Effects of Media Coverage on Demand

Leef H. Dierks
Department of Agricultural Economics, Christian-Albrechts-University at Kiel, Germany

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Leef H. Dierks[1]

[1]Department of Agricultural Economics, Christian-Albrechts-University at Kiel, Germany

Abstract

Food safety crises usually receive widespread publicity and an extensive media coverage which evidently is mainly negative. Based on previous research, the purpose of this article is to illustrate the impact of positive and negative food safety information on demand both in the short and long term. Apparently, asymmetric effects of media coverage provoke a shift in the consumers' perception of risk and, in a subsequent step, their reactions. This cycle shall be investigated and explained in detail since it improves the prospects for a prediction of consumers' reactions to food safety crises. Results will contribute to the European Commission's research project *Food Risk Communication and Consumers' Trust in the Food Supply Chain – TRUST*.

Keywords food safety, media coverage, risk perception, consumer behaviour

Introduction

The European Union has repeatedly experienced severe food safety crises in recent years; among them the foot and mouth disease or bovine spongiform encephalopathy (BSE). These crises usually are unforeseen events with characteristics that receive considerable public attention through widespread publicity and extensive media coverage. The latter is evidently mainly negative and affects demand in a substantial manner.

A number of comprehensive studies analysing explanatory variables for consumers' behaviour in potentially risky markets were published in the last decades (Böcker and Mahlau, 1999). The overall result of these studies is that regarding the disclosure of food safety incidences, media coverage occupies a crucial role. Among neoclassical microeconomic factors like income and price it is understood to equally affect consumers' demand for foods which are potentially fraught with risk (Smith et al., 1988). In this environment, information about potential health risks becomes increasingly important within the purchase decision.

Regarding the impact of media coverage on demand, it necessarily needs to be distinguished between negative and positive reports since they were shown to differently affect consumers' behaviour. Negative media coverage following a food safety issue usually peaks in a sudden and abrupt, sharp decrease in aggregate demand followed by a slow and often incomplete recovery toward previous consumption levels (Burton and Young, 1996). Positive media coverage, in contrast, has a remarkably weaker effect and only insignificantly influences demand as empiric analyses demonstrate (Herrmann et al., 1997). Thus, a similar quantity of unfavourable information weighs more heavily in consumer decision- making relative to favourable information (Smith et al., 1988). The causale for the asymmetry observed has so far not been comprehensively exemplified.

The starting point for the analysis is the role of the media in the periphery of a food safety incidence. The motives for media coverage are manifold but still match in their influence on the risk consumers perceive and thus in their indirect effect on demand. This has to be regarded within the context of strategies consumers employ to reduce the risk faced. The appropriate impact of both positive and negative media coverage shall be determined both in the short and the long run. A comprehensive illustration of the cycle outlined above is crucial for the understanding and consequently the precise and reliable predictions of consumers' response to food hazards.

The remaining paper is organised as follows. In the next section, previous studies and their major findings will be highlighted. In the third section, the general impact of media coverage will be described. Special emphasis shall be put on explaining the asymmetry between negative and positive effects and different time periods. Section four investigates the consumers' reactions under consideration of their environment. Finally, interim findings and implications shall be discussed.

Previous Studies

Despite the multitude of publications on food safety issues the following overview will constrict itself to few fundamental studies whose findings were repeatedly verified empirically over time. Relevant findings will contribute to research on modelling agent behaviour in risky markets and market aggregate outcome within the European Commission's research project *Food Risk Communication and Consumers' Trust in the Food Supply Chain - TRUST*.

