Actors co-ordination: governance structures and institutions in supply chains of protected designation of origin

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Abstract

In the first part of this article, we present the theoretical foundations of Transaction Cost Economics (TCE) (Williamson, 1985 and 1996). Co-ordination in the supply chain is certainly a major aspect for the success of the PDO product (Protected Designation of Origin) and for the competitiveness of the firms producing and marketing it. TCE helps us to have a systematic approach in the comparison of governance structures (how firms organise transactions) in different PDO supply chains. The attributes of the transactions (asset specificity, frequency and uncertainty) partly explain the encountered arrangements. We show that they are not sufficient to explain all the observed arrangements because TCE considers governance structures between two private operators (bilateral agreements). It is limited when we come to institutional arrangements set up on a collective basis at a meso-economic level (multilateral arrangements).

In the second part of this article, we highlight the diversity of PDO supply chains regarding the number of firms at the different levels. We give a list of issues which must be co-ordinated at a meso-economic level in PDO supply chains and we focus on the influence which a collective management of the supply chain can have on the arrangements of private operators. We thus highlight the strong diversity of responses to problems common to PDO supply chains. As a conclusion, we call for further research in the field of collective management of food supply chains.

Keywords : PDO products, supply chain, organisation, co-ordination, transaction cost economics

INTRODUCTION

The goal of this article is to show the complexity of the institutional system in PDO supply chains which has a direct effect on how private firms organise their transactions. Co-ordination exists at a meso-economic level between the firms which produce a common good. It modifies the environment of the firms thus having an impact on private arrangements.

In the first part of the article, Transaction Cost Economics (Williamson, 1985 and 1996) helps us to have a systematic approach in the comparison of governance structures (how firms organise transactions) in different PDO supply chains. The attributes of the transactions (asset specificity, frequency and uncertainty) explains partly the encountered arrangements. We will show that they are not sufficient nevertheless to explain all the observed arrangements because Transaction Cost Economics considers governance structures between two private operators (bilateral agreements). It is limited when we come to institutional arrangements set up on a collective basis at a meso-economic level (multilateral arrangements).

In the second part of the article, we look at different PDO supply chains. We want to show their diversity in terms of number of firms and concentration of enterprises. We also want to highlight the problems of co-ordination that all PDO supply chains have to solve. Their ability to co-ordinate on certain objectives has for us a direct influence on their performance although we do not try to measure the performance of PDO supply chains in this article. We will give a list of issues which must be co-ordinated at a meso-economic level and we will show how a collective management of the supply chain can have an influence on the arrangements of private operators. We want thus to highlight the strong diversity of responses to problems common to PDO supply chains.

1. ORGANISATION OF SUPPLY CHAINS AND TRANSACTION COST ECONOMICS

1.1. Transaction Cost Economics : theoretical foundations and open questions

Transaction Cost Economics (Williamson, 1985 and 1996) is the most developed theory to explain why some transactions between firms are organised in a certain way and other transactions in a different way. The selection criteria of "governance structures" for the organisation of the transactions is the main topic of the theory.

In TCE, Williamson identifies *three different ways of organising transactions* (governance structures) : the *market*, the *firm* and the *hybrid forms*.

TCE poses the problem of economic organisation as a problem of contracting (Baudry, 1995, p. 13). A particular task is to be accomplished. It can be organised in several alternative ways. What are the costs ? TCE assumes that there are rational economic reasons for organising transactions one way and other transactions another. However, which go where and for what reason ?

Williamson also assumes that there are two behavioural assumptions which influence transactions : bounded rationality and opportunism, related to uncertainty on the future.

Bounded rationality : economic actors are assumed to be "*intendedly* rational, but only *limitedly*" (Simon, 1976). Consequently they are not able to foreseen all possible future situations. Therefore contracts are almost always incomplete. The costs of planning, adapting and monitoring transactions need expressly to be considered. Which governance structures are more efficient for which type of transactions ?

Opportunism : can be defined as "self-interest seeking with guile". This includes lying, stealing and cheating but opportunism more often involves subtle forms of deceit : it refers to the incomplete or distorted disclosure of information "especially to calculated efforts to mislead, distort, disguise, obfuscate or otherwise confuse" (Williamson, 1985, p. 47).

Trust in the transaction partners is difficult when the exchange is characterised by a situation of uncertainty and risk. In effect, due to the fact that contracts are incomplete, *contractors may face a possible opportunistic behaviour of their partners.*

Williamson identifies three dimensions with respect to which transactions differ : *asset specificity, uncertainty and frequency.* The first is the most important but the other two play significant roles. Asset specificity refers to durable investments that are undertaken in support of particular transactions. Most relevant to the study of contracting is whether assets are redeployable or not.

Finally it is the conjunction of bounded rationality, opportunism and asset specificity which is going to determine the level of transactions costs linked to the exchange.

According to the concepts developed by Williamson, the second step of the analysis consists in comparing the nature of transactions with the institutions which will be chosen by the economic actors : *market*, *firm* or *hybrid form*. The degree of asset specificity, linked to the frequency of transactions and uncertainty induces the cost of transaction and leads to the various governance structures. Determined by the nature of transactions, the governance structures which come into view are for Williamson the most efficient. This means that they minimise the transaction costs induced by the exchange. These costs are linked to the negotiation, the following and the monitoring of the contract (Baudry, 1995, p. 15).

TCE has received considerable attention over the past decade. Rindfleisch & al. (1997) provide a very interesting synthesis of contributions to the theory by both marketers and scholars in related disciplines. Transaction Cost Economics original conceptual framework has been extended and refined and it has been used to study agri-food supply chains with consistent results (for example Verhaegen & al., 1999).

Critiques of TCE exist too (Baudry, 1995 ; Rindfleisch & al., 1997). The most problematic issue in our research field is that Transaction Cost Economics is interested in bilateral relations : contracts are passed between two private operators who select the best governance structure according to the nature of their specific transaction. We are interested however in supply chains with a large number of firms producing the same good and which have multilateral relations. The complexity of our system is high.

Brousseau (1993, p. 15) already insists on this problematic saying that to pass from the analysis of a bilateral relation over the analysis of a system of bilateral relations is not easy because of the inherent complexity of a system constituted by a large number of bilateral or multilateral relations. Institutions are complex organisms, centres of multiple interactions, which have tangled and dynamic regulation systems. Brousseau concludes in saying that due to these tangles of causal relations, the functioning of these systems is not the simple reproduction (or extrapolation) of the functioning of its separate parts.

More recently, Desjean (1999) shows that the efficient level of vertical integration for milk producers is linked to the attributes of transactions. He also demonstrates that the difficulties generated by a collective action of producers affect this equilibrium. Finally, he emphasises the role of public and private institutions in the choice of organisational forms (governance structures).

