

# Managing perceived risk: a multi-tier case study of a uk retail beef supply chain

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## Abstract

This paper examines the effect of increased environmental uncertainty and information asymmetry on contractual relationships between all members of the beef supply chain. It offers an alternative theoretical framework to the traditional Transaction Cost Economics view of the treatment of information by viewing co-ordinated supply chains as a series of Principal Agent relationships, and draws on Perceived Risk Theory to explain both consumer and organisational behaviour. The paper also presents a supply chain methodology and submits empirical evidence of the perceived risks, associated management strategies and benefits for all members, including consumers, of one particular UK retail co-ordinated supply chain for an own brand fresh beef product.

*Keywords: Principal, Agent, Incentives, Safety, Quality*

## 1. Introduction

Competitive pressures, together with regulatory and industry responses to a series of food safety and quality issues during the 1980's, have impacted on contractual relationships within the UK beef industry, resulting in the development of co-ordinated supply chains between retailers, processors and farmers (Fearné, 1998). The 1990 Food Safety Act, and the consequent 'due diligence and reasonable precautions' defence, the Consumer Protection Act 1987 (Part 1) and the Beef Labeling Scheme have driven both industry-led and proprietary assurance schemes which attempt to increase information in order to reduce the risks associated with safety and quality issues. Vertical sector schemes such as Farm Assured British Beef and Lamb (visit <http://www.fabbl.co.uk>) together with horizontal schemes which link sector level schemes, for instance the British Farm Standard (visit <http://www.littleredtractor.org.uk>), attempt to increase information along the supply chain. In addition, public monitoring and inspection activities, such as mandatory inspections by the Meat Hygiene Service (MHS) at the processor level, result in the publication of Hygiene Assessment Scores (HAS) scores.

Retail fresh meat sales in the UK are almost exclusively 'own brand' as opposed to 'own label'. Own brands, as defined by Davis (Davis, 1992) are positioned as niche, high quality products sold at a premium price, supported by strong technical and quality control involvement from the retailer. The drive for more consistent eating quality has become a competitive strategy amongst retailers to gain market share, and has led to various attempts at marketing differentiated quality beef products through retailer-led co-ordinated supply chains. However, the structure of the UK retailing

sector is such that market power is also a feature, with multiple retailers able to impose their requirements very effectively on the supply chain (Mitra *et al.*, 1999). Retailers not only require supply chain members to belong to industry-led assurance schemes, which they view as the base standard, but also to meet the additional costs of complying with proprietary safety and quality requirements for own brand beef products. However, the economic benefits resulting from the success of own brands is offset by an increase in the level of risk associated with product failure for those retailers who invest in differentiated quality beef products. The more detailed their requirements and instructions to their upstream suppliers, the more they are held responsible for the safety and quality of the end product by both regulators and consumers.

From the above, it can be assumed that the cost of meeting safety and quality requirements for fresh beef products has increased at every level in the supply chain, and that there will be a consequential trade-off between incurring such costs and the perceived risks associated with product failure (Henson, *et al.*, 1998). Transaction Cost Economics (Thompson, 1988 and Williamson, 1979) has been used by researchers to examine the costs associated with meeting food safety and quality requirements and the emergence of co-ordinated supply chains (Bredahl and Holleran, 1997; Henson *et al.*, 1998 and Hobbs, 1995). According to Williamson (1991), Transaction Cost Economics is concerned with the pursuit of transaction cost minimisation through changes in organisational form in the light of shifts in the institutional environment. Asset specificity is viewed as adding to the hazards of contracting (Williamson, 1991), but from a supply chain perspective, dedicated assets manage risk, rather than adding to it. The reality is that in addition

to cost minimisation, benefits accrue to supply chain members, to varying degrees, as a result of actions taken to reduce perceived risk. An alternative approach is required which accommodates the trade off between the costs and the perceived benefits associated with product success for all stakeholders (consumers, retailer, processor and farmers) in a co-ordinated supply chain.

This paper attempts to contribute to the supply chain literature in three ways. It offers an alternative approach to the traditional Transaction Cost Economics view of information asymmetry in supply chains; presents a supply chain research methodology, and submits empirical evidence of the perceived risks, associated management strategies and benefits for all members, including consumers, of a retail co-ordinated supply chain for fresh beef. The paper is presented in four parts. The first section establishes the theoretical framework. The chosen research methodology is described in section two, and the results of the supply chain case study are then presented in section three. The final part draws some conclusions and presents recommendations for further research.

## 2. Theoretical framework

The theoretical framework views the co-ordinated supply chain for own brand beef products as a series of principal-agent dyadic relationships, in which the goals of all members are translated into agreed contractual terms. Contractual terms are influenced not just by individual goals, but by the perception of risk associated with the beef product category and the specific 'own brand' product. In particular, it is proposed that it is the level of perceived risk, rather than objective risk, which will determine both the contractual terms and the nature of incentives designed to induce both parties to act co-operatively. The following sub-sections explain and discuss the basis of the theoretical model, namely Principal-Agent theory and Perceived Risk theory.

### Principal agent theory

Agency relationships, in which the achievement of one individual's goals depends upon the action of another, pervade every aspect of social and economic co-operative activities, and the extent of the literature reflects the universal appeal of Principal Agent Theory for both sociologists and economists (Hirsch *et al.*, 1987).

Principal Agent Theory is concerned with situations in which one party, namely the principal, requires a second party, namely the agent, to undertake an action on the principal's

behalf (Jensen and Meckling, 1976 and Ross, 1973). In Transaction Cost Economics, governance structures are designed in order to minimise the costs of transacting (Williamson, 1988), but the distinctive focus of Principal Agent Theory is on the specific role of contractual provisions in modifying behaviour (Thompson, 1988). The dyadic approach of the theory is concerned with the design and form of the contract which ensures that the agent will act in the best interests of the principal, and that the overall costs to the agency relationship of ensuring such behaviour are minimised, given differing risk preferences, environmental uncertainty and information asymmetry (Bergen *et al.*, 1992).