An early approach to determine the impact of media coverage on demand is an investigation based on the pollution of the James River in Virginia in December 1975 with the pesticide kepone (Swartz and Strand, 1981). Their study analyses how news influences the demand for oysters both from the contaminated James River and other, not affected areas. Articles from four major Baltimore and Washington newspapers were reviewed. As Swartz and Strand assume, receiving information about a possibly affected food provokes a downward shift in its demand curve for oysters in general. The extent of the shift depends on specific information available to consumers. Media coverage of a food safety incidence may not always be sufficiently detailed to allow consumers to differentiate between potentially contaminated foods and others. If their information is imperfect their reactions will be subjective and based on their perception of the risk. As a result, the perceived quality of not contaminated food, and respectively demand, declines with the extent of negative media coverage following a food safety incidence. This causes a potentially serious impact in the short-run.

Since the sale of oysters from the James River was generally interdicted, the study focussed on the impact of negative media coverage on sales of safe oysters from other regions. A measure of negative media coverage of the closure of the James River oyster beds due to kepone contamination was embedded in a model of demand for safe oysters from the Baltimore region. Swartz and Strand found that this measure of negative media coverage was statistically significant in explaining the decline in the demand for safe oysters. Negative media coverage about the kepone incidence in the James River significantly reduced demand for safe oysters from the Baltimore area. The following reduction in prices could not provoke a change.

The above study set its focus on the impact of negative media coverage on demand. Positive media coverage was not included in the approach.

In another approach, a model for estimating the decline in sales following a food safety issue is applied to the contamination incidence in the Hawaiian dairy industry in 1982 (Smith et al., 1988). In Oahu, fresh fluid milk was contaminated by the pesticide heptachlor. The article aims at estimating the effects of media coverage regarding this incidence on the demand for milk. Its theoretical foundation originates from refinements to the methodology of Swartz and Strand. Yet, in contrast to that approach, their model comprises positive media coverage, assuming that it might positively affect sales. Smith et al. hypothesise that losses resulting from imperfect information might be reduced in case of positive media coverage - counteracting the impact of negative media coverage on sales.

To estimate sales losses through negative media coverage the difference between projected sales without the incidence and actual sales after the incidence was determined. Relevant data was obtained from an econometric model of fluid milk demand. Media coverage of the incidence was approximated by coding articles in two major Honolulu newspapers during the relevant period. Each article was coded as either negative or positive depending on the information contained. The intensity of television coverage was similar to that of newspaper coverage and therefore was not further considered. In contrast to previous assumptions, Smith et al.'s model yields that positive media coverage is not considered as credible by the consumers and can therefore be excluded from the further analysis. This finding is substantiated through empirical results. Thus, only the impact of negative media coverage remains as their subject of research. Their results illustrate that sales of fresh fluid milk declined by about one third following media coverage of the incidence. Yet, negative media coverage does not seem to account for the total effect of the contamination. Other effects like further sources of information on product quality such as warning labels were also shown to have a significantly negative impact.

Smith et al.'s study yields that negative media coverage following a food safety incidence has a significant impact on demand which is not restricted to the short term. Even one year after the incidence, fluid milk sales still had not approached their original levels again. Positive media coverage was observed not to affect consumer purchases. Thus, it was shown that negative information about a food safety incidence has a greater impact relative to positive information.

A further approach to highlight the impact of media coverage on demand is an investigation of the 1989 Alar crisis in the United States (Herrmann et al., 1997). Alar is the trade name for a widespread growth regulator used in apples. After twenty years of continuous use, evidence accumulated that the product was carcinogenic and its alleged innocuousness was publicly questioned. Finally, in 1984, the Environmental Protection Agency announced a re-examination of the effects caused through Alar. However, it took five more years for a full scale crisis to erupt in February 1989, following an announcement of the National Resources Defence Council. Media coverage of the incidence rose sharply whilst demand plummeted.

