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Location effects in the production and marketing of traditional Greek cheeses

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*Typical and traditional productions:
Rural effect and agro-industrial problems*
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ABSTRACT

Improvements in the living standards and increases in consumers awareness of product quality and identity have driven the food industry to the creation of quality products aimed at fulfilling newly set standards as well as consumers' perceptions about quality.

The paper aims to identify the effects of location on the production and marketing of traditional Greek cheeses, particularly those that have an established reputation and have recently been recognised as PDO or PGI products. It will attempt an analysis of the influence of local quantitative indicators such as milk production, availability of certain types of milk for cheese making, competition for the use of the available milk, as well as specific qualitative indicators (i.e. previous experience in cheese making, specialisation, etc.) in the production of the respective cheeses. The restrictive or, conversely, supportive nature of these factors in the establishment of new agribusiness in the area, or the expansion of the existing ones, will equally be analysed.

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1. INTRODUCTION

Economic theory distinguishes four dimensions of a good: its quality, location, date and conditions of availability. Consumers place their own preferences within this range, whose diversity is reflected even if only one, specific, variety is consumed, by the demand attributed for a range of characteristics of these products. In this way their preferences remain heterogeneous.

In rich, saturated markets, like EU markets, quality has better chances of being positively differentiated. And due to the fact that these markets are wealthy, they can also pay for the extra costs that quality entails. Quality is an element that more than any other secures 'second order' competitiveness. That is, once the product is bought on any one criterion (first order competitiveness) the customer is happy and comes asking for the same product again. Quality production is normally incompatible with overproduction which assists the stabilisation of the markets and with unlimited intensification, which reduces the impact on the environment (Karabatsou-Pachaki, 1994).

Subsequently, market structures suggest that a firm develops strategies to account for both consumer preferences and to alter market conditions by driving competitors out, or suppress their efficiency to adapt to new product requirements, through the differentiation of its products (Chamberlin, 1935). Location also plays an important role in the process of differentiation, as products were made available in a broader market on the basis of distance (Hotelling, 1929).

The market area of any good corresponds to the broader region where the good is sold, whether customers travel to buy it, or the good is offered to them. Between producing firms there is spatial competition to occupy increasingly larger market areas. As Capt (1997) notes, firms can take advantage of their geographical remoteness if the goods they produce are homogeneous, while heterogeneity of the goods facilitates the overlap of market areas due to consumers who attribute less importance to transport costs and more to characteristics of the points of sale. More specifically *«firms opt separately to cluster at the market centre, when the goods they sell are sufficiently differentiated and when transport costs are low. When transport costs are high, firms seek, on the contrary to benefit from the economic advantages conferred on them by geographical isolation to sell at prices that substantially exceed the marginal cost of production»* (Thisse, 1996).

The distance between the production centre and the consumers is a decisive factor in delimiting the market areas of producing firms as the products are not readily transportable. Distance can have a diverse impact on both consumers and producers depending each time on the importance it has on them. For consumers, the impact is based on the circumstances of purchase, whether the time or distance travelled is a restrictive factor (i.e. consumers want to buy from nearer places) or if purchases are made during an excursion to a distant area. Producers of localised goods on the other hand develop their own product strategies accordingly, depending on their willingness to improve and further explore their local market by targeting visitors and out of production area consumers or to develop new distant markets by finding new means to distribute their products in more distant locations.

One critical point in the success of any product is the distribution of it. For some cheeses, the demand is growing continuously and results in a greater demand shifted to the producers, while others are relatively unknown and not produced in a constant

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quantity, a point that poses serious constraints on the programming of their distribution. Additionally, availability of a quantity required by the market, poses some problems for some cheeses and has resulted in a limited distribution area for them. Thus these cheeses can be found only in limited areas surrounding the area of production.

