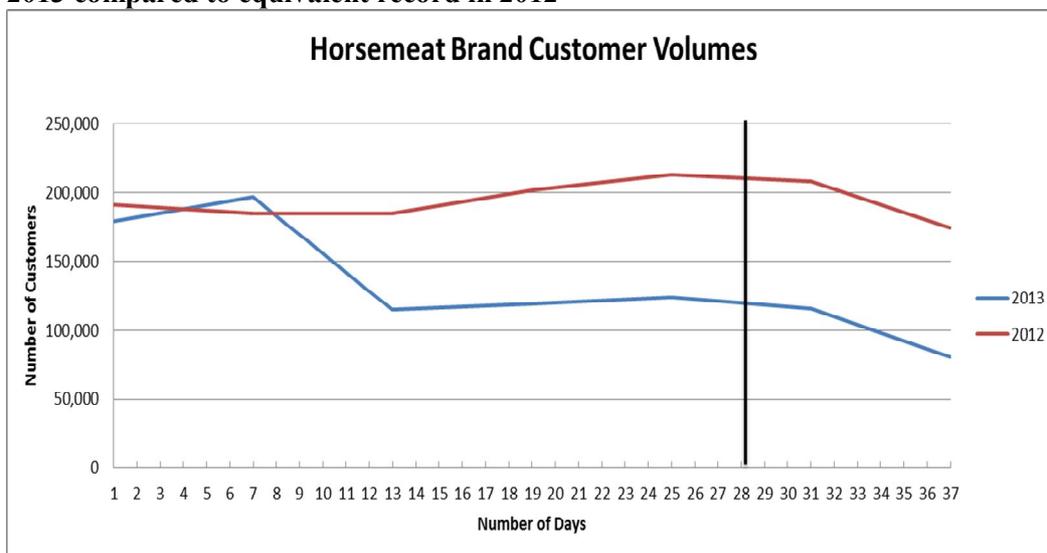
The loyalty card dataset for this research covered sales value, volume and number of customers' data on 1.7 million shoppers in Tesco over 4 months and the periods just before and after the first announcement of the crisis, as well the corresponding months of the previous year. This paper uses the analysis on the loyalty card dataset to address the research question as to whether segments responded any different and if so were the differences significant. The loyalty card dataset for this

research covers weekly retail sales, volume and customer numbers for 29 worse affected meat based products (see table 2) across the five dunnhumby life-stage segments. Specific period considered in this study was December 2012 to March 2013 and the corresponding previous year's data (December 2011-March 2012). Tesco was selected for its market leadership position in the UK food retail industry, as it has 30.7 percent market share of the total grocery retailing market in the UK by 2010 (Kantar Worldpanel, 2010) and also due to the fact it was one of the supermarkets affected by the horsemeat contamination.

## 6. Results and Discussion

Charts 1 and 2 show a drastic decline in terms of customer volume and retail sales for the burgers affected by the horsemeat scandal for the equivalent periods compared. The trend is a clear indication that the horsemeat scandal has adversely affected UK supermarkets in terms of consumer volume and retail sales.

**Chart 1. Customer volume trends for 29 Burgers in Tesco affected by the Horsemeat scandal in 2013 compared to equivalent record in 2012**



**Chart 2. Retail sales trends for 29 Burgers in Tesco affected by the Horsemeat scandal in 2013 compared to equivalent record in 2012**