Moral Hazard, or hidden action, (Arrow, 1985) is usually associated with post-contractual problems that emerge after a principal and agent have engaged in a relationship. When a principal has only limited information regarding the agent's behaviour, the principal has two options. One is to discover the agent's behaviour by investing in information systems, which will limit the opportunity for shirking and reveal the agent's behaviour to the principal (behaviour-based contract). The other is to contract on the outcomes of the agent's behaviour (outcome-based contract), which has the benefit of aligning the agent's objectives with the principal's, but at the price of transferring risk to the agent (Eisenhardt, 1989). Bearing in mind that outcomes are a function of both effort and uncertainty, this strategy will result in some risk shifting to the agent as the agent may receive a low return regardless of how much effort is expended. Under these conditions, an agent will require additional incentives to take on the increased risk entailed in an outcome-based contract (Hendry, 1997). The theory assumes a choice between behaviour-based contracts and outcome-based contracts, both of which will involve additional costs; the cost of the information systems, and the cost of measuring outcomes and transferring risk to the agent.

Most of the literature assumes that a principal is risk neutral, whilst an agent is typically risk-averse. Risk aversion has variously been described as a preference for a sure thing over a gamble (Besanko *et al.*, 1996), or security rather than adventure (Bergen *et al.*, 1992). Large firms who are able to spread risks, either through the manufacture of a large product range, or through the purchase of insurance, are said to be risk neutral, whilst a farmer is likely to be risk averse since his operation will be smaller and offer fewer possibilities for risk spreading (Segerson, 1990).

The risks associated with food quality and safety have increased for all stakeholders in the beef supply chain, and

risk neutrality can no longer be assumed. Consumers, acting as principals, have become increasingly risk averse due to high profile food safety incidents and now demand more information on the behaviour of their agents, the retailers. Risk has increased for retailers who have developed own-brand products, who now risk damage not only to the product category but to the overall retail brand. According to Principal Agent theory, under such circumstances, outcome-based contracts would be preferred. Principal Agent theory assumes a choice between behaviour-based and outcome-based contracts. However, contractual provisions between principals and agents in the UK beef industry display elements of both outcome based (e.g. product quantity, deadweight grades, conformation, and fat level) and behaviour based contracts (e.g. personal relationships, audits, monitoring, third party accreditation), the relative importance of which have increased over time. Clearly, there is a need for a complementary perspective in order to expand Principal Agent theory in order to better accommodate and explain consumer and organisational behaviour.

### Perceived risk theory

One such complementary perspective is Perceived Risk Theory, initially used by marketing researchers to understand the effect on consumer behaviour of making purchase decisions under conditions of imperfect information (Bauer, 1967). Cox (1967) argued that in a buying decision, a consumer attempts to identify buying goals and match such goals with product or brand offerings, but that such behaviour involves risk because the resultant consequences cannot be known in advance, and some such consequences are likely to be unpleasant.

#### Consumers

Cox (1967), and Cunningham (1967) first described perceived risk as comprising two components: uncertainty and adverse consequences. Both the probability and outcome of each purchase event is uncertain, which is a different perspective from the economic view of risk, which implies that a decision maker has *a priori* knowledge of both the consequences of alternatives and their probabilities of occurrence (Dowling, 1986). Other researchers note that risk perception is shaped more by the severity of the consequences than the probability of occurrence (Diamond, 1988; Mitchell, 1998 and Slovic *et al.*, 1980). Yeung and Morris (2001) explain that food safety risk is particularly associated with such phenomena, known as the 'dread' factor.

In addition to the two principal determinants of perceived risk - uncertainty and adverse consequences - researchers have proposed that the consequences from a purchase can be divided into various types of loss: namely, performance, physical, financial, psychosocial, time etc. (Mitchell, 1998); or functional, psychological, social and monetary (Dowling and Staelin, 1994).

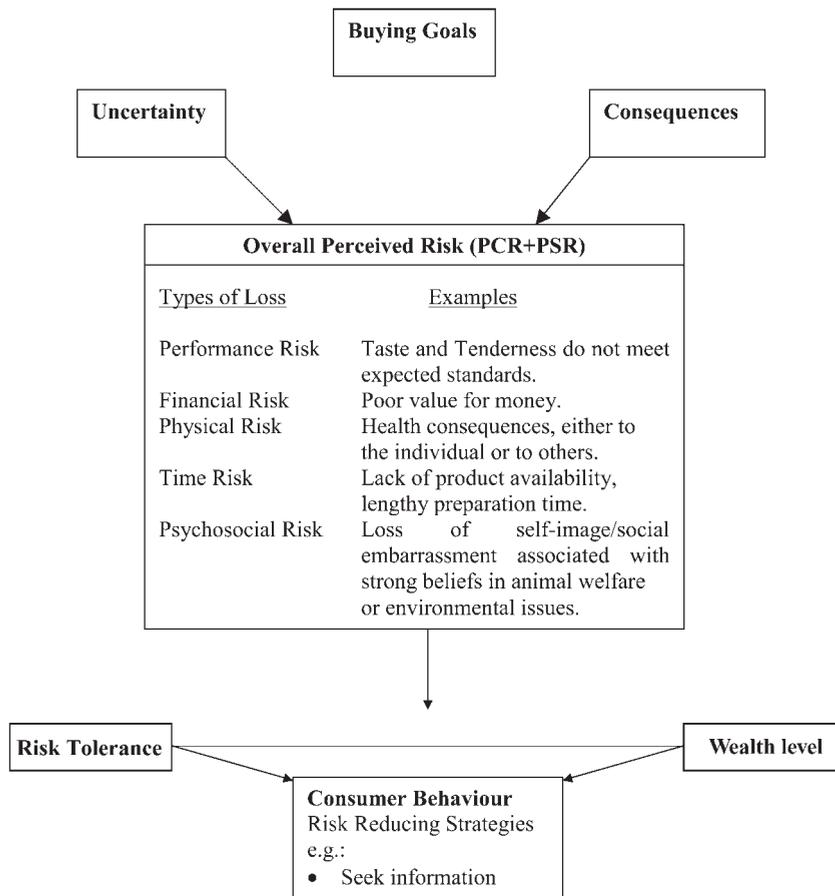
Other researchers have developed Perceived Risk Theory by describing overall perceived risk as composed of two classes of risk - alternatively described as inherent risk and handled risk (Bettman, 1973 and Dunn *et al.*, 1986), or product category risk and product-specific risk (Dowling and Staelin, 1994). Product category risk (PCR), or inherent risk, describes the perception of risk associated with a particular category. Product Specific Risk (PSR), or handled risk, is specific to the item being considered, with different products in a category associated with varying degrees of perceived risk. Total or overall perceived risk for a specific product is therefore a combination of PCR (the fixed component) and PSR (the variable component).