Employing a logit regression, Herrmann et al. identified characteristics which have a significant effect on the reduction of consumption following negative media coverage of the Alar crisis in a multivariate analysis. Their results indicate that the reduction in consumption of apples and apple products is related to a multitude of different factors; among them interestingly neither price nor income. Negative media coverage regarding the Alar crisis was found to have a significant impact on the drop in demand for fresh apples. Significant declines in sales were observed as early as the initial press reports covering the incidence. Whilst the consumers' frequency of media absorption is not relevant according to Herrmann et al., their attention to news occupies a significant role in explaining a decline in demand following a food safety incidence. Consumer perceptions of risks from Alar in apples were found to be comparable to the risks reported by the media. This also accounts for the amount of risk perceived among the individuals investigated. On average, consumer's reactions are consistent with the information available to them (van Ravenswaay and Hoehn, 1991).

Following the methodology of Smith et al. to estimate sales losses, Herrmann et al. subtract the actual sales from projections of what sales would have been had the Alar controversy not occurred. Their analysis yields that losses accumulated to thirty percent during 1984 to 1989. Approximately seventy percent of these losses can be directly traced back to the initial and sustained shift in demand due to press reports concerning the announcement of the National Resources Defence Council (van Ravenswaay and Hoehn, 1991). The impact of positive media coverage was not investigated in their study.

Finally, Burton et al. (1999) present an empirical analysis of consumers' response to perceived risks associated with BSE in Great Britain. They assume that an adjustment in the perception of risk associated with the consumption of beef will provoke a change in observed expenditure patterns. A dynamic demand system is estimated which takes account of variables that represent media interest in the BSE issue, and which may help to determine their influence both in the short and the long term.

The basis of the demand model is the Almost Ideal Demand System in which the market share of each product is expressed as a function of prices and a measure of total expenditure. Given the high media attention afforded to BSE, it would seem appropriate to use a measure of the media's coverage of the issue as a proxy for the consumers' awareness of it. The measure chosen by Burton and Young (1996, 1999) is based on the number of UK newspaper articles which refer to BSE, comprising both positive and negative media coverage. Furthermore, their approach captures the dissemination of information. An article on BSE is allowed to have two effects; an immediate but short lived impact, such that beef consumption would return to its original level once media interest in BSE has passed and a permanent effect leading to a sustained reduction of beef consumption in the long run.

Based on their findings, Burton et al. estimate that the short term impact of negative media coverage on demand causes a transitory loss in the period directly following the food safety incidence. As the market recovers to some extent afterwards this reaction turns out to be an overreaction. The estimated magnitude of the long term impact which leads to a sustained loss of market share is less but still substantial. This would seem to be due to the identification of a declining marginal impact of me-

dia interest which may be reasonable given the extreme variability of the sporadic media interest in the issue. However, the model does not account for a long term impact of media coverage, i.e. it predicts that the market share lost remains unchanged infinitely even if there is no further media coverage of the issue.

The studies briefly presented in the previous section provide a general overview over basic findings of the effects of media coverage on demand for potentially unsafe food. Negative media coverage of a food safety incidence is shown to provoke a significant change in the risk consumers perceive and thereby has an impact on consumption and demand. Positive media coverage, in contrast, results in only minor effects on demand – if considered at all. Yet, a detailed analysis of this asymmetrical impact has remained undone.

The Impact of Media Coverage

More than ninety percent of the consumers receive their information concerning food primarily through popular press and television. Extensive media coverage of a food safety incidence can contribute to heightened perception of risk and, finally, to an amplified impact (Swinnen et al., 2003). An imperfect market such as the food market impedes consumers from disposing of all relevant information. They cannot avoid a certain risk which, assuming a rational behaviour, they intend to reduce through an increased demand for media coverage. The additional provision of information in order to reduce the consumers' state of imperfect information is often assumed to be neutral. In reality, however, most information is provided by organizations that have an internal incentive to select certain information over others in their distribution activities (Swinnen et al., 2003). The media has a simple economic interest to supply information in order to preserve public attention.