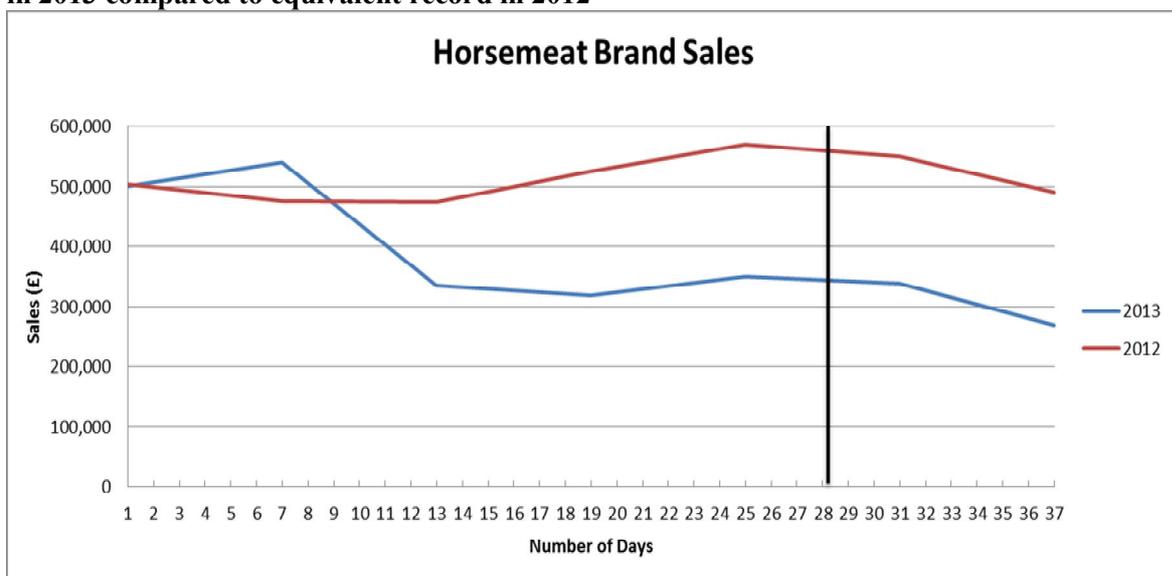
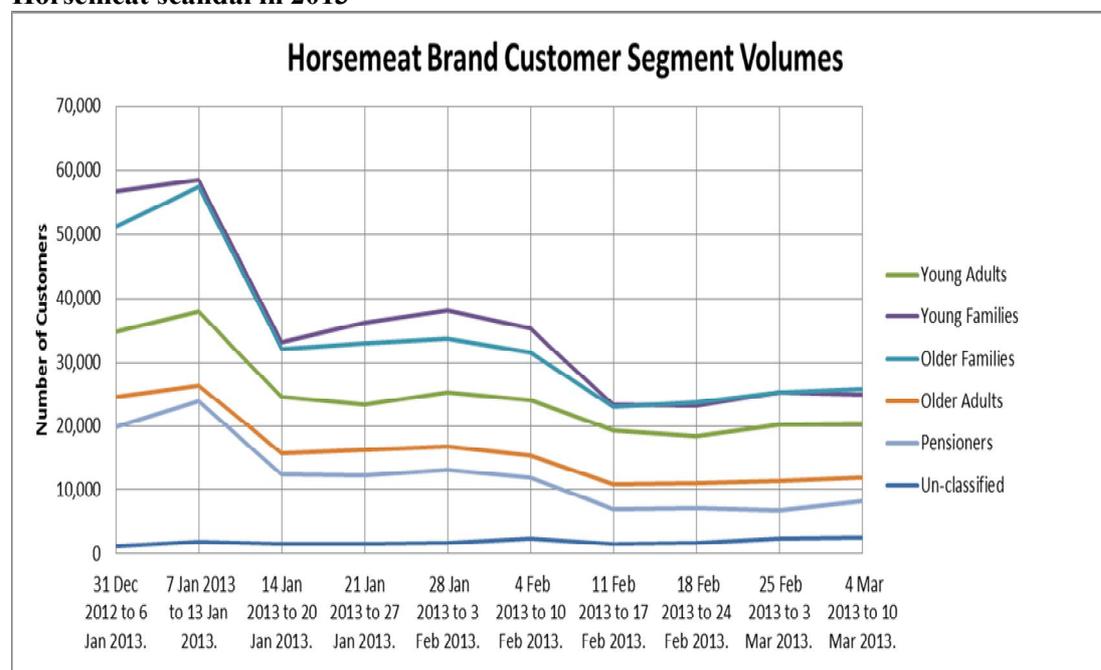


Chart 3 also indicates a sharp decline in number of customers who bought the affected burgers across the five life-stage segments immediately after the horsemeat scandal announcement from 7<sup>th</sup> January 2013, but to a varying extend. These trends shown in charts 1, 2 and 3 collectively confirms customer withdrawals from the affected meat products by all five life-stage segments due to the horsemeat crisis.