The overall level of perceived risk is viewed as the sum of the attributes' perceived risk levels, with the degree of risk perceived varying by individual consumer, depending on risk tolerance and wealth level, both of which impact on the ability to absorb a loss. If perceived risk exceeds the tolerable degree of the individual, then this triggers the motivation for risk-reducing behaviour (see Figure 1.)

Perceived risk can be reduced through increasing certainty and/or reducing the consequences, and seeking information is one such strategy. Information can both increase certainty that the product will not fail, and reduce possible adverse consequences if it does not meet buying goals (awareness of refunds, product exchange, compensation etc). Sources of information can be classified as either Marketer dominated communication channels (the product, pricing, packaging, promotion, advertising, etc.), Consumer dominated channels (friends and family) and Neutral information sources (media, consumer reports) (Cox, 1967).

#### Organisations

In addition to consumers, the impact of perceived risk on a purchase decision could also be extended to business-to-business purchase situations (Mitchell, 1998). The Perceived Risk framework has been used to view the positioning strategies of food retailers in the UK (Mitchell, 1998 and Mitchell, and Kiral, 1999). In contrast to the above work, which concentrates on the effect of consumers' perceptions of risk at the store level, theoretical debate on the possible



Key: PCR = Product Category Risk, PSR = Product Specific Risk

**Figure 1. Perceived risk and consumer behaviour: the case of beef.**

impact on complete supply chains has only recently emerged (Yeung, and Morris, 2001 and Zwart and Mollenkoop, 2000).

Mawson (1996, p.54) identifies that consumer goals and organisational goals differ, in that organisational demand, although derived from consumer demand, is more driven by objective elements such as product quality specification and consistency, while financial risks are generally much higher than those faced by consumers. As well as possible financial consequences, Mitchell (1998b, p85.) identifies time loss as being appropriate when applying Perceived Risk theory to organisations rather than individuals, in particular the time required to investigate, recall and replace product in the event that organisational goals are not met. Therefore, the two risk components of uncertainty and adverse consequences are translated into two distinct types of organisational loss, namely financial and time. The resultant perception of risk will then stimulate risk reducing strategies, such as increasing information along the supply

chain and/or reducing the consequences in the event that organisational buying goals are not met by, for example, including penalty clauses within contractual terms (see Figure 2).

*Summary*

A series of high profile food safety and quality incidents, changes in both public and private regulation of the market, and the greater exposure to the risks of product failure from retailer own label products have increased risk for all stakeholders in the UK beef industry. According to Principal Agent theory, an increase in the risk aversion of a Principal would lead to a preference for a purely outcome-based contract, but clearly this does not explain the development of co-ordinated supply chains which have been driven by the need for increased information and control. By taking a perceived risk perspective, such actions can be explained - it is the size of the adverse consequences rather than the probability of the risk occurring which influences risk

