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FACTORS THAT SUPPORT THE DEVELOPMENT OF FUR FARMS: THE CASE STUDY OF GREECE

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ABSTRACT

This study aims to discuss the key factors that can contribute to the development of the fur industry in Greece. The industry consists of two sub-sectors i.e. production and processing of fur skins (raw material), and the production of fur garments. The profitability of fur-bearing farms, considered from the perspective of investment and further international fur trade, and both these were examined in this study because these two sub-sectors are closely linked. The results obtained from the analysis of the two fur production sub-sectors showed that the investment of capital in the industry can expect positive returns while at the same time creating well-paid jobs. Although not presenting a comparative advantage, but the foreign trade of fur garments produced in the region can gain competitiveness if some of the strategies used by Greek fur companies are adjusted. Results of the current study can be concluded that despite the weaknesses that emerge from the results of this study, both sub-sectors of the fur industry can make a significant contribution to the development of the local community of Western Macedonia.

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1 Introduction

In Greece, fur industries started fur processing or fur farming around 50 years ago in the prefectures of Kastoria and Kozani, with the primary processing centers for livestock products (fur) located in the cities of Kastoria and Siatista. Fur processing companies of Greece primarily used imported raw material because only a small quantity of fur is produced in areas where fur-bearing animals are bred but this is not enough to fulfill the demand of fur processing industries of Greece. Over the last 20-30 years, various efforts have been made to increase the domestic production of fur with the prospect of substituting the import of furs at least in part and making the industry more competitive. For this, the aspiration has been to raise at least 50,000 breeding animals (RWM, 2012; Development of Western Macedonia SA, 2012).

The need for fur farms was prompted by the development of the fur clothing industry in the cities of Western Macedonia. To improve the economic efficiency of these industries, vertical small and medium-sized processing companies that incorporated the breeding and marketing of fur skins were created. Thus, and given similar farms in other countries, the first "bold and pioneering craftsmen" established the first fur farms (farms) around the prefectures but required knowledge, prerequisite experience, and infrastructure became some important obstacle in the growth of these industries in Greece. These industries already overcome many of these problems but now in these, the industry's main problems are the location for the installation of units and the management of waste after slaughter. Furthermore, the acquisition of animal feed also threatened to undermine the growth of fur-bearing animal breeding but was primarily addressed through the Leader II sectoral program, which supported the development of a fur feed production unit.

The result of such disadvantages and difficulties was that the breeding of fur-bearing animals in Greece became problematic and diminished significantly after the intermittent fur crisis. This situation gradually began to reverse and improve from the mid-1990s onwards when fur production policies were first introduced, which in part addressed the financial impasses of the producers and the simultaneous implementation of the first holistic development plan for the breeding of fur-bearing animals in Western Macedonia through the Leader II program (https://www.Kozan.gr).

The climatic factors of the region help in the breeding and production of mink, these climatic conditions also favor the breeding of chinchillas and rabbits. The number of farmed animals is not constant and may fluctuate depending on national and international circumstances and fur prices, but in general, the licensed capacities report a total of 507,985 adult animals (Tsami, 2019). Fur garments can also be produced from the fur of other animal species imported from foreign countries. In addition, raising animals to produce fur products is considered a livestock activity, and the Greek state supports the fur industry with subsidies and other initiatives, resulting in incentives for investment in the fur sector. Furthermore, the general attitude of European countries that have either banned or are in the process of banning breeding creates an investment interest from foreign breeders for new units in Greece (Semos, 2016). This study aimed to examine the economics of fur production; also this study was conducted to evaluate the dynamics and competitiveness of the domestic and international fur market for Greek fur products.

2 Materials & Methods

2.1 Factors contributing to the development of fur farms

Recently the goal of the Greek fur industry is to enter the global high-income markets, especially markets with increased demand for high-quality clothing products. It can be achieved by upgrading the quality of already available premium fur products by sharing and utilizing existing comparative advantages of Greek fur products (Vlachevei et al., 2010).

Typically, the development of an economic sector is not determined by local, endogenous factors alone but it depends on the combination of intensive action between local-endogenous and non-local-exogenous factors. This is particularly true for the small and medium export fur industry and, the enterprises involved in fur-bearing animals, such as those established in the Region of Western Macedonia, and other similar European enterprises (Artelaris & Chatzimichalis, 2016).

Accordingly, rural areas can be regarded as complex spaces where relationships between four dimensions i.e. natural resources, population, interrelations, and public and private partnership are formed and emerge. Rural areas are the first dimensions that are the important source of natural resources, these regions support economic activities and help in the multiple political and cultural exchanges. Secondly, the sharing of a specific development model and the means of subsistence are associated with natural resources and the region. Further, the settlements and the development of relations between each other and abroad can be possible through exchanging people, goods, and information. Lastly, public and private institutions provide the whole system's framework (Ortiz-Guerrero, 2013).