2. TRADITIONAL AND PDO-PGI PRODUCTS

The consumers' quest for quality products but also for products that are new and rare, tends to satisfy their need for unique foods have lead them to rediscover traditional foods, whose production is based on old practices and which exhibit a to very strong location identity. The institutional response from national authorities has been one of protectionism of typical products through legislation and adoption of monitoring systems, which over a considerable time, led to the creation of specific bodies in some countries aimed at safeguarding the production of typical products and guaranteeing their quality and identity. However this practice has not been adopted with the same enthusiasm by all countries and even as late as 1990 some of them had not taken any measures at all. EU response to protect traditional and quality products introduced regulation 2091/92 which will effectively establish a common system of traditional product protection. The regulation aims to improve the product quality and identity for the satisfaction and protection of consumers and apart from that to support agriculture and farmers in small areas. Products claiming the PDO - PGI designation are characterised by unique and traditional methods of production and are very closely related to a specific territory.

The 2091/92 introduced the PDO and PGI concept and required the preparation of application files by each EU country so that products that fulfil the law's requirements will be included in the official EU List of Products. Following this, each country has started the procedure by promoting the preparation of these files by the interested producers of typical and traditional products that fulfil the law's requirements. In the case of Greece, several files have been prepared for well known products, particularly cheeses like Feta, olives and olive-oil. In the case of cheeses 25 files had been sent to EU for approval, 21 cheeses have been granted the PDO designation, the rest are still under consideration, while other applications are in a processing stage.

Considering the aforementioned theoretical background on product differentiation through quality and location characteristics, one of the main questions arising for PDO products, derive directly from the definition of the products themselves. PDOs are products produced at a designated location and their production is based on traditional practices, which have been unchanged for years. Apart from the elements of tradition in production, and certain restrictions in the methods of production and processing and the raw materials used for their production, these products also present variations in their production and elements found in all products referring to their market and appearance in it. But compared to common products, without any tags and labels, do PDOs have the same characteristics? Do they have the same importance for their producers, do they accomplish their role as quality products and do they maintain the work and income of the rural communities?

As with other products, PDOs have established some product-specific characteristics. They do have their own reputation, their marketing patterns and they appear to exhibit differences according to the way they perform. The differences appearing between these products are a combination of two distinct factors, locality and market. The locality of a product represents all key points related to its production practice and area characteristics, while the market accounts for the availability of the product as well as its price.

This study aims to analyse and identify the differences appearing for Greek PDO cheeses and if possible to identify distinct categories or groups of these cheeses that have the same attitude. Two distinct groups of variables are used to provide information for agents, presenting the location effects and market effects. In the first group information about the availability of raw material, infrastructure of the dairies, conflicts with other products and competition were used, while in the second group variables regarding the type of market outlet, demand in and outside the region, means of marketing and production volumes were formed.

3. THE DAIRY SECTOR IN GREECE TODAY

Greece has a very long tradition in animal breeding, particularly in breeding of small ruminants, and subsequently for cheese production. Also Greeks are fervent cheese consumers, ranked second in the world with an annual cheese consumption of 22 kilos per person. While 8 Kg. of this quantity represents Feta consumption, the remaining 14 Kg. refer to a variety of other cheeses, such as the Kaseri, Kefalograviera, and different types of Graviera and Mizithra. The importance of the Greek dairy sector is very big if somebody considers the fact that it is the fastest growing part of the Greek food sector and accounts for 25% of the sector's value. Apart from these evidences one must bear in mind that except of the dairy enterprises, an additional quantity of the same size is being made in farm houses. This involves mainly Feta cheese but also a wider variety of other traditional cheeses in smaller quantities.

Greece produces a great variety of cheeses made from every type of milk. There are a lot of traditional Greek cheeses made from sheep and goat's milks and a large number of them have been already granted the PDO designation by the EU (Table 1) (Anifantakis, 1991). In addition to these 21 cheeses, another 5 have been included in our study since they have the PDO designation for Greece and their application files are being examined by the EU authorities. Traditionally cheeses were made also in great volumes in farm houses, since the procurement of milk to dairies was small (NSSG). Farmhouse cheeses are used for own consumption but also for selling to visitors to the farms. Lately the volume of milk sent to dairies is increasing continuously, due to the fact that new enterprises have been established increasing the demand for milk for processing.(Table 2). However this has not resulted in a significant decrease in the quantities of cheeses produced in farms. Notable fluctuations in the production of cheeses in both dairies and farms can be noted during the last 15 years, something that indicates the impact on the availability of milk in both production alternatives.

