SECONDARY, TERTIARY AND QUATERNARY SECTORS OF THE EUROPEAN MOUNTAIN AREA : A STATISTICAL STUDY

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Abstract

The article analyzes the current context of the secondary, tertiary and quaternary sector of the European mountain area. The analyzes develop the current context and a forecasting regarding mountain economy. According to EU statistics, in Europe, even in the context of COVID-19, production sectors, such as Agriculture, Industry and Construction, have declined in value, while the quaternary and tertiary sector has grown significantly. The authors of the study consider that the agri-food industry in correlation with the primary, secondary, tertiary and quaternary sectors is the future of Europe, an idea taken from numerous studies that argue that humanity will go through an unprecedented agri-food crisis. The quantitative analysis have been realized on Eurostat data simulated in Excel and SPSS.

Key words: European mountain area; mountain economy; secondary, tertiary and quaternary sectors

INTRODUCTION

The paper presents some aspects of the general situation of mountain entrepreneurship in Europe in the light of the dynamics of the Eurostat indices on business demography. The paper provides an analysis of industry, services and the quaternary sector through the Eurostat classification, for which the industry, construction and services sector, with the exception of insurance activities of companies (secondary and tertiary sectors). In order to verify the conjuncture presented in the paper, the following hypotheses were formulated: *Alternative hypothesis H1* - The probability of recession in the listed sectors is positively correlated with the central trends in these sectors (for those where there is an intensification of activity); in order to calibrate and support the second hypothesis, the zero hypothesis was formulated the following desideratum - *Null hypothesis H0* is the probability of recession in listed sectors is negatively correlated with the central trends in these sectors (for those where there is decreasing of activity).

The data confirm that mountain entrepreneurship is a defining dimension of scientific research on the mountain economy.

At the European level, the general situation of mountain entrepreneurship is ensured through defining business coordinates, such as

the population of active enterprises and the degree of employability in the mountain area.

Sectors performed in the study are Industry, construction and services, except for insurance activities of companies (Ix); Wholesale and retail trade, repair of motor vehicles and motorcycles (Ix1); Professional, scientific and technical activities, administrative and support activities (Ix2); Industry (except construction) (Ix3); Constructions (Ix4); Transport and storage (Ix5); Arts, entertainment and recreation, other service activities (Ix6); Accommodation and food services (Ix7); Information and communication (Ix8); Education, human health and social assistance (Ix9); Financial and insurance activities, real estate activities, except companies (Ix10).

MATERIAL AND METHOD

The data presented in the paper show that the business demographics (population of active enterprises) in European mountain area have improved positively, in particular related to the increase in employability of start-ups (table 1 and 2).

For the calculation, the authors used different variables (years 2008 - 2018), SPSS returning all as valid (there were no invalidated data).

According to the data from the table, the demographics of mountain business in Europe could represent a huge potential for the development of the community space economy.

Table 1

Enterprises active in mountain Europe in 2018 -
Secondary, tertiary and quaternary sectors (except agriculture)

	Ix	Ix1	Ix2	Ix3	Ix4	Ix5
Bulgaria	264.704	85.646	42.988	22.125	13.710	14.586
Czechia	185.908	33.902	30.809	35.425	31.674	6.508
Spain	2.365.033	534.423	415.731	143.392	306.610	136.662
France	1.186.561	218.526	201.936	79.084	171.840	32.613
Croatia	46.897	8.723	8.886	4.740	5.191	2.991
Italy	2.110.124	523.273	414.437	208.440	253.067	53.432
Austria	295.029	50.953	53.512	23.371	23.944	8.378
Poland	148.678	35.562	19.197	17.951	26.499	10.118
Portugal	269.240	58.401	55.722	25.514	26.386	5.821
Romania	275.467	86.569	37.241	30.500	27.071	25.827
Slovakia	307.725	62.372	51.905	51.163	69.635	10.698