Verhaegen & al. (1999), although finding very consistent results with the theory in their case study of innovative local marketing channels in Belgian agriculture, highlight the role of cultural, social and historical arguments in the full understanding of the selection of governance structures.

Finally Réviron (1999) highlights in her work on the diversity of market systems that, at the market level (defined as buyers and sellers who may effectively negotiate), collective choices regarding the organisation of commercial negotiations and the design of contracts have an effect on total transaction costs.

These authors raise an important question and open a very interesting field of research : the direct influence of collective decisions at meso-economic level (co-ordinated actions) on the transaction costs of private operators in their bilateral relations and thus on the institutional arrangements that they select for their transactions. PDO supply chains offer a very rich field of investigation because several issues regarding the production and the marketing of the PDO product are discussed at a collective level between the representatives of the various firms.

1.2. Transaction Cost Economics and co-ordination in PDO supply chains

Different firms producing and marketing the same good are a characteristic of PDO supply chains[1]. The way to organise the transfer of intermediary and final products between the various levels of the supply chain can be different from one PDO supply chain to another one. We also find different governance structures between the various levels in the same supply chain. This raises the following question : why do we find between apparently similar PDO supply chains, sometimes in the same supply chain, various ways to organise transactions ? Why do we sometimes observe integrated firms for the processing and elaborating of the product and sometimes independent enterprises for each step of the process ? (chapter 3).

TCE helps us approach these questions. If we compare different PDO supply chains we can notice that spot market as a governance structure only appears downstream in the supply chain (chapter 3). Transactions at the first step of the production, between milk producers and cheesemakers for example, are organised through hybrid forms, sometimes through vertical integration. Several studies on the issue confirm this observation (Pelletier, 1998 ; Petite 1998). We do not know cases of spot market between producers of raw material and processors in PDO supply chains. Spot market only seems to exist between final processors and wholesalers and between wholesalers and retailers. This observation is coherent with TCE if we consider the attributes of the transactions between the different levels of PDO supply chains.

Let us consider a PDO cheese produced in a mountainous area and its supply chain with milk producers, cheesemakers, cheese ripeners, wholesalers and retailers (Chappuis, 1999) :

- *Asset specificity* : There is strong asset specificity for milk producers, cheesemakers and ripeners. Assets cannot be easily used in other productions. Opportunity costs of these investments are very low. Uncertainty must be reduced ; therefore bilateral contracts, in some cases vertical integration, are preferred to spot market. Contracts help reduce uncertainty on the outlets. *Site specificity* is strong : costs of installation and "reloca-lisation" are high if there exists a possibility to move the production. Milk producers are generally located in mountainous areas where there are few alternatives to pasture and milk production. Cheese dairies are located next to the milk producers and depend directly on them. Herds, stables and milking equipment for milk producers, vats and ripening cellars for cheesemakers can be considered as *specific physical assets*. Opportunity costs of these factors are low : there is no alternative to their use in another production. Finally, the know-how of the different actors of the supply chain, in particular cheesemakers and ripeners, is important for the processing and the marketing of a sensitive foodstuff. Learning by experience is necessary to master all the techniques of production and elaboration of the product and we can conclude to a strong *human asset specificity*.

- *Frequency* : Transactions are frequent in milk supply chains (daily milk delivery for example). Therefore, the relationship (and the quality of that relationship) is a source of value for the economic operators. It is worth investing in such a relationship : mutual trust is a pillar of the transaction over time. Spot market is not adapted to this kind of transaction because, by definition, the relation between economic operators has no particular value in this type of governance structure (Baudry, 1995, p. 13).

- *Uncertainty* : For milk producers, the main uncertainty is linked to the outlet. They cannot afford to look every day for a new buyer and they must secure the sale of their milk (generally a one-year contract with their cheesemaker). For cheesemakers, this risk exists too : they cannot look every day for milk suppliers. They must also avoid too important stocks of cheese in their cellars. Uncertainty also exists on the quality of the milk that they process. They are interested in clear rules to determine the responsibilities of both parts in the case of milk quality problems.

As mentioned above, we have observed that spot market only seems to appear downstream in the supply chain between final processors (ripeners) and wholesalers and between wholesalers and retailers. Retailers do not depend on a single product but usually market a wide range of cheeses. They can sell other products in their stores if they have temporary problems with a supplier. The quality of the PDO product may also be considered as relatively homogenous as it has been defined in the code of practice and checked at the different levels higher in the supply chain. Therefore, retailers may be disposed to trust the quality of the product from the different suppliers and give then more weight to the price of the cheese that they purchase.

We can say that the encountered governance structures in PDO supply chains can be explained by the attributes of the transactions and that our observation is consistent with the theoretical foundations of TCE.

What TCE does not allow us to say is if the observed governance structure is the most efficient one. In other words, we are not able to say if the encountered asset specificity should lead to vertical integration or to a hybrid form. We believe that in many cases the strong asset specificity between producers, first processors and final processors should lead to vertical integration. Nevertheless, the most encountered form of governance is the hybrid form. We believe that asset specifcity, frequency and uncertainty do not alone allow

explaining the observed governance structures. Other points must be considered :

- TCE considers the relations between two firms and the way they organise the transactions when they do business. TCE does not consider the multiple relations that a group of firms may have when they produce and market the same good. In PDO supply chains various decisions regarding the production and the marketing of the product are discussed at a meso-economic level. The collective management of the supply chain is generally conducted by an interprofessional body constituted of representatives of the different firms at production, processing and elaboration level. If the co-ordination between the firms is good, they can modify their business environment : market boundaries, degree of concentration, vertical integration, competition, product differentiation and quality, market conduct (Barjolle & al. 1998). This has a direct effect on transaction costs.

- PDO products have a history. They have been produced for centuries sometimes and many business practices can be considered as habits which are not questioned. They work as conventions between the firms. Although not written anywhere, they contribute to reducing uncertainty for the firms which can rely upon them in their transactions. TCE, by considering the moment before and the moment after the transaction, can be considered as static because it does not take into account the history of the firms and the history of the supply chain as a whole which is dynamic. Two different factors contribute to the reduction of transaction costs : first, habits or conventions, inherited from the past but still in use and, second, the collective management of the product and of the supply chain by the firms in a true spirit of co-operation[2].