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Table 1: Greek PDO Cheeses

Name of cheese	Milk used	Max. Humidity	Minimum fat/volume	Type of cheese	Established as PDO in Greece	Established as PDO in EU
Anevato (PDO)	S -G	60%	45%	Soft	YES	YES
Galotiri (PDO)	S -G	75%	40%	Soft - Spread	YES	YES
Graviera of Agrafa (PDO)	S -G	38%	40%	Hard	YES	YES
Graviera of Krete (PDO)	S -G	38%	40%	Hard	YES	YES
Graviera of Naxos (PDO)	C - S - G	38%	40%	Hard	YES	YES
Kalathaki of Limnos (PDO)	S -G	56%	43%	Soft in Brine	YES	YES
Kasseri (PDO)	S -G	40%	50%	Semihard	YES	YES
Katiki of Domokos (PDO)	S -G	75%	40%	Spread	YES	YES
Kefalograviera (PDO)	S -G	40%	40%	Hard	YES	YES
Kopanisti (PDO)	C - S - G	56%	43%	Soft - Spread	YES	YES
Ladotiri of Mitilini (PDO)	S -G	38%	40%	Hard	YES	YES
Manuri (PDO)	S -G	60%	70%	Soft	YES	YES
Metsovone (PDO)	C - S - G	38%	40%	Semihard	YES	YES
Mpatzos (PDO)	S -G	45%	25%	Very Hard	YES	YES
Xinomizithra of Crete (PDO)	S -G	55%	45%	Semihard	YES	YES
Pichtogala of Chania (PDO)	S -G	65%	50%	Spread	YES	YES
San Michali (PDO)	C	40%	36%	Hard	YES	YES
Sfela (PDO)	S -G	45%	40%	Semihard	YES	YES
Feta (PDO)	S -G	56%	43%	Soft	YES	YES
Formaella of Arachova (PDO)	S -G	50%	40%	Semihard	YES	YES
Mizithra (fresh)	S-G	70%	50%	Soft	YES	NO
Mizithra (dry)	S-G	40%	50%	Hard	YES	NO
Anthotiro	S-G	70%	65%	Soft	YES	NO
Victoria	C	40%	45%	Soft	YES	NO
Telemes	C-S-G	50%	20%	Soft	YES	NO

Table 2 : Total Production of Cheeses in Greece

Year	Farm	%	Dairies	%	Total	%
1981	72,970	40.7	106,542	59.3	179,512	100.0
1985	66,106	34.6	125,425	65.4	191,531	100.0
1990	73,600	42.9	97,897	57.1	171,497	100.0
1991	76,100	44.9	93,496	55.1	169,596	100.0
1992	75,700	43.7	97,647	56.3	173,347	100.0
1993	75,700	40.8	190,982	59.2	185,682	100.0
1994	70,700	35.8	126,898	64.2	197,598	100.0

Source: Ministry of Agriculture

Cheese producing dairies are dispersed all over Greece. Lately there is a notable increase in their number which has grown from 738 in 1989 to 984 in 1996 (Ministry of Agriculture). These cheese dairies are mainly privately owned (95%) and the vast majority (89%) operates seasonally due to fluctuations in the milk production. However, 91% of these enterprises can be characterised as small ones as they process no more than 1,000 tonnes of milk annually according to information from the Ministry of Agriculture, (FEIR, 1996).

