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Alignment between Quality Enforcement Devices and Governance Structures in the Agro-food Vertical Chains*

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Abstract:

Using a Transaction Cost Economics framework, this paper studies how supply chain governance are aligned with the type of quality enforcement mechanisms used in transactions with consumers. Specifically we compare governance of supply chains when private brand assures quality to chains where official certification assures products' quality for customers. To test our proposition we conduct a set of 42 case studies in 3 agro-food sectors (processed meat, cheese, fruits and vegetable) from 7 European countries. We find that supply chain governance is closer to hierarchy-like modes of organization in cases where reputational capital is the main quality assurance device whereas market-like governance is more prevalent in cases with public certification.

Keywords: brand name, certification, governance structures, quality enforcement, reputation, vertical chains.

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0 Introduction

This paper studies the consequence of different quality labeling strategy and quality enforcement devices toward consumers for the governance of supply chains in the agrifood sectors. More specifically, we want to test whether the governance of the supply chains is related to the type of quality label and their associate quality enforcement mechanisms. The agrifood sector is particularly well suited for this analysis because, following some recent problems on product's quality in these markets (e.g. the “mad cow” crisis) concerns for traceability and quality control has become a critical issue. We can differentiate two main “quality labeling systems” in this sector by looking at what is put on the line when producer deviates. On the one hand there is the typical private brand name where the reputational capital of the owner is at stake (Klein *et al.*, 1981); on the other hand, the Protected Denomination of Origin (hereafter PDO) system that links products' quality to their geographic origin and where quality is certified by a public organization¹. Under public certification, the credibility of a quality label relies on governmental enforcement.

The efficiency with which these quality safeguards can generate credibility is related to upstream coordination (*i.e.* coordination of the vertical chain) because the quality of the final products strongly depends on the behavior of parties at different stages of the productive chain. Following Transaction Cost Economics' framework (as developed by Williamson, 1991, 1996), we expect to find an alignment between quality enforcement devices used in transactions with consumers and the governance of transactions in the chains. More specifically quality labeling based on reputational capital may lead to the adoption of hybrid forms or vertical integration rather than spot markets to cope with the need for greater control over the steps of the vertical chain that affect product's quality. On the other hand, in official certification systems, part of the contractual hazards related to quality enforcement is solved through public certification of the final product but also of all successive steps in the supply

chain. This economizes on both the amount of private “reputational capital” necessary to guarantee quality to consumers (Klein, 1996) and the extent of quality controls all along the chain (assuming that the certifying organization has the correct incentives to fulfill its task). This would tend to increase the (relative) efficiency of markets or market-like institutions.

In order to test the alignment between governance of the vertical chains and quality labels, we have conducted an analysis of 42 case studies in 3 agrifood sectors (processed meat, cheese, fruits and vegetables) from 7 European countries². We set up a comparative analysis of the governance modes by first describing the diversity of these modes in our population of cases and then comparing the chains’ governance when either private brands or public certification assure quality to consumers. Our description of governance modes is based on and refines the standard Williamsonian’ typology of governance structures (Williamson, 1991). The empirical results support our proposition. The governance of transactions in vertical chains with public quality certification is more market-oriented than the one found when private reputational capital safeguards quality.

This paper contributes to several strains of the economics of organization and supply chains. Empirically linking strategic decision, here the choice of quality label, to governance modes adds to our understanding of how these choices are inter-related (see Muris *et al.*, 1992, for a study of this interaction). Previous works in the organization of agri-food chains also highlight this point. For instance, Furquim de Avezedo *et al.* (2001) investigate the backward coordination in the Brazilian coffee market induced by the establishment of franchised chains. Compared to this paper, we do not restrict the labeling option to private brand but we investigate a broader set of quality labels and associated quality enforcement devices. Gonzales-Diaz *et al.* (2001) considered the matching between different quality labels

and governance of the vertical chain in the Spanish meat sector. Here, we extend the empirical analysis to several sectors across different countries. Moreover, whereas Gonzalez-Diaz *et al.* (2001) emphasize coordination issues related to different quality labels - mainly an incentive problem for PDO products and a coordination problem in the private brand case - we investigate more closely the governance issue related to the problem of quality enforcement. In the same vein, Hobbs *et al.* (2000), develop a framework to understand the evolution in the agro-food sectors towards “closer vertical coordination”.

This paper is also related to the analysis of enforcement mechanisms in contractual relations. Several papers emphasized the importance of enforcement issues and the diversity of mechanisms to assure contractual reliability, mostly from self-enforcement to third party assurance mechanisms (Klein *et al.*, 1981, Knoeber, 1983, Klein, 1996). We add to this literature by studying how the enforcement of quality toward consumers is supported by the governance of the vertical chains.

The paper is organized as follows. First, we describe the main family of quality enforcement devices one can find in European agrifood sectors. The next section develops our main hypothesis on the alignment between these enforcement devices and the governance of the supply chains. The description of the set of cases used to test our framework as well as the empirical results is described in the last section. Conclusion follows.

1 Quality Enforcement and the Diversity of Quality Safeguards

In this section we briefly survey the problem of quality enforcement of agrifood products and the diversity of mechanisms that mitigates quality uncertainty for consumers.

1.1 Solution to Quality Uncertainty

For several years, European agro food chains have been experiencing an increasing concern on product quality and / or food safety (e.g. the “mad cow” and “Belgian chickens” crisis in the European meat industry) with significant impacts on consumer’s willingness to buy or to pay. It is well established that for a lot of food products, consumers do not know automatically the quality of the product, or the accuracy of the information supplied about the product’s characteristics (Akerlof, 1970). The severity of this problem depends on the extent of asymmetric information. A classical typology distinguishes three main sets of product’s attributes (Darbi *et al.*, 1973). Search attributes are attributes that consumers can evaluate before purchasing. There is no asymmetric information for consumers here. Experience attributes are those for which consumers can evaluate the quality only after consuming a product. Even if *ex ante*, there is asymmetric information, consumer learns or discover the true quality *ex post*. Credence attributes are those for which even the consumption does not bring information on the quality (for instance the amount of pesticides). Most of agrofood products have experience and/or credence attributes which make asymmetric information a great concern, especially when food safety issues are involved (Foss, 1996).