**Chart 3. Life-stage customer volume trends for 29 Burgers in Tesco affected by the Horsemeat scandal in 2013**



**Table 2. Results of paired sample t-test analysis to compare the means of the life-stage customer segments for the purchases of horsemeat affected brands over the five weeks before and five weeks after the food scandal announcement in 2013**

Life-stage shopper segments (Group 1 and Group 2)	Weekly Mean Customer Volume (Group 1)	Weekly Mean Customer Volume (Group 2)	Difference between means/% decline	T-value	Significance	Segment withdrawal ranking
Young Adults_2013_Before - Young Adults_2013_After	29202	20490	8712 (29.83%)	3.138	0.035*	5 <sup>th</sup>
Young Families_2013_Before - Young Families_2013_After	44502	26378	18124 (49.73%)	3.862	0.018*	1 <sup>st</sup>
Older Families_2013_Before - Older Adults_2013_After	41536	25876	15660 (37.70%)	2.994	0.040*	4 <sup>th</sup>
Older Adults_2013_Before - Older Adults_2013_After	20002	12156	7846 (39.23%)	3.802	0.019*	3 <sup>rd</sup>
Pensioners_2013_Before - Pensioners_2013_After	16328	8250	8078 (40.39%)	3.522	0.024*	2 <sup>nd</sup>
Total Customers_2013_Before - Total Customers_After	153164	95322	57842 (37.76%)	3.382	0.028*	

\*\*p<0.01 \*p>0.05

Table 2 indicates that the t-values for each set of life-stage segments' comparison at 5% significant level are significant. This means that there is a significant difference between the rates of withdrawal of the five segments from buying the affected meat products due to horsemeat announcement. In terms of the rate of withdrawal ranking, table 2 shows that withdrawal rate was

highest among young families (49.73%), followed by pensioners (40.39%), older adults (39.23%), older families (37.70%) and the least rate by the young adults segment (29.83%).

The withdrawal patterns exhibited by the three of the five shopper segments (young families, pensioners and young adults) conforms to the underlying principles that informed the superimposition of the life-stage segments to Winsink's model (see figure 2). The trends shown by young families and pensioners reinforce the notion that they consider safety for children and personal safety as top priority. The results shows there is a direct relationship between perception and attitude to risk and the withdrawal rate of a given consumers segment from potential food safety risk.

Young adults exhibited the least speed of withdrawal which confirms to their predisposition as less risk averse. The 3<sup>rd</sup> and 4<sup>th</sup> ranking by older adults and older families respectively is contrary to the expectation that older families were more likely to withdraw from a potential risk quicker relative to older adults. The reversed results could be as a result of the nature of the food safety scandal investigated (horsemeat). The horsemeat scandal as earlier expressed has more to do with deceptive product content than risk to health. It is therefore very possible that the element of personal and cultural values also influenced the rate and extent of reaction of the segments. Specifically, older adults being older in terms of age compared to older families may have been influenced more by their values and cultural sensitivities associated with horses in the UK, and hence responded quicker by withdrawing from the offending products compared to the relatively younger compatriots – older families. This raises an interesting issue worth further investigation.

## **7. Conclusion**

In consonance with the findings of earlier studies that suggest consumers react negatively to food scares generally (Yeung and Yee, 2012), which is also the case of consumer response to horsemeat scandal in the UK (Neville, 2013; The Independent, 2013), the findings of this research revealed that the horsemeat scandal had rapid and significant effect on shoppers across all life-stage segments in the UK. However, significant differences were found between the rates of withdrawal of consumers from the five life-stage segment – a finding that is consistent with Winsink (2004). The study further found that meat based ready meals affected by the scandal suffered consistent weekly decline in retail sales and customer volumes six week after the first horsemeat crisis announcement. In terms of the rate of withdrawal young families, pensioners and young adults withdrew at rate synonymous to their respective perception and attitudes to risk. Thus, whereas young families recorded the quickest rate of withdrawal followed closely by pensioners, young adults recorded the slowest rate of withdrawal. Interestingly and contrary to expectations of the study framework to addressing the research question, older adults withdrew quicker than older families from offending products due to the horsemeat scandal. This finding leads to the suggestion that life-stage segments' react differently to food scare which possess direct risk to health and ones that do not threatening health condition; typical example being food scare bothering on mistrust and/or cultural and personal value sensitivities, such as deceptive product content declaration that included horsemeat instead of exclusively beef products.