- PDO products have a link with the "*terroir*", defined as a "particular geographical environment with its inherent natural and human factors"[3]. In many PDO supply chains there is a cultural link between the producers because they live in the same region and their family has been farming there for a long time. The role of trust has often been mentioned as being underestimated by Williamson (Baudry, 1995, p. 19 ; Rindfleisch & al. 1997). We believe that it is true in the case of PDO supply chains because people often know each other and have a close relationship in their community. Trust as well as social control in a small community also reduces the risk of opportunistic behaviour.

- Finally, we would like to highlight the influence of market power in the choice of governance structures. We have noticed that in some PDO supply chains wholesalers and retailers are strong enough to impose the arrangements which they prefer (Chappuis, 1999). A cheese ripener may prefer to have a written contract with his wholesaler. This would secure his sales and the risks linked to the quality of the product would be shared between the two. In practice, the wholesaler prefers to use the spot market : he phones the ripener in the evening and the product must be delivered to the stores the next day. He will also return the product if there is any problem of quality. The ripener assumes all the risks. The structure of the market (a limited number of buyers, a large number of sellers) has thus a direct influence on the encountered governance structures.

To end this section we would like to stress that Transaction Cost Economics is a very interesting tool to look at exchanges in PDO supply chains. It offers a systematic approach that allows comparing different PDO products with the same method. Unfortunately, it is not sufficient to say if the encountered governance structures are really the most efficient ones and if they really fit with the observed attributes of the transactions. The collective management of the supply chain and its historical dimension are not considered. TCE is not able to explain why some PDO supply chains outperform others while having similar ways to organise transactions between their different levels. Further research is necessary if we want to better understand these issues.

We believe that co-ordination is a crucial point for the performance of a product and for the firms producing and marketing it. Although we are not able to measure the degree of co-ordination of the firms, neither to measure the performance of the product nor to compare both results, we show in chapter 4 that several problems must be solved if the firms want to market their product in an efficient manner. Market does not work on its own. Several issues must be addressed and, in the case of PDO products, several firms are involved in the decision process. The ability of the firms to co-ordinate has a direct impact on the way problems can be solved. We believe that it has a strong effect on performance.

In the next chapter, we look at several PDO supply chains in order to highlight their diversity in terms of number of firms, concentration of enterprises and institutional arrangements.

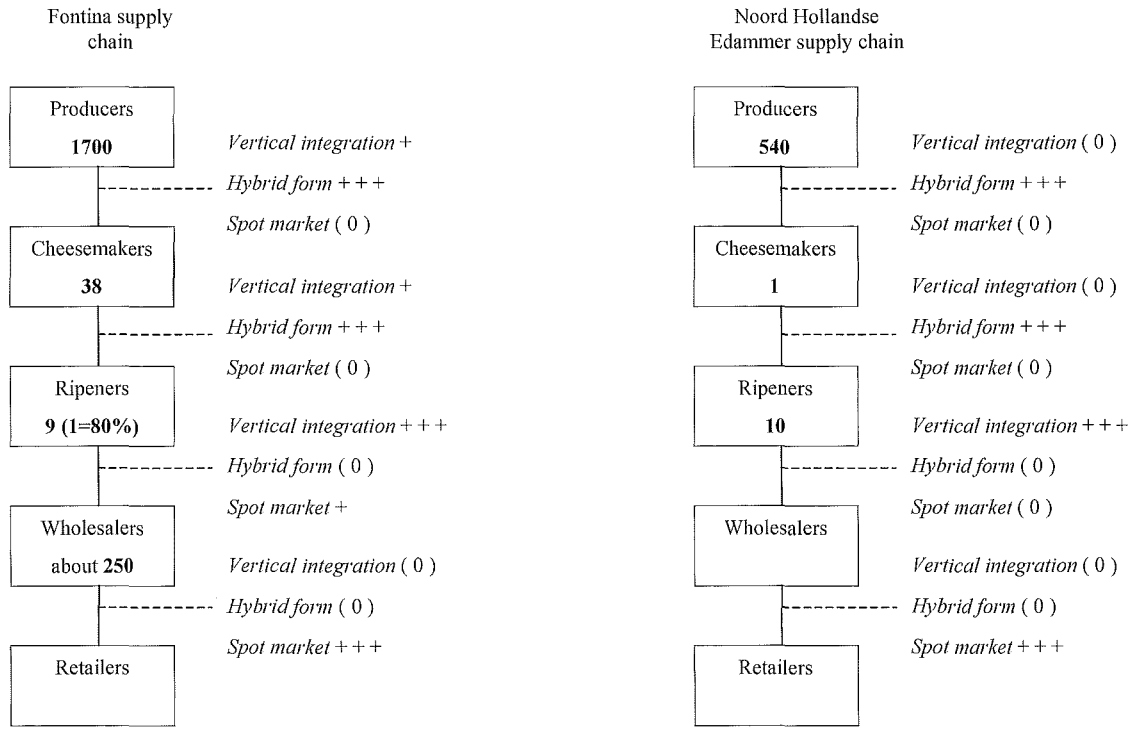
2. A STRONG DIVERSITY IN PDO SUPPLY CHAINS

In the framework of a European project[4], we had the opportunity to study 21 PDO and PGI[5] supply chains in Greece, Italy, France, Switzerland, Great Britain, The Netherlands and Spain. If we look at the number of firms at each level in the supply chain, results show a strong diversity. We present here a selection of supply chains to highlight this diversity.

Fontina

Fontina is a PDO cheese produced in the Aosta Valley in the northern part of Italy. It is a semi-hard cheese with a ripening period of three months. The annual production of *Fontina* is 3500 tons (plus 560 tons of *Valdostano*, the second grade cheese). The supply chain is characterised by **a strong concentration at the ripening level**. A co-operative (*Cooperativa Produttori Latte e Fontina*) collects, ripens and markets about 80% of the production. It also sells the ripened cheese for about 50% to wholesalers and another 50% directly to retailers. The members of the co-operative have to deliver 80% of their production to the Cooperativa which can be considered as the channel captain[6] ; they are free to market 20% of their production by themselves. The annual price established by the Cooperativa functions as reference price for the whole supply chain. Almost all 1700 milk producers receive this price with only premiums or penalties according to quality differences. Only within the 20% maximum limit, the other coops can differentiate and try to offer a better price to their members (De Roest & al., 1997).

