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Does traceability play a role in retailer's strategies for private labels?

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Abstract

Traceability is helping retailers manage food safety risks and support product differentiation. This paper aims to investigate how traceability may be used to screen supplier for private labels dedicated provider pools. Retailers in the UK and Italy have several private label product lines and increasingly select dedicated suppliers. The choice of providers is a typical agency problem as retailers contract the production for their private labels, having incomplete information on types and effort of their suppliers. Different contracts must be designed for suppliers of private labels depending on position of the product line and its food safety risk. A case study, based on the second largest Italian retailer reveals that traceability and quality assurance schemes are used together to manage suppliers of private labels.

Keywords - Traceability, dedicated providers, food products, retailing, vertical coordination

JEL codes - Q13, Q18, L81, L66, L15

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1. Introduction

Food safety and quality attributes are among the main factors affecting consumer perceptions and preferences, impacting their choices and expectations (Grunnert, 2005). Also, consumers are becoming more heterogeneous in their quality perceptions, and there is an increasing demand for products with differentiated quality attributes to which not only manufacturers but also retailers are increasingly catering (Henson and Northen, 2000; Golan et al., 2004).

The implementation of private food quality and safety labels along with quality standards is thus critical for food processors and retailers and is driven by both consumers and public authorities (Caswell, 1998; Holleran, Brendahl and Zaibet, 1999). In this context, traceability systems are gaining prominence amongst the measures used to guarantee food safety and assuring the quality of food products. The implementation of such systems is driving the reorganization of vertical relationships within the supply chains (Issachou, 1996; Banterle et al., 2006).

In the European Union traceability became mandatory for the beef sector by Reg. 1760/2000 and then for all other food products, since January 2004, by Reg. 178/2002. The later only requires a simple system to identify agents one step up and down the chain, but it allows for operators in the food chain to set their own more stringent voluntary traceability scheme. Retailers have been particularly active in setting traceability systems along with quality assurance schemes (Henson and Reardon, 2005). They have been adopting more precise and complex traceability systems to support the development of their private label products. Retailers often impose more demanding systems than the mandatory requirements (Souza Monteiro and Caswell, 2009).

These systems are adopted in order to: achieve a more precise traceback of food products; guarantee food safety and differentiate the quality of private label products. Retailers may use different levels of traceability for different private label product lines. In any case, retailer voluntary traceability systems lead to a reorganization of vertical relationships within the supply chains and facilitate procurement strategies (Hatanaka et al., 2005). It seems that retailers are using traceability to both screen and manage risk of farmers or processors for their dedicated providers pool.

Focusing on retailer traceability systems designed to support private label products, the purpose of the paper is to analyse changes introduced by such systems to the vertical organisation of supply chains. More precisely we aim to show how traceability is helping the selection of suppliers, affecting the type of contracts used and incentives for suppliers. The principal agent model framework helps understand the nature of the relation between retailers and suppliers proving for private labels. This approach supports a case study describing the procurement strategy of an important retailer in Italy. This retailer uses a private label created to market products produced according to the integrated pest management system and controlled supply chains.

The paper is organised as follows: section 2 deals with the economic issues of traceability; the link between private labels and traceability systems is analysed in section 3; the model principal agent is presented in section 4, whereas section 5 is dedicated to the case study. Finally, in section 5 some concluding remarks are set down.

2. Economics of traceability

2.1 Objectives of traceability systems

In general, it is possible to distinguish two different traceability systems within the European market, a mandatory and a voluntary one. These two systems differ from one another by the institution setting its rules and on the characteristics of the system implemented (Banterle and Stranieri, 2008). From the retailer point of view, the adoption of a voluntary traceability system, has two main objectives:

- Food safety risks management and non-compliance costs reduction,
- Product differentiation in terms of quality.

In Europe voluntary traceability systems have more specific objectives, rules and controls regarding food safety management than mandatory ones, consequently they seem to achieve higher level of safety (Charlier and Valceschini, 2007). By keeping a record of the path of products from primary production through the chain to shops, the retailer can minimize or even prevent the consequences of a food safety hazard. This is because if a defect is detected in a given product, traceability enables not only a quick identification of the product's source but also the location of other potentially defected products from that same origin (Hobbs, 2004).

Indeed, in the case of food contamination, separate batch management within a firm and along traced supply chains allows for an efficient organization of material flow, enabling the firm to withdraw specific tainted batches (Charlier and Valceschini 2008). Thus, voluntary traceability can lead to a reduction in recall expenses and the attribution of specific liabilities to agents in the traced supply chain (Banterle and Stranieri, 2008).