Regarding their impact on demand, media reports can to some extent be compared to advertising. Yet, whereas advertising is undertaken explicitly to increase sales, media coverage does not have this objective. On any topic, media coverage might as well provoke a positive as a negative consumer response. The economic theory of this phenomenon still is not well developed. Apparently, the consumption of potentially affected foods has changed significantly and perhaps permanently as a result of media coverage. Regarding negative media coverage of food safety issues, a decline in consumption might well be expected. Analogously, positive media coverage might be expected to increase demand. Impact and duration of the effects, however, are subject to a theoretical approach for which little guidance is given despite suggesting to include media coverage as an argument of the demand function (Burton and Young, 1996).

Negative Media Coverage

The impact of media coverage on food safety issues has previously been addressed by Eales and Unnevehr (1988), Kinnucan et al. (1997), or Verbeke et al. (1999), among others. Their findings unanimously demonstrate that demand for an affected food declines in response to negative press reports. The decline can be decomposed into a short term and a long term effect, pointing out the dynamics of the process of disseminating information.

In the short term, negative media coverage about a potentially affected food leads to an immediate but transitory decline in demand. The sudden and abrupt decrease is followed by a slow and often incomplete recovery towards previous consumption levels once the media's interest in the issue has ceased. This massive decline lasts only temporarily but its impact clearly exceeds the magnitude of the sustained reduction in demand (Burton and Young, 1996). Accordingly, a certain overreaction, immediate but short lived, can thus be observed on behalf of the consumers in the short term.

In the long term, in contrast, negative media coverage, among other factors, provokes a sustained shift in consumption patterns which leads to a persistent reduction in the consumption of potentially affected foods. Yet, the observation of a decline in demand should not be mistaken for an exclusive impact of negative media coverage. It could also be the trend of a generally declining consumption of certain foods as a result of changing tastes and preferences over time, especially when considering that the impact of negative media coverage is assumed to abate over time due to the media's declining marginal interest in the issue (Burton and Young, 1996).

Regarding negative media coverage as an exclusive factor determining consumers' demand improperly simplifies a manifold and complex context. Yet, it might be the pivotal element linking cause (food scare) and action (decline in demand) but falls short of regarding additional factors like generally diminishing trust or consumers' increasing saturation (von Alvensleben, 1998).Furthermore, the approach cannot explain how decision making among different consumers' proceeds and which actions can be derived. These intermediating factors, however, have to be taken into account as well in an attempt to understand how media coverage influences consumers' behaviour.

Positive Media Coverage

In contrast to the impact of negative media coverage on food safety issues, positive media coverage has a remarkably weaker effect on demand. Several empiric studies have shown that consumers asymmetrically judge favourable and unfavourable information. The latter influences the consumers' process of decision making in a stronger manner than does favourable information (Smith et al., 1988). A possible reason for the comparably weak effect of positive media coverage on consumers' reactions might be that positive reports generally do not receive a level of attention comparable to that of alarming news. Consumers only take the information they consider personally the most relevant from the mass of news they are exposed to daily. Among these, news concerning disasters and thus food safety hazards were found to be interesting to nearly all segments of the population, especially, however, to a downscale audience (Herrmann et al., 1997). An apparent disinterest in positive media coverage is further endorsed through the consumers' generally diminishing confidence in food safety information (von Alvensleben, 1998). Furthermore, public interest usually focuses on only few risks while others are being neglected. Conversely, one might argue that consumers do in fact expect negative news and therefore react more sensitively.

Consumers' Reactions

Risk Perception

Perceived Risk commonly relates to the perception of a probability of failure and possible negative consequences associated with the purchase of a potentially affected product. The latter are incompletely known to the consumers. Despite assuming rationally acting agents, their ability to identify all possible outcomes and assign exact probabilities has to be questioned. As a matter of fact, recent findings on the process of risk perception on food safety related risks suggest that the public comprehends risk in a manner quite different from scientific probabilistic assessment, for which fatality likelihood plays a key role (Böcker and Hanf, 2000). Furthermore, perceived risk has manifold contributors and is considered a multi-faceted construct. Evidently, consumers are exposed to uncertainty - particularly when purchasing foods since food safety cannot be perfectly observed prior to consumption. They will of course intend to reduce this uncertainty. A widespread method to reduce perceived risk and thus uncertainty is the use of so called *risk relievers*; generally understood as particular information increasing the likelihood of product success. Consumers will inter alia rely on media coverage to obtain this information. Yet, the impact on perceived risk does not exclusively result from the demand for information. The media itself has an economic interest in providing negative news to preserve public attention. This is illustrated through a bias in media coverage towards apparently dramatic events (Böcker and Hanf, 2000). These circumstances can be subsumed to a *vicious circle of selective perception* (von Alvensleben, 1997).

