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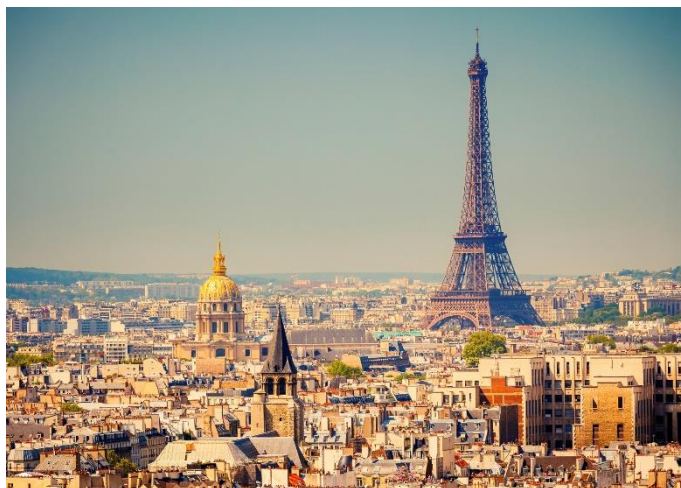
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Agency relationships in PDO products management: the role of economic associations

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Contribution appeared in Sylvander, B., Barjolle, D. and Arfini, F. (1999) (Eds.) “The Socio-Economics of Origin Labelled Products: Spatial, Institutional and Co-ordination Aspects”, proceedings of the 67th EAAE Seminar, pp. 124 - 132

October 28-30, 1999

Le Mans, France



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Agency relationships in PDO products management : the role of economic associations¹

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Abstract

The study aims to introduce a simple theoretical view concerning agency relationships in agrifood chains, by considering an association of olive oil producers whose behaviour is the basis of the theoretical view. The circumstances, which are firstly taken into account in the analysis are : a) a large number of small farms is involved in producing the raw agricultural product ; b) a high degree of heterogeneity usually affects the raw agricultural product ; c) the final demand is supported by consumers who are able to assess differences in the quality of the final product d) the PDO (Protected Designation of Origin) label reduces drastically the possibility of substituting the raw agricultural product. Therefore, the co-ordination process among economic agents has to support the concentration of the agricultural product and ensure the particular features of the final product. This means that the co-ordination process have also to include solutions to the problems related to the goals of the consumers.

If the features of the agricultural raw material do not correspond to the need of the PDO production process, then an asymmetric information occurs between the farmers and the agents of the processing stage. Thus, the hypothesis that the heterogeneity of the raw agricultural product should be more efficiently managed by an agency relationship rather than by a market process is discussed. An association of producers could define a principal-agent relationship with agents of the processing stage. The association (principal) can stipulate a contract with the management of the processing stage (agent) and specify its needs to meet fully the PDO conditions and satisfy the final consumers. Therefore, the association and the contract are assumed as basic elements of the institutional dimension of the co-ordination process.

Keywords : protected designation of origin; co-ordination process; principal-agent relationship; olive oil production

INTRODUCTION

This study aims to examine the exchange process and the co-ordination solution in the case of production and the PDO olive oil of Umbria. The production and trading process are analysed within an institutional framework determined by the farmers, the firms of the processing stage and the consumers association. We suggest that this arrangement could increase the bargaining power (Saccomandi, 1998) of the farmers and allow them to establish a principal-agent relationship (Mas-Colell, Whinston, Green, 1995 ; Rees, 1985) with the processor. Actually, in a very schematic view, the relatively higher concentration of the processing stage and the sensitivity of crucial characteristics of the raw agricultural product could support a monopsonistic behaviour of the processing firm. On the other hand, the PDO label reduces the possibilities for substituting the raw agricultural product : this may induce monopolistic behaviour on the farmers' side. Therefore, both technological and institutional conditions should structure the exchange process of the raw agricultural product in terms of a bilateral monopoly : then the determination of the price will result from the bargaining process (Saccomandi, 1998).

The low productivity of the agricultural stage seems due largely to trading problem (Inea, 1998) ; therefore an appropriate framework of the exchange should improve the economic results of the farms and contribute to the valorisation of the agricultural resources.