4. METHODOLOGY

To answer the question of how similar are some of the aforementioned cheeses, the existence of common properties and their response to a set of different variables used to describe them need to be established. A set of characteristics has been defined for each cheese, referring either to the location of production or to characteristics describing the cheeses and their market. A comprehensive list of all the variables used together with their description and structure is provided in Appendix 1. In the broader group of variables chosen to account for area related characteristics, milk quantities for all type of milks sold in the dairies or used for farm based cheese making, total area, number of dairies in the area, product producing dairies, degree of specialisation, number of other PDO cheeses in the area and existence of imitation for each respective cheese. Variables accounting for cheese characteristics includes the type of cheese, duration of maturation, the degree of artisan, if it is a PDO recognised cheese and who made the application for granting this designation. Market characteristics variables include volumes of production, quantities of exports, selling prices, percentages sold inside or outside the production area, packaging, and means of marketing.

Cluster analysis was chosen to classify the 26 cheeses, which can be treated as 26 individual cases, into groups and thus to identify how similar or not they are and between which of them do similarities exist. Cluster analysis has been used in other marketing related research to test market selection and to identify consumer or product segments (Ness, 1997).

Cluster analysis creates distinct categories, when group membership is unknown and in fact, even the number of groups is unknown. Thus the goal of cluster analysis is to identify homogeneous groups of clusters. In cluster analysis the initial choice of variables

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determines the characteristics that can be used to identify subgroups. The groups are formed on the basis of similarity, which as in many statistical techniques expresses the same concept as *distance*. Distance provides a measure of how apart two objects are, and similarity measures closeness. Distance measures are small and similarity measures are large for cases that are similar. To form clusters a number of techniques may be employed, however here, a hierarchical cluster analysis has been used, which forms clusters by grouping cases into bigger and bigger clusters to the point where all cases formed a single cluster (SPSS, 1994). There are several criteria for deciding which cases or clusters should be combined at each step. These criteria are based on a matrix of either distance or similarities between pairs of cases. One of the simplest methods is single linkage, where the first cases combined are those that have smaller distance between them. Once the distance matrix has been calculated the formation of cluster can begin. The result is the production of a vertical icicle plot where cases are being combine in each step and a graphical presentation of these combinations called the dendrogram, which provides the final cluster solution.

5. RESULTS

The results of the cluster analysis indicated that 6 distinct clusters can be created for the 26 cheeses participated in the analysis. The first cluster is a large one which includes the following cheeses: Anevato, Graviera (Agrafa, Naxos and Crete), Kalathaki Limnos, Katiki Domokos, Kopanisti, Ladotiri Mitilinis, Metsovone, Xinomizithra Crete, Pictogala Chanion, San Michali, Sfela, Victoria and finally Formaela Arachova. All of these cheeses are characterised by a moderate level of production and, compared to the remaining ones, by a smaller area of production. In relation to marketing characteristics these cheeses have zero to minimal exports and a small number of other PDOs in their production area (Tables 3 and 4).

The second cluster includes cheeses like Kefalograviera, Mpatzos, Galotiri and Manuri, the first two being hard cheeses while the rest being soft, whey cheeses. The interesting point is that although there are no distinct similar characteristics apart from nearly the same size of production area and the same degree of artisanality, they share the same more or less area of production namely the regions of Ipiros, Thessalia and West Central Macedonia (Tables 3 and 4).

The third one includes Mizithra (both fresh and dried) Anthotiro, and Telemes. All of these cheeses have not yet been granted the PDO designation by the EU authorities, although there is a designation as PDOs in Greece. For all, the applications have been made by the central Union of animal breeders, all of them have considerable volumes of production and exports (especially for Telemes exports account for 20% of its production). They are also produced at home and their production does not require a high degree of specialisation. Apart from these similarities, the previously mentioned cheeses are produced by a considerable number of dairies, since Anthotiro and Mizithra are whey cheeses and thus produced as an additional product along with other cheeses, particularly Feta, Graviera(s) and Kefalograviera. As a consequence they have a large number of competing PDOs in their production area (Tables 3 and 4).