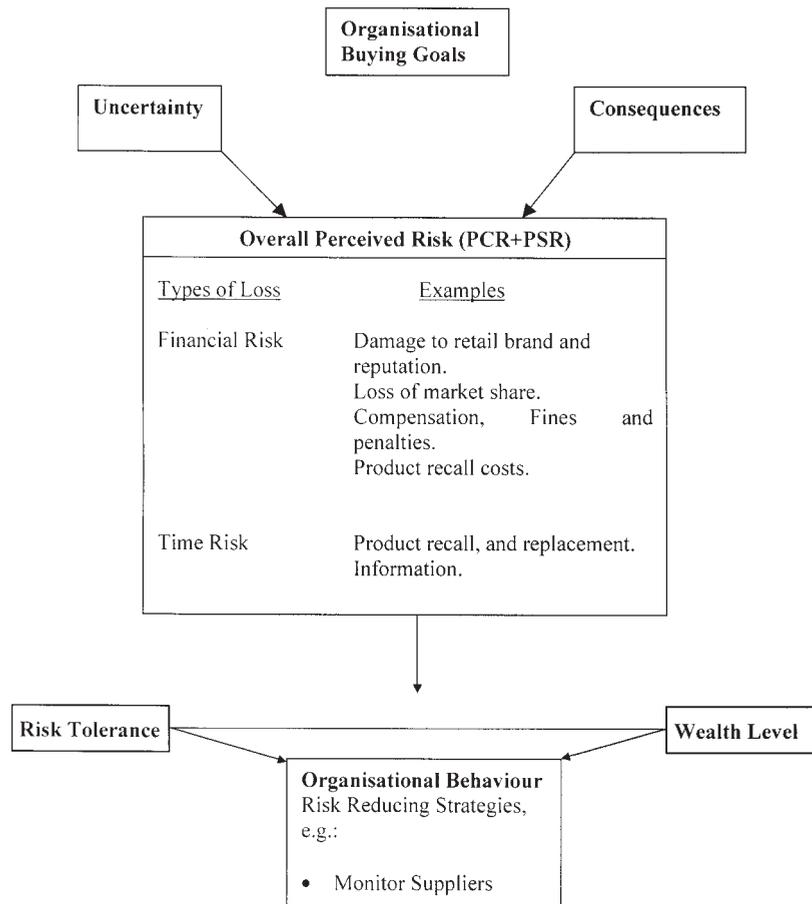


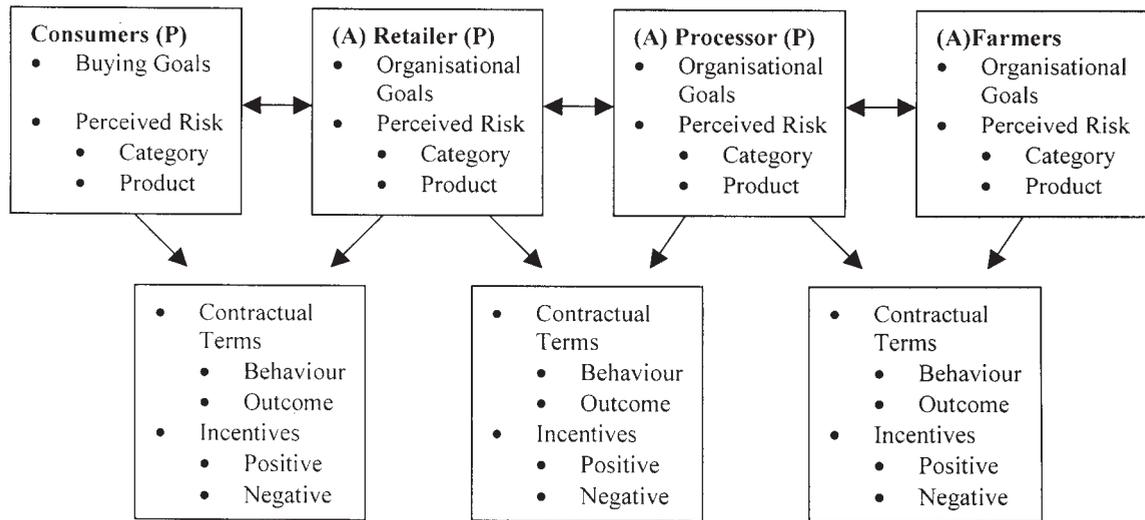
Figure 2. Perceived risk and organisational behaviour: The case of beef.

preferences and consequent behaviour. A risk averse principal will prefer a more behaviour-based contract because it will both increase information and/or reduce the consequences. Contractual terms are therefore influenced by individual buying goals and the perception of risk associated with both the beef category and the own-brand beef product.

### 3. Methodology

The case study research strategy is identified as being the most appropriate when examining 'how' or 'why' research questions; when the researcher has little control over events, and when examining contemporary phenomena. The focus of case study research is to enhance understanding and to gain insight, and are often explanatory, exploratory or descriptive (Yin, 1989). Case study research can consist of either qualitative or quantitative data, or both, incorporating multiple data collection methods including archived material, interviews, questionnaires and observations (Eisenhardt, 1989).

For the purpose of this study, a two-stage research plan was developed (see Figure 4.). The first stage was viewed as a 'stage setting' exercise, in order to gain a broad understanding of contractual relationships in the UK beef industry, including both public and private relationships and the interaction between them. As an initial step, exploratory interviews were held with representatives of key industry stakeholders using a semi-structured interview guide, in order to gain an overview of the drivers and effects over time of changes in contractual relationships. Senior personnel from British Meat Federation, Freedom Food Limited, Food Standards Agency, The Livestock Auctioneers Association, LACOTS, Meat and Livestock Commission, National Farmers Union, FABBL, National Beef Association, Product Authentication Inspectorate Limited, and Sustain. Other organisations that gave their views over the telephone included The Consumer's Association, The Guild of Q Butchers and Assured British Meat. The objective of these interviews was to obtain differing views regarding the risk associated with buying and selling beef, and the methods used to manage such risk. Following these interviews, a



Key: (P) Principal, (A) Agent.

Figure 3. Co-ordinated supply chain for retailer own brand beef in the UK.

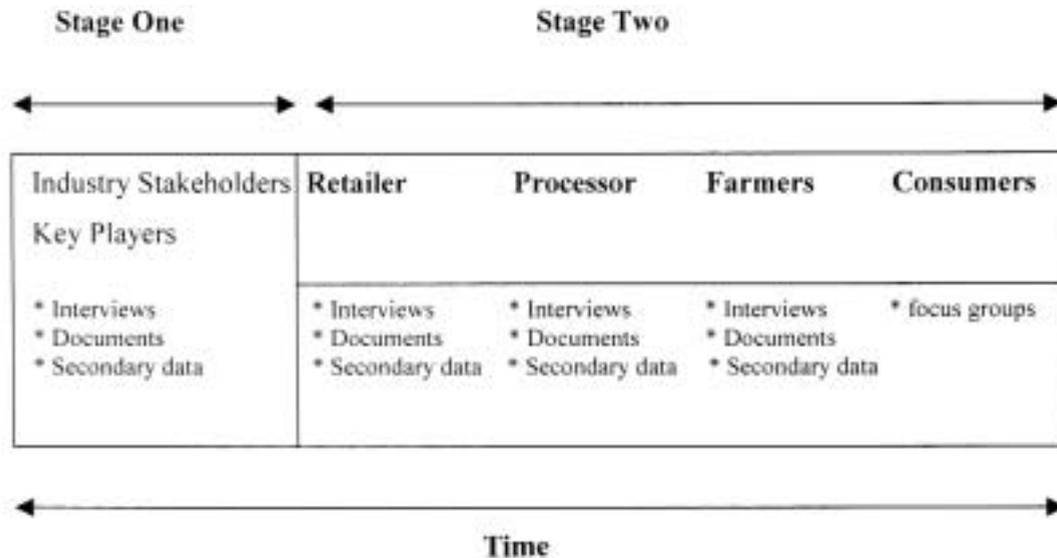


Figure 4. Supply chain case study methodology.

more detailed semi-structured interview guide was developed using constructs derived from the theoretical model, specifically organisational and buying goals, Product Category Risk, Product Specific Risk, contractual terms (behaviour and outcome based), and incentives (rewards and penalties) between principal and agent. Interviews were then arranged with the meat buyer or technologist of key distribution outlets. The objective of these interviews was to test the suitability of the interview guide, to gain the co-

operation of key players and to identify possible case studies of complete supply chains for own-brand beef products.

Following the agreement of one retailer to participate in the supply chain research, the second step involved gaining the co-operation and agreement of the rest of the supply chain; conducting face-to-face interviews using the same semi-structured questionnaire, and collecting secondary data. Having gained the co-operation of all players in the

co-ordinated supply chain, qualitative data was collected, through a series of focus groups with consumers of the own-brand beef product. Due to the request from supply chain members for anonymity, we have used pseudonyms when describing the retailer, processor and farmers' group in the following case study results.