Moreover, the introduction of voluntary traceability within assurance quality standards can improve the legitimacy of claims over food quality attributes (Holleran, Brendahl and Zaibet, 1999). Because firms in supply chains adopt specific quality assurance schemes and have certain types of control, it is possible to reduce the costs of non compliance and facilitate product differentiation. Therefore, traceability can be used to construct or prove the quality of a product, if it enables the identification of causes of quality in a given product, and it can be used as a tool for product differentiation (Green and Hy, 2002).

2.2 Reorganisations of vertical relationships

A proper implementation of voluntary traceability systems requires the reorganization of transactions among supply chain agents. This is leading to the introduction of new modes of vertical coordination and providing new transaction governance. Such reorganization is mainly connected to three elements (Banterle and Stranieri, 2008; Banterle et al., 2006):

1. Centralization of the traceability system management through a leadership role,
2. Organisational adjustments in the partners,
3. Implementation of specific contracts, called supply chain agreements.

The firm that promotes the introduction of traceability, in our analysis the retailer, then acts as the leader of the supply chain, coordinating the activities of the other agents, and can be in charge of the certification of the system. Thus, the design of the supply chain agreement, including production rules, the management of information and the planning of the controls are centred in this firm. Therefore, the introduction of a voluntary traceability system leads to a centralized mode of organization for the activities within the supply chain (Ménard and Valceschini, 2005).

Partners in the traced supply chain have to introduce organisational adjustments in the production process some to implement the traceability system. For example

there must a clear association of appropriate information to single batch of products. Therefore, the partners have to adopt the procedures to record information established in the traceability system, to implement the quality production rules, to make the necessary investments and to face the costs to manage the system. These efforts lead to an increased bilateral dependency among the economic agents involved in the traced supply chain.

Supply chain agreements define: precise rules on the size of batches; separate batch management; and procedures to record batch information. Moreover these agreements assign specific responsibilities to supply chain agents whenever products do not comply with food safety and quality requirements.

From a transaction point of view, the introduction of a voluntary traceability system can determine an increase of the transaction asset specificity, a reduction of the transaction uncertainty and a variation of transaction costs (Banterle and Stranieri, 2008; Ménard and Valceschini, 2005). Moreover, the implementation of voluntary traceability and the reorganisation of vertical relationships brings also to the rise of some adaptation costs for certified suppliers. In this context, it is interesting to understand which kind of incentives if any, can be introduced by the retailer to assure the correct executions of supply chain agreements.

3. Private labels and traceability systems

Most retailers operating in the EU have developed sophisticated private label product labels. For example Sainsbury in the UK has the “Basics” and the “Taste the Difference”, while Carrefour in France, Italy and Spain has the “Carrefour products” and “Filiere Qualite”. These different product lines cater different costumers and have different characteristics. Hence we would expect different procurement pools for each of these product lines. Consequently there may be differences in the quality assurance schemes and on traceability for each of these product lines. For the premium private labels retailer may be more demanding in their requirements, while for value offers the focus is on lower prices and therefore there is a pressure to cut costs, which may lead to lower standards.

On the other hand, not all foods present the same safety risks or have identical distribution channels. For example pasteurized milk may be considered an almost risk free product, while fresh pork has a higher chance of being contaminated with

Salmonella (van der Gaag et. al., 2004). Therefore, we would expect retailers to have different requirements for different providers.

While the platform on which the traceability system sits may be the same, different product lines and products may require distinct traceability levels. Golan et al. (2004) define traceability in three dimensions: depth, breadth and precision. Different combinations of these dimension lead to varying levels of traceability. Table 1 relates products food safety risk to product lines showing how they may vary over traceability dimensions.

Table 1: Relating safety risk, product lines and traceability levels

	High quality	Standard quality
High risk	Breadth: ++ Precision: ++ Depth: ++	Breadth: + Precision: ++ Depth: ++
Low risk	Breadth: ++ Precision: + Depth: ++	Breadth: + Precision: + Depth: +

Table 1 suggests that a retailer would be more cautious when selling premium private label products with high food safety risks, for example cheese produced with raw milk has a higher probability of being contaminated with Listeria. Therefore if Sainsburys has a 'Taste the Difference' Cheddar produced with raw milk, we would expect it to demand not only a much stricter quality assurance requirement, but also more detailed information on the origin and hygiene in the traceability system. On the other pasteurized milk on the "Basics" product line should have a less demanding quality assurance requirements and a lower traceability level.

The point is that traceability may be an additional tool to select or screen providers. Put it another way, those sellers aiming to get premium prices may want to signal their quality by their willingness to provide more information. As retailers widen their private label range they must get more involved in production and processing practices. They have to adopt different procurement strategies and manage not only commercial but also food safety risks. While it may be unlikely that retailers will own farming or processing operation, they nevertheless have an incentive to have a tighter control of upstream operations through different forms of vertical control. A suitable framework to analyse this problem is thus agency theory.