Table 3: Groups means for clusters - Area and Production Variables

CLUSTERS	Area	Dairies	Prod. Dairies	Size of Dairies	Years of Prod	Volume	Prod. Trend	Dairy Trend
Cluster 1	3,213	33	10	1.6	28	354	0.33	0.60
Cluster 2	29,146	248	21	2.0	31	641	1.00	1.50
Cluster 3	122,324	897	183	2.5	42	3,574	1.25	1.00
Cluster 4 Kaseri	52,126	384	61	3.0	50	3,759	2.00	1.00
Cluster 5 Kefalograv	82,670	914	137	3.0	50	3,580	1.00	2.00
Cluster 6 Feta	114,364	859	538	3.0	60	77,797	1.00	1.00
Clusters 2+4	33,749	275	29	2.2	35	1,265	1.20	1.40
Clusters 3+5+6	114,385	893	234	2.67	45	15,945	1.17	1.17

Table 4: Groups means for clusters - Market Variables

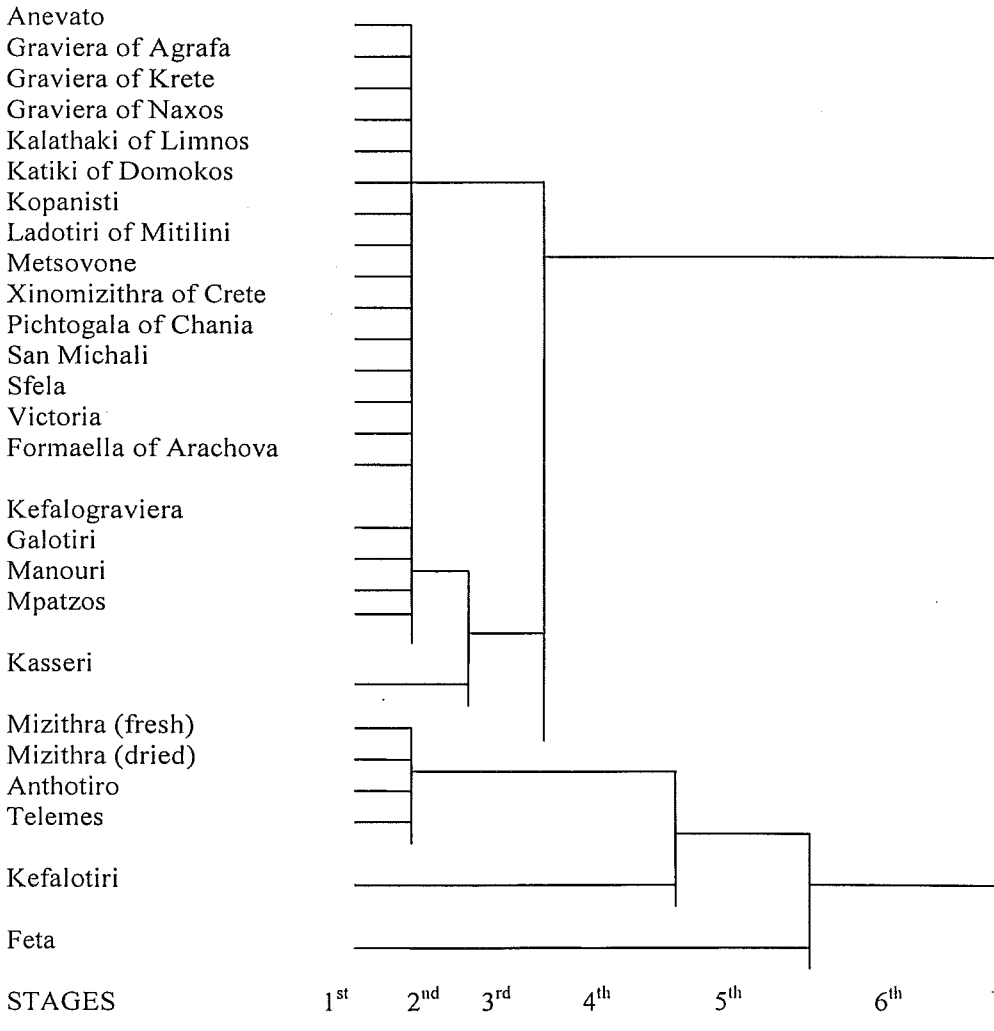
CLUSTERS	% of Exports	% sold in area	% sold outside	Minimum price	Maximum price	Other PDO	Restri- -ctions
Cluster 1	0.2	48.67	51.33	2,267	2,620	7.93	1.63
Cluster 2	5.5	80.00	20.00	1,612	1,925	6.00	1.75
Cluster 3	6.5	92.50	7.50	808	1,187	8.25	3.00
Cluster 4 Kaseri	62.0	60.00	40.00	1,750	2,200	6.00	3.00
Cluster 5 Kefalograv	8.0	50.00	50.00	2,600	3,200	6.00	3.00
Cluster 6 Feta	62.8	50.00	20.00	1,600	2,200	10.00	3.00
Clusters 2+4	6.8	76.00	24.00	1,640	1,980	6.00	1.18
Clusters 3+5+6	7.7	83.33	16.67	1,292	1,629	8.17	3.00