## **4. Case study results**

### **The retailer**

Retailer A is one of the smaller food retailers in the UK, with stores situated mainly in town centre sites. It has consistently sought to increase market share through niche strategies, has a reputation for quality and choice, and a fairly narrow customer base, mainly ABC1's, whose average spend per trip is above the national average. Research has shown that the company is heavily reliant on secondary shopping in that many shoppers visit for treats and special occasions rather than for everyday groceries.

Retailer A's buying goals for fresh beef are determined by the organisational strategies adopted by the organisation in order to meet the needs of their particular customers, and in order to deliver a difference from their competitors. The risks associated with buying livestock and selling beef in general, or Product Category Risk, were identified as environmental uncertainty, such as the relatively long growing period for cattle, disease, climate, soil type, and weather conditions. In the opinion of Retailer A, the biggest risk in producing beef lay with the producers because beef production is such a long-term arrangement. A further risk was the need to add value to a commodity product. This was a particularly difficult task, because meat is the only raw material that is taken through a disassembly process, and then put back together in order to add value and improve returns for everyone in the supply chain.

In order to manage the risks associated with buying and selling beef, all producers have to be farm assured, which is viewed as the base standard. Beef producers must belong to at least Farm Assured British Beef and Lamb (FABBL), Farm Assured Welsh Lamb (FAWL) or Scottish Quality Beef and Lamb Association (SQBLA). A high HAS score for a processor is seen as essential, as well as HACCP systems in place and membership of quality management systems such as ISO 9000. From a theoretical perspective, Retailer A reduces Product Category Risk by increasing information available from both public and industry level sources on the behaviour of suppliers.

Product Specific Risk is managed through personal and collaborative relationships with suppliers, with some trading relationships lasting twenty or twenty five years. Over the past five or six years, the importance of such relationships has increased because of recent food safety incidents. The dedicated or sole supplier arrangement is viewed as essential, and successful suppliers are mainly chosen on the basis of the quality of the management, followed by physical assets.

Processors and producers are regularly visited by experienced members of the Buying and Technology team, who are able to build up relationships and expertise over time, as the retailer does not have a policy of regularly moving buyers or technologists between departments. The retailer also organises informal visits for producers to visit stores, discussion groups, and undertakes presentations at National Farmers Union meetings.

Specifications are agreed between the retailer and their suppliers, which are then written and illustrated with photographs and graphics. There are no written contracts, with everything based on a gentleman's agreement; two way communication is viewed as the key to progress, "it's trying to help producers do it better, to help us do it better". Positive incentives are offered to ensure suppliers meet their specification, and include the opportunity to develop and grow their share of the business; to access and build a market for both hindquarter and forequarter meats; to develop new products; to achieve a premium; and to become more consumer orientated. Retailer A has supported processors who have tried to introduce new products under manufacturer brands. However, processors do not have the resources to market, promote and expand the product, and Retailer A use processor labels to introduce new lines for speed or for testing. If they are subsequently successful, new lines are then translated into Retailer A's own brand. Negative incentives include financial penalties that are incurred by those suppliers who do not meet the required specification if deliveries are late, for customer complaints, and for loss of sales due to supplier incompetence. Each incident is judged on an individual basis, but the ultimate penalty is viewed as reducing orders.

Following an informal dinner conversation between two senior managers (one from the retailer and one from a supplier) during the late 1980's, Product X was developed. At the time, retailers were using continental cattle with very low fat levels, high yields, but produced beef that was tasteless. It was seen as "a bit of a challenge" - to return to traditional breeds and values, develop maturation and production methods which would "guarantee tender" beef, and deliver a point of difference between Retailer A's offering,

and other retailer products. The relationship between Retailer A and Supplier B evolved from a previous long-standing business association, in which close personal relationships with the management team had been established. Retailer A had experienced supply problems in the past when using processors who also served the other, larger, UK retailers, and had not been able to develop a dedicated supplier arrangement because of the scale of their requirements. In 1997, the opportunity arose for the original management team of a supplier to break away and buy a small, family owned farm and abattoir which they offered to Retailer A as a dedicated plant for their breed specific own-brand beef range, Product X.

### The processor

Supplier B has no other significant customers apart from Retailer A, and is responsible for about fifty per cent of the total beef business of Retailer A. The dedicated relationship is both breed specific and customer specific - Supplier B only supplies Retailer A with Product X, for which it has no other customer. In addition, Supplier B also supplies a limited amount of another breed and some organic beef to Retailer A. Retailer A has no other suppliers for those particular products. Although Retailer A had no financial input into the development of the plant, both Retailer A and Supplier B collaborated and developed the management plan. In addition, during the first few weeks of opening, managers and technologists from Retailer A helped out on the production line at Supplier B in order to meet the Christmas period sales targets. The relationship is such that all staff at the processing plant wear overalls bearing the name of Retailer A, and are encouraged to feel that they work for the retailer through regular visits to the nearest store, where they are given guided tours by the store manager. The plant was developed to the highest standards, is accredited to EFSIS (leading UK independent inspection service) independent third party standards, and the management take great pride in having the highest HAS score in the country.

Taking a principal agent perspective, the supplier acts as both the agent of the retailer, and the principal to the farmer group. Selling goals were identified as providing Retailer A with their specific requirements and guaranteeing consistency of supply. The worst possible scenario was considered to be 'letting the customer down'. Buying goals for livestock were described as obtaining consistency, which is measured against fat class and conformation.

Product Category Risk was identified as disease, such as Tuberculosis and Foot and Mouth, and the source as being

on-farm, rather than at the point of slaughter. BSE (*Bovine Spongiform Encephalopathy*) was identified as the major risk. Such risks were managed through the specification: membership of FABBL or FAWL, cattle sired by a registered pedigree bull, a specified age range, traceability to holding of birth, grass based extensively reared. Risks could also occur elsewhere in the supply chain, for instance in the chill chain or during deliveries. Fire was also mentioned as one of the biggest risks associated with abattoirs. Such risks were managed by developing contingency plans - arrangements were in place for moving the entire management and production team to another abattoir, if necessary. Possible chill chain and delivery problems were minimised by using a small, dedicated local haulier, who could react quickly when problems arose, and transship loads.