	Ix6	Ix7	Ix8	Ix9	Ix10
Bulgaria	26.279	15.703	11.521	14.011	18.135
Czechia	14.508	10.782	5.435	7.850	9.015
Spain	210.618	211.498	43.497	184.993	177.609
France	100.173	90.964	32.100	181.802	77.523
Croatia	2.916	8.291	1.230	2.112	1.817
Italy	134.287	173.812	45.322	156.623	147.431
Austria	21.578	36.269	10.734	52.180	14.110
Poland	8.295	6.925	4.591	13.965	5.575
Portugal	20.812	26.660	2.650	36.370	10.904
Romania	21.918	15.073	11.386	10.263	9.619
Slovakia	15.177	11.037	10.415	10.667	14.656

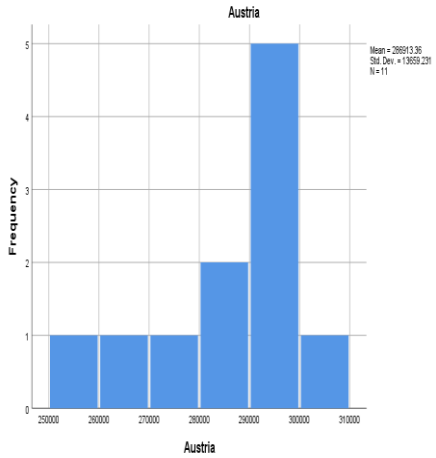
Source: Authors according to Eurostat - Business Demography Statistics

RESULTS AND DISCUSSION

The data presented show that the demographics of business in mountain Europe have improved positively, especially in the context of increasing employability of start-ups. The central trend of the secondary, tertiary and quaternary sectors of the economy, during the analyzed period, shows that the population of the European mountain economy of active enterprises increased considerably from 2008 to 2018 (figures 1). This indicator, the population of active enterprises, presents a high degree of non-variability, which means that the results do not show a large deviation and are positive. Skewness shows a corresponding symmetrical distribution, which means that the mountain business environment begins to stabilize considerably in the analyzed period. Kurtosis has an agglomeration in some industries, ICT being specific to European mountain area.

In the analyzed period between 2008 and 2018, the total population of enterprises increased considerably in all countries. The turning point of this evolution was the development of the secondary and tertiary economic sector, in the first part of the analyzed time interval, ie 2008 - 2012, and of the quaternary economic sector, in the second part of the period 2012 - 2018, to the detriment of the primary economic sector.

Services, especially summer sales and entertainment, are based on the influx of capital during the summer, when European mountain area is visited by many tourists.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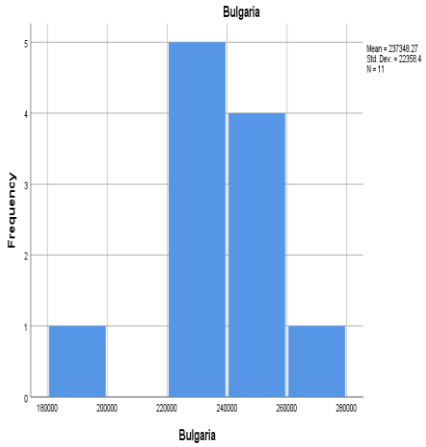
Std. Dev. = 13659.231
N = 11
Frequency
Austria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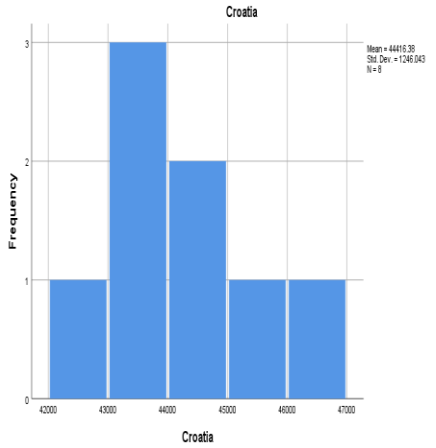
Std. Dev. = 22358.4
N = 11
Frequency
Bulgaria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Std. Dev. = 1246.043
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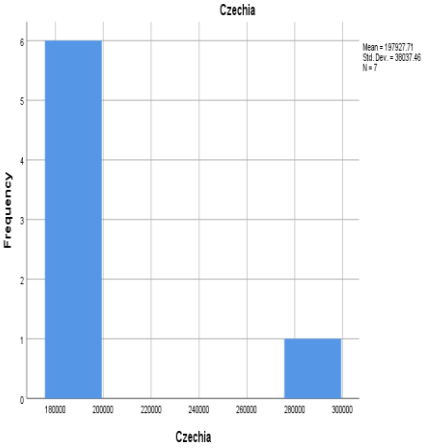
Frequency
Croatia