Figure 1 : The supply chains of *Fontina* and *Noord-Hollandse Edammer* : Number of firms and most encountered governance structures



Noord-Hollandse Edammer

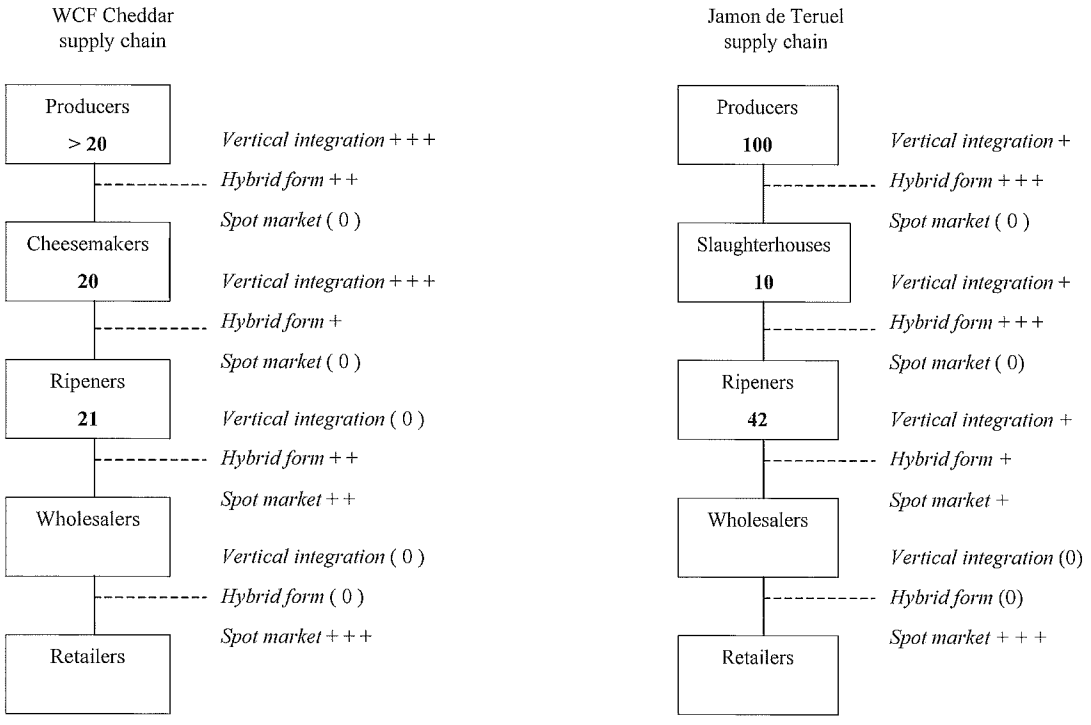
Noord-Hollandse Edammer is a PDO cheese produced in the northern part of Holland. The supply chain is characterised by a large number of milk producers who deliver their production to a single co-operative (CONO). This firm is the **only processor** of the PDO cheese among other productions. Milk producers do not depend

on this product only and do not know the use that is made of their milk. They are paid according to the overall performance of the co-operative. The main production of the coop is *Gouda* cheese. Products of CONO are marketed by ten wholesalers who ripen all their cheese. In the case of CONO, one ripener/wholesaler plays an important role because he handles about 80% of all the *Edammer* cheese of the co-operative. CONO is clearly the channel captain in the *Noord-Hollandse Edammer* supply chain (Van Ittersum & al., 1997).

West Country Farmhouse Cheddar

The WCF Cheddar is a PDO cheese produced in the south western part of England (Cornwall, Devon, Somerset and Dorset). It is a hard cheese that can be marketed at three months (young), at six months (medium) or at nine months (mature). Only the nine-month old cheese can use the PDO designation. The annual production is 22'000 tons. The WCF Cheddar supply chain is characterised by **a strong concentration of the firms** (only 20 firms produce 22'000 tons of cheese) and **a strong integration** (cheesemakers have their own herd and ripen part of the cheese). Most producers work within a co-operative (Farmhouse Cheesemakers Ltd) which has a sole agent (Mendip Dairy Crest) and the majority of the produce go through them. Nevertheless, multiple retailers appear to be the channel captain : producers will sell the cheese before 9 months of ripening if they find a buyer, thus not using the protected designation, and there is a strong pressure from substitute products (other cheddar) on the PDO product (Wilson, 1997).

Figure 2 : The supply chains of *Jamon de Teruel* and *West Country Farmhouse Cheddar* : Number of firms and most encountered governance structures



Jamon de Teruel

The Teruel Ham PDO is a dry ham produced in the Province of Teruel, south of Zaragoza, in Spain. The ham is cured at least 12 months and it weights more than 7 kilos, preferably between 8 and 9 kilos. The hams proceed from pigs older than 8 months with a live-weight between 115 and 130 kilos[7]. The volume of

production was 115'000 pieces of ham in 1997 (only 6% of the cured ham produced in the Province of Teruel).

The Teruel Ham supply chain is characterised by a large number of firms and different degrees of integration. Three companies are completely integrated : they breed the pigs, slaughter them and process the ham up to its commercialisation. There is incomplete vertical integration for 7 companies : slaughterhouses have integrated a processing plant (or the contrary) and a group of pig producers has integrated a processing plant without the slaughtering activity. Finally, there is no integration at all for 32 processing plants. The relations between the firms are then very informal. Most agreements are oral ones. Fatteners come to a one-year agreement (written or oral) with the slaughterer. They both agree on a payment scheme but they do not settle the volumes or the planning of deliveries. It is thus very difficult for the slaughterers and the processors to plan the work for their companies because of the lack of long-term agreements between breeders and slaughterers (Sans, 1997).