Depending on the individual significance of press reports on the formation of opinion it might be assumed that media coverage has an indirect impact on consumers' reactions. In fact, a negative relationship between perceived risks which media coverage apparently alters, and the consumption of potentially affected foods has been observed (von Alvensleben, 1997). Positive media coverage is rather unlikely to yield comparable effects. This is consistent with findings from the previous section.

The Element of Trust

Risk relievers in the broader sense might additionally encompass the element of *trust*. Consumers assign reliability judgements to different types of suppliers in order to reduce their uncertainty and the complexity of food purchase decisions. This behaviour seems rational when considering the volume of

information that would be necessary for fully informed choices (Böcker and Hanf, 2000). Trust might in this context be regarded as a necessary means to reduce uncertainty to an acceptable level and to simplify decisions. Supposed that trust indeed is the pivotal link between perceived risk and the consumers' purchase decisions, the influence of media coverage might be crucial to determining the change in trust and consecutively in demand.

The consumers' assessment of suppliers is subject to a constant survey of information and may abruptly be adjusted in case of news regarding the trustworthiness of suppliers. The mechanism of adjusting trust and finally demand is based on the *Bayesian Revision Process*. Differences in the reliability between types of suppliers are expressed through subjective failure probabilities. Then, trust in individual suppliers is defined as the subjective probability which classify the latter as reliable. Consumers react to news following a food safety incidence by readjusting their trust in individual suppliers. A decline in demand for potentially affected products follows and particularly affects suppliers regarded as unsafe. Taking into account the rapid distribution of information which results from media coverage, even supposedly long term relationships between consumers and suppliers can abruptly be influenced. The process of establishing trust in a supplier which usually takes several years, can be undone in a matter of seconds. This especially accounts for food safety incidences which might affect one's personal integrity.

Reasons for Asymmetry

As illustrated above, a similar quantity of unfavourable information weighs more heavily in consumer decision-making relative to favourable information (Smith et al., 1988). An attempt to identify reasons for this asymmetry necessarily has to distinguish between consumers' reactions on the one hand and the media's supply of information concerning a food safety incidence on the other hand.

Media coverage of a food safety incidence is not always sufficiently detailed to permit consumers a clear differentiation between potentially contaminated foods and other, safe foods. Assuming that information is imperfect, the consumers' reaction will inevitably be subjective and based on the risk perceived. Correspondingly, the perceived quality of not affected foods and thus demand declines following negative media coverage of a food safety incidence. The information which is intended to caution consumers about potentially affected food also provokes a decline in demand for safe goods (Swartz and Strand, 1981).

The consumption of a potentially contaminated food might directly affect the health of consumers. Against this background the remarkably stronger impact of negative information about a food safety incidence on demand is a precautious action on behalf of the consumers. A sceptical attitude or even mistrust towards comparable or similar foods to the one potentially affected has to be understood as a mechanism of self protection. It appears logical for the consumer to abstain from allegedly safe products before regretting their consumption at a later point in time. The impact on the consumer's personal health when abstaining from the consumption of a safe good is at most inconvenient whilst the consumption of a potentially affected food might be dangerous. This leads to a bias in the perception of risk associated with the foods involved and explains why consumers react more sensitively to negative media coverage compared to positive media coverage.