One way for resolving this “lemon problem” is for the informed party to signal its quality. Quality signals are important for consumers as they allow a reduction of search and measurement costs (Barzel, 1982). A diversity of quality signals has been studied in the industrial organization literature. For instance, under certain conditions, price or the amount of advertising can be used as a signal on quality (see for instance, Milgrom *et al.*, 1986). In this paper we use a narrow definition of quality signal. We call quality signal a label that appears on the product and give it a “name” or “identity”. Hereafter, we will speak of quality label. Even with this narrow definition, one can empirically observe different labels. Two main families of quality labels toward consumers can be found in the European agrifood

sectors: (i) the typical private brand name either owned by a large retailer, a producer or a group of farmers and, (ii) the Protected Denomination of Origin (PDO) system that links products' quality to their geographic origin and to specific production processes (mainly traditional). Like branded products with a well know goodwill, consumers are ready to pay a higher price for PDO products (see Loureiro *et al.*, 2000, in the Spanish meat industry). These two forms of quality labels rest on different enforcement mechanisms. In the brand name case, the issue is mainly one of self-enforcement whereas in the second case, quality is assured by the intervention of a public third party.

1.2 Different Quality Enforcement Devices

Reputation is the canonical example of a strategy that relies on self-enforcement. Reputation rests on the construction of goodwill thanks to repeated purchases. For a producer to continuously have an incentive to produce an expected high level of quality, the existence of a price premium is a necessary condition (Klein *et al.*, 1981, and Shapiro, 1983). The actual value of this premium represents the economic value of a firm reputation or its “reputational capital” (Klein, 1996). The more severe the asymmetric information on quality (for instance the longer the lag to discover quality cheating), the higher this reputational capital must be. However, the existence of a price premium is just a necessary condition for the reputation mechanism to solve the problem of potential quality cheating. It is the threat of termination of the relationship by the consumer, and the corresponding loss of reputation, that makes the implicit “trademark contract” self-enforcing³. The credibility of the brand rests on its reputational capital. Note that in this framework, the state does not play any role in assuring quality. Its sole role is to enforce property rights on trademarks and the, implicit for consumers and sometimes secret for competitors (e.g. Coke), set of specifications defining the product quality.

Third party enforcement is another mean to assure quality (more generally contractual commitments). This mechanism rests on the formalization of (verifiable) contractual terms enforced by a third party. The enforcement of products' quality by the state through public certification is a widespread phenomenon in European agrifood markets and is at the core of the PDO system. We provide here a short overview of the institutional background supporting the European, PDO system⁴. The European regulation on PDO products is similar to a trademark registration that protects property rights on brand names (here geographical names). This protection is given under strict conditions (see Barjolle *et al.*, 2000, for a more extensive presentation of the PDO system).

- Proof must be given that product's characteristics are linked to the geographical location (because of specific pedo-climatic conditions and/or traditional knowledge).
- The geographical area of production/transformation has to be delimited.
- The product's main specifications are detailed in a "list of specifications", *i.e.* a minimum quality standard that translates itself in constraints on the production/transformation process and on the final quality⁵. This "list of specifications" is collectively designed by firms involved in the supply chain (except the retail step that is not involved in the system).
- The firms involved in a PDO supply chain have to be organized in a collective organization (for instance an association of firms, a syndicate). This highlights the collective nature of a PDO label.
- The quality of final and intermediate products along the chain is monitored by a certifying organization, being the state or an organization accredited by the state.

Public certification consists of supporting the credibility of a PDO through the intervention of a formal public institution. The credibility of the label rests on *ex ante* monitoring (selection and accreditation of the firms according to some technological

restraints) and *ex post* monitoring (verification of the products) by the certifying organization⁶.

The two main mechanisms described above are just polar cases of quality enforcement mechanisms⁷. Intermediate mechanisms can mix these polar forms. For instance, the ISO norms system allows producers to be certified by an independent private organization (see also the Underwriters laboratory in the USA), audit companies' checks and certifies the account of firms... Such a private organization gets its legitimacy (and its profits) from the reputation it acquires. One can also observe that for some products, agents use more than one quality label. For instance some firms involved in PDO supply chains also have their own brands. In this paper however, we focus only on the PDO and private brand systems. According to our definition of a quality label, the ISO system or other third-party enforced system are not quality label⁸. We feel that, at least in the food markets, these systems play a more prominent role as a quality signal in intermediate transactions among firms rather than in transactions with consumers. For instance, some firms with ISO certification sometimes even do not inform consumers about this fact. Before turning to the relation between quality enforcement devices and governance of transactions in the vertical chain we provide a summary table of the two quality labeling systems.

[INSERT TABLE 1]

2 Quality Enforcement Devices and Governance of the Vertical Chains

In this section, we develop the rationale behind our proposition of an alignment between quality labeling and the governance of transactions in the vertical chains. We start by considering the consequences for vertical coordination of the brand name strategy. The impact of public certification on governance modes is then analyzed.

2.1 Reputation as the Safeguard: Consequences on the Chains' Governance

In the previous presentation of the reputation mechanism only the owner behavior was taking into account. This rested on the implicit assumption that the brand's owner was the only agent able to influence the final quality⁹. However, for most of the agrifood products, several dimensions of final quality depend on prior stages of the vertical chains, from processors to, sometimes, farmers or input suppliers. For instance the final quality of cheese strongly depends on the maturing stage but also on the quality of milk which itself is related to the feeding of animals. This stresses the importance of several intermediate transactions in the chain for the final quality. Developing efficient information and monitoring system in intermediate transactions is an important issue for the label owner especially when asymmetric information is a challenge. The implementation of these quality enforcement devices will affect attributes of transactions within the chain and modify the nature and/or the extent of coordination problems (what Williamson, 1996, called contractual hazards). Therefore, in order to cope with these hazards, the brand's owner has an incentive to design governance structure aligned with contractual hazards. Although we were unable to have an accurate measure of important transactional attributes in our empirical study (like asset specificity and uncertainty), it is possible to provide some broad generalizations regarding the impact of quality labeling on transactional attributes from case studies and casual observation.