The dependence of the quality of product on various technological and climatic conditions supports some possibilities for opportunistic behaviour of the farmers and of the processing stage. Anyway, at the time of trading the crucial characteristics of the raw material (olive) can be easily verified, therefore the relevant information asymmetry concerns the consumption of resources in the processing stage tasks.

The consumers are able to assess the traditional characteristics of the PDO olive oil and can pay a high price to obtain these characteristics. Then the main role of the consumers in the institutional arrangement is to contribute to establishing the price of the final product, by taking into account the costs of production and the quality of the product.

Even if a positive assessment of the whole framework of the exchange process seems possible, anyway a detailed study is need both in the theoretical interpretation

and, particularly, in the quantitative analysis. Actually, the very simple example we introduce will only delineate the payment to the processing firm, but will not take fully into account the evolutionary opportunities of the institutional framework.

We will briefly discuss the PDO since the institutional arrangement is still in progress, while some agreement between farmers and the processor could be held to discuss the main hypothesis. Thus, in this tentative study, we will try to develop progressively the analytical view, within the general theoretical framework of the analysis of the agrimarketing systems.

Paragraph 1 illustrates the theoretical framework. In paragraph 2, we analyse the exchange process and the institutional arrangement. Some numerical results are discussed in paragraph 3. Paragraph 4 illustrates some conclusive remarks and tries to define some opportunities to develop the analysis.

1. THE THEORETICAL FRAMEWORK

1.1. The co-ordination process and the heterogeneity of the raw agricultural product

The study concerns the production of a PDO agricultural product (olive) which is a raw material of a transformation production process : therefore, we take into account an agricultural stage and an industrial stage. The co-ordination problem examined concerns the relationship between these stages. Once the PDO status has been established and its rules and norms have been issued, each actor should follow them according to its specific role and goals. Nevertheless, the co-ordination process can take place in different ways, depending upon the way chosen by each actor to link the others.

Following Grandori (1995), we define co-ordination as the process, which yields a specific configuration of interdependent actions of actors. Particularly, the co-ordination is expected to yield a set of positive results of actions.

The co-ordination process may be activated in various ways. The agency relationship (Saccomandi, 1998 ; Mas-Colell, Whinston, Green, 1995) requires communication between the actors and implies an agreement about the actions and their selection. Any kind of co-ordination regulation uses resources (co-ordination costs). In the case of the agency, typically, these costs

are due to the costs of incentives ; in a market process, the co-ordination costs also include the value of the products which eventually is not traded (Grandori, 1995).

We will examine the exchange process, which is established in linking the two stages mentioned. Particularly, we will consider the role of the economic association of producers in defining the institutional framework of the exchange.

Furthermore, we will point out the role of the heterogeneity of the agricultural raw material in the agrimarketing relationships. Of course, an intrinsic degree of heterogeneity is due as to the biological nature of the agricultural product as influenced by the weather : anyway, in the case of typical products this is often a positive aspect as viewed by the consumers. On the other hand, another source of heterogeneity is the process of definition of the technology at farm level. Actually, the internal organisational framework of the farm is strictly connected to the process of defining technology (De Liso, Metcalf, 1997) and this could affect the quality of the product at the farm level. For example, different organisational frameworks may imply not fully suitable tasks during the harvesting time. Under this view, these organisational frameworks can be thought as the technological pattern which supports the organisational style of the farmer (see Van der Ploeg, 1990).

The heterogeneity of the raw agricultural product influences the costs of the processing stage, because of the variance of the characteristics of the raw material. Since there are many sources of variance, a processing firm has to manage some degree of uncertainty in dealing with each farmer.

1.2. The exchange process

We take into account the following elements : i) a large number of small farms is involved in producing the raw agricultural material, while the transformation is a relatively large scale process ; ii) a high degree of heterogeneity affects the raw agricultural product, mainly because of the technological and organisational conditions at the farm level ; iii) the final demand is supported by consumers who are able to assess differences in the quality of the final product ; iv) the agricultural product can be substituted only by increasing costs.