These relationships comprise positive and negative factors characterized as important and create opportunities and risks for development. What is required, in these cases, is effective risk management which, with proper handling, can bring more significant benefits to industry performance, boost productivity and reduce the impact of threats. As such, the analysis process begins with identifying risks, which is the first step in the risk

management process. Consequently, identifying external risks related to developing strategies for the fur-farming sector in the Region of Western Macedonia is a priority. This risk identification will be undertaken firstly by using the PEST (analysis Political, Economic, Sociological, and technological key factors) or PESTLE (process for the analysis of Political, Economic, Sociological, technological, legal, and environmental key factors) framework to minimize the negative impacts on the goals set for the development of the industry (Rastogi & Trivedi, 2016; Weeks, 2020).

2.2 Analysis of growth factors

As aforementioned, the development prospects of an economic sector depend not only on internal or external factors but also on the efficiency of the means of production used in the production process. The efficiency of the means of production is determined by technical and economic analyses from which the characteristics, the means, and the ways to achieve the development emerge. Such analysis can be focused, among other factors, on the dynamics of production, supply, demand, size, or market dynamism.

Productions of a livestock product require a combination of production factors and are quantified according to a specific time and size of the production unit. Furthermore, technology also determines the alternative ways and the corresponding proportions of the factors involved in producing each livestock product. Over time, the relationship between factors of production and the final product can be described by the production function. The production function is the technical relationship between the outflow (final product) and the inputs under certain conditions (Xyda, 2009; Papanagiotou, 2010; Karekla, 2014; Hatzopoulou, 2017).

In a livestock farm, the distinction of inputs into constants and variables is made when the production function is considered in the short-term, while it is not necessary when the analysis is made for the long term. In the long term, all inputs are considered variable. The output functions are typically more complex than described above, but economists use simple forms of production functions for theoretical analysis. Usually, only two inputs are used to theoretically examine the properties of a function (Semos, 2019).

In a class of output functions, the inputs are multiplied by each other. These functions are called multiplicative production functions. Representative of this category is the Cobb-Douglas production function (1928) which, in its general form, is expressed as follows:

$$Q = AK^aL^b \qquad (1)$$

Where Q is the total output, K and L express capital and labor, respectively, and a and b express the exponents of the equation, which show the elasticities of the final product for the two factors of production or the productivity of each factor of production. A represents the level of technology used in production.

The values of A, although always positive, are indefinite, i.e. they can be small or large, while the values of a and b are positive parameters where = $\alpha > 0$, and $\beta > 0$. Naturally, the soil production rate is not included in the independent variables because it is directly not involved in the production process (Cobb & Douglas, 1928).

The above production function is used to control production and investigate the efficiency of production factors used in a production process. For this purpose, the Cobb - Douglas production function with more factors of production is used. The term A in the production function is derived from the estimation of the function and represents the level of technology available to the enterprise or financial sector for the production process. The exponents a and b represent each production factor's production elasticities or productivity coefficients used in the production process.

The competitiveness of an economic sector such as livestock and a specific industry is demonstrated by its economic performance, but mainly by its performance in foreign trade. In particular, the fur farming industry is inextricably linked to the fur garment industry. Various previous studies report the competitiveness of economic activity is based on the availability of products at the right time, right place, and in the proper form in which they are demanded by buyers at attractive prices or at least better prices than those of other suppliers (Abbott & Bredahl, 1992; Lung & Lin, 2019).

To determine competitiveness, specific economic indicators of international trade are used, which largely characterize whether an exportable product has growth prospects. First and foremost, it is a competitive economy sector that has the potential for a long-term and successful presence in the domestic and international market with an ever-increasing market share. With these data, the comparative advantage of an industry is always significant in the competitiveness approach (Porter, 1990). Also, in this case, it should be emphasized that the collection companies that make up the fur industry must be competitive (Gopinath et al., 1997).

The comparative advantage of an industry is determined by calculating the index of the revealed comparative advantage or Balassa index (Hinloopen, & Marrewijk, 2001; Amadeo, 2020). The Balassa index identifies the existence of comparative advantage for the export industry in the country under study and for a product. However, the Balassa index is only used to determine whether a country has a comparative advantage but not to determine the sources. Therefore, the assessment of the comparative advantage of the country using this index is based on

the specialization of its net exports with relation to the other countries of the reference group, which in the case of exports of fur and fur clothing, concerns all countries of the world (Petropoulos et al., 2013). This index has been used by many researchers in the international literature (Balassa, 1965, 1979, 1986; Balassa & Bauwens, 1988; Hendry & Ericsson, 1991; Herrmann & Ommeh, 1995; Kolokontes & Semos, 2009). The formula that expresses the index of revealed comparative advantage (RCA) has the following mathematical expression (Hinloopen & Marrewijk, 2001):

$$RCA = \frac{X_i/\Sigma X_i}{M_i/\Sigma M_i} \qquad (2)$$

Where X_i, M_i symbolizes the exports and imports of a sector i in a market and from the same market respectively, and ΣX_i, ΣM_i is the total exports and imports of the region in each direction, referring to the same specific sector.