Firstly, some forms of asset specificity arise in significant respects. As pointed out by Williamson (1991), brand or label's reputation is a specific asset. Labeling quality through a brand name is a credible signal for consumers when the informed party commits its reputational capital. On the other hand, if suppliers must satisfy particular specifications in order to meet the quality standard designed by the brand owner, these requirements may increase the specificity of assets invested to meet these constraints (for instance, specific

characteristics of the raw material, or an increase in storage capacity to sort GMO free products...). The presence of specific assets raises issues of opportunistic behavior such as free-riding and hold-up problem.

The main problem related to brand name capital is the ability of firms in the chain to free ride on quality (Williamson, 1985, 1991)¹⁰. Absent vertical integration or contractual restrictions in the chain, each firm involved in the production process is a residual claimant and tries to maximize its own profit. Therefore, each firm has incentives to encourage the others to make the costly investments required to maintain quality while shading one's own effort to do so and free ride. Furthermore, because of observability issues, the risk of free riding is higher when a large number of firms are involved in the supply chain¹¹.

Furthermore, input suppliers and/or retailers of the brand owner can try to hold-up part of the value created by the label by delaying their supply in order to push for a more favorable distribution of the rents, etc. This problem is closely related to the natural attributes of the technology and of the products that also impact the nature and the intensity of different types of contractual hazards. Certain products, such as fresh fruits and vegetables, are subject to strong climatic uncertainty that influences both the quality and the quantity of products available. They are also subject to strong perishability constraints. This raises the importance of the timing of performance in the chain (Masten, 2000) and the related hazards of temporal specificity (Knoeber, 1983, Masten *et al.*, 1991).

Therefore, as pointed out by Transaction Cost Economics, it is therefore necessary to adopt particular governance structures in the vertical chain that, relative to spot markets, offer greater control on quality and reduce contractual hazards related to specific assets. The owner of the label can contract with firms, introducing restrictions on the production process, imposing specific inputs, monitoring the quality at several stages, linking the price paid to objective measure of quality or even vertically integrate the transaction¹². At the same time,

the suppliers need some form of commitments in order to assure the profitability of their specific investments. A shift from market governance to closer vertical coordination modes is also needed if suppliers invest in specific assets.

Secondly, the degree of uncertainty, especially the level of uncertainty on quality at various stage of the chain also shapes governance choice. A salient aspect of a lot of processed food products is the strong heterogeneity of raw materials. At the same time, the supply of raw material is still largely fragmented with sometimes thousands of suppliers for national brand. This can pose serious problems for evaluating and assessing each firm's separate contributions to the final quality or individual responsibility in case of food-related diseases. The issue here is related to the problems of evaluating individual performance (see Alchian and Demsetz, 1972, Anderson, 1984) and measuring products or asset characteristics (Barzel, 1982). The severity of this problem probably increases with the number of independent firms involve in the vertical chains. The owner of the brand must therefore deal with heterogeneous inputs of variable qualities and, at the same time, being able to deliver an uniform and stable final product (or set of products). Put differently, the uncertainty on quality becomes more consequential for the brand owner. This implies some mechanisms to deal with this uncertainty on quality in order to reduce observability and traceability problems (Spiller and Zelner, 1997, Ménard, 2004). Quality grading and the creation of quality standards are examples of mechanisms implemented to reduce and manage quality uncertainty (Barzel, 1982, Foss, 1996). Furthermore, the brand owner can go a step further and directly try to control critical steps of the production chain by vertically integrate or by contractually specifying restraints on it suppliers / retailers' behavior (for example a specific harvesting period, a particular technology, growing methods.....)^{13 14}.

Furthermore, there is more than only uncertainty on quality along the chain. The owner of the brand must also react to several kinds of difficult to predict external “shocks” like a food safety crisis, a new strategy or marketing campaign trigger by its competitors and so on. The combination of specific asset and the need to adapt to new external circumstances raises important coordination problems (Muris *et al.*, 1992). Here again, Transaction Cost Economics predicts a shift from a market-like governance to a more hierarchical one.

To summarize, by committing his reputational capital to protect quality, by creating a quality standard to be cope with by suppliers in the production chain, the brand owner put itself at risk and increase potential contractual hazards in transactions. Asset specificity, the degree of uncertainty concerning quality and free riding are important factors. The brand owner has therefore strong incentives to implement governance structures that can mitigate these hazards (Furquim de Azevedo *et al.*, 2003, Hobbs *et al.*, 2000).

2.2 Institutional Support as a way to Economize on Self-enforcement

The analysis was previously conducted without considering the role of the institutional environment as a potential provider of quality assurance for final and intermediate products. But this is precisely the role of the public certification in PDO labels. Through this system, the institutional environment provides resources to create and define property rights on public brands and to enforce quality along the vertical chains. European countries like France and Italy have a strong tradition of public definition and protection of geographical name as a quality signal¹⁵. Three important regulatory requirements for our purpose are the existence of a collective quality standard, public enforcement of this quality standard and the collective nature of the agreement (at the chain level). This standard is on a product-by-product basis and set the minimum set of requirements to comply with in order to have the right to use the public label¹⁶. We have just argued in the previous section that the need to monitor quality all

along the chain and prospect for free riding behaviors were important drivers for the decision to shift from market-like governance to more explicit form of commitment. However, if the institutional environment provides part of the control necessary to safeguard final quality and reduce free riding on quality, we expect governance structures in PDO vertical chains to be relatively closer to market governance (see Vetter *et al.*, 2002, for a formal statement). By providing public support to control and certify quality both at final and intermediate stages of the chain, the PDO system economizes on the specific reputational capital that private firms must commit to safeguard quality (Klein, 1996) and on the cost related to this commitment function (mainly monitoring costs by private firms along the chain). This provision of public certification also economizes on measurement costs all along the different production steps, especially if there is economies of scale in monitoring (North, 1990).