Product Specific Risk was identified as the peaks and troughs of supply, which are managed at both the retail level and farmer level. Production capacity is inelastic and therefore planning information is essential in order to either plan promotions or to push back supply by changing feeding regimes. Promotions are used at the retail level at times, especially during the summer, but the costs are borne entirely by Retailer A and Supplier B, who take reduced margins, whereas the premium paid to producers is maintained. Supplier B feels that it is very important to offer producers security by maintaining premiums, because of the long cycle of production.

The scarcity of the breed means that there has to be a wide weight range in order to meet demand, but because the range is so wide, there is inevitably more size inconsistency - "we can't actually get peas in a pod". The breed grows slower than other commercial cattle, but if they are not produced correctly, they tend to grow fat rather than muscle, and the farmer will be financially penalised. Farmers are therefore paid a premium as compensation for the costs associated with the time and skill required producing Breed X. Each animal must have the Breed X bull declared on the passport but if there are any doubts as to the parentage of the animal, Supplier B will undertake DNA testing. One other risk would be if the market became flooded with Breed X cattle, in which case both Retailer A and Supplier B would lose their niche positioning, and farmers would lose their premiums.

Incentives for Supplier B to meet the requirements of Retailer A are described as the ability to plan and to grow the business in the long term. The capacity to sell both forequarter and hindquarter beef in balance was also an important incentive. In addition, Retailer A also encourages their manufacturing suppliers to use Supplier B to supply them with forequarter

meat for Breed X prepared beef products. Financial incentives include prompt payment, which is made by EDI transfer from Retailer A on a weekly basis. Prices are only negotiated two or three times a year, with changes either up or down of approximately three per cent. Other major supermarkets will change the price weekly by around 0.6 per cent according to the market average. Prices are therefore very stable; if any changes are necessary, then it is discussed and agreed beforehand with both the farmers and Retailer A. Personal incentives were also viewed as being important, such as gentlemanly conduct from Retailer A and enjoying work - "we want to come to work, we enjoy it".

Contractual terms within this particular Principal Agent dyad exhibit examples of both outcome and behaviour based contracts. Information on supplier behaviour is delivered through close working and personal relationships between Retailer A and Supplier B; independent third party inspections; public regulatory monitoring activities, while outcomes are measured against product specification such as consistent taste.

### **The producer group**

Producer Group C trades as a farmers' co-operative, and has an annual turnover of around £40 million from marketing cattle, sheep and pigs on behalf of its farmer members. Producer Group C manages the administration associated with the supply of Breed X on behalf of Supplier B, for which they are paid a headage fee. There are approximately 700 farmers on the database, but there is a core of around 50 larger producers who supply cattle regularly, with a further 100 who supply on a more irregular basis. Smaller farmers make up the rest. Supplier B has procurement officers who visit farmers, but they view Producer Group C as being mainly responsible for on-farm visits and inspections. The positive incentive for Producer Group C to meet Supplier B's specification is viewed as continued business. On the other hand, if they get it wrong, the ultimate penalty would be loss of orders.

Selling goals for the organisation are identified as obtaining the highest price for cattle within a secure market. Farmers are classed as both customers as well as suppliers. Producer Group C work with Supplier B to identify farmers within their membership who can supply them with the product they require. The group sees their role as one of co-ordination, communicating their customers' message, i.e. the abattoirs, up the supply chain to farmer members. Members who provide scheme cattle such as Breed X for Supplier B are viewed as much more market driven, working to specific requirements such as using a particular bull for

breeding, feeding regimes, consistently meeting grade and conformation targets.

The main risks associated with selling livestock, or Product Category Risk, are viewed as the environment, such as weather, disease and climate. A further risk is bad debt where businesses go bankrupt. In order to help manage such risk, Producer Group C offer an insurance service for all stock bought from members' farms. The insurance is designed to cover the value of the stock outstanding if an abattoir went bankrupt, and consists of 90% cover by insurance with the remaining ten per cent covered by a bad debt pool. All abattoirs have to be assessed by the insurance company before Producer Group C can trade with them. A further risk is the cost, and lack of, appropriate haulage. The number of farmer members was also identified as a risk to Producer Group C. Farmers leaving the agriculture industry have affected membership size, and therefore the costs per unit for the company have increased. In order to offset this, Producer Group C have invested in IT systems in order to help those farmers staying in the industry to become more efficient and better informed.

The relationship between Producer Group C and Supplier B began with supplying about twenty breed X cattle per week, but now average around 100 per week. The specification is set by Supplier B, and includes fat class, conformation, membership of a farm assurance scheme, the use of a registered bull from the database, and extensive rearing. Producer Group C monitor the performance of their members through audits of membership of farm assurance schemes, internal audits on sire details, feeding systems, minimum farm holding and traceability, on farm visits by fieldsmen and staff of Supplier B. In turn, Supplier B determine that Producer Group C are meeting their requirements by the quality of the delivered cattle - grades, weight, cleanliness, MHS scoring, meeting delivery schedules, quantity agreed, audits. Again, in Principal Agent terms, contractual terms display elements of both behaviour and outcome based contracts. Producer Group C do have a relationship with Retailer A, but this mainly takes place via Supplier B. Members of Producer Group C have been to Retailer A open days, and have direct communication with buyers who have attended farm open days. The advantages of delivering market driven information to farmers, together with the use of on farm fieldsmen, is that very few cattle who do not meet the specification get through to Supplier B, and consequently farmers are not penalised financially.

The positive incentives for farmers to meet the specification are mainly concerned with the stable pricing strategy offered by Supplier B and Retailer A. The producer group felt that

this removed the traditional 'trading' environment in which the focus is on bargaining over price changes on a weekly basis. Prompt payment is a further incentive as Supplier B pay Producer Group C who then pay their farmers within sixteen days. Incentives for Producer Group C include the commission obtained from farmers, which can then be ploughed back into the business in order to increase efficiency, and increase market share. In addition, the security offered by having a precise market for stock, the ability to forecast and manage stock numbers, and expertise gained from dealing with Supplier B and Retailer A are also seen as positive incentives. Conversely, the negative incentives for farmers were the loss of premium incurred if specification standards were not met.