We will examine the exchange process of raw agricultural product (olive for PDO olive oil of Umbria) under these

conditions. Note that the general analytical framework can be easily found in the theoretical inquiry of the agrimarketing systems (Saccomandi, 1998). In this study, we simply point out some specific terms of the process and some numerical issues related to the case study.

The technological characteristics of the processing stage suggest the possibilities for a type of monopsonistic behaviour. Actually, even if there is a relatively large number of processing firms, the exchange process takes place locally, mainly because of the technological conditions and local relationships. Therefore, each of these firms faces a high number of farmers. Thus, a firm could manage the processing stage by collecting the agricultural product according to its profit maximisation. According to Saccomandi (1998), we know that the monopsonist will pay the price p_0 and buy a x_0 amount of the quantity supplied by the small farms. Given the production function of the monopsonist $q=f(x)$, his own total income is :

$$(1) \quad R = pq = p f(x)$$

where p is the price of the final product. Then the demand for x is $p(dq/dx)$ and the cost for an additional unit of x is dC/dx , where :

$$(2) \quad C = p_a x = g(x)x$$

given that p_a is the price for x . Let us also assume that $dg(x)/dx > 0$. The market equilibrium implies that the total sale value of the agricultural product to the monopsonist is $p_{ac}x_0$, which is lower than the typical value of a pure competitive equilibrium $p_{ac}x_c$.

The farmers have a possibility of self-organising in promoting an association, but, on the other hand, the possibility of concentration of the agricultural supply suggests that the exchange process could also be carried out under a bilateral monopoly. Actually, if the association of the farmers is able to concentrate the agricultural supply, a monopoly equilibrium may exist. The exchange process, then, will be characterised by the price and the quantity included within the range mentioned. In this case, the price p_a will be determined by the bargaining process. Actually, in the case of the monopoly, the price would be $p_{am} > p_{ac} > p_{ao}$, and the quantity would be $x_M : x_{ao} < x_M < x_c$ (Saccomandi, 1998).

Therefore, the institutional framework of the co-ordination process should allow an improvement of the

results mentioned : we point out that both the determination of the prices (p_a and p) and the rules of co-ordinating are relevant parts of that framework. In trying to develop this analysis, we have to discuss some specific characteristics of the production and of the exchange process in Umbria.

2. THE PRODUCTION AND EXCHANGE OF OLIVE OIL IN UMBRIA

2.1. The production of olive oil

In 1990, the farms involved in the production of olive fruits in Umbria were the 46.5% of the total Umbrian farms, corresponding to 2.6% of the national total. From 1982 to 1990, the number of farms has decreased and the total land used was 8.9% less, while during the previous ten years the reduction was equal to 1%. This is due both to technological conditions (which require high production costs) and to long term changes in the institutional dimension of agriculture (i.e., the drastic reduction of sharecrop farming). The low productivity which characterises this activity in Umbria seems largely to depend on the conditions of trading (Inea, 1998).

Nevertheless, during recent years, production has increased because of new plantations and improvements in the basic technology. The organisation of the olive oil production process of olive oil in Italy is differentiated (Inea, 1998), mainly because to the traditional role of the olive crop on the farm. In Umbria, agricultural stage is characterised by a large number of small farms, which mainly sell the product on the local market, facing a relatively high number of processing firms.

Only 50% of the production of olive oil is really traded (20% direct, 20% delivered to industrial agents, 10% sold in high price market's segment) ; 60% of the processing firms has a small scale (2.000-4.000 l./8 hours), while the higher scale firms (4.000-10.000 l./8 hours) – which are the 36% - manage the 61% of the entire production. In the period 1991-1997 the production increased from 6.320 tons to 8.274 tons.

The consumers are often in direct contact with these firms ; therefore, the consumer is relatively able both to know the characteristics of the product and to communicate with the other actors (Ferretti, Magni, 1992). Therefore, the quality of the product is traditionally of interest to the agents of the whole production process.

According to this view, the recent evolution of some characteristics of the production system can be interpreted in terms of path dependency and context dependency (Hodgson, 1993). Actually, the structure of the agricultural production of olive oil is largely due to the traditional Umbrian farming, linked to the sharecropping system. On the other hand, this tradition also has influences upon the image of the final product. Therefore, path-dependency may be invoked because of material and immaterial relevant issues of the PDO olive oil.