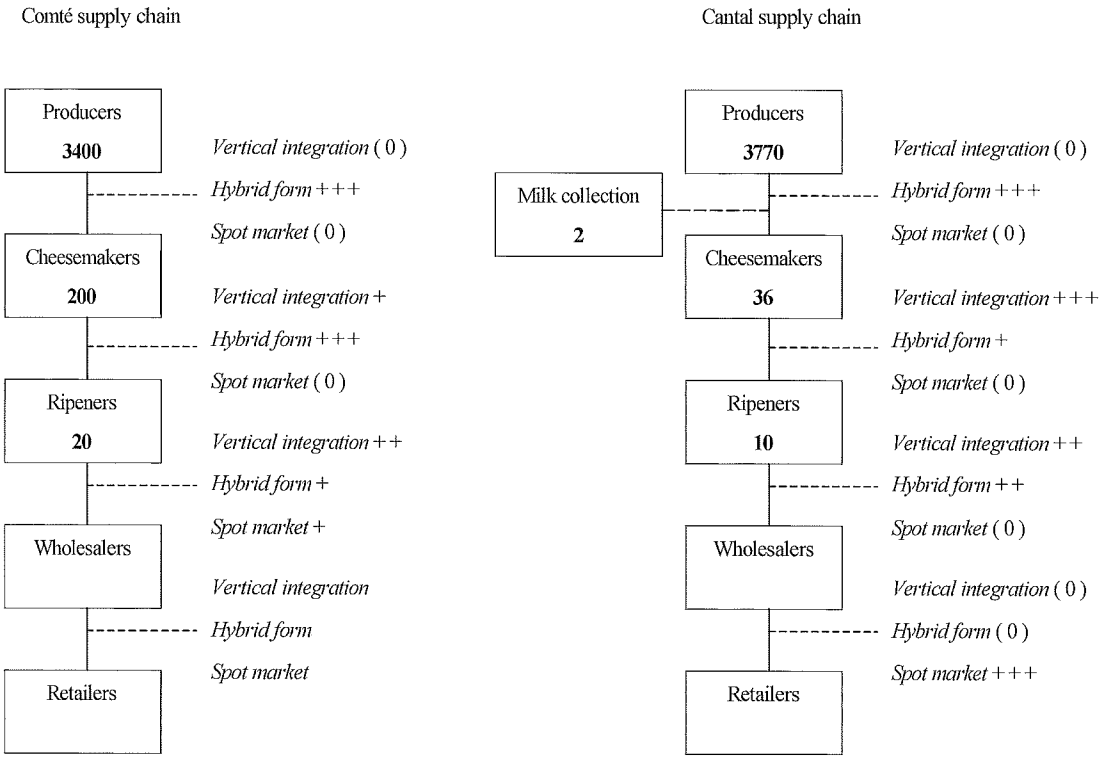
Comté

Comté is a PDO cheese produced in the French Departments of Jura and Doubs. It is a hard cheese processed with raw milk and ripened for a minimum of 4 months. Annual production is 41'000 tons. The *Comté* supply chain is characterised by **a large number of firms at each level**. Most of the firms are not integrated. Out of 200 cheesemakers, about 20 have a partial ripening activity and 20 have a total ripening activity. Milk producers are organised in co-operatives. Milk producers, cheesemakers and ripeners are represented in a union which defends the interests of the PDO product and has a strong influence on the whole supply chain. It deals with many co-ordination issues, thus preventing a single firm or small group of firms from ruling over the others. The Union can be considered as the channel captain (Bobon & al., 1997).

Cantal

Cantal is a PDO cheese produced in the French Departments of Cantal, Puy-de-Dôme, Haute-Loire and Allier (Auvergne). It is a an uncooked pressed cheese processed with raw milk and it is ripened for either 30 days (young), two months ("*entre-deux*") or more than six months (old). Annual production was 16'800 tons in 1996. The *Cantal* supply chain is characterised by a large number of firms at each level. There though is an interesting difference with the *Comté* supply chain. The Union (interprofessional body) has no real decision power on the supply chain. A limited number of firms (3 companies produce 65% of the *Cantal* cheese), with decisional power outside of the production area, manage to rule over the others and clearly appear as the channel captain. It is also interesting to mention the existence of two firms specialised in the milk collection which do not exist in the other supply chains : in the mountainous area of Auvergne, milk collection costs are high and the know-how about collection appears as a strategic issue (du Pontavice, 1997).

Figure 3 : The supply chains of *Cantal* and *Comté* :
Number of firms and most encountered governance structures



3. CO-ORDINATION IN PDO SUPPLY CHAINS

As already mentioned in chapter 2, we believe that co-ordination is a crucial point for the performance of a PDO product. Several problems must be solved at a collective level in a PDO supply chain because the companies depend on the production and the marketing of a common good. In section 4.1, we list different issues which must be or can be managed at a meso-economic level and we explain why these issues are important for the functioning (i.e. the competitiveness) of the supply chain. In section 4.2, we focus on transactions and contracts, showing that sample contracts negotiated at a meso-economic level between representatives of the various firms (interprofessional body) have an influence on private arrangements between economic operators.

3.1. Co-ordination functions and the actors of the co-ordination

PDO supply chains are composed of different firms that remain economically and legally independent while producing and marketing the same good. Production methods are defined in a code of practice that all the firms using the protected designation must comply with. Firms organised around a PDO have to solve various problems of co-ordination :

The definition of the PDO product

According to Regulation EEC 2081/92, only a group is entitled to apply for a PDO. A group means "any association, irrespective of its legal form or composition, of producers and/or processors working with the same

agricultural product or foodstuff" (art. 5). To apply for a PDO the group must first agree on the product specification and on the production area. The definition of the PDO product can be considered as a minimum agreement between all the actors living from the product. The product specification will have a strong influence on the possible technological development of the product and on its image. It affects the firms in their development possibilities and thus appears as an important stake between the actors in the negotiation. A loose code of practice will favour the production of a large range of products using the same designation. It can be confusing for the consumers and competition between farmers may be unequal. A strong code of practice strengthens the image of a unique product and reduces differences in processing technologies between the firms.

Controls

Controls are necessary to check the conformity of the firms and of the product to the specifications of the code of practice. These controls are necessary because different firms use the same designation and every single firm depends on the practices of all the others. Free riders with opportunistic behaviour must be identified and fined in order to guarantee the quality of the product and its reputation. Controls can be made by an institution external or internal to the supply chain. In this case, professionals assess the quality of the work of firms similar to theirs. Controls are not only technical but concern also the organoleptic characteristics of the product. All PDO supply chains must have a certification body which checks that controls are conducted properly in accordance with what the group using the designation has defined in the product specification[8].

Information to the firms

Information can be related to the technical process of the product, to prices on the market or to development opportunities for the firms. Some interprofessional bodies have been able to set up services which compile and synthesise this information for the firms. They may also have extension services which give advice to the farmers on the ground. Producers generally do not have the time to look for information which contributes to either improve the quality of the product, its marketing or reduce the uncertainty of the environment of the firms.

Promotion of the product

Most of the firms which produce a PDO product are small and are not able to invest in advertisement. Fees collected at the level of the interprofessional body for all the firms living from the product allow the producers to benefit from important means of promotion, sometimes television campaigns at national level[9].

Research and development

Quality improvement and costs reduction in the process of the product can be favoured by research and studies. Some interprofessional bodies help finance programs conducted by research institutes, in other cases they have their own research facilities. Here again, the relatively small contribution of each firm, put together, allow the producers to have access to interesting results for the development of the product thus improving or reinforcing the competitive position of their enterprise in relation to their competitors outside the production area.

Political lobbying

This function of co-ordination may seem odd but several studies have highlighted that some PDO supply chains receive an important support from political authorities and public institutions (De Roest, 1997 ; Sans 1997). This support cannot explain alone the success of a PDO product but it can help improve its competitiveness when important investments like the renewal of stables or the building of roads in the mountains are supported with public funds. Supply chains which manage to appear in front of political authorities as the bearers of a project from general public interest will have a better access to political support (point 4.2).