Three cheeses, Feta, Kefalotiri and Kaseri formed individual clusters, since they perform differently compared to other cheeses. However in latter stages of grouping (Figure 1) Kaseri formed a common cluster with the second group of cheeses (i.e. Kefalograviera, Mpatzos, Galotiri and Manuri), since its production area has similar size to the one of the aforementioned cheeses, while Kefalotiri merged with the third cluster (i.e. Mizithra (both fresh and dried) Anthotiro, and Telemes), particularly due to the large number of dairies producing it and its considerable volume of exports (8% of its production). Feta kept apart from all other cheeses and only at the 5th stage merged with

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the cheeses of the third group which are of the best known cheeses and the ones produced by a great number of dairies in a wide area of Greece (Tables 3 and 4).

Figure 1: Dendrogram of the cluster classification of Greek PDO cheeses



Figures 2, 3 and 4 indicate how distinct these three group of cheeses are and how similar appear to be the cheeses assigned in each respective group. As mentioned above, cheeses belonging to Group 1 are all cheeses that have been strongly influenced by locality. They are characterised by the small size of the area of production which sometimes do not exceed the borders of a prefecture. All cheeses produced in islands belong to this group. Due also to their limited production area, availability of raw

materials restricts the volume of production. Thus these cheeses do not often reach distant markets. They are mainly consumed locally and, in addition, their limited production cannot permit any exports. Due to local consumption their distribution system is based mainly on agreements with super market chains and retailers. They also sold directly to customers through local outlets. In the group belong some of the most expensive cheeses (Formaela and Metsovone).

The cheeses belonging to Group 2 indicate another area effect. The production of all of them is concentrated in the regions of Ipiros, Macedonia and Thessalia. They are mainland cheeses, produced in the areas where animal breeding is thriving and where the biggest cheeses dairies are based. However Kefalograviera and Galotiri are more present in the regions of Ipiros and Thessalia, while Mpatzos and Manuri are located in Macedonia. An interesting point here is that while Mpatzos and Galotiri produced in small quantities, Kefalograviera and Manuri are some of the most important Greek cheeses with considerable production as well as exports. Thus what played an important role in this grouping was the fact that these cheeses are produced in areas of a similar size.

Cheeses assigned to Group 3 are all soft cheeses and with only exception of Telemes all are whey cheeses. One other common characteristic is that they have not been designated as PDO in the EU level yet and that they can be produced all over Greece. This makes these cheese vulnerable to the requirements of the PDO regulation. They can also be regarded as some of the cheaper cheeses in the market.

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Feta Kaseri and Kefalotiri remained alone since their response to the variables used for the analysis is not the same as for the other PDO cheeses. Feta is probably the best known Greek cheese and the one with the highest volume of production. It is also produced in a wide area of Greece. On the other hand, Kefalotiri is not produced in such a wide area and its production volume falls below the volume of other cheeses, like Teleme, Mizithra and Kasseris. But it is the most produced hard cheese of Greece. Kaseri is regarded as the dominate cheese in the market of semi-hard cheeses. Apart from these characteristics these cheeses are the ones with the most established reputation since they have existed for centuries and their production techniques and characteristics are well documented in literature (Zigouris, 1952). Feta is also characteristic as the cheese of the mainland, Kefalotiri as the cheese of the islands and mountains and Kaseri as the cheese of the plains.