4. A principal agent procurement model with traceability

The choice of dedicated providers and the contract arrangements set by retailers can be analyzed using the principal agent framework. Clearly in procurement strategies there is asymmetric information, the buyer cannot completely assess the characteristics of the farm or processing plant, nor the ability of farmers or processors. Moreover, once a seller is selected to the pool of providers it is not possible to fully observe how much effort does he or she exerts.

The objective of the retailer (the principal in our case) is to maximize his expected utility, which has three main components: revenues from sales of private labels, liability or recall costs due to safety failures (non compliance costs), and compensation to suppliers. The challenge is to design a menu of contracts to select suppliers (the agents) to a pool such that they deliver the quality level required at the least possible costs. Retailers then face a challenging task, i.e. design a contract or a menu of contracts (in the case of selection of providers for different product lines) such that each provider reveals its type and exerts the appropriate effort level. In short, the problem of the principal is twofold:

- Select suppliers for a specific level of quality connected to a specific line of private label products, avoiding the adverse selection,
- Design a contract that leads the agent to exert a level of effort to deliver the quality level required, avoiding the moral hazard.

Suppliers get utility from the compensation paid by the retailer for the sale of their output, but have disutility associated to production costs, which increase in effort levels. Note that not all suppliers have the ability or capacity to produce high quality products. Moreover the more effort a supplier puts on production the higher its quality.

If the type of supplier and its effort level were perfectly observable to the principal he could set a complete contract stating the levels of quality and paying for it at marginal cost. However, neither the type nor the effort level is observable to the principal, as the suppliers hold private information. Therefore a retailer selecting providers for their private label products faces both adverse selection and moral hazard. It then faces a challenging task, i.e. design a contract or a menu of contracts (in the case of selection of providers for different product lines) such that each provider reveals its type and exerts the appropriate effort level.

Traceability can mitigate information asymmetries and help the principal select supplier for the pool. The retailer can then use different levels of traceability to differentiate screen suppliers. However, when designing the contract the supplier's private information must be taken into account. To make suppliers reveal their information the principal has to first solve the problem of adverse selection, which translates into defining a participation constraint such that the supplier reveals their type. In practical terms, by attaching a certain payment to a given level of traceability the retailer is forcing the supplier to reveal some of his private information. Second, retailers need to motivate the agent to put exert the appropriate effort, which translates into the definition of an incentive compatibility constraint.

Now recall that table 1 identifies four possible types of private labels. The usefulness of a principal agent framework is that it helps thinking of which contracts would we expect to observe for each of those situations. Depending on the food safety risk and on the quality of the private label different participation and incentive compatibility constraints would have to be defined. Different private label product lines should have different providers. For example one would expect to observe differences in the contracts between providers of the Sainsburys 'Taste the Difference' Italian Olive oil and the "Sainsburys Basics Olive oil". Traceability enables the reduction of information asymmetries between parties in supply chain relations (Souza Monteiro and Caswell, 2010). Thus it may be seen as an element of a contract between retailers and its dedicated providers. For products presenting low food safety risks and in value product lines, the mandatory level of traceability may suffice. In such case, retailers will not be willing to pay any information rents to its providers. However for premium products the retailer has more in stake and cannot choose an inadequate provider as it risk loosing consumers trust. In such case the contract must be design such that it creates an incentive for providers to reveal their true type and exert the efficient level of effort to produce the required quality. This may require the payment of information rents.

5. Case study on an Italian retailer: Esselunga

Esselunga was founded in 1957 in Milan and is the second largest Italian retailer. It has 128 different stores in the middle-north of Italy subdivided into

supermarkets and superstores. This retailer's main strategy is to offer a variety of high quality food products and to promote the sustainability of food production.

Esselunga has four different private labels that differ in terms of qualitative attributes of products: 'Esselunga', 'Esselunga top', 'Esselunga bio', 'Naturama'. The 'Esselunga' label specifically refers to conventional processed food. The 'Esselunga top' sorts products with specific sensorial characteristics and renown on the Italian cookery tradition. Examples are fresh pasta, olive oil, fish, jam, butter, pizza, chocolate and other products of the confectionery industry. 'Esselunga bio' relates to organic farming and provides both fresh and processed food products. Finally, the 'Naturama' private label, sets a specific quality scheme for products such as beef and chicken, fruit and vegetables, fish and eggs. The different private labels product lines have different quality assurance schemes and traceability systems.

Our case study mainly focus on the last private label described, i.e. Naturama. This private label has been created to identify products produced according to the integrated pest management system and controlled supply chains. The reorganisation of the supply chain for the production of Naturama label requires a higher level of traceability, requiring a more sophisticated batch management.