Czechia
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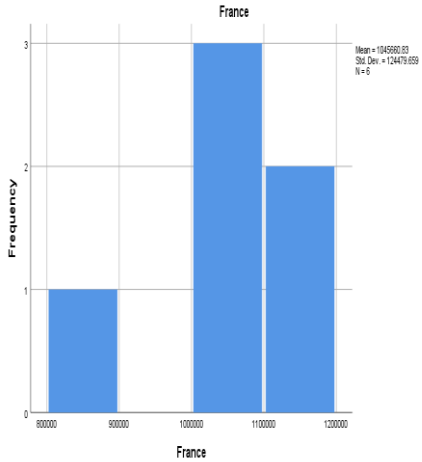
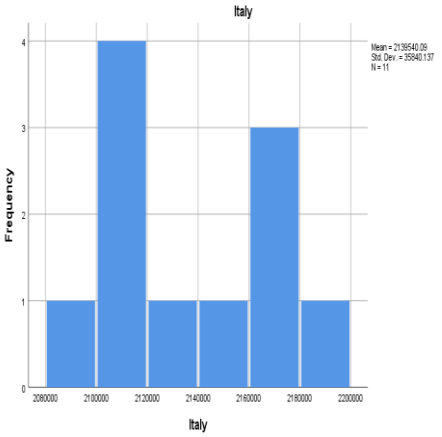
Frequency
Czechia