## **8. Managerial Implications**

The findings of the study have implications for food safety management and marketing communication strategies to rebuild and maintain public confidence in times of crisis. The study has revealed that despite the symptomatic mass withdrawal phenomenon on the part of shoppers in times of food scare announcement life-stage segments respond at a different rate and ought to be managed differently. For example, a quicker re-introduction period could be adopted for the affected products on an incremental basis to serve first young adults who make up about 16% of the market. This can be increased gradually as the message of reassurance sinks in to the point where young families and pensioners would be won back the product. The results have shown that food scares with direct health risk potential ought to be managed differently from those that bother on other factors such as mistrust, personal values, and cultural sensitivities among others. To this end, it important for food safety managers and marketing communication experts to be conversant with the different food scares and design customised remedy for each of them and not to resort to one general approach. For example,

retailers and marketing managers' response to mad cow disease outbreak ought to be significantly different from that of horsemeat scandal.

Consumer reaction to food scares is of interest to stakeholders. For governments and international organizations that are pursuing changes in legislation and creating or transforming food safety institutions, understanding the public's response to safety issues in the food supply is crucial to ensuring effective public policy. For growers, producers, and distributors of food and food products, insight into the rate at which different shopper groups respond to food scares based on their impressions of the level of risk of food products, and knowledge of the effect of food safety concerns on purchasing behaviours can be essential in marketing products and proactively reacting to food scares with the most effective approach. The key to enabling food industry stakeholders help the public become better informed is by continuing to explore the evidence beneath the headline figures on how and why consumers react to food safety concerns.

## **9. Limitations and Areas for Future Research**

The research presented in this paper is based on data on one category of meat based products (burgers) from a leading food supermarket with about 30.7% market share. The research therefore is limited in terms of depth of product coverage and the proportion of the UK food market captured. Further investigation based on data gleaned from other meat based products that were also affected by the scandal across other food retailers could provide a more comprehensive understanding of how people of different life-stage and lifestyle segments responded to the horsemeat scandal. Further research to determine the role that personal values and cultural sensitivities play in shopper reaction to food scare, especially those that do not directly predispose people to health risk could yield useful insight.

## **References**

- BBC News (2007), *Timeline: Bird flu in the U.K.*, accessed at <http://news.bbc.co.uk/1/hi/uk/4882824.stm>, January 30, 2008.
- BBC News (2013), *Tesco pledges to sell meat from closer to home*. Available Online: <http://www.bbc.co.uk/news/uk-21597596>, accessed 03/03/2013.
- Dunnhumby (2010), *Supermarket Clubcard data base of Tesco*, Nov. 2013.
- Dunnhumby (2013), *Supermarket Clubcard data base of Tesco*, Nov. 2013.
- De Jonge, J.D., Frewer, L., Trip, H.V. (2004), *Monitoring consumer confidence in food safety: an exploratory study*, *British Food Journal*, 106(10/11), 837-849.
- Felgate, M., Fearn, A., Di Falco, S. (2011), *Analysing the Impact of Supermarket Promotions: A Case Study Using Tesco Clubcard Data in the UK*. Kent Business School, University of Kent Working Paper Series No.23.
- Garcia (2011), *The role of involvement in the use of information and labelling in the context of fairtrade foods*. Unpublished PhD thesis, University of Kent.
- FSA (2007) Food Standards Agency Annual Report, (2006/2007).
- Huang, C.L. (1993), Simultaneous-equation model for estimating consumer risk perceptions, attitudes, and willingness-to-pay for residue-free produce. *The Journal of Consumer Affairs*, 27(2), 377-388.
- Käferstein, F., Motarjemi, Y., Bettcher, D. (1997), *Disease Control: A Transnational Challenge*. Emerging Infectious Diseases, World Health Organization, Geneva, Switzerland, 3, Number 4.
- Kantar Worldpanel (2010), in; *Fairtrade Report 2011* at [www.fairtrade.org.uk](http://www.fairtrade.org.uk), accessed 15/07/2012.
- Knowles, T., Moody, R., McEachern, M.G. (2007), *European food scares and their impact on EU food policy*. *British Food Journal*, 109(1), 43-67.
- Lee, E., Hu, M.Y., Toh, R.S. (2000), *Are consumer survey results distorted? systematic impact of behavioral frequency and duration on survey response errors*. *Journal of Marketing Research*, 37(1), 125-132.
- MAFF (2000), *The Inquiry into BSE and Variant CJD in the United Kingdom*, Ministry of Agriculture, Fisheries and Food, London.
- Mørkbak, M.R., Christensen, T., Gyrd-Hansen, D. (2010), *The importance of food safety as a quality characteristic - a choice experiment*. *British Food Journal* 112(7), 775-791.