The number of farmers and of processing firms and the ability of the consumer to be in touch with the production process contribute to qualifying the whole economic context of the production and of the exchange. Under this view, the co-ordination solutions cannot avoid the values and the expectations of these subjects : this circumstance would suggest a role for the socio-economic context. Anyway, this point has to be fully investigated, since the historical, sociological and economic characteristics of the productive systems in Umbria are not sufficiently clear.

2.2. The exchange of olives and olive oil : some institutional aspects

The association of producers we are examining regulates the exchange process by defining specific agreements with other actors in the production system. In the present case, their main role is to define an agreement with a processing firm in order to carry out specific tasks. These tasks are required to obtain the best qualitative results from the raw agricultural material.

The current agreement concerns only the agricultural product managed by the association mentioned.

According to the previous analysis, let us suppose that the association of the farmers sells the raw agricultural product to a processor. The price paid by the processor depends also on the quality of the final product and of the raw material. The main source of the bargaining power of the association is the control of agricultural product. The quantity of the agricultural product managed by the association is x_A , fixed in each period of trade ; since this quantity is usually larger than x_0 , then an agreement sets bounds to the monopsony's inefficiency in terms of quantity. Anyway, a bargaining approach could also imply an equilibrium characterised

by a quantity lower than x_A . The association can avoid this result by accepting a price closer to p_{ao} , than to p_{am} , given the productivity and the costs of the processing stage. Nevertheless, its bargaining power is limited by the impossibility of checking all the tasks of the processing stage. Given their role in determining the characteristics of the final product (and then its price), the association should subject the processing activity to a close inspection. Anyway, this goal is too costly, particularly because of the uncertainty determined by the heterogeneity of the agricultural product. Therefore the institutional framework of the exchange has to be implemented, at least to manage this uncertainty (Hodgson, 1998), by including a specific agreement related to the link between quantity and quality². The bargaining area – defined by x_M , x_o , p_{ao} , p_{am} (Saccomandi, 1998) – should be interpreted as a list of price-quantity elements, since the agreement concerns a given amount of agricultural product.

The agreement mentioned may appear as a core element in the future definition of the entire co-ordination under the PDO regulation, even if now it is not concerned with the whole production of Umbria. Actually, the high value of the PDO product could increase the value of the agricultural resources by avoiding the monopsonistic behaviour of the processor. The agreement concerns both tasks and their costs, therefore it contributes to the pricing process of the final product (olive oil). In other words, this agreement can be held as a contract in economic sense and, on the other hand, it represents a suitable way to connect the historical evolutionary paths to new conditions due to PDO.

The PDO regulation is very complex arrangement based upon the EU laws and includes a subject, which is authorised to certify the product, given the technical rules defined³. Therefore, according to the idea of a complex contribution of more institutions in realising the exchange (North, 1990), we may say that the co-ordination process in this case is based upon : a) the production rules, largely due to path-dependent dynamics ; b) the agreement between association of the farmers and processors ; c) the regulation process determined by EU laws.

3. THE AGENCY RELATIONSHIP

3.1. Information asymmetry

Within the agreement mentioned, the association of producers can behave as a principal with respect to the processing stage : it can ask the agent to behave

correctly in order to maximise the net benefit of the farmers. This opportunity is supported both by the availability of raw agricultural material and by the agreement itself. We point out that concentration of product is a preliminary condition. Actually, under this condition, the cost of substituting the product supplied by the association is higher than the reduction of the profit of the processing stage due to the agreement. To examine this point we will the exchange in more detail.

After harvest, the production cost of the agricultural product (olive) and the total agricultural supplies are already fixed. The price of the final product (olive oil) depends upon the ability to meet the required standards and features fixed by PDO. This price is crucial in determining the value of the agricultural product ; nevertheless, the farmer obtains only a part of this value, according to its profit maximisation.