France
Mean = 1045660.83
Std. Dev. = 124479.659
N = 6
Frequency
France


Italy
Mean = 2136540.09
Std. Dev. = 35840.137
N = 11
Frequency
Italy

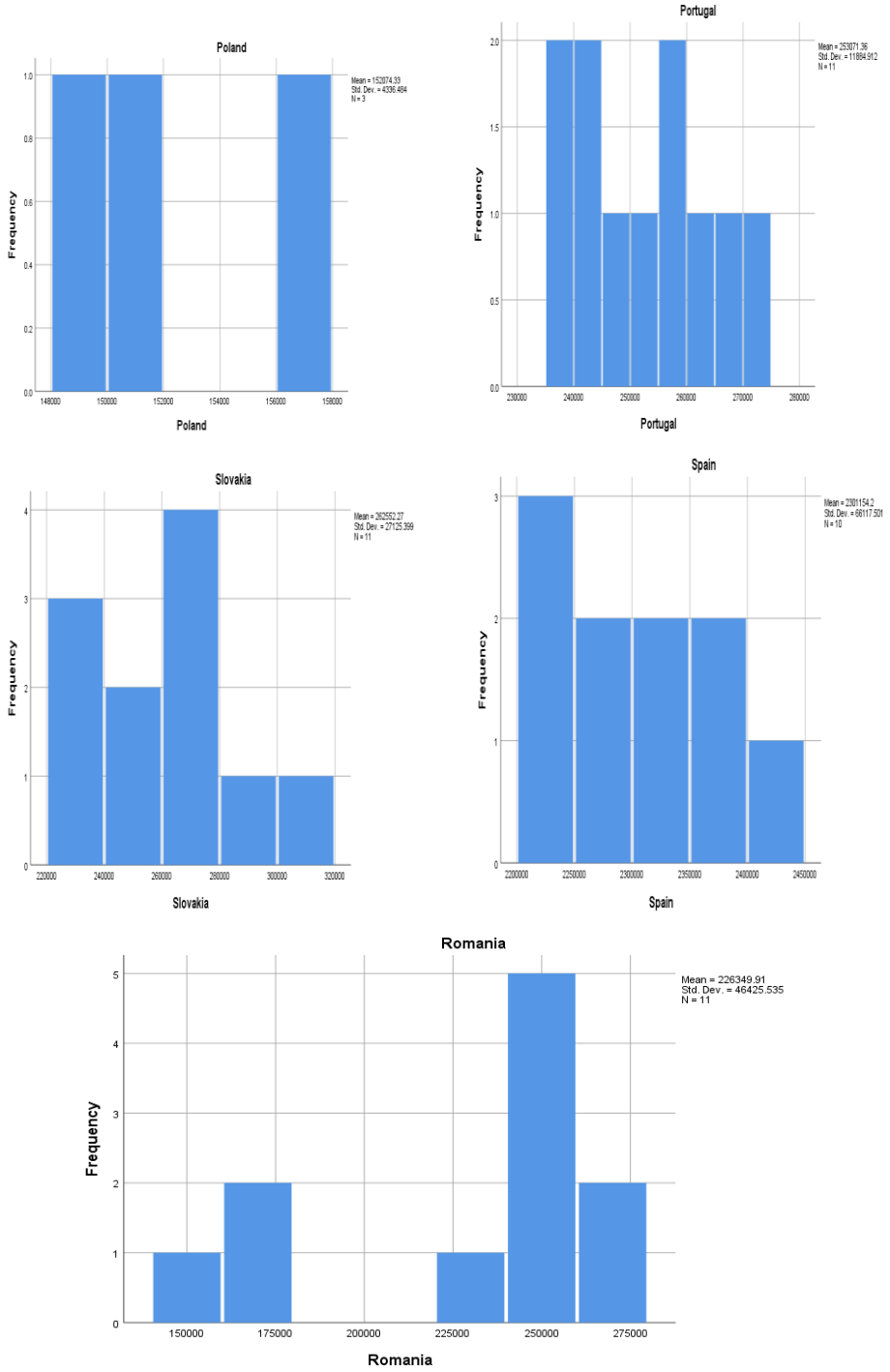


Fig. 1. Countries histogram for the Industry, Construction and Services sectors excluding insurance activities of companies

Source: Authors according to Eurostat - Business Demography Statistics

The increased variation of the analyzed index indicates a high volatility of the economy in mountain Europe. In the latter part of 2008-2018, the economy based its development on other resources, such as IT and food production.

In this context, agriculture should not be neglected and agricultural products should be processed locally for the secondary, tertiary and quaternary sectors. Processed products must be distributed at higher prices than primary products, thus adding value to primary production.

Statistics for secondary, tertiary and quaternary sectors, excluding insurance activities of companies (table 1 and figures 1), the indicator represented was Average working population, as follow 237,248.27 (Bulgaria), 197,927.71 (Czech Republic), 2,301,154.2 (Spain), 1,045,660.83 (France), 44,416.38 (Croatia), 2,139. 540.09 (Italy), 286,913.36 (Austria), 152,074.33 (Poland), 253,071.36 (Portugal), 22,349.91 (Romania), 262,552.27 (Slovakia), with Standard Deviations: 22,358.4 (Bulgaria), 38,037.46 (Czech Republic), 66,117,501 (Spain), 124,479,659 (France), 1,246,043 (Croatia), 35,840,137 (Italy), 13,659,231 (Austria), 4,336,484 (Poland), 11,884,912 (Portugal), 46,425,535 (Romania), 27,125,399 (Slovakia). H1 hypothesis has been validated.