- Neville, S. (2013), Frozen burger sales plunge 43% after horsemeat scandal. Available Online:<http://www.guardian.co.uk/uk/2013/feb/26/frozen-burger-sales-fall-horsemeat-scandal>, accessed 02/03/2013.
- National Health Service (2013), *Horsemeat investigation: latest update*. Available Online: <http://www.nhs.uk/news/2013/February/Pages/Official-health-advice-released-about-horsemeat-safety.aspx>, accessed 03/03/2013.
- Pennings, J.M.E., Wansink, B., Meulenberg, M.T.G. (2002), *A note on modeling consumer reactions to a crisis: The case of the mad cow disease*. International Journal of Research in Marketing, 19, 91-100.
- Piggott, N.E., Marsh, T.L. (2004), Does food safety information impact U.S. meat demand? *American Journal of Agricultural Economics*, 86(1), 154-174.
- Press Association (2013), *How the horsemeat scandal unfolded*. Available Online:<http://www.guardian.co.uk/world/2013/feb/08/how-horsemeat-scandal-unfolded-timeline>, accessed 03/03/2013.
- Richards, T.J., Patterson, P.M. (1999), *The economic value of public relations expenditures: Food safety and the strawberry case*. Journal of Agricultural and Resource Economics, 24(2), 440-462.
- Rigby, E., Wiggins, J. (2007), *Tesco reports shoppers shun poultry*. Financial Times, 2007.
- Schroeder, T.C., Tonsor, G.T., Pennings, J.M.E., Mintert, J. (2007), *The role of consumer risk perceptions and attitudes in cross cultural beef consumption changes*. Western Agricultural Economics Association Annual Meeting, Portland, 2007.
- Smed, S., Jensen, J.D. (2005), *Food safety information and food demand*. British Food Journal, 107(3), 173-186.
- Smith, M.E., van Ravenswaay, E.O., Thompson, S.R. (1988), *Sales loss determination in food contamination incidents: An application to milk bans in Hawaii*. American Journal of Agricultural Economics, 70, 513-520.
- Tiltman, D. (2007), *Touch of flu costs Bernard Matthews 17 percent of sales*, Marketing, August, 30.
- The Guardian (2013), at <http://www.theguardian.com/uk-news/2013/oct/23/horsemeat-food-scandal-meat-trade>, accessed 12/11/2013.
- The Independent. (2013), *Horsemeat doubts put shoppers off frozen burgers*. Available Online:<http://www.independent.co.uk/life-style/food-and-drink/news/horsemeat-doubts-put-shoppers-off-frozen-burgers-8512149.html>, accessed 03/03/2013.
- The Times. (2013). 'Tesco to DNA test meat products as supermarket giant drops burger supplier' Available Online:<http://www.thetimes.co.uk/tto/business/industries/retailing/article3672734>, accessed 04/03/2013.
- Verbeke, W. (2001). *Beliefs, attitude and behaviour towards fresh meat revisited after the Belgian dioxin crisis*. Food Quality and Preference, 12, 489-498.
- Verbeke, W., Frewer, L.J., Scholderer, J., De Brabander, H.F. (2007), *Why consumers behave as they do with respect to food safety and risk information*. Analytica Chimica Acta, 586(1-2), 2-7.
- Verbeke, W., Ward, R. W., Viaene, J. (2000), *Probit analysis of fresh meat consumption in Belgium: Exploring BSE and television communication impact*. Agribusiness, 16(2), 215.
- Wansink, B. (2004), *Consumer reactions for food safety crises*. Advances in Food and Nutrition Research, 48, 103.
- Yeung, R., Yee W.M.S. (2012), *Food safety concern: Incorporating marketing strategies into consumer risk coping framework*. British Food Journal, 114, 40-53.
- Yeung, R.M.W., Yee, W.M.S., Morris, J. (2010), The effects of risk reducing strategies on consumer perceived risk and on purchase likelihood: a modelling approach, British Food Journal, 112(3), 306-322.