If the index value is higher than one, there is a comparative advantage for the industry and, in the current study, this is related to the production of fur garments and the fur industry. However, if the index value is less than one unit, then no comparative advantage is formed for the specific country or region.

In addition to the above, comprehensive analyses of export structures should include information on the forces that shape trade between two countries for a particular product. In other words, it is necessary to know the main forces that determine and shape the trade between Greece and the international market.

There are two prominent cases: a) Trade is shaped by differences in the quantities of production factors available to each side. In this case, the creation of trade is interpreted with the Heckscher-Ohlin theorem (Heckscher-Ohlin trade model); it is all about the cross-sectoral trade and it must be based on a series of hypotheses (Södersten, 1985). In cross-sectoral trade, different products are exchanged. b) Trade results from technological research and economies of scale, so Leontief's (1953) theoretical approach dominates. In this study intra-sectoral trade i.e. trade exchanges concerned the same or similar products were used. According to Leontief's theoretical approach, the size of intra-sectoral trade depends positively on market size, growth level similarity, per capita income, degree of integration, the similarity of tariff and non-tariff protection, and similarity of horizontal specialization between the two parts. These cases can be investigated with the help of models (equations) and the evaluation of indicators that describe the trade conditions of fur products (Zioganas & Semos, 2000; Kotsionopoulos, 2012; Petropoulos et al., 2013).

The analysis of intra-sectoral trade, i.e. the trade of a single product, is undertaken with the help of the Grubel & Lloyd index (1975). This index is defined by export and import parameters and has the following mathematical expression:

$$B_i = \frac{(X_i+M_i)-|X_i-M_i|}{(X_i+M_i)} = 1 - \frac{|X_i-M_i|}{(X_i+M_i)} \qquad (3)$$

Where X_i represents the exports (volume) of a product i in a specific market and M_i is the imports (volume) of product i from a specific market.

The values of the index B_i range between 1 and 0. For a maximum value of $B_i = 1$, the sector's exports are equal to the imports, i.e. the trade is intra-sectoral. On the contrary, when we have the minimum value $B_i = 0$, i.e. when exports or imports are non-existent, the trade is inhomogeneous, and we have entirely interbranch trade. The higher the exports or imports, the higher the $B_i \rightarrow 0$, which means that trade is better explained than traditional forms of trade. Most empirical applications in this area in the international literature show that the size of the intra-branch trade of industry varies depending on the concept of "industry" used by each study. Thus, the more aggregate the industry, the index values will be higher, without this the greater intensity of intra-sectoral trade to the prices will be resulting in the higher-ranking industries (Kotsionopoulos, 2012). A disadvantage of calculating this index with this equation is that protectionist policies can distort the results.

As per the above-mentioned facts, to be characterized as competitive, an industry must demonstrate the ability to have a continuous and successful presence and maintain its position in the internal and external market. Seemingly, the comparative advantage of an industry is always crucial in determining competitiveness (Porter, 1990), while in combination with the industry's productivity, it is possible to conclude that this industry has significant growth prospects.

3 Results

3.1 Estimation of growth factors

The technical and economic data used were derived from the available statistics of the fur farming sector and data on the fur and fur clothing trade. These data were obtained from various sources such as EL.STAT. 2015, 2020a, 2020b; Kasapidis, 2012; Region of Western Macedonia, 2012, 2015a, 2015b, and others. These data are necessary for the production function and are also required to control the competitiveness of the fur sector of the region. The estimation of the production function was completed using the statistical program Stata. The estimated parameters formed the following production functions:

$$Q_p = -2.11 + K^{0.827} + L^{0.410} \qquad (1)$$

(-11,7) (18,47) (4,56)

$R^2 = 0.782$

and

$$Q_{PV} = 1.79 + K^{0.875} + L^{0.475} \quad (2)$$

(7,09) (2,71) (13,94)

$R^2 = 0.765$

Where Q_P and Q_{VP} are the quantity of natural product, i.e. the number of fur skins and the value of fur skins, respectively, K is the annual cost of total capital (fixed and variable), and L is the annual cost of labor. More specifically, Equation (1) describes the changes in the number of fur coats produced as a function of the independent variables (K, L), while (2) describes the changes in the value of the fur coats produced as a function of the independent variables (K, L).