At a first analysis, the distribution curves are relatively symmetrical on the central value, and the scores around the average are very concentrated, with the appearance of leptocurtosis, although the distribution is unimodal. Leptocurtosis is a statistical distribution in which points along the X-axis are grouped, resulting in a larger peak or a kurtosis larger than the curvature found in the distribution. Leptocurtosis can have an impact on how analysts estimate the value at risk (VaR). An investor who uses a normal distribution to estimate VaR may overestimate at low levels of significance, but may overestimate at high levels of significance if the return distribution is leptocurtic. This is the result of the leptocortical distribution having a thicker tail. The fat tail means that the risk comes from extraordinary events, and extreme observations are much more likely to occur. Therefore, conservative investors should avoid this type of return distribution.

Regarding specific sub-sectors from the analyzed economic sectors, statistics present increase for all the European mountain areas. Statistics related to the evolution of the field of activity *Wholesale and retail trade, repair of motor vehicles and motorcycles* (table 1, figure 2) shows, mainly average values of 82,827.64 (Bulgaria), 561,775.18 (Italy), 51,836.73 (Austria), 60,643 (Portugal), 77,409 (Romania), 66,766 (Slovakia), with standard deviations of 4,747.31 (Bulgaria), 24,040,658 (Italy), 1,098,528 (Austria), 3,920,721 (Portugal), 12,693,011 (Romania), 3,422,343 (Slovakia); H1 hypothesis has been validated. *Secondary sector (excluding*

construction) (table 1, figures 1) show average values of 21,268.64 (Bulgaria), 222,065.18 (Italy), 23,527.45 (Austria), 24,589.64 (Portugal), 26,531.45 (Romania), 44,781.09 (Slovakia), having standard deviations of 964,682 (Bulgaria), 1,0658,087 (Italy), 723,048 (Austria), 1,174,249 (Portugal), 3,660,899 (Romania), 3,266,588 (Slovakia); H1 hypothesis has been validated. Statistics for *Professional, Scientific and Technical Activities, administrative and support activities* (table 1, figures 1) presents averages of 35,352.09 (Bulgaria), 393,396.55 (Italy), 52,420.55 (Austria), 47,699.73 (Portugal), 31,647.91 (Romania), 37,100.45 (Slovakia), having standard deviations of 5,661,148 (Bulgaria), 10,014.17 (Italy), 2,063.69 (Austria), 3,614,614 (Portugal), 8,162,452 (Romania), 9,154,217 (Slovakia); H1 hypothesis has been validated. Statistics for *Construction sector* (table 1 and figures 1) show - averages of 13343.82 (Bulgaria), 289242.45 (Italy), 22953.73 (Austria), 27495.82 (Portugal), 22625.82 (Romania), 55966.09 (Slovakia), having standard deviations of 780,698 (Bulgaria), 28615,948 (Italy), 1028,583 (Austria), 3900,296 (Portugal), 2996,174 (Romania), 7905,466 (Slovakia); H0 hypothesis has been validated. Statistics for *Transport and Storage sector*s (table 1 and figures 1) presents averages of 12,462.91 (Bulgaria), 58,331.27 (Italy), 8,762.45 (Austria), 5,976.45 (Portugal), 18,845.27 (Romania), 8,660.73 (Slovakia), having standard deviations of 1,543,081 (Bulgaria), 3,774,077 (Italy), 359.93 (Austria), 398.84 (Portugal), 5,262,442 (Romania), 1,120,484 (Slovakia); H1 hypothesis has been validated. Statistics for *Art, Entertainment and Recreation, other activities dedicated to services* (table 1 and figures 1) present averages of 20,828.64 (Bulgaria), 127,952.73 (Italy), 21,913 (Austria), 18,005.18 (Portugal), 13,623.91 (Romania), 11,628.36 (Slovakia), having standard deviations of 3,778,706 (Bulgaria), 3,320,696 (Italy), 1,397,259 (Austria), 1,308,409 (Portugal), 6,408.38 (Romania), 1,877,443 (Slovakia); H1 hypothesis has been validated. Statistics on *Accommodation and Food Service Activities* (table 1 and figures 1) show averages of 14,951.64 (Bulgaria), 165,570.82 (Italy), 38,573.18 (Austria), 23,433 (Portugal), 12,218.82 (Romania), 10,293.82 (Slovakia), having standard deviations of 201,140.35 (Bulgaria), 6,253,434 (Italy), 1,895,689 (Austria), 1,368,137 (Portugal), 2,591,518 (Romania), 671,853 (Slovakia); H1 hypothesis has been validated. Statistics for *Information and Communication* (table 1 and figures 1) show averages of 8,323.55 (Bulgaria), 42,540.27 (Italy), 10,086.91 (Austria), 2,110.73 (Portugal), 8,327.82 (Romania), 7,191.27 (Slovakia), having standard deviations of 2,144,565 (Bulgaria), 1,371.66 (Italy), 559,725 (Austria), 239,136 (Portugal), 2,527,372 (Romania), 1,868,763 (Slovakia); H1 hypothesis has been validated. Statistics for *Education, human health and social work activities* (table 1 and figures 1) present average of 12,587.82 (Bulgaria),