### Consumers

Four focus groups were held during a two-week period during April, 2001. Each focus group consisted of purchasers of Product X from Retailer A, of mixed gender and age, recruited in-store from four Retailer A stores, located in the South of England. Initially, twelve potential participants were recruited in store, to allow for any non-response on the day of the focus group interviews: the final number of participants ranged from eight to ten, which is considered an ideal size (Krueger and Casey, 2000).

Following a brief warm-up discussion about food shopping in general and participants' perception of Retailer A, the discussion turned to Product Category Risk with respect to beef. Not surprisingly, the risk mentioned most extensively by the discussants was BSE, but in particular by those participants who had children or were concerned about other people's children. The concern was primarily with processed beef products, and for those with older children, what their children ate out of the home. The reasons given were the length of time for the disease to present itself, the difficulty in accurate diagnosis, the specific effect on younger people, the uncertainty associated with the cause, and the future extent and impact of new variant *Creutzfeldt-Jacob Disease* (nvCJD).

Other risks associated with the beef category were the use of hormones and antibiotics, the poor standard of hygiene in supermarkets, the age of the animal before slaughter, and E-Coli. The health problems associated with cholesterol and the link with consumption of red meat were also a cause for concern for some, as was the nature and source of animal feed. Price was only mentioned by a few people in one of the groups as being an issue for concern when buying beef, but not at the expense of quality.

Credence attributes, such as food safety, nutritional and process attributes represent the main concerns associated with the beef category by consumers from Retailer A. Credence attributes are associated with higher levels of perceived risk because they are associated with lower levels of pre-purchase knowledge (Mitra *et al.*, 1999). The type of adverse consequences associated with such attributes can be classified as resulting in both physical loss, in terms of health, and psychosocial loss. From a perceived risk perspective, it would seem that the severity of the adverse consequences associated with BSE and the resultant physical risk, rather than the probability of occurrence, was an influencing factor on behaviour. It was also apparent that physical risk was also a concern, not just for participants, but for others, especially children and families with children. From the comments and attitudes of the participants, it would seem that BSE and nvCJD are particularly associated with the 'dread factor' as identified by Yeung and Morris (2001), and can therefore be classified as a Low Probability/High Consequences situation (Yeung and Morris, 2001).

According Cox (1967), one strategy available to consumers to reduce the perceived risk associated with beef is to increase information, and the four groups were specifically asked to describe what information they sought and from where. Most of the discussants were able to identify and discuss their sources of information although it became clear that some sources of information were not consciously viewed as such, but emerged during the course of the discussion (see Table 1.).

No mention was made of the Internet as a source of information regarding beef. Significantly, after some discussion, it became obvious that many people did not listen to nor believe the information that came from government sources. A minority mentioned the Ministry of Agriculture as a source of information, no one mentioned the Food Standards Agency, and one individual felt there was a need for an independent source of information, and suggested there might be a role for a Ministry for Food.

It became very clear that the provision of information was associated with strong feelings of confusion, mistrust, and concern, with most members of every group mentioning the need for clarity, or the provision of more information. One group felt that more information, including the correct cut of meat and the best cooking time and method, should be provided on the front of prepacked beef rather than on the underside of the label, because consumers needed to know the information before purchase. In other words, these particular consumers were requesting that information

**Table 1. Consumers of brand x - information channels.**

| Information channel         | Examples   |
|-----------------------------|--|
| Marketing dominated channel | Promotional material<br>Symbols<br>Packaging<br>Sell-by dates<br>Leaflets<br>Special offers<br>In-store promotions<br>Butchery and counter staff       |
| Consumer dominated channel  | Past experiences<br>Children<br>Other family members   |
| Neutral channels            | Newspapers<br>Radio programmes<br>Cookbooks<br>Cookery tv programmes<br>Magazines<br>TV celebrity chefs<br>Cookery classes<br>Ministry of agriculture* |

\* Now known as the Department for the Environment, Food and Rural Affairs.

currently available post purchase should be made available as pre-purchase information, in order to increase the certainty that the consequences of such a purchase would not result in one type of loss associated with perceived risk: time loss. Symbols and labels such as Freedom Food, Organic, British and the Farm Assured label were all discussed, with some participants expressing their bewilderment associated with the lack of understanding of such standards. Such bewilderment was expressed by both male and female participants, and across all age groups. From a Principal Agent perspective, such comments reveal the imperfect nature of systems designed to deliver information regarding both the state of nature and an agent's actions.

Turning to Product Specific Risk, discussants were asked if they had ever experienced problems with the quality of Product X, and if so, what action had they taken. Most people had never experienced any problems with the quality of Product X, but two people did discuss occasions when they had been disappointed, but neither of them took the beef back to the shops, or complained to Retailer A. However, in the general discussion, people did discuss how they might react and why. Most people felt that their reactions would

depend on the nature and severity of the problem, the timing of the problem, how much blame they apportioned to themselves, and whether they had the time to act. From a perceived risk perspective, it would appear that the adverse consequences associated with time loss was the most important factor influencing their behaviour.

Nobody felt that they would avoid buying Product X, or switch stores, if they were ever disappointed with the quality of the product and had to take it back or complain. However, some participants mentioned the willingness of Retailer A to refund or replace any disappointing items. From a perceived risk perspective, the availability of refunds or replacements can be viewed as a post purchase risk reduction strategy in that it reduces the adverse consequences of a purchase.

Finally, participants were asked to describe why they bought Product X from Retailer A. Buying goals included the flavour, safety, and quality of the meat, consistency, reputation, origin, purity, and hygiene standards. Other reasons included the service and friendship from the meat counter staff.

Other comments revealed the risk reducing strategies of some consumers, who reduced their perceived risk associated with the beef category by only purchasing Product X, because it increased the amount of certainty that the product would not fail, and in addition reduced the negative consequences through the availability of refunds or exchanges.