Periodical tests by the certifying organization are done at all stages of the production chain in order to check the conformity to the quality standard (with frequency and financing depending on the case), to detect quality cheating. This reduces the need for a more privately-designed quality control system. If a particular batch does not meet the quality standard, the product cannot be sold with the PDO label. In last resort, if a particular firm does not meet repeatedly the quality standard, it can lose the right to use the PDO and be excluded from the collective organization managing the PDO. By reducing the need for private monitoring of quality, the public certification supports the development of more market-based modes of bilateral governance in the chain^{17 18}.

Finally, the collective nature of PDO brand may reduce the hold-up problem related to the degree of bilateral dependence among firms. The redeployability of some of the assets is easier in PDO chains because the specific assets involved in the production process by individual firms are more “PDO-specific” than transaction-specific (thanks to the collective

nature of the quality standard. If, at each stage of the chain, several firms are present, the prospect of bilateral dependency is less severe. As a result, we expect the governance of transactions in PDO chains to be closer to the market-like governance than the governance of chains with a private brand. We now turn to our empirical analysis.

3 Empirical Evidence

In this section, before presenting our case studies, we start by providing a model of the vertical chain as well as a typology of governance structures. The alignment between quality labeling, quality enforcement mechanisms and governance structure is then explored.

3.1 A Generic Model of Vertical Chains and Governance Structures

Our empirical analysis is based on the comparison of governance structures in different case studies. To take into account the diversity of both the different vertical chains and the governance modes, we have established a stylized model of agri-food vertical chain. This “transactional” model is mainly based on a technological decomposition of the production process along the chain and integrates five main transactions.

- Transaction between farmers and their input suppliers (hereafter labeled **T.1**),
- Transaction between farmers and the first processing stage¹⁹ (**T.2**),
- Transaction between the first and the second processing stages (**T.3**),
- Transaction between the last processing stage and wholesalers (**T.4**),
- Transaction between wholesalers (or the last processing stages) and retailers (traditional and/or large retail chains) (**T.5**).

It should be note that the length of each chain varies mainly from sector to sector (as well as within them). For instance, the vertical chain in the fruits and vegetables sector in our sample is shorter than the other two sectors. The transaction between the first and the second

processing stage (T.3) does not exist. This is because the vast majority of the case studies in this sector are about fresh products (only one French case study deals with processed vegetables sold in cans). In the cheese sector the transformation of milk into cheese is always followed by a maturation stage (of variable length depending on the product). In the meat sector, fresh meat involves only one processing stage (slaughtering) whereas processed meats also involve a second processing stage (for instance sausages).

For each transaction T_i we looked at the governance structure. We based our description of governance modes on the well-known typology provided by Williamson (1991) that distinguishes between market, hybrids and hierarchical governance. However, we add to this typology an extension of the hybrid category into several distinct types (see Ménard, 2004, for more on hybrid organizations). Six different governance structures were identified²⁰.

- *Spot market contract* (hereafter labeled **S**). A contract for the immediate exchange of goods or services at current prices where the identity of the parties is irrelevant (because the switching costs to find a new partner is low),
- *Relational (or implicit) contract* (**S+**). Share understanding that are not legally enforceable but based on reputational or more generally social ties. Because the transactions are repeated with the same partners, their identity does matter now,
- *Relational contract with “approved partner(s)”* (**S++**). Firms are longer free to choose their trading partners, but have to select them among a set of “qualified” partner (buyer and/or seller accredited for instance by the certifying organization in PDO chains or retail shops that must deal only with ISO certified producers),
- *Formal (written) contract* (**C**). Legally enforceable promises with variable duration,

- “*Equity-based contract*” (JV). One of the firm is a stockholder of its partner but stays legally independent from it. Joint-venture, characterized by a particular level of equity participation, is a canonical example,
- *Vertical integration* (VI). Bringing two or more successive stages in production and distribution under common ownership and management.

Three main comments can be made on this typology. First, it does not pretend to be exhaustive or universal. Our governance structures are analytical types although they emerge from a careful analysis of empirical observation. Each case study has been classified according to a frame common to all the teams involved in the study²¹. The classification is close to the one some used by some agricultural economists (Peterson and al., 2001) and similar in spirit to the one used by supply chain management scholars like Gereffi (2001) (see also Gereffi and al., 2003). However, we depart from Gereffi’s work on one important respect. His classification of different governance structures mixes elements describing contractual relations, bilateral or multilateral dependence, products and transactional attributes (see Gereffi et al., 2003, p. 5). We “stick” more closely to Williamson by focusing only on contractual elements (including allocation of assets ownership)²². Second, our typology describes and ranks the different bilateral governance structures. As we move away from spot market commitments become more formalized and closer to hierarchical relation. Finally, these bilateral governance structures are not mutually exclusive. In several case studies, different bilateral governance structures coexist side by side for the same transaction²³.

3.2 The Population of Case Studies

We propose in this section a methodology of case study based on Yin (2003). Following this author and applications in industrial markets (see for example Johnston, Leach and Liu, 1999 ; Dubois and Gadde, 2002 ; Sterns, Schweickhardt and Peterson, 1998), we suggest to consider Three steps in the definition of a rigorous case study research design : (i) definition

of the unit of analysis; (ii) selection of case ; (iii) data collection and analysis. We will consider consecutively these three steps.