At the farm level, the profit for a unit of product is the following :

$$(3) \quad \pi_A = p_a - CM_a$$

where π_A is the profit at the farm level, p_a is the price for the olives and CM_a is the average cost of production. Since the production process has been completed, the higher the price, the higher is the profit.

The profit of the processing firm is :

$$(4) \quad \pi_T = p - (CM_t + p_a)$$

where π_T is the profit, p is the price for the olive oil and CM_t is the average cost of processing. We can suppose that the price of the olive oil will be higher if the processing stage has been carried out correctly, lower if some tasks have been badly managed. The latter implies, of course, a significant reduction of p_a .

Anyway, because of the heterogeneity mentioned, there is a variable need for additional tasks both during the harvesting time and the processing stage. This implies an "additional" variance of the amount in resources employed.

Then, a right technical behaviour could hold the product characteristics within the permissible range accepted by the local traditions and consumer preferences. However, the additional tasks should follow the best technological rules stated and this, of course, does not imply any standardisation.

Each farmer knows if he has acted correctly to meet the required features ; the processor can verify the corresponding results. It follows that the uncertainty about the difference between expected and realised final features increases only within the processing stage. Therefore, there is an information asymmetry between the farmers and the firm about the processing production cost. The processing firm may claim to reduce the payment p_a to the farmers by declaring a higher cost of production due to the poor quality of the raw agricultural product (olive).

Let us suppose that the price p is fixed. By examining this case within the exchange theory of the bilateral monopoly (Saccomandi, 1998), we find two problems : a) the association cannot easily vary the quantity of raw agricultural material, because of its own nature ; b) the monopsonist (the processing firm) could manage the bargaining process by rejecting some potential equilibrium by claiming its high transformation costs. This may increase the social loss by forcing the price toward the p_0 level and the quantity toward the x_0 level.

An incentive mechanism can be defined by the producer association, to achieve the best additional effort, actually this will ensure the farmer of the characteristics of the final product. Alternatively, the monopsonist can reduce the quantity of x demanded and its payment. We will try to examine this mechanism in order to verify the opportunities supplied by the agency relationship.

3.2. The Principal-agent model : some numerical results

The structure of the principal agent model can be described in the following way (Milgrom, Roberts, 1994 ; Rees, 1985 ; Guiso, Terlizzese, 1994) : the agent (A) must choose an action $e_i \in \{e_1, \dots, e_n\}$ whose result $y_i \in \{y_1, \dots, y_m\}$ also depends upon the state of the world $\theta_j \in \{\theta_1, \dots, \theta_m\}$. The principal (P) makes a payment w to A to obtain a given outcome. While the utility of P depends on the outcome and the payment, the utility of the agent depends upon the payment and the effort he should support. Usually, it is assumed that a conflict of interest arises between the principal and the agent and there is not an opportunity for a complete control of the agent's action (Luporini, 1998).

In the case we are studying, the association of the farmers acts as the principal with respect to the agent of the processing stage. This is due to the arrangement established between the parts : some necessary tasks

of the processing stage (including the storage and the first packaging) have to be carried out in order to meet the norms and the consumer's preferences.

For the sake of simplicity, we can continue to refer to equations (3) and (4) by giving a different interpretation of p_a . We can consider it as the basic price of the raw agricultural material : this price will be rightly reduced by the costs of the tasks mentioned. The contract provided to the agent concerns these payments.

The problem faced by the association of the farmers is a hidden action problem (Mas-Colell, Whinston, Green, 199), since after the contract has been signed and the processing is going on, some stochastic effects may occur due to weather. The effort of the firm of the processing stage is related to the necessary tasks form meeting the quality characteristics ; nevertheless the stochastic variable θ determines a probability distribution of the outcomes. Then the farmers can only observe these results, but the effort is unobservable.

The association (principal) can induce the firm (agent) to do the right level of effort in such a way to obtain the best qualitative characteristic of the final product.

If the possible levels of effort are just two, the payment for the lower effort will be exactly the reservation utility and there is no differences with respect to the case of an effort fully observable (Mas-Colell, Whinston, Green, 1995). Anyway, the lower effort's level should be induced only if the producers pay low attention to the quality of the final product. Under this view, the payments for the additional tasks are necessary costs of the co-ordination process.