Some people were able to express their feelings about their relationship with Retailer A, which enabled them to buy Product X, despite having concerns regarding beef in general. Trust and belief in the retailer were identified as being important determinants of product choice, and therefore, risk reducing behaviour. Moreover, some people only bought Product X beef from Retailer A, and would not buy beef from any other outlet. From a theoretical perspective, such consumers could be viewed as high risk perceivers, who would rather limit their choice set than risk possible disappointment, whilst others, possibly lower risk perceivers, would also buy beef from their local butchers or from other supermarkets.

## 5. Conclusions and recommendations

In the UK, consumers have become increasingly concerned about food safety and quality issues, particularly those risks that have potentially severe consequences and are little understood, such as nVCJD. For retailers, the economic benefits derived from the success of own brand beef products is tempered by the increase in the possible penalties imposed

by both risk averse consumers and regulators in the event of product failure. The impact of adverse consequences is not just confined to the beef product category but affect the overall retail brand, and consequent market share. As such, consumers and retailers can be described as risk averse. According to Principal Agent Theory, a risk averse principal would prefer an outcome-based contract in which agents are rewarded purely on achieving specified outcomes, assuming that such outcomes are easily observed and measured. However, the choice between outcome-based and behaviour-based contracts is based on an objective view of risk, which implies that a decision-maker has *a priori* knowledge of both the consequences of alternatives, and their probabilities of occurrence (Dowling, 1986). By including the effect of perceived risk, in which it is the size of the possible adverse consequences rather than the probability of the risk occurring that influences behaviour, the result is different. Assuming that contracts can be placed along a continuum from purely outcome-based to purely behaviour-based, a risk averse principal will prefer a more behaviour-based contract because information will both increase certainty and reduce adverse consequences.

According to Principal Agent theory, information systems only deliver information to the principal on the behaviour of the agent. However, the empirical evidence shows that this is clearly not the case. By taking a perceived risk and supply chain approach, information on the behaviour of the principal is also delivered to the agent, for example when Supplier B and farmers from Producer Group C visit and meet with Retailer A. In addition, Principal Agent theory only considers objective monitoring, and not subjective monitoring of agent behaviour (Arrow, 1985). The research findings identify the importance of such subjective monitoring systems through personal relationships along the co-ordinated supply chain. From the consumer behaviour literature, past research has demonstrated that on the whole, the higher the magnitude of perceived risk, the greater the importance of information search (Dowling and Staelin, 1994) and in particular, personal sources of information in making the decision (Mitra *et al.*, 1999). The findings from the consumer focus groups underline the importance of personal relationships (butchery and counter staff) and the high degree of trust that consumers place in the retailer. Moreover, the chain perspective of this case study underlines the importance of personal relationships in each dyad. In contrast, the considerable investment in 'institutional' risk reducing programmes, such as on-farm Quality Assurance schemes have clearly been effective in reducing risk from a retailer perspective,

but far less so in the eyes of the consumer. This suggests that scope exists to improve and extend the benefits from such schemes - an important finding given the resistance to their implementation amongst beef producers.

Principal Agent theory has been criticised because incentives are virtually always expressed in monetary form, with no consideration of socially mediated rewards, which eventually have economic consequences (Arrow, 1985 and Shaw and Gibbs, 1995). In addition, industry observers have criticised the price focus prevalent in the beef industry (Fearne, 1998 and Rickard, 2000). The focus of Transaction Cost Economics is on the costs of supply chain behaviour, with little emphasis on the form and distribution of possible benefits. However, by using the theoretical framework, the case study findings, identify both short and long-term economic and personal incentives to meet contractual obligations, which both satisfy organisational goals and reduce perceived risk at every point along the supply chain. From a supply chain perspective, if contractual terms between a Principal and Agent recognise the perceived risk at each point along the supply chain and offer incentives to overcome them, then the total costs for the supply chain associated with a conflict of interests are reduced. In particular, the additional monitoring and inspection costs associated with proprietary assurance schemes borne by the processor and farmers can be viewed as an investment which is then offset by the range of incentives offered from belonging to a co-ordinated supply chain, provided that the benefits are effectively communicated at the point of sale.

By examining co-ordinated supply chains as a series of Principal Agent relationships, the case study findings provide evidence that both the previous dyad and the perception of risk influence contractual terms, including the incentives. The development of own brand beef products can be viewed as a strategic reaction by retailers to consumers' perceived risk associated with the beef category. Taking a marketing perspective, organisational goals are derived from customer needs, and therefore the specification of the product and consequential contractual terms between retailer and processor, and processor and farmer, are designed to meet such goals and to reduce consumers' perceived risk associated with beef. Contractual terms that include asset specificity can be viewed as offering incentives that reduce the perception of risk for both Principal and Agent, as evidenced from the above case study. Retailer A reduces the threat of opportunism associated with using processors of beef who serve the larger multiple retailers, whilst Supplier B reduces

the risks associated with the long term security and growth of the business.

By examining perceived risk as a combination of both the perception of risk associated with the category and that associated with the product, regulatory and industry led initiatives which increase information can be viewed as targeting Product Category Risk. However, the higher perceived risk associated with developing a brand requires risk reducing strategies which also target Product Specific Risk, leading to the development of proprietary assurance schemes.

If organisational behaviour is driven by perceived risk, then public policy should be focused on using limited resources to identify those firms who do not meet regulatory minimum standards, and increasing the penalties for non-compliance. In addition, regulators should review the distribution of the costs associated with public monitoring, given that the market offers greater incentives to meet food safety and quality standards.

One threat to domestic based co-ordinated supply chains is the emergence of global supply chains, driven by innovations in information, transport and production technologies, resulting in diminishing trade barriers. An area for possible future research is the effect of such changes in the operating environment on perceived risk and the consequent structure of co-ordinated supply chains.

From a theoretical perspective, it can be argued that the revised framework offers a more powerful model for viewing contractual relationships within a co-ordinated supply chain. The case study comprises the supply chain for one of the smaller, niche retailers and involves small volumes of a scarce product; therefore results cannot be generalised to other supply chains in the UK beef industry. However, the revised theoretical model together with the research findings, provide a relatively rich hunting ground for further theoretical development and empirical research, the results of which can only add to our knowledge of supply chain behaviour.

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