- definition of the unit of analysis : as suggested by Yin, a clearly research question is central to the implementation of a proper case study research. The appropriate unit of analysis will result from an accurate specification of this research question.
- Selection of a case: The basic idea of case study research is what Yin calls ‘analytic generalization’. For Yin, an analytic generalization is to be contrasted with another way of generalizing results, the statistical generalization. In this situation of statistical generalization, the cases are ‘sampling units’ and the replication of cases. Instead, in the analytic generalization, the cases are not sampling units and are not chosen for this reason. For Yin, in an analytical generalization, ‘the previously developed theory is used as a template with which to compare the empirical results of the case study’ (Yin, 2003:32-33). Then, ‘case studies; like experiments, are generalizable to theoretical propositions and not to population or universes’ (Yin, 2003). Following this idea of an analytic generalization, it is still possible to have different types of case studies selection. Case selection results from the research hypotheses. The multiple case study design is usually interesting when the objective is
- Data collection and analysis: in case study, the step of ‘study protocol’ is extremely important. According to Yin , the study protocol stipulate not the survey or interviews techniques but at a meta level what are the research questions that “need to be addressed by the case to support the research hypotheses” (Johnston et al. 1999:207). Then, in a second step and considering the constraints of time, confidentiality etc..., multiple sources are collected. Three types of sources have been used in the case study :
 - – quantitative data about the case
 - in depth interviews with different informants
 - questionnaires

Our empirical study is based on a set of 42 case studies coming from 7 European countries (6 case studies by country), in 3 different agrifood sectors: (i) Processed and fresh meat, (ii) Fruits and vegetables, (iii) Cheese products. The choice of case studies was made in order to have both PDO and private brand cases in the population. This choice was also driven by previous knowledge of each team of researchers involved in the study. This second

criterion as a drawback: our population of case study is not necessarily representative of the diversity of organizations in the selected sectors. For example, we choose some firms with established brand goodwill at the national level. As a consequence, small scale regional firms are largely underrepresented in our population. However, this criterion also has an advantage: because of previous contact with the firms and compare to large sample analysis, it was easier to have information on the topics we were looking for. Our main source of information is an extensive data collection based on semi-structured interviews and meeting with top managers of the firms or collective organizations owning or managing the label (remember that PDO labels are own by the state but manage by collective organizations). In each PDO cases and in some trademark cases, we supplement the previous interviews by interviewing other firms involved in the chain. To facilitate the comparative analysis, investigations and interviews were conducted by all teams involved in the study with a common questionnaire we designed for all the case studies (see annex 2 for an overview of the repartition of quality labels among sectors and countries). Three main items were analyzed by several questions in the questionnaire: quality labeling strategy and quality definition (for instance the technical “list of specifications” that defines quality), the organization of quality control and the governance of transactions in the production chain. For instance, the typology of governance structures we use in the analysis directly result from the description of governance modes provided by the respondents. Before starting the description of the results, some general comments are necessary.

First, we previously note that each case study may have a vertical chain of different length. Because, the occurrence of a particular governance structure increases with the length of the chain, the empirical results could be bias toward an over-representation of some governance structures simply because there is more transactions. To handle this problem, we choose to measure the occurrence of a particular governance structure in term of frequency. For each transaction, the number of time a specific governance structure appears was divided by the number of case studies for which we had information on the governance for this transaction.

Second, in some case studies several quality labels coexist for the same product (for instance a PDO and a private brand). During the interviews, we asked respondents to rank the different quality labels posted on products according to their reputation or prestige for consumers. This allows us to split the population of case studies in two sub populations depending on this “reputational” rank. All the cases where the brand name was either the only or the most well known label were grouped together (the same was done with the PDO cases).

For each of the two populations, we report the repartition of each governance structure for each transaction.

Finally, as pointed out by North (1990) and Williamson (1991) differences at the institutional level can also impact the choice of governance structures by shifting their relative costs and benefits. We try to “catch” this effect by comparing the different governance modes by country. Furthermore, sectoral differences can also affect the governance decisions. We also checked whether broad technological differences were driving the results.

To summarize, the set of governance structures we observe for each case study will then depend on (i) the type of quality label, (ii) institutional differences proxied here by the country and (iii) technological attributes proxied by the sector. In order to check for sectorial and / or institutional differences, we will evaluate the dominant governance structures for each transaction T_i respectively by sector and country. The “dominance” of a particular governance structure is simply evaluated by the number of times this governance occurs in the sub-population.

3.3 Quality labels and Chains’ Governance

In this section, we compare the set of bilateral governance structures in two subsets of case studies: (i) case studies with private brands as the main quality label, (ii) case studies

with PDO brands as the main label. We start the empirical analysis by a general overview of the matching between the set of transactions and the governance structures for the whole population of case studies. We did that without taking into account national and/or sectoral differences.

[INSERT TABLE 2]

We observe a diversity of governance structures for each transaction at the exception of the transaction T.3 (transaction between the first and second processing stage). Vertical integration governs this transaction in 90% of the cases. This result is mostly driven by case studies in the cheese and meat sectors (only one case study has a T.3 transaction in the fruits and vegetables which is govern as well by vertical integration). The governance of this transaction does not seem to depend on the quality labeling strategy. Therefore, we omit this transaction for the rest of the analysis. We then compare the governance of transactions for the PDO and brand name cases respectively. 36 case studies out of 42 were used in the comparison, 11 are PDO cases whereas the others are cases with private brand. 6 cases were omitted because the main relevant quality label in terms of reputation was neither a brand nor a PDO²⁴.

[INSERT TABLE 3]

Our hypothesis stresses that the governance of the supply chains for the case studies with private brand name should be closer to the internal governance (vertical integration) than the governance in the PDO cases. This is what we observe when we look at the distribution of governance structures for the two sub-populations. If we compute the “dominant” governance structure for each transaction (*i.e.* the governance that occurs most frequently), the dominant governance for the brand name cases is similar (case of transaction T.2) or closer to the hierarchical mode than the governance for the PDO cases. To emphasize the difference between the two groups of case studies, the following table compares for each

transaction the frequency of the last three governance structures pooled together (contract, “joint venture” and vertical integration). As a sensitivity check, we reproduce the analysis by taking into account only the last two governances.

[INSERT TABLE 4]

When we pool the last three governance structures together, the occurrence of this group is significantly higher in the brand name cases than in the PDO cases which lead support to our proposition. The main differences are for the last two transactions. Except for the transaction T.1, the results still hold when we pool only the last two governance structures but the differences between the two sub-populations are less important. This suggests that the shift of governance between the two groups of cases mostly comes from the higher occurrence of explicit contractualization in the BN cases.