Management of production volumes

This issue is much debated because it often conflicts with anti-trust policies which forbid agreements on volumes and prices. Several studies have highlighted the difficulty for PDO supply chains to exercise a minimum of control on production volumes (Esposito, 1997 ; Raynaud & al., 1997). The objective of volume management is not to limit supply in order to get higher prices but to stabilise the market thus avoiding large fluctuations of supply. Strong variations in supply generally lead to a price crisis. Large firms may manage to survive but small-scale enterprises (artisans) may

not : they must shut down or move to another production if they can. When prices raise again, the small-scale enterprises are not able to come back in the business and large firms, some of them industrialised, increase their production. If one considers that the identity of a PDO product is closely related to the practices and to the know-how of small-scale businesses, the upkeep of a certain number of firms is important. Stability on the market avoids a too strong concentration of the firms in PDO supply chain. It does not prevent a normal evolution of the number of firms in the supply chain, mainly when children decide not to carry on with the business of their parents.

3.2. Collective management and contracts

For each one of the co-ordination functions listed above we could look at the various supply chains presented in chapter 3. The institutional response to each co-ordination issue would be different from one supply chain to the other, according to the structure of the supply chain and to its history. In this section we want to come back to TCE and show how sample contracts, negotiated at a meso-economic level between representatives of the various firms (interprofessional body) or prepared by a public institution, can have an influence on private arrangements between economic operators.

Teruel Ham

Until 1995, the Teruel Ham PDO supply chain had a problem of pig availability for slaughterhouses and ripeners. Pig producers, many of them independent (i.e. not affiliated to any group of producers), hesitated in producing pigs for the protected designation although demand was higher than supply. Despite a strong potential, the production could not grow as expected because of a lack of co-ordination between pig producers and slaughterhouses. The source of the problem was to be found in the valorisation of the pig carcasses. The green hams produced for the PDO proceed from pigs older than 8 months with a live-weight between 115 and 130 kilos. Pigs normally bred for ham production are slaughtered when they are 6 months old and weight between 90 and 95 kilos. The PDO pigs are thus heavier and fatter than normal pigs. The valorisation of the PDO pigs is done through the processing and the sale of the ham. There is hardly any possible valorisation of the carcass because at that age the meat is too fat to be sold on the fresh market. The only possible use of the carcass is the production of sausages but there is no tradition in the Teruel region and only a small number of companies have developed this production. Additional fodder costs for raising pigs for more than 8 months and the risk of a bad valorisation of the green ham (finally not good enough for the processing of PDO cured hams according to the specifications of the code of practice) and of the carcass limited the number of pigs available for the production of the PDO product. Farmers preferred to change from one slaughterhouse to the other according to offered prices thus making production planning very difficult for the industrials.

The development of the production was always below the one expected by the *Consejo Regulador* (the interprofessional body responsible for the management of the protected designation). In 1996, the situation was considered as critical by the Government of the Region of Aragon which threatened to withdraw the subsidies granted to the industrials if the production was not increasing rapidly. A new elected Consejo Regulador fixed two objectives for the supply chain : to increase the volumes of production by inciting breeders and fatteners to join the PDO and to develop exchanges between all the actors in the supply chain. In order to reduce the uncertainty on pigs' availability for slaughterhouses and ripeners, the Regional Government of Aragon has been promoting the signature of agricultural contracts. Each independent fattener can sign this contract with a slaughterer. Both operators agree on a minimum price, the volumes and a provisional planning of deliveries. The fattener is paid cash although the slaughterer only pays 30 days after the delivery. The Regional Government assumes the cost of the credit. In promoting agricultural contracts (sample contracts) the Regional Government hopes to increase the participation of breeders and fatteners to the PDO scheme and to help the industrials better manage their plants.

In addition to the development of sample contracts by the Government of the Region of Aragon, the *Consejo Regulador* of the PDO has organised two annual meetings, one for the slaughterers and the ripeners and another one for the breeders, to improve contacts and co-ordination and to solve the various problems encountered by the supply chain. It has also taken a more severe measure in threatening the firms not producing for the PDO to cut back their subsidies : the objective is to avoid that operators, not producing for the PDO, benefit from public money because their company is registered in the protected designation. Fatteners,

slaughterers and ripeners must produce and process at least 5% of their potential annual production in the PDO otherwise they are expelled from the register. These various measures linked to a good promotion campaign had a strong effect on production volumes which increased from 70'000 hams in 1995-1996 to 170'000 hams in 1998, above the objective of the Regulating Council which was to produce 140'000 Teruel Hams in 1998.

Comté

In the *Comté* supply chain, the interprofessional body plays a major part in the co-ordination of the supply chain. Elected representatives of the milk producers, cheesemakers and ripeners are gathered in the *Comté* Interprofessional Committee (CIGC). Most of the operators are dedicated to the defence of the interests of the entire supply chain. They know that they directly depend on the success of the PDO product if they want to remain farmers in the Jura mountains and plateaux, a region where there is hardly any alternative to milk production. The CIGC is active in many different fields such as information to the firms, advertisement, technical assistance to the companies, research and development, quality controls and production volumes management (to avoid production crises and important variations in prices).

In 1969, the Federation of milk co-operatives (FDCL) and the Ripeners' Union (CEC), under the supervision of the CIGC, agreed on a sample contract between cheesemakers (co-operatives) and ripeners for the sale of "white cheese" (before the ripening step). This sample contract defines the various quality grades (A, B, C and D) for *Comté* cheese, lays down the mutual obligation of buying and selling during one year, fixes delivery conditions and sets a payment scheme according to the quality of the cheese and to the average price paid to the ripeners by their customers at national level (*Moyenne Pondérée Nationale*, MPN)[10].

This contract is widely used and it has a direct effect on the involvement of the milk producers in the PDO supply chain[11]. They are no more suppliers of raw material for the industry but milk suppliers for the *Comté* production. They care about the quality of their production and accept the higher constraints of the code of practice. They are encouraged to produce milk of a good quality and this system federates all the actors of the supply chain in the improvement of the *Comté* production and marketing. The benefit is better distributed along the supply chain. CIGC works to adjust the individual goals of the companies to a collective one.

Thanks to the good co-ordination in the *Comté* supply chain, the price of the milk paid to the producers is one of the highest in France. Moreover, the price of the milk processed in the industry is connected to the *Comté* milk price which thus supports the milk price of other supply chains located in the region[12]. This higher price allows farmers to face the costs of milk production in a less favourable and mountainous area with its geographic and climatic particularities. It thus permits to maintain an economic activity and a social network in a remote and less-favoured area.