Let us suppose that the principal is risk-neutral and the agent is risk-averse. The probability of the outcome y_i , given the action e_i is $\pi(e_i) = P(y_i|e_i)$. The utility function of the agent is $u_A(w, e) = u(w) - d(e)$, where $d(e)$ is the disutility of the effort (let us assume $\partial \pi_A(w, e) / \partial \pi w > 0$ and $\partial \pi_A(w, e) / \partial \pi(e) < 0$)⁴.

If u_0 is the reservation utility of the agent the best contract is determined by solving the following problem (Mas-Colell, Whinston, Green 1995 ; Guiso, Terlizzese, 1994 ; Kreps, 1990) :

$$(5) \quad \text{Min}_i w(y_i) \pi_i(e_i)$$

s.t :

$$(6) \quad j [u_A w(y_j, e_j)] \pi_j(e_j) > u_0$$

$$(6.1) \quad j [u_A w(y_j, e_j)] \pi_j(e_j) > j [u_A w(y_i, e_s)] \pi_i(e_s), \forall s \neq j$$

for each possible action and then by choosing the contract, which implies the maximum difference between the expected benefit and the cost of the contract.

By adopting this view, the association could determine a suitable list of payment for each outcome, given a notion of its probability. Equations (3) and (4) then can be revised :

$$(7) \quad \pi_A = (p_a - w) - CM_a$$

$$(8) \quad \pi_T = (p + w) - (CM_t + p_a)$$

where w is the payment for the appropriate tasks.

In the present study, a simple numerical example has been developed to take in account the increasing degree of reservation utility of the agent as a proxy of the comparison between the difficulties to substitute the raw material and the additional transformation costs. Actually, the association of farmers will participate in the agreement if the farmer's profit is positive. On the other hand, the payment w must increase as the additional costs increase because of the opportunity of finding a substitute. Of course, the competition in the market of the final product cannot allow the final price to increase.

The additional costs of the processing stage increase as the variance of the characteristics of the raw product increase. Nevertheless, when the total amount of the product increases sufficiently, the growth of this variance is limited by regularities both in terms of technology definition and of biochemical and physical properties. Then as the total quantity of the product managed by the agreement increases, the additional costs should weakly decrease.

On the other hand, the cost of substituting the raw material (by the "monopsonist") is increasing as the total amount of the raw product under agreement increases. This is due both to the increasing price and to the increasing transaction costs. The costs of substituting should be infinitely high if the institutional arrangement discussed concerns the whole raw agricultural product.

Anyway, in the admissible range, the cost of substituting is higher than the additional cost of processing the poor raw material. Therefore, an increasing u_0 , should take in account several possible conditions.

Under this view, we assume the following empirical data : $CM_a = \text{Lit./l. } 9.000$; $p_a = \text{Lit./l. } 10.000$; $p = \text{Lit./l. } 11.000$; $p CM_t = \text{Lit./l. } 200$. Furthermore we have assumed : two levels of effort $e_1=0$ and $e_2=5$, three possible outcomes (good, medium, bad, respectively, with probability : 0.6, 0.3, 0.1 ; 0.1, 0.3, 0.6) and a reservation utility varying from 0 to 35, given the utility function $u(w, e) = w^{0.5} - e$.

The numerical results are the following :

Reservation utility of the agent	Payment due to agent for eH=5	Profit of the farmer (π_A)	Profit of the firm (π_T)
0	9	991	809
5	34	966	834
10	109	891	909
15	234	766	1.034
20	408	592	1.208
25	644	356	1.444
30	909	91	1.709
35	1.233	-233	2.033

Firstly we have to stress that the association could define this kind of contract if the payment is lower than Lit./l. 1.000, which is the range admitted by the difference between the price and the average production cost. Furthermore, we would point out that the profit π_T is highly increasing in the range considered : this fact is due to the relatively low direct costs of transformation.