These previous results support our proposition. We now check for national or sectoral differences that could also influence the results. The sector variable is used here to take into account the effects of technological differences on the choice of governance modes. The “nationality” of case studies is used here as a proxy for differences in the institutional environment. We first present the dominant governance structure for each transaction in each sector.

[INSERT TABLE 5]

The results do not show sharp differences between sectors. Relational contracts are the dominant governance structure for a lot of transactions. When two governance structures appear for a transaction, this means that they equally occur in the population. To assess more precisely the influence of sectoral differences, we compare the governance of transactions for PDO and brand names respectively for the cheese and meat sector²⁵. The result is show in the following table.

[INSERT TABLE 6]

The distribution of governance structures among the different transactions confirms our proposition. The frequency of contracts or vertical integration is higher in cases with a private brand compare to the PDO ones. This is especially true for the last two transactions (T.4 and T.5).

We now check for the influences of case studies' "nationality" on our results. Countries are supposed to catch differences at the institutional level. The following table shows the main governance structure for each transaction in each country. The information for the Netherlands is not reported here because the majority of the Dutch cases were excluded form the sample.

[INSERT TABLE 7]

There are differences among countries, mainly for the last two transactions (transactions with wholesalers and/or retailers). Explicit contracts (C) and vertical integration (VI) are more prevalent in the German and Greek cases. Note that these two countries also have the smallest number of PDO cases in the population (no PDO as the most important quality label for Germany and only 2 out of 6 for Greece). This indirectly supports our proposition. In order to check if our previous results are not driven by the national patterns of these two countries we reproduce the analysis of the table 2 by excluding the German and Greek cases (these cases account for half the brand name cases). Because the differences in governance respect are mainly for the last two transactions, we only compare the governance of these two transactions by countries. We expect that with this new sample the governance of the brand name supply chains will still be closer to hierarchy than the governance of the PDO cases. The following tables (similar to tables 3 and 4) present the new results.

[INSERT TABLE 8 and 9]

The results support our hypothesis and are similar to the ones presented in table 3. On the one hand, the most frequent governance structure(s) for the brand name cases in each transaction is never lower (relative to our typology) than the one(s) for the PDO cases. On the other hand, if we pool the last three governance structures (C, JV, VI), this group is largely more prevalent in the brand name cases. Here again, this difference is mostly driven by the relative importance of explicit contractualization in the brand name cases. However, if one compares these results with the previous ones for the whole set of countries (compare table 2 and table 7, table 3 and table 8), the relative importance of governance modes closer to hierarchy is slightly lower in the new sample. For instance, the occurrence of spot market contracting for the T.1 transaction in the BN cases jumps from 11% to 25% in the sample without Greece and Germany. In that sense, national differences explained part of the results we found in table 2, at least for the last two transactions. In order to check for other national influence, we reproduce the same analysis several times by excluding one different country each time. The previous results still hold.

4 Conclusion

In this paper, we studied the relation between the quality enforcement mechanisms used in the transaction with consumers and the governance of the vertical chains. Two main quality enforcement modes were compared: on the one hand, the typical private brand where reputational capital is the source of credibility; on the other hand, the PDO system where consumer confidence is supported by public certification. These two quality enforcement devices are different ways to deal with the problem of quality uncertainty for consumers. The reduction of this uncertainty is at the core of the economic value of these brands. It is difficult to assess which of these systems is the most efficient as a provider of safeguards to consumers. We could even argue that this question is probably not the most relevant one. The private label strategy is quite often impossible for small firms that are still so prevalent in agri-food

sectors. For these firms, a collective agreement on quality definition supported by public certification is the only way to compete vis-à-vis large firms (processors or large retailers). It is only through a collective agreement that they will be able to reach the efficient scale to promote their products at a national or international scale. This is different for larger firms that can decide to join or not a collective system. Put it differently, the size of individual firms largely affect their choice among the two quality systems. The point we emphasized in this paper is that, whatever the system used to provide quality assurance to consumer, its implementation has consequences on the governance of vertical transaction in the supply chain. Following a Transaction Cost Economics framework, we argued that different quality enforcement devices should be aligned with different governance of the supply chains. More specifically, we expected that private brand with reputational capital as a commitment device should be supported by governance structures close to the hierarchy side of the governance typology. On the other hand, the governance of vertical chains with a public certification brands should be more of the market like governance.

Based on a sample of cases studies in different agro-food sectors for different European countries, we compare the governance of the supply chains for cases with a private brand name and a PDO brand respectively. The empirical results are consistent with our proposition even after controlling for others variables able to blur the results. For the brand name case studies, agents rely more on explicit commitment (through written contracts) or financial links (“joint venture” or vertical integration) relative to the PDO cases.

This results show that quality labeling and governance of the vertical chains are related. If quality labeling is part of the global strategy developed by firms to enhance their strategic position in the market and create value, our results show that strategy and structure (here the governance of the vertical chains) are inter-related (see Spiller *et al.*, 1997, and Yin

et al., 2004). However, in order to improve the accuracy of the results, we should look in more details at the mechanisms of governance per se, *i.e.* incentive mechanisms, allocation of decision rights, contractual provisions, but also improve the evaluation of differential contractual hazards (see Hueth *et al.*, 1999). For some classes of governance structures we identify, we could probably find heterogeneity in the mechanisms of governance even in the same class. However, we can expect to observe only a small set of clustered mechanisms. The rationale behind the clustering also needs to be understood. The recent literature on the complementarity in the organizational design can be a good starting point (see Milgrom and Roberts, 1990, Hendrikse, 2003). A more detailed analysis is thus needed.

For a lot of transactions, we were able to evaluate a dominant governance structure. A dominant structure does not mean only one structure. There is a huge variability of governance modes in the case studies. We can expect that the alignment between quality enforcement mechanisms and governance to be more efficient in some cases relative to others. This ultimately brings us to the question of the organizational performance of these governance modes. Even if the information on performance is not well developed in our case, we should devote some future researches on that topic. Another extension should be to assess the relative influence of each transaction (or stage of the vertical chains) on the final quality. One can expect to observe that the more a transaction is “important” for the final quality, the more control the owner of the label should have on that transaction. This is left for future researches.