Fontina

The *Fontina* supply chain is a good example of a supply chain with an economic co-ordination strongly influenced by public institutions. An historic event is at the origin of the actual system. In 1951, at the international conference of Stresa[13], *Fontina* cheese was put in category B (defining the name type and providing a standard product description without preventing the processing of such cheeses anywhere in the world) instead of category A (protecting the designation of the cheese and prohibiting the use of the name outside its production area). The reactions of both the entire political class and the local inhabitants of the Aosta Valley were to consider this classification as an insult, especially since the majority of the population was involved in the *Fontina* production. Many people were taken by surprise and realised that *Fontina* was in a potentially very vulnerable situation. It was threatened by imitations which could not be challenged at law and with little interest being shown in its protection by Rome (De Roest & al., 1997, p. 5).

This experience led to the mobilisation of all the human resources available within the Aosta Valley. These included the politicians representing the region in the national Parliament, the local political forces and the cattle farmers based in the various valleys of the region. The latter were invited by the Aosta Valley political leaders on a number of occasions to act together to create an organisational structure which was better equipped to resist external attacks and to project a positive image to the outside world.

The *Consorzio di Produttori Fontina* (Consortium of *Fontina* Producers) was founded in 1952. It was set up

with the purpose of managing the production, the ripening, the promotion and the sales of *Fontina* cheese on a collective basis. The patient work at the political level by the Aosta Valley representatives at the national Parliament and the mobilisation of the whole regional farming sector led to the registration of *Fontina* in category A by a presidential decree in 1955. From 1955 to 1957, the Consortium of *Fontina* producers organised for the first time the collection, the ripening and the sales of *Fontina* produced by cheese dairies in the Aosta Valley. In 1957, The Consortium was entrusted by a ministerial decree with the functions of supervising the production and sales of *Fontina*. It also initiated the marking system of the cheese, the degrading of improper cheeses and the punishment of fraudulent practices in the production and the sales of *Fontina*. From that moment, when it was given such a function with relevance to both civil and criminal proceedings, the Consortium of *Fontina* Producers completely withdrew from the marketing of *Fontina*. The necessity to separate the role of protection and supervision from that of a purely commercial organisation led to the creation of the *Cooperativa Produttori Latte e Fontina* (Co-operative of Milk and *Fontina* Producers) with the task of collecting the *Fontina* production of its members and to ripen it in its cellars. Both bodies are still very active nowadays.

Most of milk producers are part of a co-operative which itself is part of the *Cooperativa Produttori Latte e Fontina*. As the *Cooperativa* is collecting and commercialising almost 80% of the *Fontina*, it plays a very important part in the price formation of the cheese. The *Cooperativa* sells the ripened cheese for about 50% to wholesalers and another 50% directly to retailers. At the end of the year, the balance of the Cooperativa determines the price of the "white" unripened cheese to be paid to the members. An anticipated payment on the final cheese price (about 50%) is given during the year. The final cheese price is determined in March of each year. All the *Fontina* producing co-operatives which are members of the *Cooperativa* receive the same undifferentiated cheese price. The milk price paid to the farmers depends then on the processing and transport costs of their co-operative and on its differentiation strategy. The co-operatives may take back 20% of their production after the ripening step and market the cheese themselves. Private dairies exist too. They may deliver part of their production to the *Cooperativa* but they are not obliged to do it. They generally ripen larger quantities of cheese themselves and sell their *Fontina* cheese to wholesalers and retailers within and outside the Aosta Valley.

This system has the following advantages : many milk producers have a limited number of cows and earn the majority of their income outside agriculture, in the tourism sector for example. Cheesemakers sometimes work in two separate dairies, one on the plain in the winter and the other one in the mountains during the summer months. The *Cooperativa* takes on the responsibility for the ripening of the cheese. It contributes to the improvement of the average quality level of the product and concentrates supply. It creates a sales and distribution network, both in the valley and outside, which would be impossible for the individual dairies to develop. Considering the market share of the *Cooperativa*, we can consider it as almost operating as a monopolist. Per contra, we must also consider the increasing market power of supermarket chains : without a central marketing agency like the *Cooperativa*, even more unbalanced market relations would appear. The interests of the small single dairies are better defended with a centralised supply. Dairies remain free to exploit the possibility to sell directly to the consumer and to the small retail shops. They can differentiate their production and try to improve their economic results.

The central driving force of the institutional system, and by far the most important element, is the Autonomous Region of the Aosta Valley. It has special privileges, especially in the agricultural policy, guaranteed by its Regional Charter of Autonomy. It has been involved at all levels of the *Fontina* production cycle since 1950 and is still very active nowadays. It contributes to the financing of the construction of new cow-sheds and the modernisation of those already existing, to the construction of access roads to upland dairies and pastures, to the building of cheese dairies and to the equipment of the plants installed in the dairies, only to mention the most striking areas of intervention. It also finances part of the activities of the *Consorzio Produttori Fontina* and part of the activities carried out by the *Cooperativa Produttori Latte e Fontina*.

Up to now, the marketing system developed in the *Fontina* supply chain has contributed to the success of the PDO cheese and production volumes have been increasing in a constant way since 1950. But the strong institutional support must also be a source of concern : it is difficult to determine to which extent the collective performance is due either to public support or to a

market which remunerates a high quality and specific product. The institutional support remains dependent on public finances which could be less important in the future. More would be required from a strong institutional co-ordination in order to maintain the collective benefits.

4. CONCLUSION

In this article, we have highlighted the variety of PDO supply chains in terms of number of firms and concentration of enterprises. Co-ordination in the supply chain is certainly a major aspect for the success of the PDO product and for the competitiveness of the firms producing and marketing it. Transaction Cost Economics helps us to have a systematic approach in the comparison of governance structures (how firms organise transactions) in different PDO supply chains. The attributes of the transactions (asset specificity, frequency and uncertainty) explain partly the encountered arrangements. We have shown that they are not sufficient nevertheless to explain all the observed arrangements because Transaction Cost Economics considers governance structures between two private operators (bilateral agreements). It is limited when we come to institutional arrangements set up on a collective basis at a meso-economic level (multilateral arrangements).

We have given a list of issues which must be co-ordinated at a meso-economic level in PDO supply chains and have focused on the influence which a collective management of the supply chain can have on the arrangements of private operators. We thus have highlighted the strong diversity of responses to problems common to PDO supply chains. As a conclusion, we call for further research in the field of collective management of food supply chains.

NOTES

(1) All the firms that respect the code of practice and are located in the delimited production area are allowed to use the protected designation.

(2) The will to co-operate varies of course from one supply chain to the other : it can be very good in some cases, it can be very poor in other cases.