135,681.09 (Italy), 42,982.09 (Austria), 33,004.73 (Portugal), 8,261.64 (Romania), 10,750.45 (Slovakia), having standard deviations of 1,102,334 (Bulgaria), 13,305,708 (Italy), 8,576,096 (Austria), 1,572,964 (Portugal), 4,455,942 (Romania), 837,814 (Slovakia); H1 hypothesis has been validated. Statistics for *Financial and Insurance Activities, real estate activities* (table 1 and figures 1) present averages of 15401.55 (Bulgaria), 142982.55 (Italy), 13857.27 (Austria), 9913.09 (Portugal), 6838.27 (Romania), 9414 (Slovakia), having standard deviations of 2278,127 (Bulgaria), 7959.51 (Italy), 1638,002 (Austria), 504,891 (Portugal), 1898,701 (Romania), 2809.27 (Slovakia); H0 hypothesis has been validated. Statistics for *Financial and Insurance Activities, real estate activities* (table 1 and figures 1) present averages of 15401.55 (Bulgaria), 142982.55 (Italy), 13857.27 (Austria), 9913.09 (Portugal), 6838.27 (Romania), 9414 (Slovakia), having standard deviations of 2278,127 (Bulgaria), 7959.51 (Italy), 1638,002 (Austria), 504,891 (Portugal), 1898,701 (Romania), 2809.27 (Slovakia); H1 hypothesis has been validated.