The implementation of this system forces the retailer to have closer vertical relationships. The purchasing strategy for products under the Naturama label involves a centralised mode of supply chain relationships organisation. This improves management of product flows along the supply chain and allows for a tighter control of the product. Esselunga mainly contracts with processors, cooperatives or traders, but it controls the quality all along the supply chain from the farm to its shops. Processors, cooperatives or traders are selected by Esselunga based on their ability to assure not only the required quality but also a sufficient quantity to meet consumer demand. In short, although Esselunga only deals with the agents aggregating product from farms, it applies quality assurance schemes and monitors all agents in the supply chain.

The construction of the Naturama supply chain is based on an efficient selection of the type of suppliers responding to the retailer requests regarding this private label. It is therefore critical to carefully design an adequate contract, specifying the quality attributes required for the Naturama label.

When selecting suppliers for the Naturama supply chain Esselunga has two main challenges. First it needs to select only those suppliers that can both assure the quality required on the quantity demanded, in other words it must avoid adverse

selection on the choice of the adequate suppliers. The second problem is to make sure the hired supplier does not shirk, that is it puts the effort require to produce a high quality product. This implies reducing moral hazard.

With regard to the suppliers' selection process, Esselunga is mainly concerned with the pool of undifferentiated fresh food products. Suppliers for these products are selected based on their entrepreneurial capabilities and suitable size to participate to the pest management system and controlled supply chains. Once selected the potential suppliers, the retailer frequently visits these producers to monitor their actual capacity and assess the ability of these firms to perform at their potential. If the retailer judgment is positive, it actively supports the supplier in the adjustment process to implement rules of the pest management system.

The selection of certified suppliers and their adjustment with new rules may take a long time, in average between six and twelve months. Therefore, the suppliers process selection implies high transaction costs and increases the bilateral dependency between the retailer and the suppliers.

With regard to the creation of an efficient contractual system able to reduce moral hazard of suppliers, Esselunga introduced supply chain agreements containing specific rules. These relate to specific farming and food processing activities and also detail control procedures along with other commercial aspects. Moreover, the retailer introduces a traceability system connected to the production rules of Naturama private label in order to increase transaction transparency and reinforce the suppliers liability. Indeed, in case of non-compliance the retailer can reconstruct the complete history of the product and precisely identify the responsible. In addition to this, Esselunga can also introduce a suspension of the certified food supply up to three months.

The suppliers' utility in complying with the certified supply chain Naturama is connected to several factors, namely: higher prices comparing to other retailers, shorter payment periods, and, above all, the prespective of a long term perspective in terms of sales and the opportunity to grow in terms of firm capacity to stay on the market.

The organisation of the supply chain supported by Naturama quality scheme and traceability system lead to a strong bilateral dependency among the economic agents of the chain and to an increased transparency in the transactions, bringing about steady economic relationship between retailer and suppliers.

This case study reinforces the idea that selecting providers of private labels is clearly an agency problem. The case study briefly outlines the mechanisms use to

ensure information asymmetries linked to adverse selection and moral hazard are reduced.

6. Concluding remarks

Retailers are increasingly using private labels to increase profits and meet consumer demand. While in the past private labels were mainly found on the value product category, there is now a trend to include premium products on the private label portfolio. This entails a more sophisticated procurement strategy. This paper argues that traceability, combined with quality assurance schemes, is being used as a tool to screen and then control dedicated providers of private labels for premium products.

We argue that selecting providers for private labels is a typical agency problem, as the retailer gains utility from farmers and producers efforts. One of the problems facing the retailer is asymmetric information, as neither the type nor the effort level are observed by the retailer. Information asymmetries lead to additional costs when setting transactions, thus they can be seen as one of the categories of transactions costs (Laffond and Martimort, 2002). Therefore, the problem of the retailer is to design a menu of contracts such that producers not only reveal their types but also have an incentive to exert the optimal effort level. Depending upon the market position of the private label and the food safety risk of the product different requirements will have to be defined in contracts. We pose that, among other elements, these contracts may differ on the level of traceability. For example, we expect the level of traceability required from a supplier of a premium private label with a high food safety risk should be also higher (in terms of precision and breadth) than for a value private label.

Our insights were confirmed by in-depth interviews managers from the second largest Italian retailer. This retailer has four private labels catering different types of consumers. One of its private labels (Naturama) has a sophisticated process of selection of suppliers for the dedicate providers. This process involves a selection based entrepreneurial and production capability. Then visits to the facilities assess the potential for performing to the requirements to reduce adverse selection. Finally, technical assistant, frequent monitoring and traceability of small batches are put in place to reduce moral hazard.

This paper is part of a wider research program investigating the role of traceability systems in procurement strategies. Here we argue that traceability can be combined with quality assurance schemes to screen producers for a dedicate providers pool. An opposite argument is that suppliers may adopt certain practices and levels of traceability to be selected for a given pool. This way traceability could be used as a signal. We plan to conduct a survey to Italian producers asking about their strategies to get a contract to supply private labels.

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