Annex 1: Quality labels by countries and by sub-sectors

Country		France	Germany	Greece	Italy	Netherlands	Spain	UK
Cheese	Aged	2 PDO	2 BN	2 BN	1 PDO, 1 BN	1 PDO, 1 BN	1 PDO	1 PDO, 1 BN
	Fresh						1 PDO	
Meat	Fresh beef	1 BN	1 BN		1 BN		1 BN, 1 PDO	1 PDO
	Fresh pork					2 CB		
	Processed pork			2 BN	1 PDO			
	Poultry and others	1 PDO	1 BN					1 BN
Fruits and vegetable	Fresh fruits		1 BN	1 BN	1 BN		1 PDO	1 BN
	Processed fruits							
	Fresh vegetables	1 BN	1 BN		1 BN	2 CB	1 PDO	1 BN
	Processed vegetables	1 BN		1 BN				

BN: brand name, PDO: Protected Denomination of Origin

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Table 1: Main differences between private brands and PDO brands

	Private Brands	PDO brands
Quality signal	Regular and uniform quality level	Regular quality level and geographical origin
Quality standard	Yes and own by the firm (protected by intellectual property rights)	Yes and own by the state (protected by European regulation)
Quality enforcement	Reputation as a collateral	Public certification

Table 2: Distribution of governance structures among the transactions²⁶

Transactions	T.1	T.2	T.3	T.4	T.5
GS					
S	13 %	7.1%	0	19.3%	20.5%
S+	17.4%	4.8%	0	37.7%	41%
S++	34.8%	2.4%	0	0	10.3%
C	17.4%	19.1%	4.5%	22%	25.7%
JV	0	57.1%	4.6%	5.2%	0
VI	17.4%	9.5%	90%	15.8%	2.5%
Number of observations	24	42	22	37	39

Table 3: Frequency of governance structures by transaction (%)

Transactions	T.1		T.2		T.4		T.5	
	BN	PDO	BN	PDO	BN	PDO	BN	PDO
S	18.75%	14.3%	0	6.25%	11.3%	25%	19.3%	23%
S+	18.75%	57.1%	0	12.5%	27%	66.6%	31%	61.6%
S++	25%	14.3%	0	6.25%	0	0	15.3%	15.4%
C	25%	0	26.9%	18.75%	31%	8.4%	31%	0
JV	0	0	57.7%	50%	7.7%	0	0	0
VI	12.5%	14.3%	15.4%	6.25%	23%	0	3.4%	0

BN: brand name, PDO: Protected denomination of Origin

Table 4: Occurrence of the last three (respectively last two) governance structures (%)

Transactions GS	T.1		T.2		T.4		T.5	
	BN	PDO	BN	PDO	BN	PDO	BN	PDO
C+JV	37.5%	14.3%	100%	75%	61.7%	8.4%	34.4%	0
+VI								
JV+VI	12.5%	14.3%	73.1%	56.25%	30.7%	0	3.4%	0

Table 5: Dominant governance structures in each sector

Transaction Sector	T.1	T.2	T.4	T.5
Cheese	S+	JV	S+	S+
Meat	S++	C	S / S+	S / S+
Fruits	?	JV	No dominant GS	S+ / C
Vegetable	S+ / C	JV	S+	S+

Table 6: Dominant governance structures for PDO/brands in meat and cheese sectors

Transactions GS	T.1	T.2	T.4	T.5
Dominant GS meat	PDO	?	No dominant GS	S/S+
sector	BN	S/S++	C	VI
Dominant GS cheese	PDO	S+	JV	S+
sector	BN	?	JV	C

? means that we didn't have enough observations to make any comparisons

Table 7: Dominant governance structures for each country

Transactions Countries	T.1	T.2	T.4	T.5
France	No dominant GS	C	S+	S+
Germany	?	JV	VI	S+
Greece	?	JV	C	C
Italy	S+	JV	S	S
Spain	?	JV	S / S+	S+
UK	?	C / JV	C	S+

? means that we didn't have enough observations to make any comparisons

Table 8: Governance of the last two transactions in the sample (without Germany and Greece)

Transactions GS	T.4		T.5	
	BN	PDO	BN	PDO
S	25%	18%	23%	23%
S+	25%	73%	31%	61.5%
S++	0	0	15%	15.5%
C	25%	9%	31%	0
JV	0	0	0	0
VI	25%	0%	0	0

Table 9: Occurrence of the last three (respectively last two) governance structures without Greece and Germany

Transactions GS	T.4		T.5	
	BN	PDO	BN	PDO
C+JV+VI	50%	9%	31%	0
JV+VI	25%	0	0	0

¹ See the following site for an exhaustive list of PDO products in the European Community:

(http://europa.eu.int/comm/agriculture/qual/eng/lbbab_en.htm)

² France, Germany, Greece, Italy, Netherlands, Spain, UK. More specifically, we conducted six cases studies in France. The rest of the empirical research was conducted by six other teams, one per country, in close cooperation with the French team who was also in charge of the coordination of the whole set of cases.

³ The repeat purchase mechanism can work even if the purchases are not made by the same consumer. The consumers can relay information between them. For the repeat purchase mechanism to work, it is necessary that the horizon of the relationship between the producer and the consumer be infinite or, in the case of a limited horizon, the end of the relationship must be uncertain in order to solve the "last period" problem.

⁴ The PDO products are protected by a European regulation (regulation EEC 2081/92 of July 1992) on the protection of geographical indications and designations of origin for agricultural products and foodstuff.

⁵ For instance, a specific level of tenderness for meat, a minimum ripening duration for cheese.

⁶ See for instance Ménard (1996) for an analysis of the institutional structure supporting a particular type of PDO, the "red label" logo developed in the French poultry industry

⁷ Klein *et al.* (1981) identified a third mechanism to enforce quality, namely vertical integration. In our context of agrifood products, this means self production by consumers. See also Henson *et al.* (1999) for more on quality assurance devices with a special emphasis on food safety.