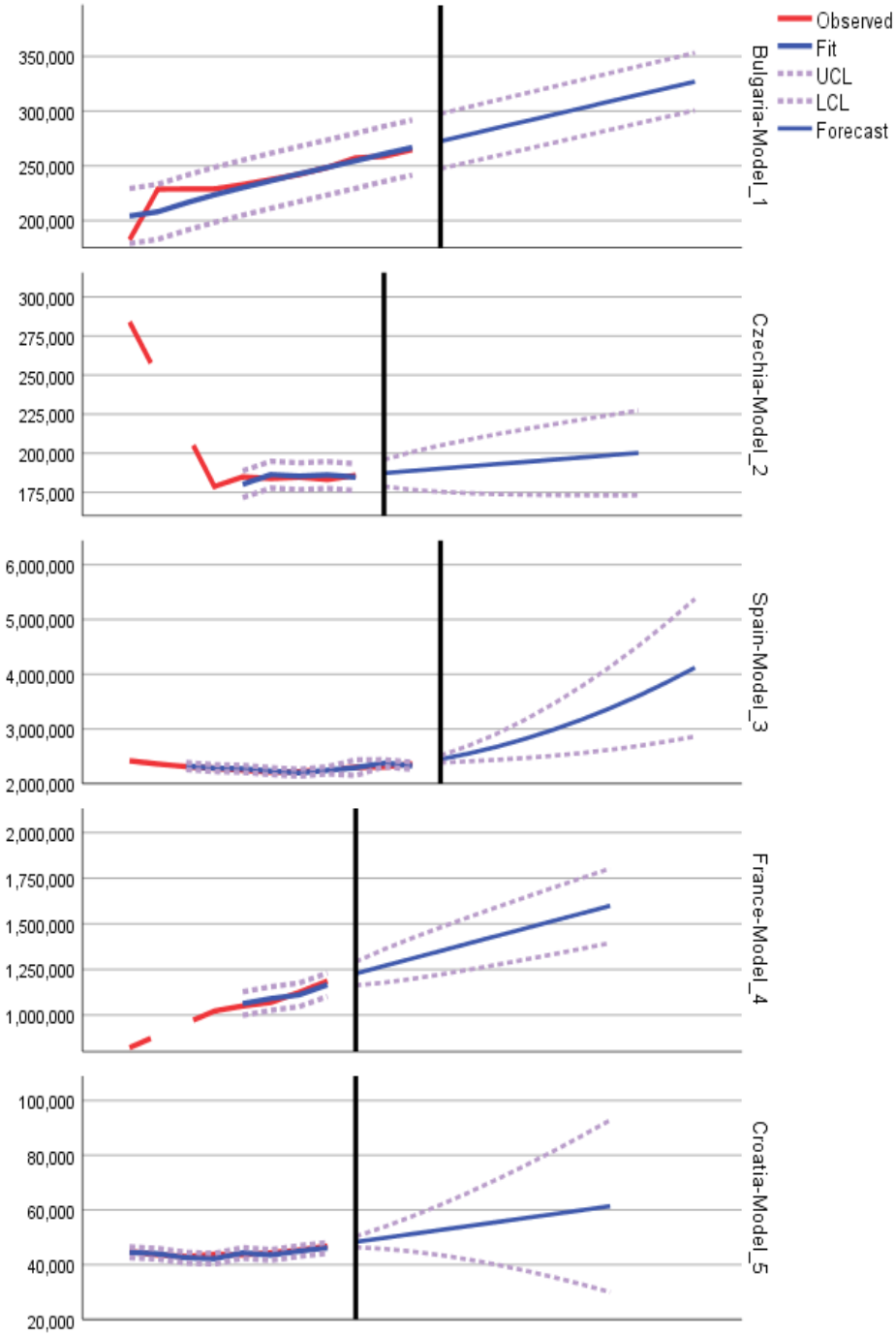
According to the forecasting analysis, for created models - Bulgaria, Czech Republic, Spain, France, Croatia, Italy, Austria, Poland, Portugal, Romania and Slovakia, the population of active enterprises will increase considerably in Europe by 2028 (figure 2).

According to forecasting analysis, Bulgaria, Spain, France, Austria, Portugal, Romania and Slovakia will have considerable increases in the sectors analyzed for active enterprises, while the other countries moderate increases or decreases.

The perspectives for 2028 present the defining ascending mountain area both in terms of indicators regarding the population of active enterprises and those related to the degree of employability.

The development trends of mountain entrepreneurship will be supported by major investments made for this area, but also by ensuring the repopulation of mountain areas.

The fluctuations of the mentioned coordinates characterize the general picture of the mountain entrepreneurship. The results of the forecast study show that the economy of mountain areas, especially mountain entrepreneurship, has developed significantly in recent years.