6. CONCLUSIONS

The study demonstrated that there are distinct differences between the various Greek PDO cheeses related to location factors. Greek cheeses can be differentiated as cheeses produced nationally, regionally and locally. This single factor plays an important role in the survival and performance of each of these cheeses as a PDO product. Due to the fact that regulation 2091/92 poses serious constraints in relation to the production area and the origin of the raw materials used, cheeses produced in a limited area are faced today with the problem of expanding their production volumes. Competition for milk in this case has been increased and within their production area nearly no other non PDO cheese-making occurs. This constraint shrink the number of potential market places within the country and eliminates the options for exports with a result that the product will never exceeds the borders. However these cheeses have a limited domestic competition, since all their production is consumed and the existing demand provides for premium prices. It being so difficult to acquire milk for production of these cheeses, the number of producers has remained unchanged for many years. Due also to the nearly monopolistic behaviour of these products, developments and investments in infrastructure have not take place, an element that supports further the tradition and the artisanality of these products.

On the other hand the remain two remaining groups of cheeses are the ones that dominate the Greek markets and achieve considerable exports. They are both typical and traditional cheeses. Typical because they are well known and loved by the Greek consumer and traditional due to their reputation and history. However these are the cheeses that are more vulnerable from the adoption of regulation 2091/92. The large number of producing firms, the more accessible and available raw material create the danger of imitations within the large producing area. Also, fierce competition between producers has resulted in a war of prices and in an industrialisation of the production. Thus the objective of regulation 2091/92 to sustain small agri-food business, in this case seems to suffer, although a counter effect is that the need for milk for the large industries will increase and thus farmers will have more markets for their milk although it still remains to be seen what the selling prices will be, since competition normally drives prices down.

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Appendix 1: Variables used for the cluster analysis of the Greek PDO cheeses

N.	Variable Description	Definition of Variable	
1	Milk Used for production	Sheep	0 = No, 1 = Yes
		Goat	0 = No, 1 = Yes
		Cow	0 = No, 1 = Yes
2	Type of cheese	1= Hard, 2 = Semihard, 3 = Soft, 4 = Spread	
3	Duration of maturation	in months	
4	PDO / PGI in EU level	0 = No, 1 = Yes	
5	Application made by	1 = KTINOTROFIKI (Greek union of animal breeders) 2 = Co-operative of cheeses producers 3 = Cheese producer 4 = Co-operative of milk producers	
6	Area of production	in Km ²	
7	Ratio of milk sold to dairies to milk used in the farm	Each ratio has been calculated for each distinct type milk, i.e. sheep, goat, cow	
8	Number of dairies in the area		
9	Number of producing dairies		
10	Size of Dairies	1 = small (1,000 tones of milk per year) 2 = medium (up to 10,000 tones of milk per year) 3 = large or industrial (more than 10,000 tones/year)	
11	Years of production		
12	Volume of production		
13	Trend in production	0 = steady, 1 = increasing, 2 = decreasing	
14	Change in number of producing dairies	0 = steady, 1 = increasing, 2 = decreasing	
15	% of production exported		
16	Farm produced	0 = No, 1 = Yes	
17	Restrictions posed by PDO-PGI regulation	1= High, 2 = Medium, 3 = Low	
18	Degree of artisanality	1= High, 2 = Medium, 3 = Low	
19	Imitation in the area	0 = No, 1 = Yes	
20	Competing PDO in the area	Number of other PDO cheeses in the area	
21	Selling Price	Minimum	(in Drachmas)
22		Maximum	(in Drachmas)
23	% sold in production area		
24	% sold out of production area		
25	Packaging	0 = No, 1 = Different packaging available	
26	Means of Marketing	Wholesalers	0 = No, 1 = Yes
		S-Markets and retail stores	0 = No, 1 = Yes
		Customers	0 = No, 1 = Yes