⁸ One of the referee points out that we could have also add in this quality device publicly defined and inspected quality classes for intermediate products. While we fully agree that quality grading is important, these systems are not quality label according to our definition. However, they can play an important role in the governance of quality along the vertical chain.

⁹ Alternatively, in a producer/retailer relation, we could consider a situation where the producer uses a distributor's services to market his products but the latter has no influence on the quality of the final goods (for example through a special packaging, e.g. vegetables sold in cans). However, farmers can greatly influence this quality.

¹⁰ In the literature on franchising, the issue of free-riding (a form of moral hazard) is hardly distinguished from the hold-up problem related to brand name capital. Most papers refer to quality debasement as an example of both free riding and quasi-rent appropriation (see Minkler and Park, 1994, Williamson, 1985, p. 181-182, 1991,

p. 16-17). It is therefore not clear whether or not the distinction between moral hazard and opportunistic behaviour related to specific goodwill is relevant.

¹¹ This kind of free riding problem is similar in franchised chains when franchisor is unable to observe franchisees' behavior (see Lafontaine *et al.*, 2002). For instance, in the context of franchising, Michael (2000) showed that the level of quality in retail chains was positively related to the extent of vertical integration.

¹² In the case of the large retailer in France selling high quality beef, the creation of the quality label was followed up by a modification of the relations with slaughterhouses and farmers, *i.e.* a shift from spot market to explicit contractualization (trilateral contracts between the retailer, individual slaughterhouse and farmers' organizations, see Mazé, 2002, for more on this).

¹³ One of the referees suggested that the existence of regulatory quality grading systems or other mandatory devices like food safety regulation could act as a substitute for formal contractualization. This suggests that the main goal of contract is to explicitly specify the definition of products' quality. However, even in a sector where quality grading was developed at the European level, namely the fresh beef sector with the EUROP carcass grading system, the use of formal contract is becoming more prominent. In one of our case studies, the relation between the larger French retailer and both growers and slaughterhouses are governed by formal contract designed by the retailer (see Mazé, 2002, 2003, p. 16-17, for the French meat sector and Gonzalez-Diaz *et al.*, 2003 for the Spanish one). The same result also appears in all other cases involving private brands in the beef sector. One interesting question however is to know whether the extent of contractualization is related to the "accuracy" or the scope of the quality grading system. However, our data are not precise enough to test this proposition. As pointed out by the same referee, it is possible that some firms rely on formal contracts to specify characteristics not covered by the grading system. We totally agree with this point but this rather brings us to the issue of avoiding hold-up problem because of specific assets. If a brand owner asks for inputs with particular specifications, the suppliers will probably invest in specific assets to meet the requirement.

¹⁴ This argument is supported for instance by Foss (1996): "*Processing firms in the fruit and vegetable industry therefore to a large extent insure a uniform quality primarily through contractual specification and control of the raw product characteristics*" (p. 543).

¹⁵ As pointed out by Bertozzi (1995), people in European countries are used with geographical origin of products since the fourth century BC (for instance wines from Corinth).

¹⁶ However, this does not prevent a subset of firms to go further and add more specifications. For instance, in one of the French case studies in the cheese sector, the collective definition of quality allow for a distinction between “regular” and “extra” quality for the final product (with different prices).

¹⁷ The sanction for repeated opportunistic behaviour in the PDO system is the exclusion of the system, *i.e.* the exclusion of the right to use the public brand as a label.

¹⁸ Here, we implicitly assume that the certifying organizations have the correct incentives to accurately check and report quality level and does not collude with firms involve in the system.

¹⁹ Depending on the sector studied, the term “first processing” refers to different activities. In the case of the fruits and vegetables sector, this stage mainly refers to pack and sort products (sorting, selection, aggregation, packaging, stocking, etc.). In the cheese sector, the first level of processing refers to a real physical transformation of the product.

²⁰ The capital letter (S ...) will be used in several tables in the next section to describe the governance structure for each transaction. Most of the definitions of bilateral governance structures come from Milgrom *et al.* (1992).

²¹ Because of the international nature of the study, the selected team in each country was responsible for collecting the data in it own country. Several meetings were organized with the aim to ensure an overall coordination of the data collection. The identification and classification of the governance modes in each case were based on a preliminary “guide for data collection” in the form of a questionnaire (designed by the French team). Part of this guide was dedicated to the identification of governance mechanisms. The first version of the guide was very detailed on the governance issue (asking about some contractual details like specific contractual provisions, e.g. quantity, quality, price provisions). After a first round of interviews, it appears that the questionnaire was difficult to implement in interviews partly because it was too complicate and time consuming. Therefore, we decide to simplify it by using broader items to describe the governance. The detailed questionnaire turns more into a “reminder of important issues” based on simpler items. It appeared that this simpler version was easier to manage. For each case study, the interviewer had to classify the governance structures into the typology. It also had to write a 25-30 pages draft paper on the case. We collected all these papers and collectively (all members of the “French team”) checked whether or not we agreed on the identification and classification of the bilateral governance structures. In case of ambiguity, we asked the responsible of the case for additional details in order to validate or not his classification. It appears that in most of the case, the views were converging.

²² Gereffi and al. (2003, p. 4-5) also extent the domain of intermediate modes of governance but speak of network instead of hybrid governance. We do not have any definitive statement to decide whether hybrid or network should be use as an appropriate characterization of “intermediate” modes of governance.

²³ This is for instance the case when a firm simultaneously buy and produce in-house some components (“tapered integration” in managerial literature) or when a franchisor own some outlets and franchise others (“dual distribution”).

²⁴ Most of the Dutch case studies belong to this group.

²⁵ We were unable to do the same comparison for the fruits and vegetable sector because of the number of PDO case in that sector (only one case study).

²⁶ We don’t have the same number of observations for each transaction. This reflects the fact that (i) for some case studies we didn’t have the information for the governance of a particular transaction and/or, (ii) the transaction was irrelevant (for instance the T.3 transaction does not exist in the fresh fruits and vegetable cases).