(3) Regulation EEC 2081/92, article 2.

(4) European Project FAIR CT 95-306 : PDO-PGI Products : Market, Supply Chain and Institutions (Sylvander B. & al., 1999).

(5) PDO : Protected Designation of Origin ; PGI : Protected Geographical Indication (Regulation EEC 2081/92).

(6 The channel captain can be defined as the strategic leader of the supply chain.

(7) Pigs normally bred for ham production are slaughtered when they are 6 months old and weight between 90 and 95 kilos.

(8) Regulation EEC 2081/92, art. 10.

(9) Fees are usually collected on the basis of the production volumes of the firms.

(10) For example, between December and April, an A cheese will be paid to the cheesemaker 80,5% of the MPN, a B cheese 69,5% of the MPN and C + D cheeses 56,5% of the MPN. Between June and October a cheese will be paid 85,5% of the MPN, a B cheese 74,5% of the MPN and C + D cheeses 61,5% of the MPN, etc.

(11) Milk producers are paid according to the financial result of the co-operative and to the price obtained for the "white cheese".

(12) Milk price in Jura in 1995 : 2,20 FF./litre ; milk price in France in 1995 : 1,91 FF./litre.

(13) The Stresa International Conference followed those of Stockholm (1949), Amsterdam (1950) and Bern (1951). The participating countries were Italy, Belgium, France, Switzerland, Austria, Denmark, Sweden, Holland and Norway. The aim of the conference was to come to a set of rules to regulate, including at an international level, the reciprocally recognised classification of a number of type of cheeses with their origins in particular areas of and processed in accordance with practices which were local, equitable and continuous over time and following traditions or techniques of production particular to each (de Roest & al., 1997).

BIBLIOGRAPHY

BARJOLLE D., CHAPPUIS J.M., SYLVANDER B. (1998). From individual competitiveness to collective effectiveness in PDO systems. 59th EAAE Seminar "Competitiveness : does economic theory contribute to a better understanding of competitiveness ?", Appeldoorn (NL), 1998/04/22-24, 17 p

BAUDRY B. (1995). Une nouvelle microéconomie, l'économie des coûts de transaction. *Cahiers français*, n° 272, Les nouvelles théories économiques, juillet-septembre 1995, La Documentation Française, Paris.

BOBON B., GAUDIN N., MARTY F. (1997). The Comté market and supply chain in France. European project FAIR 1 CT 95-0306 "PDO and PGI products : market, supply chain and institutions", Progress report, Le Mans, France.

BROUSSEAU E. (1993). *L'économie des contrats, technologies de l'information et coordination inter-entreprises*. Presses Universitaires de France, Paris.

BROUSSEAU E. (1995). De la science du marché à l'analyse économique des formes de coordination. *Cahiers français*, n° 272, Les nouvelles théories économiques, juillet-septembre 1995, La documentation Française, Paris.

CHAPPUIS J.M. (1999). Organisation des échanges dans les filières agro-alimentaires. *Economie et sociologie rurales*, 1-1999, Société suisse d'économie et de sociologie rurale, Zurich, pp. 105-125.

DE ROEST K., ANTONELLO S., FORNACIARI G. (1997). Production, marketing and supply chain of Fontina cheese. European project FAIR 1 CT 95-0306 "PDO and PGI products : market, supply chain and institutions", Progress report, Reggio Emilia, Italy.

DESJEAN S. (1999). Contractual design and pricing mechanism in the dairy sector. IXth Congress EAAE, Warsaw (POL), 1999/08/24-28.

DU PONTAVICE N. (1997). Cantal performance report. European Project FAIR 1 CT 95-0306 "PDO and PGI products : market, supply chain and institutions", Progress Report, Le Mans, France.

ESPOSITO F.M. (1997). Antitrust commission vs. consorzi di tutela : an economic evaluation. *In :* Arfini F., Mora C. (eds.) "*Typical and traditional products : rural effects and agro-industrial problems*", 52nd EAAE Seminar, Parma (ITA), 1997/06/19-21, pp. 143-160.

PELLETIER G. (1998). La filière du Mont-d'Or ou Vacherin du Haut-Doubs, analyse par la théorie des coûts de transaction. Document interne, EPFZ, Institut d'économie rurale, Lausanne, Suisse.

PETITE G. 1998). La filière du Vacherin Mont-d'Or en Suisse, une approche par la théorie des coûts de transaction. Document interne, EPFZ, Institut d'économie rurale, Lausanne, Suisse.

RAYNAUD E., VALCESCHINI E. (1997). Competition regulation against quality policy : the "Label Rouge" in the French poultry industry. *In :* Arfini F., Mora C. (eds.) "*Typical and traditional products : rural effects and agro-industrial problems*", 52nd EAAE Seminar, Parma (ITA), 1997/06/19-21, pp. 529-546.

RÉVIRON S. (1999). La diversité des systèmes de marché. Thèse de Doctorat, Institut National Agronomique de Paris-Grignon, Paris.

RINDFLEISCH A., HEIDE J. B. (1997). Transaction cost analysis : past, present and future applications. *Journal of Marketing*, vol. 61, October 1997, pp. 30-54.

SANS P. (1997). The Teruel ham marketing and supply chain in Spain. European Project FAIR 1 CT 95-0306 "PDO and PGI products : market, supply chain and institutions, Progress report, Le Mans, France.

SIMON H.A. (1976). From Substantive to Procedural Rationality. *In* : Latsis S. (ed.) "*Method and appraisal in economics*", Cambridge University Press, Cambridge.

SYLVANDER et al. (1999). Projet de recherche européen en cours. European Project FAIR 1 CT 95-306 "PDO-PGI products : market, supply chain and institutions", Rapports intermédiaires.

VAN ITTERSUM K., CANDEL M. (1997). The Noord-Hollandse Edammer cheese market and supply chain in The Netherlands. European Project FAIR 1 CT 95-0306 "PDO and PGI products : market, supply chain and institutions", Progress report, Wageningen, The Netherlands.

VERHAEGEN I., VAN HUYLENBROECK G. (1999). Analysing the governance of innovative local marketing channels in Belgium agriculture with the transaction cost

theory. IXth Congress EAAE, Warsaw (POL), 1999/08/24-28.

WILLIAMSON O. E. (1985). *The economic institutions of capitalism.* The Free Press, New York.

WILLIAMSON O. E. (1996). *The mechanisms of governance.* Oxford University Press, New York

WILSON N. (1997). The market and supply chain of West Country Farmhouse Cheddar in the UK. European Project FAIR 1 CT 95-0306 "PDO and PGI products : market, supply chain and institutions", Progress report, University of London, Wye College, UK.