The parameters evaluated are acceptable because their size is within the framework defined by economic theory, all have the expected sign, and all are statistically significant at a level of 1%. At the same time, the multiple determination coefficient has a very good size. What matters is the production function, which in this case, is used to estimate the production elasticities or productivity coefficients of each production factor used in the production process. They represent the percentage of the factor used that is converted into a product or with what percentage each factor contributes to the final product.

The value of the constant A that resulted from the solution of the function and that, as mentioned previously, expresses the technology used in production, does not give positive points of contribution to the increase of production. Exhibitors a and b represent the elasticities of production or the productivity coefficients. The above elasticities or coefficients show the expected percentage increase or decrease in the value of the final product when each factor of production increases or decreases by 1%, while the rest remain constant.

The sum of the estimated factors a and b is an important element in estimating the productivity of livestock production. Specifically, this sum in the first equation is $\alpha + b = 0.827 + 0.410 = 1.237$ and in the second equation it is $\alpha + b = 0.875 + 0.475 = 1.35$. In other words, the sum of the estimated coefficients is seemingly greater than the unit, which means that the farming sector has increasing scale yields. More specifically, an increase of all factors of production by 1% will increase the value of the product produced by more than 1%. This fact characterizes the breeding of fur-bearing animals as a dynamic livestock activity, which has potential and prospects to increase production. In addition, the multiple determination factor states that (76% to 78%) changes in production or production value are essentially due to capital investment in either modern facilities or food costs. A small percentage of production changes are due to others being produced, which is justified because the production process is completely controlled.

The investigation of the fur clothing industry, as mentioned, is inextricably linked to the domestic production of fur since, in addition to this production, the industry is forced to import vast quantities of fur or to export Greek furs when prices in the international market are advantageous (EANG, 2019). Therefore, the estimation of the competitiveness parameters of the Greek companies, which in this case are expressed by the indicators of the revealed comparative advantage (RCA) and the Grubel - Lloyd (Bi) index, was estimated with the available export and import data and with the help of the equations (2) and (3) expressed in the previous paragraph. The annual changes in the fur indicators are summarized in table 1.

Table 1 RCA and Grubel - Lloyd indices

S. N.	Year	RCA index	Grubel – Lloyd Index
1	2004	1.28	0.85
2	2005	1.24	0.90
3	2006	1.25	0.91
4	2007	1.23	0.88
5	2008	1.06	0.95
6	2009	0.69	0.81
7	2010	0.88	0.78
8	2011	0.84	0.86
9	2012	0.87	0.94
10	2013	0.90	0.98
11	2014	0.92	0.92
12	2015	0.67	0.89
13	2016	0.55	0.71
14	2017	1.00	0.77
15	2018	0.94	0.75
16	2019	1.38	0.74

As the data in Table 1 show, as well as the time course of the RCA index, the foreign trade of fur products (fur skins and fur garments), does not have an absolute comparative advantage since it achieves values higher than the unit values during the studied period of 2004-2019. Further, it seems that throughout the study period, the value of the index moves close to the unit, which means that with some corrective interventions in the structure of production and marketing, these industries can gain a continuous comparative advantage. The Grubel - Lloyd index in all years of the study takes very close values to the unit. This revealed that the trade structure, in this case, is intra-sectoral.

4 Discussion and Conclusion

Modern fur farms are seen as a source of social and economic benefits in the development of the local economy. Fur has both usefulness and commercial value so emphasis should be given to

the problems associated with fur breeding. Firlej et al. (2019) has identified cold and unfavorable weather conditions as two important problems associated with fur breeding.

In this study, the factors that can support the development of the fur farming industry in Greece were investigated. Fur farming is a livestock activity of an economic nature, and each farm is created with funds and provides employment; an important product is fabricated, and income is generated for all involved. Therefore, it is crucial to emphasize the nature of the industry and formulate performance-enhancing strategies.

The analysis of production statistics revealed the breeding of fur-bearing animals to be a productive activity -with increasing scale yields. This means that investing capital to create new modern farms is profitable. In this case, the strategy should focus on empowering existing entrepreneurs and at the same time encouraging and supporting new entrepreneurs to create a new culture featuring cutting-edge knowledge and skills.

An essential factor for the development of the whole range of fur garments is the economic character of the industry. This requires an increase in the efficiency of production of skins/fur and sales efficiency. Replacing imported products in the domestic market at the expense of domestic production will be a solution to the problem in conditions of limited growth in the purchasing power of the population (Khusainova & Vorozheykina, 2019). Although the estimated indices of international trade show little influence, to form a clear picture of the comparative advantage of Greek exports in the sector, the values of the comparative advantage index show that with a little effort, the country (region) can acquire a comparative advantage in exports.

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