Another aspect is the credibility of media coverage concerning food safety information. Consumers do not consider positive media coverage as being particularly credible (Smith et al., 1988). This, in turn, leads to a subconscious overvaluation of negative media coverage and increases the risk perceived regarding the specific food. Assuming that the consumer a priori regards a potentially affected food as critical - which seems plausible since his state of health might be affected - negative media coverage will only substantiate his point of view. Positive media coverage about a certain food which the consumer eyes sceptically will in this context only encounter doubts and scepticism. It furthermore seems reasonable for consumers who have a positive attitude towards the potentially affected food to react to negative media coverage through an abdication of consumption since their health might be affected. Positive media coverage, in contrast, will only confirm their apparent knowledge and attitude which usually does not result in an increase in demand.

When investigating the causale for the asymmetry in reactions to positive and negative media coverage the consumers' general attitude towards risk has to be considered, too. Their attitude towards

risk is assumed to affect the consumers' purchase decision in a subconscious manner. It would be barely comprehensible to purchase potentially affected foods that might have serious effects on one's health simply for the thrill of it. Consumers who are particularly risk averse certainly proceed more cautiously in their selection of foods compared to risk neutral or risk friendly individuals. Negative media coverage has an impact the demand for potentially affected foods for both risk averse and risk friendly consumers whereas positive media coverage will not have a significant effect on them. It needs to be questioned whether consumers will change their attitude towards risk following media coverage of a food safety incidence.

Interestingly, the role of the consumers' gender proves to be meaningful in the above context. Men react to negative media coverage by hesitantly and disbelievingly decreasing their consumption and demand of the potentially affected food. Women, in contrast, constrict their demand in a much stronger manner (Hermann et al., 1997). This behaviour increases particularly when women raise small children or are responsible for the purchase and preparation of food for a family and thus occupy a *gatekeeper's function*. Women react significantly more attentively to food safety incidences than men in comparable situations (von Alvensleben, 1998). However, it would be desirable to conduct further research on the influence of social differences in general on consumers' risk perception and their reactions on demand. Still, this behaviour contributes only marginally to the explanation of the asymmetry to consumers' reactions following media coverage.

Central elements that determine an asymmetry of reactions are both the consumers' fear for their state of health and the strong discrepancy in possible outcomes resulting from the consumption or abdication of a potentially affected good.

Conclusion

Food safety incidences are usually unforeseen events with characteristics which receive an extensive media coverage that evidently is mainly negative. For a multitude of different reasons positive media coverage, in contrast, is not quite as common as negative media coverage and does not receive that attention.

Still, the importance of the frequency of media coverage featuring food safety incidences is not to be overestimated. General scepticism in information or even disbelief in positive media coverage also account for the asymmetry in consumers' reactions. Furthermore, their uncertainty and state of incomplete information as a consequence of the food safety incidence makes consumers vulnerable to scare stories and exaggerated precaution which provoke drastic declines in consumption.

An argument considered more crucial for the asymmetry in consumers' reactions to the media coverage of food safety incidences is the impact on their state of health. The discrepancy in consequences of either consuming a potentially affected food or abdicating from the consumption is immense. When abstaining from the consumption of a safe product consequences are at most inconvenient whereas the consumption of a potentially affected food might put one's own health at danger. This provokes a bias in the perception of the risk perceived regarding the foods involved and partly explains why consumers' react more sensitively to negative media coverage as to positive media coverage.

The impact of media coverage on demand for potentially affected foods cannot be comprehensively illustrated without covering behavioural aspects. The consumers' allegedly rational attempt to reduce the particular uncertainty results in the assignation of subjective probabilities which classify selected suppliers as being either trustworthy or not. Yet, the process of deriving subjective probabilities is largely influenced by the uncertainty concerning both the product's and the supplier's trustworthiness. According to this context, consumers might face a circularity problem. In a state of imperfect information, they assign subjective probabilities in an effort to reduce their uncertainty.

Still, an in depth analysis of trust affecting consumers' purchase decisions will not be the emphasis of this article. It remains subject to further research.

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