Because of the information asymmetry and of the principal-agent relationship, we cannot strictly consider the analysis in terms of the bilateral monopoly. Nevertheless, the quantity under the agreement - i.e. managed by the agency - is the total production managed by the association : if the basic price is lower than the monopolistic price, then the social loss due to absence of perfect competition can be considered lower than in the monopolist or monopsonist case. It is very difficult to assess this point because of the difficulties of knowing exactly the full production cost at then farm level.

In general, we could assume that if the quote of the raw product under the agreement is less than a threshold value A^* , then the cost of substituting is lower than the additional costs of processing. As this quote increases, the costs for substituting increase and become higher than the additional costs. We would suggest that the growth of the payment necessary to obtain the best qualitative results should be limited by the widening of the institutional agreement.

There is another remark of some interest, concerning the heterogeneity of the raw material in terms of probability distribution of the outcomes of the processing stage. The distribution can vary, therefore the monotone likelihood ratio property (Kreps, 1990 ; Mas-Colell, Whinston, Green, 1995) may be not met. In this case, the profit of the principal does not increase as the effort increases. Therefore a conflict may arise between the association and the single farmer, since the goal of obtaining the best qualitative results (linked to the highest effort) could become a strong constraint of the profit maximisation. This conflict can find a solution by implementing the institutional dimension of the co-ordinating process : in widening the agreement under the developing of the PDO regulation, the technical control supported by the certification procedure and the consumers' assessment, could allow a suitable proportion between the price of the final product and the agricultural price.

Furthermore, while the agency seems to have some interest in defining useful relationship between different actors of the production and of the processing stage, its role within the whole co-ordination process under PDO may increase its economic results. Accordingly, the role of the consumers is : a) to assess the corresponding characteristics of the final products to the PDO requirements and to their preferences ; b) contribute to the pricing both of the final product and, by means of the agency, of the raw agricultural product.

The complex institutional arrangements technically based upon the certification procedure may therefore regulate a co-ordination process characterised by lower costs.

4. FINAL REMARKS

This tentative study has analysed the case of the production and processing of olive oil in Umbria (PDO) and has discussed a specific institutional arrangement of the current co-ordination process. Because of this arrangement, an association of producers can act as the principal with respect to the firm of the processing stage and this could reduce the whole co-ordination costs.

If this kind of result is confirmed by further analysis, the institutional framework may be extended to the whole co-ordination process under PDO. The analysis proposes a very simple view of the complex arrangements of the socio-economic process. The rationality of an economic decision may explain only a little part of the social determination of the regulation while habits and tradition largely contribute to this process (Hodgson, 1998 ; Bicchieri, 1998). The two institutional elements of the exchange here examined (the association and the contract) may promote and qualify the whole PDO regulation if the rationality of the calculus can be embedded in the social relations.

To complete the present analysis, it is necessary to attempt to estimate the costs of the agricultural product in a suitable range. The low assessment of family labour causes severe difficulties in analysing the problem examined.

The differences among the farms in terms of heterogeneity may be managed differently by the processing firms : for example, they could try to attempt to screen the farms. Particularly the case of a monopolistic screening has to be investigated, since the firms may avoid the agreement by selecting the farms whose product requires the lower additional cost. In this case, the range of reservation utility may not be significant.

The role of the consumers, finally, should be investigated more in order to specify the relationship between the cost of substituting and the additional costs and by taking in account the possibilities of monopolistic behaviour in the market of the final product.

NOTES

- (1) This study was carried out as a part of the research project "Struttura e tendenze dell'agroindustria in Umbria" (with the financial support of the University of Perugia and of the regional government of Umbria). Of course, the author is the sole responsible for the ideas and the thesis discussed.
- (2) A similar conclusion seems possible if the association does not sell the raw agricultural product, but pays for obtaining processing services, and if it can efficiently manage the final product.
- (3) I wish to thank the "*Parco Scientifico e Tecnologico dell'Umbria-3A*" for the informations about the certification procedure. The total amount of the PDO Olive Oil of Umbria certified during 1998-1999 was equal to 300.000 l. and it concerns almost a third of the total number of firms included in the list. The basic norms were issued in "Gazzetta Ufficiale della Repubblica Italiana, Serie Generale, n.193, D.M., 6.8.1998".
- (4) The basic hypotheses are discussed in Kreps (1990).

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