Observed
Fit
UCL
LCL
Forecast
Bulgaria-Model_1
350,000
300,000
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200,000
Czechia-Model_2
300,000
275,000
250,000
225,000
200,000
175,000
Spain-Model_3
6,000,000
5,000,000
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3,000,000
2,000,000
France-Model_4
2,000,000
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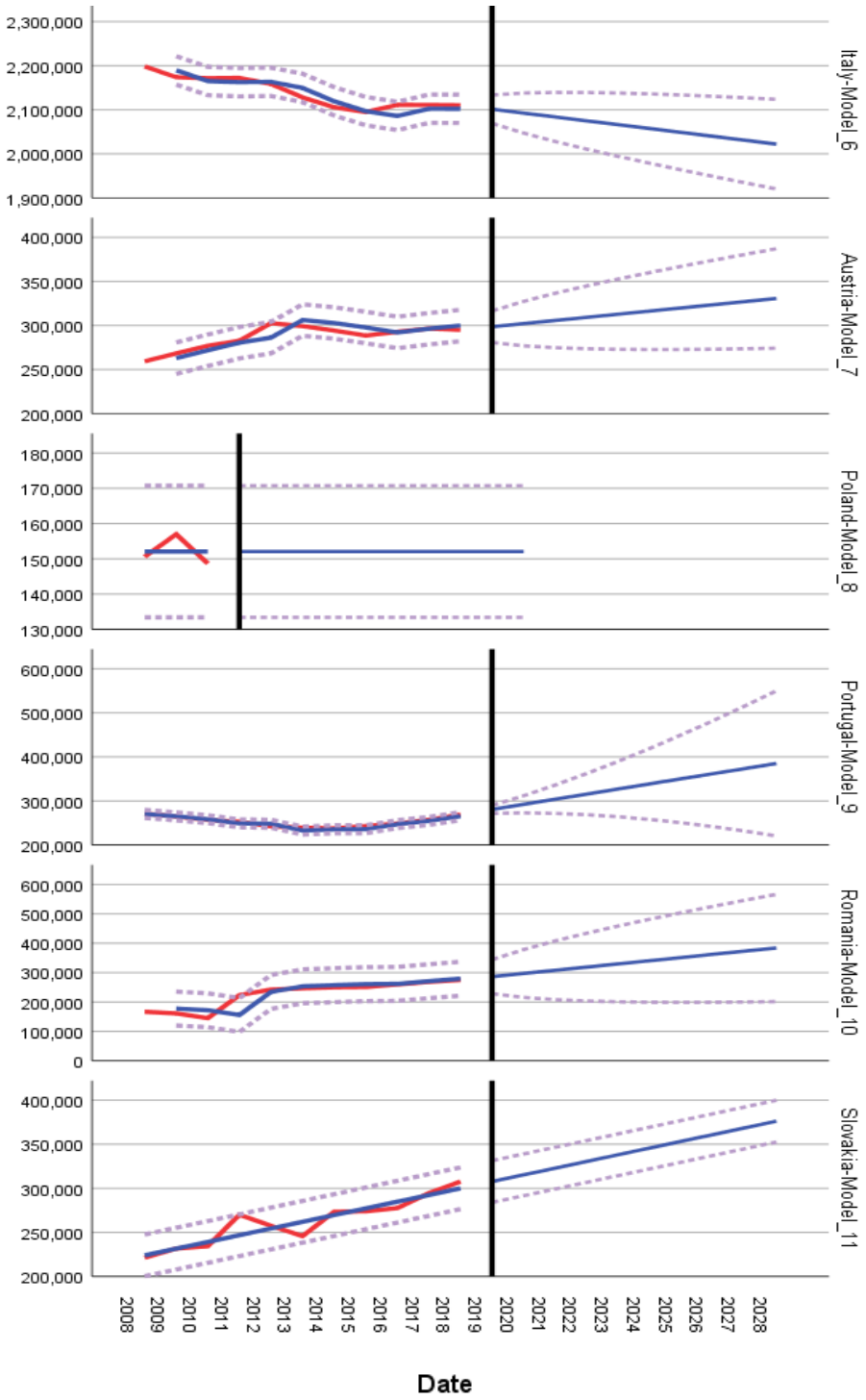

Fig. 2. Forecast analysis for the secondary, tertiary and quaternary sectors of the population of enterprises active in the mountainous area of Europe

Source: Authors according to Eurostat - Business Demography Statistics

CONCLUSIONS

At the European Union level, the mountain area is considered to have a huge potential for organic farming and human health, the air-water-soil ecosystem of this area being less polluted than the other relief areas. This is, moreover, the reason why European countries have legislated on issues related to the mountain area, as no other country or group of countries outside Europe has specific mountain regulations. Europe believes in the development of the economy through the sustainability of mountain science. In this context, mountain entrepreneurship, especially for the population, is a permanent subject of studies and applications for the public and corporate governance of European countries.

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